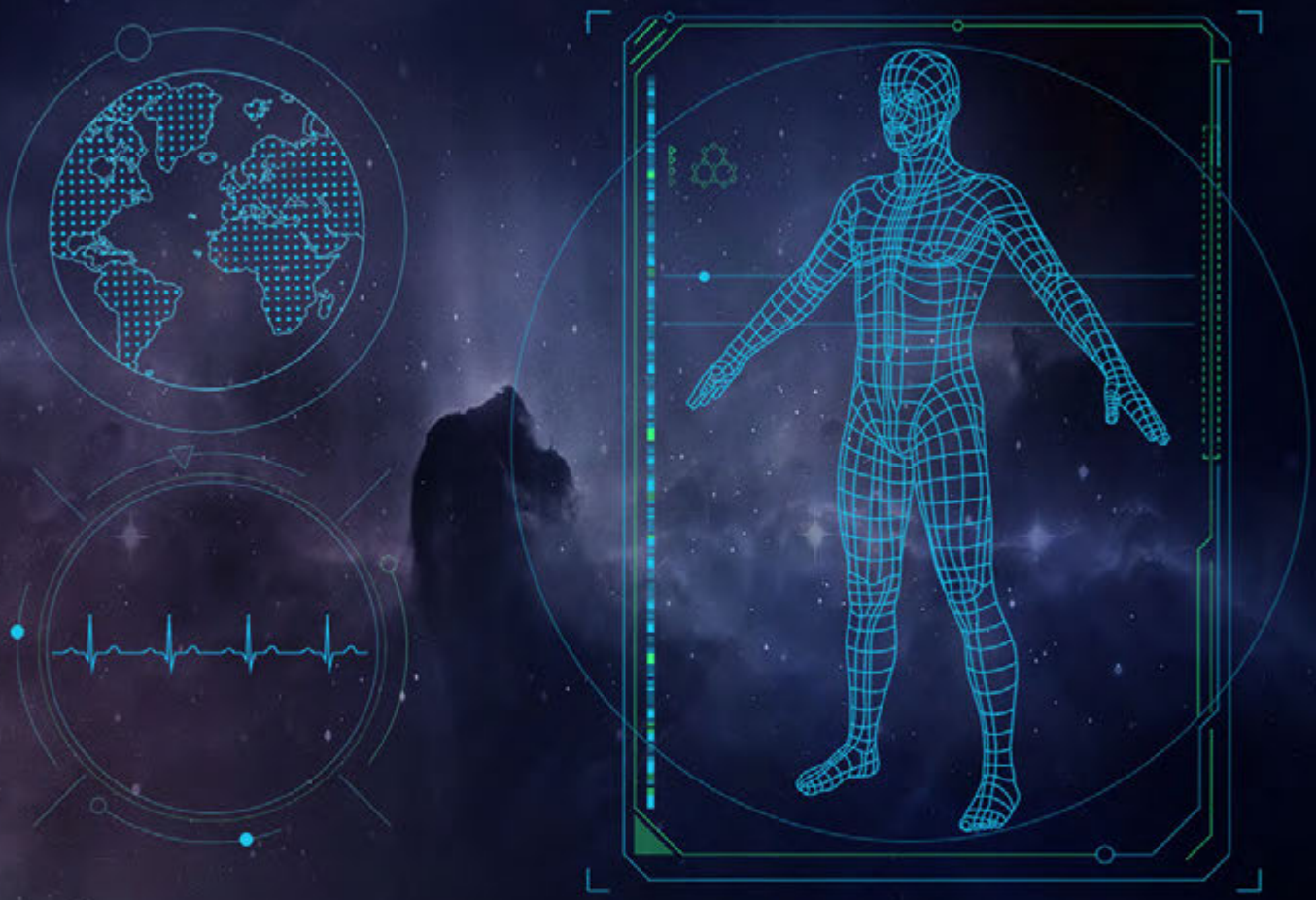
United States Air Force Aerospace Medicine Waiver Guide Compendium



Clinical • Environmental • Operational

April 10, 2025

The Aerospace Medicine Waiver Guide provides guidance for waivers relating to flying class and special duty personnel medical standards. The Aerospace Medicine Waiver Guide does not cover issues relating to general military accession or retention standards.

This document is guidance to be used by flight surgeons for aeromedical decision-making. It does not replace individualized clinical judgment, nor does it limit options for aeromedical disposition. While this document is not policy, it describes current USAF medical standards at the time of writing. This document does not supersede changes to evidence-based practice or updated medical standards outlined in DAFMAN 48-123, 8 Dec 2020 and the most recent version of the regularly updated Medical Standards Directory. Flight surgeons may contact the MAJCOM/SGP or AFMEDCOM for further assistance.

The waiver guide has been reorganized into specialty categories with direct links to the waiver guide topics. For fastest access, use Google Chrome or another web browser to open the file. The Search function, accessed by <ctrl f>, will assist in locating and cross-referencing diagnoses which may appear in other waiver guide topics. Use the Home button on your keyboard to jump back to the top of the document.

AIMWTS ACCESS: https://aimwts.cce.af.mil/aimwts/login/login.cfm - updated 1 Oct 2024
Aeromedical Information Management Waiver Tracking System (AIMWTS) is a management system that tracks waivers and Exception To Policy (ETP) cases. To gain access into this system click the Request Access link on the main screen at the link above. Once request for access has been submitted an administrator from the user's site will need to approve the account and give appropriate permission.

Process for Submission of Clinical Images to the ACS

Preferred Option: Upload studies electronically at: https://zhtv-md-cv01p.area52.afnoapps.usaf.mil/PicomCloud/
*Here are the directions for MEDCOI users to access the web portal. First, try to open the site through the web browser. If this doesn't work, use the below method.

1. Open web browser.
2. Launch AVHE.
3. Launch Google Chrome in the AVHE Apps.
4. Cut and paste PICOMGATEWAY Web Portal into browser.
   https://zhtv-md-cv01p.area52.afnoapps.usaf.mil/PicomCloud/Default.aspx
5. Unit POC enters username/password.

Option 2: Upload studies to: https://safe.apps.mil/ and send to the following org box: USAFSAM.FECI.ACSLibrary@us.af.mil. Please include in the **subject line the sending MAJCOM.** Note: more than 25 images or studies will need to be put in a compressed zip file. Ensure to send a separate email to the org box containing the passphrase.

Option 3: Mail via FedEx/USPS to the address below. Please include the following: Service member's name, DoD ID, type of studies with date of study, date of mailing, and a POC at the submitting flight surgeon's office with all mailed materials. Additionally, please document the **mailing tracking number** in AMS submission.

USAFSAM/FECI (ECG Library)
2510 Fifth Street, Bldg. 840
Wright-Patterson AFB OH 45433-7913

Chapters that have been significantly updated in this edition are noted with * below.

CARDIOLOGY

Aortic Aneurysm and Peripheral Arterial Disease
Aortic Valve Disease
Atrial Fibrillation and Atrial Flutter
Cardiac Conduction Delay (Heart Block, Bradycardia)
Cardiomyopathy
Catheter Ablation of Tachyarrhythmias and Pre-Excitation (WPW)
Congenital Heart Disease
Coronary Artery Calcium Testing
Coronary Artery Disease
Coronary Artery Revascularization
ECG Findings in USAF Aircrew, Disposition of
Ectopy, Supraventricular, and Ventricular and Pairing
Hypertension
Left Bundle Branch Block
Mitral, Tricuspid, and Pulmonic Valve Disorders
Myocardial Infarction
Pericardial and Myocardial Disorders, Including Pericarditis, Myopericarditis, and Myocarditis
Supraventricular Tachycardia
Syncope
Valve Surgery, Replacement or Repair
Ventricular Tachycardia
Wolff-Parkinson-White (WPW) and Other Pre-Excitation Syndromes

DERMATOLOGY

Acne
Eczematous Dermatitis (Eczema) and Atopic Dermatitis
Psoriasis and Psoriatic Arthritis

GASTROENTEROLOGY

Abnormal Liver Enzymes and Gilbert Syndrome
Celiac Disease
Chronic Viral Hepatitis
Crohn's Disease
Diverticular Disease of the Colon
Eosinophilic Esophagitis and Other Eosinophilic Gastrointestinal Disorders
Esophagitis, including Gastroesophageal Reflux Disease (GERD)
Hemochromatosis
Hepatic Cirrhosis
Irritable Bowel Syndrome (IBS)
Pancreatitis
Peptic Ulcer Disease (PUD)
Ulcerative Colitis

HEMATOLOGY

Anemia, Blood Loss, and Bone Marrow Donation *
Congenital and Acquired Asplenia
Sickle Cell Disease/Trait and Heterozygous Sickling Disorders
Thalassemia and Other Disorders of Hemoglobin Synthesis
Thromboctopenia, Immunee Thrombocytopenic Purpura (ITP), and Thrombotic Thrombocytopenic Purpura (TTP)
Thrombocyosis
Venous Thromboembolism (VTE)

INTERNAL MEDICINE

Ankylosing Spondylitis
Chronic Kidney Disease
Diabetes Mellitus
Gout
Human Immunodeficiency Virus (HIV) Infection
Hypercholesterolemia and Hyperlipidemia
Hyperthyroidism
Hypogonadism
Hypothyroidism
Lyme Disease
Malaria and Antimalarial Medications
Osteoarthritis
Osteoporosis and Osteopenia
Proteinuria and IgA Nephropathy
Raynaud's Phenomenon
Rheumatoid Arthritis
PrEP, HIV Pre-Exposure Prophylaxis (PrEP)
Systemic Glucocorticoid (Steroid) Therapy
Urticaria, Angioedema, and Anaphylaxis

MALIGNANCIES / CANCERS

Bladder Cancer
Breast Cancer
Cancers (Misc.)
Cervical Cancer
Colorectal Cancer
Hodgkin Lymphoma
Leukemia
Malignant Melanoma
Non-Hodgkin Lymphoma
Pituitary Tumors
Prostate Cancer
Testicular Cancer
Thyroid Cancer

NEUROLOGY

Bell's Palsy
Chronic Low Back Pain
Guillain-Barré Syndrome (Acute Inflammatory Demyelinating Polyradiculoneuropathy)
Headache
Meningitis and Encephalitis
Multiple Sclerosis and Central Demyelinating Disorder Seizures, Epilepsy, and Abnormal EEG
Transient Ischemic Attack (TIA) and Stroke Traumatic Brain Injury

OBSTETRICS and GYNECOLOGY

Birth Control
Dysmenorrhea
Endometriosis
Polycystic Ovary Syndrome
Pregnancy *
Uterine Fibroids (Leiomyomas)

OPHTHALMOLOGY

Cataract, Capsular Opacification, and Intraocular Lens Implant *
Central Retinal Vein Occlusion
Central Serous Chorioretinopathy
Color Vision Deficiencies
Dry Eye Syndrome (Keratoconjunctivitis Sicca)
Glaucoma and Ocular Hypertension
Implantable Collamer Lens (ICL) Surgery
Keratoconus, Abnormal Corneal Topography, and Corneal Collagen Crosslinking
Lattice Degeneration
Ocular Histoplasmosis Syndrome
Optic Nerve Head Drusen
Optic Neuritis
Refractive Error, Excessive
Refractive Surgery
Retinal Holes, Retinal Tears, Retinal Detachment, and Retinoschisis
Substandard Stereopsis (Formerly Defective Depth Perception)
Uveitis

ORTHOPAEDICS

Abnormal Spinal Curvature (Kyphosis, Scoliosis, Lordosis)
Herniated Nucleus Pulposus (HNP) and Spinal Fusion
Retained Orthopaedic Device and Joint Replacement
Spinal Fracture
Spondylolysis and Spondylolisthesis

OTOLARYNGOLOGY (ENT)

Allergic Rhinitis & Vasomotor Rhinitis
Cholesteatoma
Eustachian Tube Dysfunction
Hearing Loss, Asymmetric Hearing Loss, Use of Hearing Aid(s)
Motion Sickness
Otosclerosis/Stapedectomy
Peripheral Vertiginous Disorders
Sinusitis (Rhinosinusitis), Hypertrophic Sinus Tissue, and Nasal Polyps
Salivary Gland Disorders
Vestibular Schwannoma (Acoustic Neuroma)

PSYCHIATRY / NEUROPSYCHIATRY

Mental Health Waiver Guide Checklist
Adjustment Disorder
Alcohol Use Disorders
Anxiety Disorders and Obsessive-Compulsive Disorder
Eating Disorders *
Mood Disorders: Depressive, Bipolar, and Related Disorders
Neurodevelopmental Disorders: Attention-Deficit/Hyperactivity Disorder and Specific Learning Disorder
Other Conditions That May Be a Focus of Clinical Attention (V and Z Codes), and Miscellaneous Disorders *
Personality Disorders
Post-Traumatic Stress Disorder (PTSD)
Schizophrenia Spectrum and Other Psychotic Disorders
Somatic Symptom and Related Disorders
Suicide Attempt or Suicidal Behavior

PULMONOLOGY

Asthma
Pneumothorax
Sarcoidosis
Obstructive Sleep Apnea
Other Sleep Disorders

UROLOGY

Benign Prostatic Hyperplasia (BPH)
Congenital Urinary Anomalies
Hematuria
Prostatitis *
Renal and Ureteral Stones (Nephrolithiasis)

OTHER

Anthropometrics (Short Stature, Excessive Height, Weight, and Other Body Measurements)
Decompression Sickness and Arterial Gas Embolism

Aerospace Medicine Waiver Guide

Aortic Aneurysm and Peripheral Arterial Disease

Revised: Aug 2022
Authors/Reviewers: Col Eddie Davenport (ACS Chief Cardiologist) and Dr. Edwin Palileo (ACS Cardiologist); Maj Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator); Lt Col Paul Vu (AFMRA Medical Standards Policy Chief)

Significant Changes: New waiver guide.

I. Waiver Consideration

Any arterial or aortic disease or disorder is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. These diseases and disorders include, but are not limited to, any history of the following: aneurysm, dissection, arteriosclerosis, collagen vascular disease, inflammatory conditions, infectious diseases, vasospastic diseases, and diabetic vascular disease. Any history of surgical repair or percutaneous intervention on these conditions is also disqualifying. Disqualifying arterial diseases and disorders include, but are not limited to, aneurysm, dissection, arteriosclerosis, collagen vascular disease, inflammatory conditions, infectious diseases, vasospastic disease, and diabetic vascular disease.

In general, peripheral vascular (arterial or venous) disease is not disqualifying for ATC, GBO, or OSF personnel. However, any history of symptomatic peripheral or central vascular disease is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties as well as for retention. These conditions include, but are not limited to, claudication, skin changes, stroke or central venous accident (CVA), transient ischemic attack (TIA), and any other peripheral or central vascular infarct. Furthermore, other concomitant factors may exist alongside aortic aneurysm and peripheral arterial disease. Please cross-reference the appropriate Air Force Waiver Guide chapters, the Medical Standards Directory, and DoDI 6130.03 vol 2. For example, arteriosclerosis of the coronary arteries is discussed in the chapters on *Coronary Artery Calcium Testing* and *Coronary Artery Disease*. Percutaneous coronary artery interventions are addressed in the chapter on *Coronary Artery Revascularization*. For more information regarding aeromedical and operational waiver considerations for central nervous system vascular disease, please refer to the Aerospace Medicine Waiver Guide chapter on *Stroke and Transient Ischemic Attack*. Medical Standards Directory, Air Force Waiver Guide, and appropriate career field medication list for all potentially disqualifying conditions and treatments.

Table 1: Waiver potential for Aortic Aneurysm and Peripheral Arterial Disease

Flying Class	Condition	Waiver Potential Waiver Authority	ACS Review or Evaluation
FC I/IA	Any history of disease or disorder of the aorta[1]	Yes AFRS/CMO	Yes
	Any history of peripheral arterial disease[2]	Yes AFRS/CMO	Yes
FC II/III/SWA	Any history of disease or disorder of the aorta[1]	Yes MAJCOM[4]	Yes
	Any history of peripheral arterial disease[2]	Yes MAJCOM[4]	Yes
ATC/ GBO/OSF	Any history of disease or disorder of the aorta[1]	Yes MAJCOM[4]	Yes
	Any history of symptomatic peripheral arterial disease[3]	Yes MAJCOM[4]	Yes

1. May occur anywhere along the length of the aorta. Disqualifying conditions include, but are not limited to, aneurysm (or aortic enlargement over 4.0 cm in diameter), dissection, arteriosclerosis, collagen vascular disease, inflammatory conditions, infectious diseases, vasospastic diseases, and diabetic vascular disease. Any history of surgical repair or percutaneous intervention on these conditions is also disqualifying.
2. Disqualifying conditions include, but are not limited to, aneurysm, dissection, fistula, arteriosclerosis, collagen vascular disease, inflammatory conditions, infectious diseases, vasospastic disease, claudication, skin changes, erythromelalgia, and diabetic vascular disease.
3. In general, peripheral vascular (arterial or venous) disease is not disqualifying for ATC, GBO, or OSF personnel. However, any history of symptomatic peripheral or central vascular disease is disqualifying. Disqualifying conditions include, but are not limited to, claudication, skin changes, stroke or central venous accident (CVA), transient ischemic attack (TIA), and any other peripheral or central vascular infarct.
4. Certification authority for untrained assets is AFRS/CMO.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

NOTE: *It is required that all original cardiac imaging and electrical tracings be submitted to ACS Cardiology for independent review.*

For image submission process, refer to page 2.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Summary of diagnostic evaluation and treatment history, including list of any/all procedures with dates.
    c. List current medications with dosages.
    d. Specify current activity level.
2. Consultation report from the treating specialist (e.g., cardiologist, vascular surgeon) and all subsequent consultation notes.
3. Results of any other testing performed in the course of diagnosis, evaluation, and management of aortic or peripheral arterial disease, including other laboratory studies, all imaging reports, and any other ancillary studies.
    a. Include procedural reports from all surgical or percutaneous interventions that were performed, if applicable.
    b. Include radiology reports from any imaging studies that were performed, if applicable (e.g., plain radiographs, ultrasound, CT, or MRI).
4. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Summarize any interval evaluation and/or treatment.
    c. List current medications with dosages.
    d. Specify current activity level.
2. All interval consultation reports from the treating specialist (e.g., cardiology, vascular surgery), if applicable.
3. Results of any other testing performed in the course of diagnosis, evaluation, and management, including other laboratory studies, all imaging reports, all procedure reports, and any other ancillary studies.
4. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Aeromedical and operational concerns related to aortic aneurysm and peripheral arterial disease include sudden incapacitation and sudden performance impairment resulting from acute vascular events, which may occur with little or no warning and be catastrophic or fatal without immediate definitive medical attention. Major events include acute aortic or arterial rupture or dissection, as

well as central venous accidents or transient ischemic attacks due to carotid or vertebral artery occlusion. Depending on the artery involved and the downstream perfusion, symptoms of arterial disease may include chest pain, back pain, the consequences of local mass effect (e.g., in the setting of an aneurysm), claudication, and systemic embolization (e.g., from a cardiac mural thrombus traveling to the brain or from an aortic thrombus traveling to the mesenteric arteries). The consequences may range from distraction and loss of attention on critical aviation or operational duties, to decrements in function that would compromise individual service member health and mission safety or effectiveness (e.g., loss of vision, concentration impairment, aphasia, severe pain, etc.).

Aortic aneurysm refers to a pathologic segment of aortic dilatation that expands and can eventually rupture. Aortic aneurysms are described by their size, location, morphology and cause. Aneurysms may be fusiform (more common) or saccular. Abdominal aortic aneurysms (AAA) occur in 3-9% of men older than 50 years and are the most common form of aortic aneurysms. AAA are five times more prevalent in males than in females and are strongly associated with age (mostly occurring in men over the age of 60 years), cigarette smoking (coveys a five-fold increase in risk over non-smokers), hypertension, and hyperlipidemia. Additionally, there is a 20% heritable component. Echocardiogram and either computed tomography (CT) with intravenous contrast or MRI of the entire aorta is required for all service members requesting a waiver for aortic aneurysm or dilation. Size should be corrected for body surface area (BSA). Repair with either an open or percutaneous approach should be pursued per published guidelines. Aircrew with a history of aortic aneurysm may be considered for a waiver. Waiver consideration after surgical repair will be on a case-by-case basis, and no sooner than six months after surgery.

Thoracic aortic aneurysms (TAA) have an estimated incidence of 5-10 per 100,000 person-years. Aortic root or ascending aortic aneurysms are the most common (60%) followed by aneurysms of the descending aorta (35%) and aortic arch (<10%). Thoracoabdominal (descending thoracic aneurysm extending distally to involve the abdominal aorta) represent another 10%. Causes of TAA include genetic (congenital) and degenerative (formerly known as atherosclerotic) disorders, mechanical, inflammatory, and infectious etiologies. Many genetic disorders preferentially involve the aortic root and ascending aorta. Cystic medial degeneration is often associated with Marfan syndrome and many other genetic TAAs. The association between bicuspid aortic valve (BAV) and dilatation of the aortic root and ascending aorta is well-established. Up to 20% of individuals with BAV will develop aortic aneurysms, and these individuals are at higher risk of aortic dissection and severe aortic enlargement. Due to abnormal aortic wall shear stress caused by the aortopathy of BAV disease, BAV results in turbulent blood flow even in the absence of a stenotic or regurgitant lesion.

Most TAAs are asymptomatic and discovered incidentally, but they may result in a variety of symptoms due to mass effect. The most serious complications are rupture and dissection. The thresholds for surgical repair vary depending on disease- and patient-specific factors and are outlined in published professional guidelines. Endovascular repair is now possible for many of these conditions. Echocardiogram and either computed tomography (CT) with intravenous contrast or MRI of the entire aorta is required for all service members requesting a waiver for aortic aneurysm or dilation. Size should be corrected for body surface area (BSA). Aircrew with

a history of TAA may be considered for a waiver limited to non-high performance airframes. For aortic root or ascending aorta dilation found incidentally on echocardiogram or CT scan, waiver is required if the diameter is over 4.0 cm, but flight restrictions may not be necessary.

Peripheral Artery Disease (PAD) refers to acute or chronic obstruction of the arteries of the upper or lower extremities. When severe, it can result in downstream ischemia, potentially leading to tissue necrosis or limb loss. PAD is most often caused by atherosclerosis; hence, the prevalence varies from 6% in persons 40 years and older to 15-20% in those 65 years and older. PAD correlates strongly with major adverse cardiovascular events, because it is frequently associated with coronary and cerebral atherosclerosis. Aircrew with PAD should undergo bilateral ankle brachial index (ABI) measurement, carotid ultrasound, and cardiac evaluation with ECG, echocardiogram, and exercise stress testing. CT coronary calcium scoring is also recommended, if available. Treatment is per published professional guidelines. Waiver may be considered for service members with non-flow-limiting PVD (generally <70% stenosis) and no or minimal claudication symptoms.

Peripheral Vascular Disease (PVD) is a less-specific term and can include other atherosclerotic disease, such as renal artery and carotid artery disease, as well as other vasculitides (e.g., vasospastic disease, venous thromboembolism, venous insufficiency, lymphatic disorders, etc.). More information regarding other specific disqualifying conditions can be found in other Aerospace Medicine Waiver Guide chapters.

Review of the AIMTWS database revealed a total of 48 total cases for aortic aneurism, peripheral vascular disease, and arterial embolism. The breakdown of the number of waivers and number of total cases are tabulated below. Of the disqualified waiver adjudications, 8 of 9 cases were related to aortic insufficiency or bicuspid aortic valves.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)				
		IFC I/IA	FC II	FC III	GBO	ATC
I71.9	Aortic aneurysm, unspecified site, w/o rupture	0	24/29	9/13	3/3	3/3
I71	Aortic aneurysm and dissection					
173.9	Peripheral vascular disease					
174	Arterial embolism and thrombosis					

IV. Suggested Readings

1. Chaikof EL, Dalman RL, Eskandari MK, et al. The Society for Vascular Surgery practice guidelines on the care of patients with an abdominal aortic aneurysm. J Vasc Surg 2018;67:2-77. Available at https://www.jvascsurg.org/article/S0741-5214(17)32369-8/pdf. Accessed 11 March 2022.
2. Hiratzka LF, Bakris GL, Beckman JA, et al.; American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines; American Association for Thoracic Surgery; American College of Radiology; American Stroke Association; Society of Cardiovascular Anesthesiologists; Society for Cardiovascular Angiography and Interventions; Society of Interventional Radiology; Society of Thoracic Surgeons; Society for Vascular Medicine. 2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/STS/SVM guidelines for the diagnosis and management of patients with Thoracic Aortic Disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, American Association for Thoracic Surgery, American College of Radiology, American Stroke Association, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society of Interventional Radiology, Society of Thoracic Surgeons, and Society for Vascular Medicine. Circulation 2010;121:e266-369. Erratum in: Circulation 2010;122:e410. Available at https://www.ahajournals.org/doi/epub/10.1161/CIR.0b013e3181d4739e. Accessed 11 March 2022.
3. Rooke TW, Hirsch AT, Misra S, et al.; American College of Cardiology Foundation Task Force; American Heart Association Task Force. Management of patients with peripheral artery disease (compilation of 2005 and 2011 ACCF/AHA Guideline Recommendations): a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol 2013;61:1555-1570. Available at https://www.sciencedirect.com/science/article/pii/S0735109713001770?via%3Dihub. Accessed 11 March 2022.
4. Guettler N, Nicol ED, d'Arcy J, Rienks R, Bron D, Davenport ED, Manen I, Gray G, Syburra T. Non-coronary cardiac surgery and percutaneous cardiology procedures in aircrew. *Heart*. 2019;105 (suppl 1);s70-s73. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6256296/pdf/heartjnl-2018-313060.pdf

Aerospace Medicine Waiver Guide

Aortic Valve Disease

Revised: Apr 2023
Reviewed: Col Eddie Davenport (ACS Chief Cardiologist), Lt Col Phillip Strawbridge (Aerospace Medicine Resident), Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Table 1 re-organized and reformatted and document updated.

I. Waiver Consideration

All flying classes are disqualified for aortic valve insufficiency (AI) greater than trace, any degree of aortic stenosis (AS), and bicuspid aortic valves (BAV) (regardless of degree of AI or AS). ACS review is required for waiver consideration. An in-person ACS evaluation may be required, depending on the flying class of the servicemember or specific concerns in an individual case. Waiver recommendations are primarily dependent on the presence and severity of associated AS or AI as well as evidence of aortopathy.

FC I/IA will only be waiver eligible for BAV with ≤ mild AI and no AS. More significant AI or any degree of AS are unlikely to be recommended for waiver. FC II/III requires in-person ACS evaluation for waiver consideration. ACS re-evaluations will be performed at 1-3 year intervals, depending on the degree of AI and/or AS and other related conditions such as chamber dilatation, left ventricular function, and left ventricular hypertrophy.

The use of approved renin-angiotensin-aldosterone system (RAAS) inhibitors or nifedipine for afterload reduction is acceptable in aviators with BAV and asymptomatic moderate or severe AI.[1] Waiver may be considered after surgery; please refer to the Valve Surgery, Replacement or Repair aeromedical waiver guide.

Note: **Screening echocardiograms** in aircrew candidates was discontinued in 2008 secondary to low yield and eventual waiver for asymptomatic, non-hemodynamically significant, slowly progressive disease. Family history of significant valve disease and/or any symptoms or exam findings such as murmur not deemed normal variant should undergo echocardiography.

Table 1: Waiver potential for Bicuspid Aortic Valve (BAV) and Associated Clinical Conditions

Flying Class (FC)	BAV and Associated Levels of Aortic Stenosis (AS) and/or Insufficiency (AI)	Waiver Potential	Waiver Authority[3]	ACS Review or Evaluation
I/IA	AI: None, trace or mild AS: None	Yes	AFRS/CMO	Yes – Review
	AI: > Mild AS: Any severity	Unlikely	AFRS/CMO	Yes – Review 1st
II	AI: ≤ Mild AS: ≤ Mild	Yes[1]	MAJCOM	Yes – Review
	AI: Moderate	Yes[1,2]	MAJCOM	Yes – Evaluation
	AI: Severe – asymptomatic and non-surgical	Maybe[1,2]	AFMRA	Yes – Evaluation
	AI: Severe with surgical correction AS: ≥ Moderate	Unlikely	AFMRA	Yes – Review 1st
III	AI: ≤ Mild AS: ≤ Mild	Yes[1]	MAJCOM	Yes – Review
	AI: Moderate AS: Moderate	Yes[1]	AFMRA	Yes – Evaluation
	AI: Severe – only asymptomatic and non-surgical	Maybe	MAJCOM	Yes – Evaluation
	AS: Severe with surgical correction	Unlikely	AFMRA	Yes – Review 1st
GBO/ ATC/ SWA	AI: ≤ Mild AS: ≤ Mild	Yes	MAJCOM	Yes – Review
	AI: Moderate	Yes	AFMRA	Yes – Evaluation
	AS: Moderate	Maybe	AFMRA	Yes – Evaluation
	AI: Severe – only asymptomatic and non-surgical	Maybe	MAJCOM	Yes – Evaluation
	AI: Severe AS: Severe with surgical correction	Maybe	AFRMA	Yes – Evaluation

1. Waiver in untrained individuals is unlikely.
2. Non-sustained high-G aircraft only.
3. The AFRS/CMO is the waiver authority for all initial flying or operational duties.

Table 2: Waiver potential for Aortic Insufficiency (AI) and Associated Clinical Conditions

Flying Class (FC)	Degree of AI	Waiver Potential	Waiver Authority[3]	ACS Review or Evaluation
I/IA	Mild	Yes	AFRS/CMO	Yes – Review
	≥ Moderate	Unlikely	AFRS/CMO	Yes – Review 1st
II	Mild	Yes	MAJCOM	Yes - Evaluation
	Moderate	Yes[1,2]	AFMRA	Yes – Evaluation
	Severe – only asymptomatic and non-surgical	Maybe[1,2]	AFMRA	Yes – Evaluation
	Severe with surgical correction	Unlikely	MAJCOM	Yes – Review 1st
III	≤ Moderate	Yes[1]	MAJCOM	Yes – Evaluation
	Severe – only asymptomatic and non-surgical	Maybe[1]	MAJCOM	Yes – Evaluation
	Severe with surgical correction	Unlikely	AFMRA	Yes – Review 1st
GBO/ ATC/ SWA	≤ Moderate	Yes	MAJCOM	Yes – Evaluation
	Severe – only asymptomatic and non-surgical	Yes	MAJCOM	Yes – Evaluation
	Severe with surgical correction	Maybe	AFMRA	Yes – Evaluation

1. Waiver in untrained individuals is unlikely.
2. Non-sustained high-G aircraft only.
3. The AFRS/CMO is the waiver authority for all initial flying or operational duties.

Table 3: Waiver potential for Aortic Stenosis (AS) and Associated Clinical Conditions

Flying Class (FC)	Degree of AS	Waiver Potential	Waiver Authority[2]	ACS Review or Evaluation
I/IA	Mild	Unlikely	AFRS/CMO	Yes – Review 1st
II	Mild	Yes	MAJCOM	Yes - Evaluation
	Mild to Moderate (greater than mild but not meeting all criteria for moderate)	Yes[1]	AFMRA	Yes – Evaluation
	≥ Moderate	Unlikely	AFMRA	Yes – Review 1st
III	Mild and Mild to Moderate (greater than mild but not meeting all criteria for moderate)	Yes	MAJCOM	Yes – Evaluation
	≥ Moderate	Unlikely	AFMRA	Yes – Review 1st
GBO/ ATC/ SWA	Mild and Mild to Moderate (greater than mild but not meeting all criteria for moderate)	Yes	MAJCOM	Yes – Review
	≥ Moderate	Maybe	AFMRA	Yes – Review

1. Non-sustained high-G aircraft only
2. The AFRS/CMO is the waiver authority for all initial flying or operational duties.

II. Information Required for Waiver Submittal

No additional studies beyond the initial diagnostic study are required for the aeromedical summary (AMS). However, the index study and any studies obtained by the treating physicians are required to be forwarded to the ACS for review. There is no minimum required DNIF, DNIC, or grounding period for BAV waiver consideration, regardless of AI and/or AS severity.

A. Initial Waiver Request:

1. List and fully discuss all clinical diagnoses requiring a waiver.
2. Complete history and physical examination, to include a detailed description of symptoms (if present), medications, activity level, family history, and Coronary Artery Disease (CAD) risk factors (positive and negative).
3. Copy of the local ECG, echo report & digital copy of the study (actual images).
4. Additional local testing is not required but may be requested in individual cases. If done, copies of reports and actual tracings and images of any other cardiac tests performed locally (e.g. Holter, treadmill, stress echocardiogram). (See Note)
5. Results of IRILO/MEB, if required
6. Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Complete history and physical examination, to include a detailed description of symptoms (if present), medications, and activity level.
2. Local follow-up cardiac testing is not routinely required prior to ACS re-evaluation. However, in asymptomatic individuals with ≤ mild AS/AI, it is common for the ACS to make a recommendation based on local AMS, ECG and echo. This will be specified in the report of the previous ACS evaluation.
3. Copies of reports and tracings of any other cardiac tests performed locally (e.g. Holter, treadmill, stress echocardiogram). (See Note)
4. Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

All cardiac studies (actual images and tracings) should be submitted electronically to the EKG Library. If this is not possible, use the following address. Physical media and reports not attached in AIMWTS can also be mailed or send through an expedited delivery services. See page 2 of the Waiver Guide Compendium for details.

III. Aeromedical Concerns

Aortic valvular disease is relatively common in the aviator population. An Israeli study of all initial aircrew candidates with screening echo found some form of valvular disease in 2.4% of applicants with BAV being the most common, comprising 1% of applicants.[2,3] Due to the significant overlap in different aortic valve pathologies, this waiver guide will consider them together.

Bicuspid Aortic Valve (BAV)

BAV occurs in 1-2% of the general population and is the most common congenital cardiac malformation, excluding mitral valve prolapse. BAV and calcified aortic valve are the most common causes of chronic aortic regurgitation in the US and developed countries.[4] The prevalence of BAV is 0.6% in the USAF based on a database of over 20,000 Medical Flight Screening echocardiograms performed on pilot training candidates. Based on an ACS database review, 84% of BAV subjects will develop some degree of AS and/or AI during their lifetime. Additionally, 30-40% will require aortic valve replacement during their lifetime, with interventions occurring predominately after age 45.[1]

In an Israeli study on 8 aviators with BAV (5 fast-jet aviators) with a mean follow up length of 12.1 years, there were no AI severity progression, AS, infective endocarditis, or abnormal LV function during the study period. Additionally there were no incidents of sudden incapacitation or serious cardiac events.[15] However, five participants had progression of the aortic root diameter. Ten-year disease progression or complication rates in USAF aviators with BAV was 10% for AS, 84% for AI, and 0.8% for endocarditis.

There is an association between BAV and aortopathy, thus CT angiography of the aorta is recommended if the morphology of the aortic sinuses, sinotubular junction, or ascending portion cannot be assessed fully by echocardiogram or when the aortic diameter appears above population norms (> 40 mm in men, > 36 mm in women, or Z-score > 2).[5] For all BAV, one evaluation of the ascending aorta with contrast CT is indicated even in the absence of any signs or symptoms of aortopathy.

BAV related aeromedical risks include myocardial ischemia, syncope, heart failure or sudden cardiac death all often associated with significant AI or AS.[6] Waiver criteria is largely based on the degree of concomitant AI or AS, however even in the absence of those conditions, a waiver is still required due to the high progression rates of BAV that increases with age.[6] Waiver for BAV with no or trace AI will typically be followed every three years with an echocardiogram.

Aortic Insufficiency (AI) or Aortic Regurgitation

AI is usually precipitated from aortic root or leaflet pathology. Root pathology is most commonly caused by dilation associated with hypertension and aging. Other root pathologies include Marfan's syndrome, aortic dissection, ankylosing spondylitis, and syphilis. Leaflet pathologies include infective endocarditis, BAV, and rheumatic heart disease.[4] In the aviator population, the most common etiologies will be BAV or idiopathic AI with normal aortic valve and root.

AI, particularly in its milder forms, is usually asymptomatic for decades due to the compensation of the left ventricle (LV) to the volume overload produced by this condition. Symptoms generally do not become clinically apparent until some degree of LV failure has occurred, usually after the fourth decade of life. AI is therefore most commonly associated with symptoms related to LV failure manifested as exertional dyspnea, orthopnea, fatigue, and paroxysmal nocturnal dyspnea. Additionally, anginal symptoms can occasionally develop despite normal coronary arteries due to reduced blood flow reserve in the hypertrophied LV. The characteristic murmur of AI is a high-frequency decrescendo diastolic murmur best over the third and fourth intercostal space over the left sternal border.[7]

Echocardiogram with doppler flow can easily diagnose AI and characterize its severity as trace, mild, moderate, or severe. Trace AI is considered to be a normal variant in the absence of an AI related murmur and with a structurally normal tri-leaflet valve. LV function and chamber size also impact the assessment of disease severity.[8]

The natural progression of AI varies based on symptoms, LV dysfunction, and severity of AI. In early AI, compensatory mechanisms maintain a normal LVEF, but those eventually fail and LV hypertrophy develops. This can happen even in the absence of overt symptoms despite a steady decline in LVEF and may lead to fatigue, dyspnea, angina, mitral valve regurgitation/dilation, decreased cardiac output, pulmonary edema, arrythmias, and heart failure.[7] These symptoms can be subtitle and develop slowly and would be expected to have a negative impact on AGSM and hypoxia tolerance. Event rates for symptoms, LV dysfunction, and sudden death in severe AI are 3-6% annually. However, AI can be adequately monitored with regular echocardiograms, allowing for quantification of cardiac function and estimation of the risk of progression.[3]

Progression from mild to moderate AI approaches 10% and thus requires waiver and regular follow-up (unlike all other mildly regurgitant valves which rarely progress and thus do not require waiver). Mild AI rarely progresses to surgical intervention or severe cardiac events over a 10-year period. Conversely, 80% of severe AI patients will require surgery and 20% will have a major cardiac event within 10 years.[9] An ACS review of 877 cases of AI followed for 10 years demonstrated a progression rate from mild to moderate disease in 8% while moderate to severe disease progressed in 23% of the study population. While the likelihood of developing asymptomatic LV dysfunction is low, more than 25% of patients who die or develop systolic dysfunction will do so prior to the onset of any warning symptoms.

Theoretical concerns exist that extreme athletic activity or isometric exercises, or activities which include a significant component of such exercise (e.g.: Anti-G Straining Maneuvers (AGSM), weightlifting, sprint running), may promote progression of AI and should therefore be discouraged. Published guidelines for athletes with AI allow for full sports participation in cases with only mild or moderate AI with normal LV ejection fraction (LVEF) and no more than mild LV dilation if they have a normal exercise cardiopulmonary testing.[10] Therefore more severe cases are restricted to non-high performance aircraft.

Any AI worse than mild should be followed closely, preferably by a cardiologist, for development of criteria for surgical intervention and to address the need for vasodilator therapy.

Medications to reduce afterload such as RAAS inhibitors (ACE and ARB only) and nifedipine, have documented clinical benefit in chronic AI of moderate or greater severity, especially if blood pressure is elevated. These medications can also delay the need for surgery and improve surgical outcomes. Although waiver is still required for the underlying condition of AI, the use of approved RAAS medications and nifedipine is acceptable in aviators with asymptomatic moderate or severe AI.[1,8] Aircrew with moderate or greater AI are restricted from high performance airframes secondary to decreases in pre-load and pressure gradients that occur with Gz. Similarly, vasodilators and multidrug therapy used to reduce afterload may also decrease Gz tolerance and thus flight restrictions. Aviators may progress to surgical repair, with intervention recommended in severe AI with symptoms and asymptomatic severe AR when LVEF < 50%.[13] Return to flight after surgery is possible, but only to multi-place, non-high performance aircraft.[16]

Aortic Stenosis (AS)

Risks include angina pectoris (due to ventricular hypertrophy often without coronary artery disease), fixed cardiac output, syncope (especially on exertion), and eventually systolic dysfunction and LV failure causing pulmonary edema, fatigue, palpitations, and sudden cardiac death. After symptom onset, mean survival in untreated patients is 2-5 years.[17]

While sometimes identified by a crescendo-decrescendo systolic murmur, most commonly AS will be diagnosed incidentally on echocardiogram. AS is graded as mild, moderate or severe on echocardiogram by a combination of mean pressure gradient across the stenotic valve and the calculated valve area.[8,11] When asymptomatic, AS is a slowly progressing disease with a long latent period. However, once symptomatic, AS can have rapid decompensation and quickly require valve repair surgery. Risks at the symptomatic stage include sudden death, syncope, angina (even in the absence of CAD), and dyspnea. One should be mindful that once mild AS has been diagnosed, valve replacement at a future date is likely and near certainty if symptomatic.[11]

AS usually occurs at the level of the aortic valve. Supravalvular and subvalvular forms of AS exist, but are unusual congenital defects less likely to present as a new diagnosis in military aircrew. Supravalvular and subvalvular AS would be addressed aeromedically on a case-by-case basis. Valvular AS in older adults is usually caused by age-related calcification and degeneration and is termed senile AS. Rheumatic disease is another cause but less common in the developed world. In the military aircrew population, associated BAV is the most common cause for AS. Over the course of 20 years, 27% of BAV patients will require a cardiovascular surgical procedure and 40% will have some form of cardiovascular event or require surgical intervention. However, it remains unusual in military aircrew because AS secondary to BAV typically develops in middle-aged and older patients.[4,11] Event rates for asymptomatic and symptomatic moderate AS are 5% and 10% respectively and considerably higher in severe AS. The prognosis for mild AS is good and essentially normal for at least the first 5 years. Mild-to-moderate AS will likely progress to more severe disease and maintenance of normal cardiac output under +Gz load is reduced requiring restriction from high-performance aircraft.[1] Given the fixed cardiac output associated with AS, restriction to non-high performance airframes is required unless very mild.

Antibiotic Endocarditis Prophylaxis for Aortic Valve Disease

Since 2007 and refined in 2017 and 2021, endocarditis prophylaxis guidelines have restricted their recommendations to specific high-risk groups and only for dental, respiratory tract, and infected skin/musculoskeletal procedures. High risk groups include patients with: (1) prosthetic cardiac valve/material/devices, (2) previous relapse or recurrent infective endocarditis, (3) congenital heart disease, or (4) cardiac transplant. These patients are very rare in the military flying population. Furthermore, prophylaxis in high-risk patients is only recommended for dental procedures that involve manipulation of gingival tissue or periapical region or perforation of the oral mucosa. Prophylaxis might also be indicated in a limited set of respiratory and urinary tract procedures.[12-14]

AIMWTS search in January 2023 showed 1,468 total cases related to congenital valve disease. The breakdown of the number of waivers and number of total cases are tabulated below.

Table 4: AIMWTS database aortic valve disease waivers n=1468 cases.

Please use only these ICD-10 Codes for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	ATC	GBO	SWA
I06.0	Rheumatic aortic stenosis	0	0	0	0	0	0
I06.1	Rheumatic aortic regurgitation	2/2	1/2	0	0	0	0
I06.2	Rheumatic aortic stenosis with aortic regurgitation	0	0	0	0	0	0
I06.8	Other rheumatic aortic stenosis	0	0	0	0	0	0
I35.0	Non-rheumatic aortic stenosis	0	0	1/1	0	1/1	0
I35.1	Non-rheumatic aortic insufficiency	1/1	1/1	8/11	2/2	3/3	2/2
I35.8	Other non-rheumatic aortic valve disorders	62/70	84/96	41/55	1/1	9/10	8/9
Q23.0	Congenital stenosis of the aortic valve	0	0	1/1	0	0	0
Q23.1	Congenital insufficiency of aortic valve (Bicuspid Aortic Valve)	52/58	29/33	46/53	7/8	11/11	6/6

IV. Suggested Readings/References

1. Kruyer WB, Davenport ED. Cardiology. In: Rayman RB, ed. *Rayman's Clinical Aviation Medicine*. 5 ed. Castle Connolly Graduate Medical Publishing, LTD; 2013:3-126:chap 2.

2. Wand O, Prokupetz A, Assa A, Barenboim E. Screening echocardiography of military aircrew candidates: aeromedical implications. *Cardiology*. 2010;115(1):22-8. doi:10.1159/000245936

3. D'Arcy JL, Syburra T, Guettler N, et al. Contemporaneous management of valvular heart disease and aortopathy in aircrew. *Heart*. Jan 2019;105(Suppl 1):s57-s63. doi:10.1136/heartjnl-2018-313056

4. Fishbein GA, Fishbein MC. Pathology of the Aortic Valve: Aortic Valve Stenosis/Aortic Regurgitation. *Curr Cardiol Rep*. Jul 5 2019;21(8):81. doi:10.1007/s11886-019-1162-4

5. Braverman AC, Harris KM, Kovacs RJ, et al. Eligibility and Disqualification Recommendations for Competitive Athletes With Cardiovascular Abnormalities: Task Force 7: Aortic Diseases, Including Marfan Syndrome: A Scientific Statement From the American Heart Association and American College of Cardiology. *Circulation*. Dec 1 2015;132(22):e303-9. doi:10.1161/CIR.0000000000000243

6. D'Ascenzi F, Valentini F, Anselmi F, et al. Bicuspid aortic valve and sports: From the echocardiographic evaluation to the eligibility for sports competition. *Scand J Med Sci Sports*. Mar 2021;31(3):510-520. doi:10.1111/sms.13895

7. Flint N, Wunderlich NC, Shmueli H, Ben-Zekry S, Siegel RJ, Beigel R. Aortic Regurgitation. *Curr Cardiol Rep*. Jun 3 2019;21(7):65. doi:10.1007/s11886-019-1144-6

8. Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease: executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Circulation*. Jun 10 2014;129(23):2440-92. doi:10.1161/CIR.0000000000000029

9. Detaint D, Messika-Zeitoun D, Maalouf J, et al. Quantitative echocardiographic determinants of clinical outcome in asymptomatic patients with aortic regurgitation: a prospective study. *JACC Cardiovasc Imaging*. Jan 2008;1(1):1-11. doi:10.1016/j.jcmg.2007.10.008

10. Bonow RO, Nishimura RA, Thompson PD, et al. Eligibility and Disqualification Recommendations for Competitive Athletes With Cardiovascular Abnormalities: Task Force 5: Valvular Heart Disease: A Scientific Statement From the American Heart Association and American College of Cardiology. *Circulation*. Dec 1 2015;132(22):e292-7. doi:10.1161/CIR.0000000000000241

11. Kanwar A, Thaden JJ, Nkomo VT. Management of Patients With Aortic Valve Stenosis. *Mayo Clin Proc*. Apr 2018;93(4):488-508. doi:10.1016/j.mayocp.2018.01.020

12. Wilson W, Taubert KA, Gewitz M, et al. Prevention of infective endocarditis: guidelines from the American Heart Association: a guideline from the American Heart Association Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group. *Circulation*. Oct 9 2007;116(15):1736-54. doi:10.1161/CIRCULATIONAHA.106.183095

13. Nishimura RA, Otto CM, Bonow RO, et al. 2017 AHA/ACC Focused Update of the 2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation*. Jun 20 2017;135(25):e1159-e1195. doi:10.1161/CIR.0000000000000503

14. Wilson WR, Gewitz M, Lockhart PB, et al. Prevention of Viridans Group Streptococcal Infective Endocarditis: A Scientific Statement From the American Heart Association. *Circulation*. May 18 2021;143(20):e963-e978. doi:10.1161/CIR.0000000000000969

15. Carter D, Pokroy R, Azaria B, et al. Effect of G-force on bicuspid aortic valve in aviators. *Cardiology*. 2007;108(2):124-7. doi:10.1159/000096024

16. Syburra T, Nicol E, Mitchell S, Bron D, Rosendahl U, Pepper J. To fly as a pilot after cardiac surgery. *Eur J Cardiothorac Surg*. Mar 1 2018;53(3):505-511. doi:10.1093/ejcts/ezx346

17. Zakkar M, Bryan AJ, Angelini GD. Aortic stenosis: diagnosis and management. *BMJ*. Oct 19 2016;355:i5425. doi:10.1136/bmj.i5425

Atrial Fibrillation & Atrial Flutter (Jun 2020)
Reviewed: Lt Col Eddie Davenport (ACS chief cardiologist), Dr. Edwin Palileo (ACS cardiologist), Dr. Dan Van Syoc (ACS waiver guide coordinator, and Lt Col David Gregory (AFMRA Physical Standards Development Chief)

Significant Changes:
Updated content and format

I. Waiver Consideration

History of atrial fibrillation (AF) and/or atrial flutter is disqualifying for all flying classes and retention. The one exception is a single episode of atrial fibrillation clearly associated with a reversible cause. Additionally, the use of maintenance medications for the treatment or prevention of major rhythm disturbances including atrial flutter or atrial fibrillation requires a waiver for retention and all flying classes. A history of catheter ablation is also disqualifying for all flying classes and is addressed in a separate waiver guide, Catheter ablation of Tachyarrhythmias. If hyperthyroidism is determined to be the cause of the AF, a waiver may be considered per policy after treatment of the hyperthyroidism (see hyperthyroidism waiver guide).

Table 1: Atrial fibrillation (lone), atrial flutter and waiver potential.

Flying Class	Condition	Waiver Potential Waiver Authority	ACS Review/Evaluation
I/IA	Atrial fibrillation, single episode, without hemodynamic symptoms, no medications, and including "holiday heart" scenario.[6]	Maybe[1] AETC	Yes
	All other atrial fibrillation episodes, with or without hemodynamic symptoms.	No AETC	No
	Atrial flutter, with or without hemodynamic symptoms.	No AETC	No
II/III[5]	Atrial fibrillation, single episode, without hemodynamic symptoms, no medications.	Yes[1, 2] MAJCOM	Yes
	Atrial flutter and/or atrial fibrillation, paroxysmal or chronic, without hemodynamic symptoms, with or without beta-blocker, with or without radiofrequency ablation.	Yes[2, 3, 4] AFMRA	Yes
	Atrial flutter and/or atrial fibrillation not rate controlled and/or with hemodynamic symptoms or abnormal cardiac testing.	No MAJCOM	No
ATC/GBO SWA	Atrial fibrillation and/or atrial flutter, paroxysmal or chronic, without hemodynamic symptoms, with or without beta-blocker, with or without radiofrequency ablation. (No waiver required for single episode of AF with reversible cause, without hemodynamic symptoms, on no medications).	Yes[4, 6] AFMRA	Yes (review only)

1. Waiver for single episode AF should not be submitted until at least 3 months after conversion to sinus rhythm, including a minimum of two months off antiarrhythmic medications. There is a minimum 6 months observation before submitting waiver for paroxysmal and chronic atrial fibrillation.
2. For untrained FC II individuals waiver is unlikely and for untrained FC III individuals, waiver will be considered on a case-by-case basis.

3. In cases of paroxysmal and chronic atrial fibrillation treated with or without beta-blocker, waiver will be restricted to low performance aircraft (IIA, III) and in case of pilots, with another qualified pilot at redundant controls (IIC).
4. If treated with radiofrequency ablation, see *Radiofrequency Ablation (RFA) of Tachyarrhythmias* waiver guide for further guidance.
5. Initial FC II/III waiver authority is AETC.
6. "Holiday heart" refers to rhythm disturbances brought on by binge drinking episodes.

II. Information Required for Waiver Submittal

Aeromedical disposition and waiver submission should only be submitted after administrative and clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines/recommendations.

A. Initial Waiver Request:

1. Complete history and physical exam – to include description of any symptoms, blood pressure, medications, and activity level.
2. Cardiology consult. Copies of electrophysiology consultation report, electrophysiology study and catheter ablation reports
3. Electrocardiogram (ECG) during atrial fibrillation and if paroxysmal or cardioversion then repeat after conversion to sinus rhythm.
4. Report and digital images of echocardiogram to the ACS (may also upload in PICOM), includes repeated studies if performed after conversion to sinus rhythm.
5. Lab testing to include Complete Blood Count (CBC), Complete Metabolic Panel (CMP) and Thyroid function test (TSH).
6. Report and representative tracings of Holter monitor performed in the final month of DNIF observation.
7. Copies of reports and tracings/images of any other cardiac tests performed locally for clinical assessment (e.g. treadmill, cardiac cath, cardiac CT or MRI).
8. Results of medical evaluation board MEB (worldwide duty evaluation), if required. FL4 with RTD and ALC status, if member did not meet retention status.
9. If any of the above requested items cannot be provided, please provide an explanation to the waiver authority in the AMS why that could not be provided.

B. Renewal Waiver Request:

1 Complete updated history and physical exam – to include description of any symptoms, medications, and activity level.
2 Electrocardiogram (ECG).
3 Additional local cardiac testing is not routinely required for re-evaluation cases followed at the ACS but may be requested in individual cases. If so, the previous ACS evaluation/review will specify details regarding any requested local testing.
4 Copies of reports and tracings/images of any other cardiac tests performed locally for clinical assessment (e.g. treadmill, Holter monitor, cardiac cath, cardiac CT or MRI). If reports not attached in AIMWTS, send to the ACS.
5 If any of the above requested items cannot be provided, please provide an explanation to the waiver authority in the AMS why that could not be provided.

All studies should be submitted to the ECG Library. For image submission process, refer to page 2.

III. Aeromedical Concerns

Atrial fibrillation (AF) is the most common type of heart arrhythmia found in aircrew and seen in 0.4-1% of the general population with a lifetime incidence of 10% and can be found on 0.3% of asymptomatic screening ECGs. AF affects all ages and genders with a lifetime reported incidence of approximately 10% (although likely much higher). Aeromedical concerns include palpitations, dizziness, syncope, shortness of breath, hemodynamic instability, and stroke. A diagnosis of new atrial fibrillation should lead to immediate DNIF and cardiology consultation.

AF can be classified as paroxysmal if AF terminates <7 days (with or without intervention), persistent if AF >7 days in duration, long standing persistent if >12 months, and permanent AF when the patient and clinician make a joint decision to stop attempts to restore or maintain NSR. Etiologies of AF include electrolyte disorders, stimulant use, severe infection, excessive alcohol or caffeine intake, valvular heart disease, CAD, cardiomyopathy, HTN, hyperthyroidism, and/or respiratory disease, and in many cases is not identified (idiopathic). All aircrew with documented AF should undergo lab testing, chest imaging (CXR or CT), Holter monitor, echocardiogram, and cardiac stress test.

A single idiopathic episode of AF often has an identifiable precipitating cause, such as acute abuse of alcohol (holiday heart syndrome) and/or other stimulant use (heavy caffeine (including energy drinks), decongestant use, weight lifting supplements, surgery, electrolyte disturbance, or sepsis. A single episode of AF lasting less than 24 hours that converts either spontaneously or by medical intervention and there is a clearly identifiable precipitating cause may be recommended for waiver for return to unrestricted flight after correction of any underlying precipitating cause. Complete cardiac evaluation is still required and a waiting period of 3 months after restoration of NSR is recommended prior to return to flight. After ensuring there is no correctible etiology of the AF, one must then decide on rate vs rhythm control and stroke risk

Stroke risk should be estimated using the CHA_2DS_2VASc score. The annual risk of stroke for a score of 0, 1, 2, and 3 is <0.5%, 1.3%, 2.2%, and 3.2% respectively. According to the latest guidelines, scores greater than 2 in men and 3 in women should be placed on anticoagulation which should lower the stroke risk to less than 1% but confers a bleeding risk of approximately 1% thus disqualifying for all USAF aircrew. Rate vs Rhythm control should be managed in accordance with published guidelines although aeromedical implications exist for nodal blocking

agents and antiarrhythmics. Impaired atrial contraction in AF decreases ventricular cardiac output by up to 25% and additional therapy with nodal blockers such as beta-blockers and non-dihydropyridine calcium channel blockers (verapamil and diltiazem) will further reduce cardiac output. Treatment with beta-blockers or calcium channel blockers therefore limits aircrew to non-high-performance aircraft. Similarly, many antiarrhythmics (especially Vaughan-Williams Class I & III) can affect cardiac output and also have side effect profiles and proarrhythmic risks such that they are not waiverable for any USAF aircrew. AF catheter ablation is becoming increasingly popular with success rates up to 85% in the young with paroxysmal AF, however success rates are as low as 40% in persistent AF. Repeat ablations do carry higher success rates.

Atrial flutter is often associated with atrial fibrillation but may occur as an isolated rhythm disturbance. It presents unique considerations as it is typically a right atrial macro-re-entrant tachycardia passing through the area between the inferior vena cava and tricuspid valve referred to as the cavo-tricuspid isthmus which can be a focus of ablation. Catheter ablation of typical atrial flutter has success rates over 90% although there is possibly increased atrial fibrillation risk. If NSR has been maintained for over 6 months off all medications regardless of treatment option then ACS evaluation with maximal stress testing can be done for return to flight status. For unrestricted flight in high performance airframes, a centrifuge study must also be completed. As of May 2020 there has been only 2 cases of Afib or Atrial flutter s/p ablation returned to unrestricted flight.

Aeromedical disposition of all aircrew with AF (paroxysmal, persistent, or permanent) and atrial flutter includes return to flight if not hemodynamically significant, rate controlled and low stroke risk with negative cardiac evaluation as above. Waiver will be limited to no single seat, high performance aircraft (unless single episode less than 24 hours with clear precipitant or >6 months after ablation maintaining NSR off all medications and s/p ACS evaluation with centrifuge testing as above).

A five-year review of AIMWTS through May 2020 revealed 76 cases of atrial fibrillation/flutter; there were 10 disqualified cases. Breakdown of the cases revealed: 42 FC II cases (2 disqualified), 23 FC III cases (6 disqualified), 8 GBO cases (2 disqualified), and 3 SWA cases. There is an ACS Atrial fibrillation working group with 168 cases being actively followed.

ICD-10 Codes for atrial fibrillation and flutter	
I48.91	Unspecified Atrial fibrillation
I48.82	Unspecified Atrial flutter

IV. Suggested Readings

1. 2019 AHA/ACC/HRS Focused Update of the 2014 Guideline for the Management of Patients with Atrial Fibrillation. doi : 10.1026/j.jacc.2019.01.011

2. Gray GW, Davenport ED, Nicol ED. Clinical Aerospace Cardiovascular Medicine. Ch. 13 in: *Fundamentals of Aerospace Medicine*, 5th ed. In press, pending publication 2020.

3. Strader JR, Jr, Gray GW, Kruyer WB. Clinical Aerospace Cardiovascular Medicine. Ch. 13 in: *Fundamentals of Aerospace Medicine*, 4th ed. Philadelphia: Lippincott Williams & Wilkins, 2008; 344-45.

4. Kruyer WB and Davenport ED. Cardiology. Ch. 2 in: *Rayman's Clinical Aviation Medicine*, 5th ed., Castle Connolly Graduate Medical Publishing, LTD, 2013; 75-79.

5. Guettler N, Bron D, Manen O, et al. Management of cardiac conduction abnormalities and arrhythmia in aircrew. Heart 2019;105:s38-49

6. Natale A, Newby KH, Pisanó E, et al. Prospective randomized comparison of antiarrhythmic therapy versus first-line radiofrequency ablation in patients with atrial flutter. J Am Coll Cardiol 2000;35:1898–904.

7. Feld G, Wharton M, Plumb V, et al. Radiofrequency catheter ablation of type 1 atrial flutter using large-tip 8- or 10-mm electrode catheters and a high-output radiofrequency energy generator: results of a multicenter safety and efficacy study. J Am Coll Cardiol 2004;43:1466–72.

Cardiac Conduction Delay (Heart Block, Bradycardia) (Jun 2020)
Previously Atrioventricular Conduction Disturbances
Reviewed: Lt Col Eddie Davenport (chief ACS cardiologist), Dr. Ed Palileo (ACS cardiologist), Dr. Dan Van Syoc (ACS Waiver Guide coordinator, and Lt Col David Gregory (AFMRA Physical Standards Development Chief)

Significant Changes: New version and new title

I. Waiver Consideration

All ECGs done on USAF aircrew, even if normal, should be sent to the ECG Library. All ECGs are reviewed, dispositioned, and archived by aerospace medicine trained cardiologists. Asymptomatic sinus bradycardia, sinus pause, junctional escape, accelerated idioventricular rhythm (AIVR), first degree AV block, and second degree type I (Wenckebach) AV block are generally considered normal variants and as such do not require a waiver (see aeromedical considerations below). Second degree type II AV block and third degree (complete) AV block are at high risk of hemodynamic symptoms and often recommended for permanent cardiac pacing thus waiver for these diagnoses is unlikely. The exception is atrioventricular block clearly associated with a reversible cause. Disqualifying diagnoses are per MSD H12-H17.

Table 1: Waiver potential for AV conduction disturbances.

Flying Class	Condition	Waiver Potential Waiver Authority	ACS Review/Evaluation
I/IA, II/III/ATC ATC/GBO SWA	First degree AV block, Second degree type I (Wenckebach) AV block, Junctional rhythm, AIVR	Not required – qualified[1, 2]	Yes[1]
	Symptomatic bradycardia, first-degree AV block with PR >400ms, prolonged sinus pause >3 sec, or higher degree AV block (Reversible & Resolved).	Yes AETC (FCI/IA) AFMRA (all others)	Yes[1]
	Mobitz II second degree AV block and third degree (complete) block. Idiopathic, symptomatic and/or with pacemaker.	No AETC (FCI/IA) AFMRA (all others)	Yes[1]

1. ECG Library reviews all ECGs for all flying classes (includes USAFA, USAFSAM and AD sent by HQ AETC).
2. Must be asymptomatic and heart rate >39bpm without prolonged sinus pause/arrest (<3 sec) and PR interval for first degree AVB <400ms.

II. Information Required for Waiver Submittal

Aeromedical disposition and waiver submission should be done after administrative and clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines/recommendations.

A. Initial Waiver Request:

1. Complete history and physical exam – to include description of symptoms (positive and negative) as well as medications, treatments, and activity level.
2. Cardiology consult. (Not required in first degree block or Mobitz I second degree block, if ECG Library does not request.)
3. Electrocardiogram (ECG), all ECGs if multiple.
4. Copies of reports and all tracings/images of any other cardiac tests performed locally for clinical assessment (e.g. treadmill, Holter monitor, cardiac cath, cardiac CT or MRI).
5. Electrophysiologist consultation if done, if electrophysiology study is done then procedure report should be submitted.
6. RTD and ALC status, if member did not meet retention status.
7. If any of the above requested items cannot be provided, please provide an explanation to the waiver authority in the AMS why that could not be provided.

B. Renewal Waiver Request:

1. Complete updated history and physical exam – to include description of any symptoms, medications, and activity level.
2. Electrocardiogram (ECG).
3. Additional local cardiac testing is not routinely required for re-evaluation cases followed at the ACS but may be requested in individual cases. If so, the previous ACS evaluation/review will specify details regarding any requested local testing.
4. Local studies done since prior waiver or waiver renewal should be sent to ACS for review even if not requested by ACS. (e.g. stress test, echocardiogram, Holter monitor, cardiac cath, EP study, cardiac CT or MRI).
5. If any of the above requested items cannot be provided, please provide an explanation to the waiver authority in the AMS why that could not be provided.

All studies should be submitted electronically to the ECG Library. For image submission process, refer to page 2.

III. Aeromedical Concerns

Aeromedical concerns of cardiac conduction disturbances include bradycardia-related hemodynamic symptoms, heart failure, syncope, and even sudden death. Joint guidelines were recently published by the American College of Cardiology, American Heart Association and Heart Rhythm Society regarding the management of bradycardia and conduction delay, and should be followed in all aircrew.

Fit aircrew may have resting heart rates lower than that of the general population and are also more likely to have junctional or ventricular escape rhythms. Evaluation is usually not indicated for asymptomatic **sinus bradycardia or junctional escape** rhythms for rates >39 bpm. The USAF Central ECG Library/ACS may request further local evaluation for unusual individual cases including first appearance of AV block at an older age (usually >40 years), **Marked sinus bradycardia (<40 bpm**) and **Prolonged sinus pause/arrest (>3 sec**). Cardiac conduction delays occurring only during sleep may also require polysomnography study.

First degree AV block, defined as PR interval >200 ms, is common in athletes and has been found in approximately 1% of all USAF screening ECGs. If the airman is asymptomatic without evidence of structural heart disease then further evaluation is not necessary. There should be no limitations for flying or flying training and waiver is not required. However, if symptomatic or with **PR intervals >400ms**, there is increased risk of structural heart disease or more advanced conduction disease and therefore additional testing is required.

In **Second degree type I block (Wenckebach) AV block** there is a progressive delay between atrial and ventricular conduction and contraction which manifests as a prolonged PR interval with an eventual dropped beat (P wave not followed by QRS). Like first degree AV block, the site of block in second degree Mobitz type I AV block is at or above the AV node and thus likely secondary to increased Vagal tone. Second degree type one AV block was found in 0.1% of all screening USAF aircrew ECG. In most cases, Mobitz type I block does not produce any symptoms and further evaluation is not indicated unless symptomatic, very frequent, or not resolving with increased heart rates (exercise or atropine).

In **Second degree Mobitz AV type II block**, as with type I block, there is a dropped beat; however, in type II block the PR interval is fixed. The site of involvement for type II block is often below the AV node (His-Purkinje system) which puts the patient at a considerable risk for progression to complete heart block (third degree heart block). In third degree AV block there is complete AV dissociation and the atrial and ventricular rates are independent of each other. Second degree Mobitz type II and third degree heart block occurs in less than 0.004% of USAF aircrew screening ECGs. Second and third degree block require a complete cardiac evaluation including structural imaging and electrophysiologist referral. Aircrew should be grounded while undergoing workup. They generally are recommended for permanent pacemaker placement and disqualified for all flying classes. Second degree type II AV block and third degree heart block is also disqualifying for retention in the military.

One final note. In athletes and young aircrew with high vagal tone there can be AV dissociation without block secondary to a junctional or ventricular pacemaker (accelerated idioventricular rhythm-**AIVR**) that is faster than the sinus node so on the ECG there will be more QRS complexes than P waves. However, careful examination of the ECG usually demonstrates intermittent ventricular capture of the P waves which excludes complete AV block. AIVR may be a benign arrhythmia in young, fit individuals, but also may be associated with underlying heart disease including cardiomyopathy and ischemic heart disease. If detected in aircrew, further assessment is recommended to include echocardiography, exercise ECG and Holter monitoring. Cardiac MRI may be appropriate in some cases. If asymptomatic with no underlying cause, no waiver is required.

A five-year review of AIMWTS through May 2020 revealed 10 cases of cardiac conduction delays. A breakdown of these cases revealed: one FC I case, two FC II cases (one disqualified), five FC III cases (three disqualified), one GBO case, and one SWA case.

ICD-,10 Codes for AV conduction disturbances	
I44.2	Atrioventricular block, complete
I44.0	First degree atrioventricular block
I44.1	Mobitz (type) II atrioventricular block
I44.39	Other atrioventricular block

IV. Suggested Readings

1. Kusumoto FM, Schoenfield MH, Barret C, et al. 2018 ACC/AHA/HRS Guideline on Bradycardia and Cardiac Conduction Delay. A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the Heart Rhythm Society. J Am Coll Cardiol, 2019; 74(7): 933-983
2. Gray GW, Davenport ED, Nicol ED. Clinical Aerospace Cardiovascular Medicine. Ch. 13 in: *Fundamentals of Aerospace Medicine*, 5th ed. In press, pending publication 2020.
3. Strader JR, Jr, Gray GW, Kruyer WB. Clinical Aerospace Cardiovascular Medicine. Ch. 13 in: *Fundamentals of Aerospace Medicine*, 4th ed. Philadelphia: Lippincott Williams & Wilkins, 2008; 344-45.
4. Kruyer WB and Davenport ED. Cardiology. Ch. 2 in: *Rayman's Clinical Aviation Medicine*, 5th ed., Castle Connolly Graduate Medical Publishing, LTD, 2013; 75-79.
5. Guettler N, Bron D, Manen O, et al. Management of cardiac conduction abnormalities and arrhythmia in aircrew. Heart, 2019; 105: s38-49
6. January CT, Wann LS, Alpert JS, et al. 2014 AHA/ACC/HRS Guideline for the Management of Patients with Atrial Fibrillation: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the Heart Rhythm Society. Circulation, 2014; 130: 2071–2104.
7. Stevenson WG and Tedrow U. Preventing ventricular tachycardia with catheter ablation. Lancet, 2010; 375: 4-6.

Cardiomyopathy (Dec 2019)
Reviewed: Lt Col Kevin Alford, (RAM 21), Lt Col Eddie Davenport (ACS Cardiology), Dr. Dan Van Syoc (ACS Waiver Guide Coordinator), and Lt Col David Gregory (AFMRA Physical Standards Development Chief)

Significant Changes: Update to aeromedical concerns. Update to waiver considerations. Addition of Special Warfare to Table 1

I. Waiver Consideration

Cardiomyopathy is disqualifying for all classes of flying duties. It is disqualifying for retention purposes, and members with all but the most mild degrees of cardiomyopathy will only be considered for aeromedical waiver after the individual has been released to full unrestricted activity and found fit for continued military duty by a medical evaluation board (MEB). For the purposes of this waiver guide, cardiomyopathy includes any disease of the myocardium, reduction in left ventricular ejection fraction (<50%), or clinical diagnosis of heart failure. Heart failure is classified according to the New York Heart Association (NYHA) classes (class I or greater is disqualifying) and the American Heart Association (AHA) stages (stage B or greater is disqualifying). Heart failure also includes heart failure with preserved ejection fraction (HFpEF) when symptomatic. Waiver submissions should be made only after resolution of any acute episode, stabilization of the medical regimen, and release of the individual back to full unrestricted activities by the treating cardiologist. ACS review is required for initial waivers for cardiomyopathy to confirm the diagnosis. Mild cases of dilated cardiomyopathy (DCM) which resolve over time may be considered for waiver after ACS evaluation. Some secondary cardiomyopathies may be waiver eligible, based on policies for the underlying disorder and the impact of the secondary cardiomyopathy on overall prognosis. Typically, this will involve definitive therapy that results in an aeromedically acceptable outcome, including resolution of the cardiomyopathy. Resolution of tachycardia-induced cardiomyopathy and return of left ventricular and left atrial size and function to normal after successful surgical repair of severe mitral regurgitation are examples.

Table 1: Waiver potential for Cardiomyopathy[3]

Flying Class (FC)	Condition	Waiver Potential Waiver Authority	ACS Review/Evaluation
I/IA	DCM, HCM, RCM, ARVC/D, secondary cardiomyopathy	No AETC	Yes[2]
II/III[1]	DCM, HFrEF, HFpEF	Maybe MAJCOM	Yes[2]
	HCM, ARVC/D, and RCM	No MAJCOM	Yes[2]
	Secondary cardiomyopathy	Yes MAJCOM	Yes[2]
ATC[1] GBO[1] SWA[1]	DCM, HFrEF, HFpEF	Maybe MAJCOM	Maybe[2]
	HCM, ARVC/D, and RCM	No MAJCOM	Maybe[2]
	Secondary cardiomyopathy	Yes MAJCOM	Maybe[2]

DCM – Dilated Cardiomyopathy; HCM – Hypertrophic Cardiomyopathy; RCM – Restrictive Cardiomyopathy; ARVC/D – Arrhythmogenic Right Ventricular Cardiomyopathy/Dysplasia; HFrEF – Heart Failure with Reduced Ejection Fraction; HFpEF – Heart Failure with Preserved Ejection Fraction.
1. Initial training cases should all be treated similar to FC I/IA.
2. ACS review or evaluation for initial cases is at the discretion of the waiver authority.
3. Per AFI 48-123 6.4.1.3., AFMRA remains waiver authority for all initial waivers for conditions that do not meet retention standards, unless 6.4.1.4.1. applies.

II. Information Required for Waiver Submittal

Aeromedical disposition and waiver submission should only be submitted after administrative and clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines/recommendations.

The aeromedical summary for the initial waiver for cardiomyopathy should include the following:

1. Complete history and physical exam – to include description of symptoms before and after the acute episode, medications, and activity level.
2. Cardiology consult.
3. Electrocardiogram (ECG).
4. Chest x-ray report.
5. Official report of all local echocardiograms. For image submission process, refer to page 2.

6. Copies of reports and tracings/images of any other cardiac tests performed locally for clinical assessment (e.g. treadmill, Holter monitor, cardiac cath, cardiac CT or MRI). If reports not attached in AIMWTS, send to the ACS.
7. Results of medical evaluation board MEB (worldwide duty evaluation for ARC members).
8. If the local base is unable to provide all required items, they should explain why to the waiver authority.

The aeromedical summary for waiver renewal for cardiomyopathy should include the following:

1. Complete history and physical exam – to include description of symptoms before and after the acute episode, medications, and activity level.
2. Electrocardiogram (ECG).
3. Additional local cardiac testing is not routinely required for re-evaluation cases followed at the ACS but may be requested in individual cases. If so, the previous ACS evaluation/ review will specify details regarding any requested local testing.
4. Copies of reports and tracings/images of any other cardiac tests performed locally for clinical assessment (e.g. treadmill, Holter monitor, cardiac catheterization/angiography, cardiac CT or MRI). If reports not attached in AIMWTS, send to the ACS.
5. If the local base is unable to provide all required items, they should explain why to the waiver authority.

For image submission process, refer to page 2.

III. Aeromedical Concerns

Cardiomyopathy is disease of the myocardium and can often result in functional cardiac deficits sufficient to affect aviation safety. Academically, the diagnosis of cardiomyopathy is distinct from the clinical syndrome of heart failure, which can be caused by disorders other than those of the myocardium. However, for the purposes of this waiver guide, cardiomyopathy includes any disease of the myocardium, reduction in left ventricular ejection fraction (<50%), or clinical diagnosis of heart failure. Heart failure is classified according to the NYHA classes (class I or greater is disqualifying) and the AHA stages (stage B or greater is disqualifying). Heart failure also includes heart failure with preserved ejection fraction (HFpEF) when symptomatic. The aeromedical concerns due to cardiomyopathy include the risk of sudden incapacitation, altered physiology secondary to the disease process, and the impact of medical treatment. The risk in these areas varies based on the cause of the cardiomyopathy, the severity of disease, and the

treatments used. Cardiomyopathy can be caused by primary disorders of the myocardium or result secondarily to systemic diseases. When a systemic disease is causative, aeromedical risk may be amplified by extra-cardiac manifestations of the disorder. While the natural history of most cardiomyopathies is to progress to more severe disease, some cardiomyopathies – particularly peripartum cardiomyopathy, tachycardia induced cardiomyopathy, and cardiomyopathy secondary to viral myocarditis – may resolve.

The risk for sudden incapacitation is increased in all members with cardiomyopathy due to an increased risk for ventricular arrhythmias. Certain types of cardiomyopathy result in proportionally higher risk for sudden incapacitation. For instance, individuals with Hypertrophic Cardiomyopathy (HCM) and Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC) are at high risk for symptomatic and incapacitating arrhythmias. This hazard alone may exceed historical risk tolerances. All aviators in whom the diagnosis of cardiomyopathy is considered require an evaluation for ischemic heart disease, as those with ischemic cardiomyopathy also are at an increased risk for incapacitating ischemic events that can be modified with appropriate treatment. Importantly, the aviation environment may increase the risk for incapacitation. As an example, exposure to high $+G_z$s may potentiate ventricular arrhythmias. [Also, those who are not acclimated to intermittent hypoxia may be at higher risk for cardiovascular complications.]

Alterations of cardiac function associated with cardiomyopathies increase the risk to aeromedical safety. Even if any cardiomyopathy associated heart failure is well compensated, aviators may experience decreased exercise tolerance that impairs execution in high-performance aviation. Furthermore, left ventricular dysfunction can reduce capacity to augment cardiac output during exposure to sustained acceleration increasing the risk for G-induced loss of consciousness. Finally, aviators with cardiomyopathy may more poorly tolerate the hypoxic environment of aviation than do their colleagues with normal cardiac function.

Treatments for cardiomyopathy can also have a deleterious effect on aviation safety. For instance, beta blocker (βB) therapy is recommended by published guidelines for treatment of those with reduced EF primarily to reduce risk of arrhythmia; beta blockers have also been shown to improve cardiac function in subsets of cardiomyopathy patients. [Of note, angiotensin converting enzyme inhibitors (ACE-i) and angiotensin receptor blockers (ARBs) are also recommended in heart failure with reduced EF.] Regardless of the indication, βBs reduce tolerance for $+G_z$ acceleration. Similarly, vasodilators such as nitrites and hydralazine, used for symptom management in heart failure would reduce G-tolerance. Medical devices are increasingly used in the management of cardiomyopathy. Those with sufficient cardiac dysfunction or risk of sudden cardiac death to warrant placement of an implantable cardioverter defibrillator (ICD), use of resynchronization therapy, or placement of more advanced devices such as left ventricular assist devices, are not suitable for military aviation.

In the USAF aviator and special operator populations, presumed diagnoses of cardiomyopathy are often identified after routine testing of an asymptomatic individual, such as with a screening EKG. However, young, athletic individuals can develop changes on cardiac testing that may appear similar to those identified in mild cardiomyopathies. For instance, EKG testing in athletic individuals may demonstrate first degree AV block, incomplete right bundle branch block, early

repolarization, or QRS voltage criteria for left ventricular hypertrophy in the absence of true pathology. Similarly, echocardiography may identify changes in the left ventricular size, mass, and wall thickness secondary to physical training that can appear similar to mild dilated or hypertrophic cardiomyopathies. These findings may be accompanied with borderline low left ventricular ejection fraction leading to a diagnosis of cardiomyopathy, but systolic function should appropriately augment under exercise testing in the athletic heart. In addition to properly supervised exercise testing, cardiac MRI (CMR) can help distinguish between pathology and changes related to physical fitness. These diagnostic challenges highlight the importance of ACS evaluation for aviators and special duty personnel with new aeromedical waiver requests for cardiomyopathy.

AIMWITS search in Dec 2019 for the previous five years revealed 41 cases listed as cardiomyopathy. Breakdown of the cases was as follows: 3 FC I/IA (1 disqualified), 18 FC II (1 disqualified), 1 RPA pilot, 14 FC III (4 disqualified), 1 special warfare airman, and 4 ATC/GBC (1 disqualified). All cases with a disqualification either had symptoms, were on a nonapproved medication or did not meet initial flying standards or radiographic evidence of cardiomyopathy.

ICD-9 Codes for cardiomyopathy	
425.4	Other primary cardiomyopathies (hypertrophic, restrictive, idiopathic, familial, not otherwise specified, congestive, constrictive, obstructive, nonobstructive)
425.9	Secondary cardiomyopathy, unspecified
086.0	Chagas' disease with heart involvement

ICD-10 Codes for cardiomyopathy	
I42.8	Other cardiomyopathies
I42.9	Cardiomyopathy, unspecified
B57.0	Chagas' disease with heart involvement

IV. Suggested Readings

1. D'Arcy JL Manen O, Davenport ED, et. al. Heart Muscle Disease Management in Aircrew. Heart, 2019; 105:s50-s56.

2. Nicol ED, Rienks R, Gray G, et. al. An Introduction to Aviation Cardiology. Heart, 2019; 105:s3-s8.

3. Yancy CW, Jessup M, Bozkurt B, et. al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Circulation, 2013; 128:e240–e327.

4. Maron BJ, Udelson JE, Bonow RO, et. al. Eligibility and disqualification recommendations for competitive athletes with cardiovascular abnormalities: Task Force 3: hypertrophic cardiomyopathy, arrhythmogenic right ventricular cardiomyopathy and other cardiomyopathies, and myocarditis: a scientific statement from the American Heart Association and American College of Cardiology. Circulation, 2015; 132:e273–e280.

5. Yancy CW, Jessup M, Bozkurt B, et. al. 2017 ACC/AHA/HFSA focused update of the 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Failure Society of America. Circulation. 2017;136:e137– e161. DOI: 10.1161/CIR.0000000000000509.

Catheter Ablation of Tachyarrhythmias & Pre-Excitation (WPW) (Jun 2020)
Reviewed: Lt Col Eddie Davenport (ACS Chief Cardiologist), Dr. Edwin Palileo (ASC Cardiologist), Dr. Dan Van Syoc (ACS Waiver Guide Coordinator) and Lt Col AFMSA David Gregory (AFMRA Physical Standards Development Chief)

Significant Changes:
New format and updated references

I. Waiver Consideration

Ablation of cardiac tachydysrhythmias is a catheter based therapeutic intervention and thus disqualifying for flying classes (FC) I/IA, II, III and SWA (MSD H56). If catheter ablation is being performed only for aeromedical reasons and not for clinical indications, then ACS review and/or evaluation is highly recommended before procedure to assure that it is aeromedically indicated. The underlying diagnosis may also require a waiver or possible MEB. Refer also to the waiver guide for the underlying diagnosis for further details.

Table 1: Waiver potential for catheter ablation cases

Flying Class	Condition Treated with catheter ablation	Waiver Potential Waiver Authority[4]	ACS review/evaluation
I/IA	WPW ECG pattern only, WPW syndrome and AVNRT	Yes[2] AETC	Yes
	Other supraventricular tachycardias and RVOT ventricular tachycardia.	Yes[3] AETC	Yes
	Atrial fibrillation, Ventricular Tachycardia secondary to myocardial infiltration or scar	No AETC	No
II, III, SWA (including untrained applicants)	WPW ECG pattern only	Yes[1] MAJCOM	Yes
	WPW syndrome, RVOT tachycardia, and AVNRT	Yes[2] MAJCOM	Yes
	Atrial fibrillation / Atrial Flutter	Yes[3] MAJCOM	Yes
	Ventricular Tachycardia from infiltration/scar	No	No

1. No observation post-ablation required prior to waiver submission.
2. Submit waiver no earlier than 4 months post-ablation.
3. Submit waiver 6 months post-ablation observation. Repeat EP study and/or centrifuge testing is required for FCI/IA and FCII high performance waivers.
4. Waiver authority is as listed for the ablation procedure itself. However, if underlying condition required an MEB, waiver authority is AFMRA for FCII, FCIII, ATC, and SWA.

II. Information Required for Waiver Submittal

Aeromedical disposition and waiver submission should only be submitted after administrative and clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines/recommendations. See appropriate waiver guide for arrhythmia undergoing ablation for other possible requirements.

A. Initial Waiver Request:

1. Complete history and physical exam – to include description of symptoms before and after ablation as well as medications and activity level.
2. Cardiology consult.
3. Official report of ablation and electrophysiologic study/studies (EPS).

4. Electrocardiogram (ECG) prior to ablation and at 2 months, 3 months and 4 months post-ablation for all tachyarrhythmias. A-fib requires an additional ECG at 6 months.
5. Copies of reports and all tracings/images of any other cardiac tests performed locally for clinical assessment (e.g. treadmill, Holter monitor, cardiac cath, cardiac CT or MRI).
6. RTD and ALC status, if member did not meet retention status
7. If any of the above requested items cannot be provided, please provide an explanation to the waiver authority in the AMS why that could not be provided.

B. Renewal Waiver Request:

1 Complete updated history and physical exam – to include description of any symptoms, medications, and activity level.
2 Electrocardiogram (ECG).
3 Additional local cardiac testing is not routinely required for re-evaluation cases followed at the ACS but may be requested in individual cases. If so, the previous ACS evaluation/review will specify details regarding any requested local testing.
4 Local studies done since prior waiver or waiver renewal should be sent to ACS for review even if not requested by ACS. (e.g. stress test, echocardiogram, Holter monitor, cardiac cath, EP study, cardiac CT or MRI).
5 If any of the above requested items cannot be provided, please provide an explanation to the waiver authority in the AMS why that could not be provided..

For image submission process, refer to page 2.

III. Aeromedical Concerns

Sudden cardiac death is the most compelling concern for any tachyarrhythmia; however, in many tachyarrhythmias this risk is low. The risk of recurrent sustained tachyarrhythmia and associated hemodynamic symptoms is the more likely aeromedical concern. To quantify these risks, the specific tachyarrhythmia, the presence or absence of hemodynamic symptoms, the presence or absence of associated structural heart disease and results of electrophysiologic studies and/or RFA must be considered. Careful review of the ablation procedure and corresponding electrophysiologic study is paramount, as this will provide details of the mechanisms and characteristics of the ablated pathway. These characteristics as well as response to ablation acutely will provide prognostic information necessary for aeromedical disposition. See individual waiver guides for more details on each specific diagnosis

Joint guidelines were recently published by the American College of Cardiology, American Heart Association and Heart Rhythm Society regarding the management of arrhythmias (supraventricular and ventricular). Detailed definitions and criteria for diagnosis of accessory pathways, supraventricular tachyarrhythmias and ventricular tachycardias are also addressed with treatment algorithms to include when ablation is indicated. These guidelines should be followed for all acute tachyarrhythmias in aviators. For long term therapies these guidelines should also be followed in regard to ablation and beta-blocker use, however antiarrhythmic medications and non dihydropyridine calcium channel blockers are rarely waiverable for ongoing flight duties. Ablation success rates and consequently aeromedical risks vary depending on ablation site and indication as follows:

1. Accessory pathways (AVRT, WPW pattern/syndrome) - Catheter ablation is potentially curative for accessory pathway tachyarrhythmias with an immediate success rate of 95-99%. Most recent guidelines consider catheter ablation as first line therapy and recommend catheter ablation particularly, if the accessory pathway has high risk features such as a short refractory period, retrograde conduction, or multiple pathways. The complication rate for ablation is low, but includes the possibility of complete heart block and subsequent requirement for permanent cardiac pacing. This risk is inherent to ablation performed on or near the anterior surface of the AV node. Approximately 5% to 10% of accessory pathways are located in this dangerous area; risk of complete heart block for such cases is 5% to 10%. Recurrence of a functional accessory pathway after ablation occurs in 1-5%, usually within 2-4 months after ablation. Late recurrence is rare. A nonflying observation period of 3 to 4 months is appropriate to get beyond the window of most clinical recurrences and to allow healing. The appropriate documentation of successful ablation is an important aeromedical decision. Based on USAF experience with consistently negative EPS and stress testing results, ambulatory ECG monitoring is the only test recommended 3 months after ablation and if negative then return to flight is supported. Annual follow-up with interval history, physical and ambulatory ECG monitor is recommended. Accessory pathways s/p ablation is waiverable for all flying classes.

2. Atrioventricular node reentrant tachycardia (AVNRT). AVNRT is the most common mechanism of SVT (about 60% of all SVT cases). It is caused by a reentry circuit within the AV node made possible by functional dissociation within the AV node with differential electrophysiologic properties creating 2 pathways with different conduction velocities and different refractory periods, a condition favorable for reentry phenomenon to occur). The published experience on catheter ablation for AVNRT is comparable to that of WPW ECG pattern and syndrome, with a success rate approaching 99% and a recurrence rate of 1-2% and thus waiverable for all flying classes. Ablation of AVNRT is typically performed on the posterior surface of the AV node; risk of complete heart block at this location is approximately 1%. Careful explanation of risks should be done with all aircrew prior to ablation and the procedural electrophysiology/ablation study reports should be carefully reviewed prior to return to flight. Annual follow-up with interval history, physical and ambulatory ECG monitor is recommended.

3. Other supraventricular tachycardias. The remaining 10% of SVTs are due to a variety of uncommon mechanisms. These may include reentrant pathways, such as around the

sinus node (sinus node reentry) or around a surgical scar (intra-atrial reentry post-congenital heart disease repair) and automatic foci, such as focal atrial tachycardia and paroxysmal junctional tachycardia. Published experience of ablation regarding these rhythm disturbances is limited. Waiver will be recommended on a case-by-case basis with careful review of EP study by ACS.

4. Atrial flutter. Atrial flutter is most often due to a macro- reentry circuit within the right atrium including the atrial septum and the right atrial free wall and incorporating a narrow isthmus of atrial tissue between the tricuspid valve and the inferior vena cava (commonly referred to as cavo-tricuspid isthmus) which offers an accessible target for ablation to interrupt the reentry circuit. Curative ablation is very feasible, with success rates >90% approaching those of accessory pathways and AVNRT. However, atrial flutter can be atypical not following usual circuit and all atrial flutter can be associated with atrial fibrillation. Therefore, a 6-month period of observation is recommended for atrial flutter s/p ablation prior to return to flight. Careful review of actual electrophysiologic testing, ablation procedure, and chart review by ACS is necessary for prognostication and aircrew disposition. Repeat EP study and/or centrifuge testing may be necessary to FCI/IA and high performance FCII aircrew.

5. Atrial fibrillation (AF). Ablation of atrial fibrillation is less successful both immediately after the procedure and at follow-up. The success of atrial fibrillation ablation depends on the type (ex. paroxysmal, long-term, persistent, or permanent) as well as the presence of absence of structural heart disease and the degree of severity of atrial fibrosis. Overall success rates of 60% to 90% have been reported, with reoccurrences mostly within 3 to 6 months of the procedure. Specific procedures for atrial fibrillation ablation are continuously under development and refinement, however there still is an approximately 25% recurrence rate which often require repeat ablation procedures. Late recurrence is also more likely than for ablation of other mechanisms. An extended observation period of 6 months is therefore recommended in all aircrew. Graded exercise testing, 24-hour ambulatory monitoring, and echocardiography are recommended prior to return to flight. In high performance aircrew repeat EP study (with provocation, which may be done immediately after ablation during initial EP procedure) and centrifuge testing is required. Of note, recurrent AF after ablation does not necessarily mean the ablation was not successful; the member may have decreased symptoms, better rate control, and/or the ability to decrease or stop medications thus allowing for return to non-high performance flight.

Although Stroke risk decreases after successful ablation, recent data shows that those who have recurrent AF after ablation may be at an even higher risk of stroke such that the overall risk of stroke is not necessarily changed by undergoing the ablation procedure. Therefore, CHA2DS2VASc score is still used and if elevated risk then anticoagulation is recommended regardless of ablation and waiver is not recommended.

6. Ventricular Tachycardia and Ventricular Ectopy (PVC). Most published experience with ablation for VT deals with ablation performed for sustained VT or hemodynamically symptomatic nonsustained VT, often in the setting of prior myocardial infarction with ischemic scar tissue or other infiltrative or idiopathic cardiomyopathy. Ablation is often performed after

failure of one or more antiarrhythmic medications to prevent VT recurrences. Recurrence rates post-ablation varies in the clinical literature from 0% to 30% within 1-2 years. In many reports control of VT after ablation with continued use of antiarrhythmic medications is considered an ablation cure, this is not so in aircrew. Long-term success, outcomes, recurrence rates and late adverse consequences depend on the type of VT mechanism and the underlying heart disease. Most published success rates range between 50% and 75% at 6 to 12 months but very little is known beyond this time frame and thus wavier is not recommended. Ablation may be done in conjunction with AICD implantation, which is permanently disqualifying.

Specific types of VT can occur in relatively healthy individuals without other structural heart disease. This includes foci in the ventricular outflow tracts, mainly the RVOT but can also be from the LVOT or the area of the fascicles of the left bundle. These are mostly amenable to RF with success rates over 90% and thus low enough risk to allow return to unrestricted flight. Ventricular ectopy (PVC) ablation appears to have lower success rates however there is little risk of increased arrhythmia after the procedure and the PVCs either resolve or decrease in frequency. If the PVCs are idiopathic (not secondary to structural or coronary heart disease) and the indication for PVC ablation is either only high burden and/or symptoms, then return to unrestricted flight following ablation may be reasonable after an observation period.

AIMWTS review in late May of 2020 for cases receiving catheter ablation in the past five years revealed the following results. There were 31 FC I/IA cases (five disqualifications), 147 FC II cases (two disqualifications, 104 FC III cases (18 disqualifications), six ATC cases, 31 GBO cases (two disqualifications), and 13 SWA cases.

ICD-10 Codes for radiofrequency ablation procedure	
93650 93653 93654 93656	Radiofrequency ablation

ICD-10 Codes for conditions requiring catheter ablation	
I45.89 I45.6	Anomalous atrioventricular excitation (Wolff-Parkinson-White syndrome)
I47.1	Paroxysmal supraventricular tachycardia
I47.2	Ventricular tachycardia
I48.91	Atrial fibrillation
I48.82	Atrial flutter

IV. Suggested Readings

1. Page RL, Joglar JA, Caldwell MA, et al. 2015 ACC/AHA/HRS Guideline for the Management of Adult Patients with Supraventricular Tachycardia: Executive Summary. A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the Heart Rhythm Society. J Am Coll Cardiol, 2016; 67(13): 1575-1623.

2. Gray GW, Davenport ED, and Nicol ED. Clinical Aerospace Cardiovascular Medicine. Ch. 13 in: *Fundamentals of Aerospace Medicine*, 5th ed. In press, pending publication 2020.

3. Strader JR, Jr, Gray GW, Kruyer WB. Clinical Aerospace Cardiovascular Medicine. Ch. 13 in: *Fundamentals of Aerospace Medicine*, 4th ed. Philadelphia: Lippincott Williams & Wilkins, 2008; 344-45.

4. Kruyer WB and Davenport ED. Cardiology. Ch. 2 in: *Rayman's Clinical Aviation Medicine*, 5th ed., Castle Connolly Graduate Medical Publishing, LTD, 2013; 75-79.

5. Guettler N, Bron D, Manen O, et al. Management of cardiac conduction abnormalities and arrhythmia in aircrew. Heart 2019; 105:s38-49.

6. Davenport, ED and Kruyer WB. Clinical and Aeromedical Guidelines for Wolff-Parkinson-White. Presented at the Aerospace Medical Association 81st Annual Scientific Meeting, May 2010. Abstract published Aviat Space Environ Med. Mar 2010; 81(3): 272.

7. January CT, Wann LS, Alpert JS, et al. 2014 AHA/ACC/HRS Guideline for the Management of Patients with Atrial Fibrillation: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the Heart Rhythm Society. Circulation, 2014; 130: 2071–2104.

8. Stevenson WG and Tedrow U. Preventing ventricular tachycardia with catheter ablation. Lancet, 2010; 375: 4-6.

9. Packer DL, Mark DB, Robb RA, et al. Effect of Catheter Ablation vs Antiarrhythmic Drug Therapy on Mortality, Stroke, Bleeding, and Cardiac Arrest Among Patients with Atrial Fibrillation: The CABANA Randomized Clinical Trial. JAMA, 2019; 321(13):1261-1274.

Congenital Heart Disease

Revised: Apr 2023

Reviewed: Col Eddie Davenport (Aerospace cardiology consultant), Capt Joelle Thorgrimson (Royal Canadian Air Force), Col Stacey Aycock (ACS Aerospace Medicine), Dr. Max Lee (ACS Waiver Guide Coordinator), and Lt Col Paul Vu (Chief, Medical Standards Policy)

Significant Changes: Inclusion of coronary artery anomalies, pulmonary stenosis, Marfan syndrome, Ebstein's anomaly, and complex CHD. Review of most recent Canadian, American and European CHD guidelines.

I. Waiver Consideration

Congenital heart disease (CHD) includes various structural cardiac abnormalities attributable to abnormal fetal cardiac development but does not include inherited disorders that may have cardiac manifestations such as Marfan syndrome or hypertrophic cardiomyopathy.[1] Congenital heart defects, uncorrected or corrected by surgical or catheter-based procedures, including closure of PFO, are disqualifying for FC I/IA, II, and III. Congenital and structural anomalies of the heart that are not normal structural variants, other than PFO, must meet retention standards, thus ATC, SWA, and GBO personnel would need a waiver, as they require an MEB. Uncorrected hemodynamically insignificant ASD and VSD, as well as ASD, VSD, and PDA successfully corrected by surgery or catheter-based techniques, especially in childhood, may be favorably considered for waiver for all classes of flying duties. Uncorrected small PDAs and coarctation of the aorta will be considered on a case-by-case basis. Congenital valve disease such as bicuspid aortic valve disease is discussed in Aortic Valve Disease waiver guide.

Table 1: Waiver potential for congenital heart disease[1]

Flying Class (FC)	Condition	Waiver Potential	Waiver Authority	ACS Review/Evaluation
I/IA II/III and initial GBO/ATC/SWA	Hemodynamically insignificant ASD, VSD, PDA	Yes	MAJCOM[4]	Yes
	Hemodynamically significant ASD, VSD, PDA (uncorrected)	Highly Unlikely	AFRS/CMO or MAJCOM	No
	Hemodynamically significant ASD, VSD, PDA (corrected)	Yes[2]	AFRS/CMO or MAJCOM	Yes
	Coarctation of aorta	Maybe[2,3]	AFRS/CMO or MAJCOM	Yes
	PFO surgically closed	Maybe	AFRS/CMO or MAJCOM	Yes
	PFO asymptomatic/ incidental finding	N/A (not DQ)		No
	Coronary artery anomalies	Maybe	AFRS/CMO or MAJCOM	Yes
	Pulmonary stenosis (corrected)	Maybe	AFRS/CMO or MAJCOM	No
	Marfan syndrome	Maybe	AFRS/CMO or MAJCOM	Yes
	Ebstein's anomaly	Maybe	AFRS/CMO or MAJCOM	Yes
	Tetrology of Fallot	Highly Unlikely	AFRS/CMO or MAJCOM	Yes
ATC/GBO/SWA	Any congenital heart defect	Maybe	MAJCOM[4]	No

1. Waiver authority for most initial flying waiver is the AFRS/CMO. Refer to DAFMAN 48-123 Attachment 2.
2. Must wait at least six months after surgery before submitting waiver.
3. Not waiverable if PFO closed due to TIA or CVA episode. See TIA/CVA Waiver Guide.
4. Certification authority for untrained assets is AFRS/CMO.

II. Information Required for Waiver Submittal

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations. Note that CHD recurrence rates in offspring vary from 2-50% so further genetic testing should be considered in all CHD patients.[2]

NOTE: *It is required that all original cardiac imaging and electrical tracings be submitted to ACS Cardiology for independent review. Electronic submission to the ECG Library is preferred. If electronic submission is not possible, electronic media can be sent to the address below. Refer to page 2 of the Waiver Guide Compendium for additional information.*

Attn: Case Manager for [specify the appropriate MAJCOM]
USAFSAM/FECI
Facility 20840
2510 Fifth Street
Wright-Patterson Air Force Base, OH 45433-7913

A. Initial waiver request:
   1. Complete history and physical exam including description of any symptoms, treatment, medications, and activity level.
   2. Cardiology consultation.
   3. Electrocardiogram (ECG).
   4. Official report of all local echocardiograms as well as images of the most recent echocardiogram. If recent surgery, echocardiogram should be done 6 months post-op.
   5. Copies of reports and tracings/images of any other cardiac tests performed locally for clinical assessment (e.g. treadmill, Holter monitor, cardiac catheterizaion, cardiac CT or MRI). If reports not attached in AIMWTS, send to the ACS.
   6. Operative report, if any surgery.
   7. Results of medical evaluation board (MEB) (worldwide duty evaluation for ARC members), if congenital abnormalities not satisfactorily treated by surgical correction.

   Note: State in the AMS the date of submission. Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:
   1. Complete history and physical exam – to include description of any symptoms, treatment, medications, and activity level.
   2. Electrocardiogram (ECG).
   3. Additional local cardiac testing is not routinely required for re-evaluation cases followed at the ACS but may be requested in individual cases. If so, the previous ACS evaluation/review will specify details regarding any requested local testing.
   4. Copies of reports and tracings/images of any other cardiac tests performed locally for clinical assessment (e.g. treadmill, Holter monitor, cardiac cath, cardiac CT or MRI).

   Note: State in the AMS the date of submission. Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Congenital heart disease (CHD) is estimated to involve up to 1% of live births in the US.[3,4] CHD in adults includes common and uncommon defects, with and without correction by surgery or catheter-based interventions. Consideration of waiver for continued military flying duties or training requires normal or near-normal cardiovascular status and acceptably low risk of aeromedically pertinent events. Since the advent of reparative surgery for congenital cardiac defects, it is estimated that 85% of affected children survive into adulthood.[5] In 2010, researchers estimated there are approximately 1.1 million Americans over the age of 18 with congenital heart disease.[6] Longitudinal studies estimate that approximately 20% of individuals with CHD will experience tachyarrhythmias during their lifetime which can possibly become an aeromedical concern.[4]

The most common congenital disorders that will require aeromedical consideration are the atrial septal defect (ASD), ventricular septal defect (VSD), and patent foramen ovale (PFO) with/without associated atrial septal aneurysm (ASA). Patent ductus arteriosus (PDA) and coarctation of the aorta may also be seen. Hemodynamically significant defects are likely to be detected and corrected during infancy or childhood, especially VSD and PDA. Other, more complicated congenital disorders will be very unusual because most will be detected in infancy or childhood and, even if corrected, will be unacceptable for entrance into military service. Bicuspid aortic valve is discussed in the Bicuspid Aortic Valve Waiver Guide.
A full aeromedical review of congenital heart disease can be found by Nicol *et al*.[7]

Atrial Septal Defect (ASD)

There are several types of ASDs including ostium secundum (80%; failure of the septum primum to cover the fossa ovalis), ostium primum (15%; inadequate development of the endocardial cushion, thus failing to close the ostium primum), superior sinus venous defect (5%; located near the superior vena cava entry, associated with partial or complete connection of right pulmonary veins), inferior sinus venous defect (<1%; located near the inferior vena cava entry) and unroofed coronary sinus (<1%; partial or complete separation from the left atrium). ASDs allow shunting of blood flow from the left to right atrium, with resultant right-sided volume overload and enlargement of the right atrium and ventricle. A fixed splitting second heart sound and systolic pulmonary flow murmur can be found. ECG may show an incomplete right bundle branch block and right-axis deviation and chest x-ray can reveal increased pulmonary vasculature. Echocardiogram is the first-line diagnostic technique.

Presence and duration of symptom development depends on the magnitude of the pulmonary shunt to systemic flow ratio (Qp:Qs) where > 1.5 generally producing significant volume overload with resultant symptoms, including fatigue, dyspnea, functional decline, heart failure, pulmonary arterial hypertension, and arrhythmias, especially atrial fibrillation. Straining, coughing, Valsalva, anti-G straining maneuvers or positive pressure breathing may cause the blood flow to reverse, which could serve as conduit for embolic material. Moderate and even large sized ASDs may not be detected until adulthood. Many patients are minimally symptomatic during the first three decades of life although more that 70% became somewhat impaired by the fifth decade.[8] Prognosis after successful and uncomplicated closure of significant secundum and sinus venosus ASD is normal if accomplished before age 25.[9–11] Closure later in life increases

the risk of atrial fibrillation, stroke, and right heart failure. Percutaneous device closure has a risk of device movement, embolization, and infective endocarditis so aircrew may be considered restricted to dual crew operations and low performance aircraft.

Ventricular Septal Defect (VSD)

VSDs account for a third of simple CHD.[2] There are four types of VSD including perimembranous (80%), muscular (15-20%), outlet (5%)) and inlet/AVSD (<1%).[12,13] Severity of disease relates to the number, type, location and size of the defect. Hemodynamically significant defects (QP:Qs ≥ 1.5 with no significant PAH) are likely to be detected and corrected during infancy or childhood. Those repaired before age two have a good long-term prognosis[11], however, those repaired after age 40 appear to have slightly lower survival than the general population.[14] Early life surgical repair results in near normal life expectancy, however, has increased risk of arrhythmias, specifically AV conduction and aortic regurgitation. Small perimembraneous VSDs are rarely symptomatic or hemodynamically significant and usually compatible with unrestricted civilian flying, while military high-performance flying duties will be evaluated on a case-by-case basis.

VSD requiring surgery is generally aeromedically incompatible with aircrew applicants and is restricted to dual operator, non-high performance and non-flight-critical aircrew roles. Hemodynamically insignificant VSDs (QP:Qs < 1.5) will also likely be detected in infancy or childhood due to the characteristic pansystolic murmur with palpable thrill. These may not be recommended for closure because of insignificant shunting and a high likelihood, approximately 50%, of spontaneous closure over time.[8] Rarely, these present in adulthood with left ventricular volume overload, infective endocarditis, progressive aortic regurgitation or pulmonary arterial hypertension.[15] Aeromedically, aymptomatic and hemodynamically insignificant VSDs are usually compatible with civilian aviation and military flying duties in non-high performance is generally possible.

Patent Ductus Arteriosus (PDA)

PDAs range from mild to severe, and classically produce a prominent continuous ‘machinery’ murmur heard at the second left intercostal space. In full term neonates, the ductus arteriosus closes soon after birth, while persistent PDA occurs in 1 per thousand. Large PDAs are typically recognized early in life and closed pharmacologically but can be closed using a percutaneous closure device or with surgical ligation. Associated disease including BAV, subaortic stenosis, pulmonary stenosis, and aortic root disease must be ruled out with echo prior to closure. PDAs may recur in childhood during growth. If closure is stable, this is compatible with unrestricted flying, however, percutaneous device closure has a risk of device movement, embolization and infective endocarditis, which may preclude high performance flying. Small and silent PDAs may not be detected and have rare long-term risks including heart failure, infective endocarditis, and pulmonary arterial hypertension. These diagnoses generally require grounding and restrictions.

Coarctation of the Aorta

Coarctation of the aorta is narrowing of the aorta at the ductus arteriosus, which results in elevated blood pressure in the upper limbs, with normal or low pressure in the lower limbs. Associated abnormalities with coarctation include bicuspid aortic valve in >50% of patients[16], Shone complex, VSD, PDA and intracranial aneurysm. Unrepaired coarctation with a resting

gradient ≥ 20mmHg between the upper and lower extremities carries an increased risk for progressive left ventricular hypertrophy and subsequent left ventricular dysfunction, persistent systolic hypertension, as well as premature atherosclerotic cerebrovascular and coronary heart disease. Coarctation of the aorta is usually diagnosed in childhood, but up to 20% of cases are reportedly not detected until adolescence or adulthood. Long-term prognosis is related to the age of repair, with the best outcome for correction being before age nine.[17] Complications of repair include re-coarctation, aneurysm, pseudoaneurysm, and dissection.

Unrestricted flying could be considered for surgically corrected defect in early life if normotensive, with demonstrated regular cardiac MRI follow-up without evidence of re-coarctation (which can occur in 10-20% of patients) or aneurysms.[18] High-performance flying is generally not possible due to minimal data on complications in $+G_z$ environment. Concomitant dilation of ascending aorta with coarctation, is generally disqualifying.

Patent Foramen Ovale (PFO) and Atrial Septal Aneurysm (ASA)
PFO and ASA are anatomic anomalies of the interatrial septum, which may present alone or together. Asymptomatic PFO and/or ASA are typically incidental findings discovered on echocardiogram evaluation performed for unrelated indications. PFO is considered a normal variant occurs in 25-30% of the general population and is qualifying for all classes of flying duties including initial training.

Despite these defects being considered normal anatomic variants for aeromedical evaluation, PFO and ASA, alone or in combination, have been associated with possible paradoxical embolic events, notably stroke, transient ischemic attack and decompression illness. Although the relative risk for such an event may be increased, the absolute risk is low. The 2010 published CLOSURE trial showed no decrease in recurrent stroke after PFO closure via percutaneous device and a possibly significant vascular complication rate and increased risk of atrial fibrillation after PFO closure, with a 3.1% stroke rate in both the medical treatment and PFO closure arms of the trial.[19] The 2013 published PC and RESPECT trials both found that device closure of a PFO did not offer a significant benefit over medical therapy for the prevention of recurrent ischemic stroke.[20,21] Therefore, asymptomatic and hemodynamically insignificant PFO by itself is considered a normal variant and does not require waiver unless it has been percutaneously surgically closed. If closure is stable, this is compatible with unrestricted flying, however, percutaneous device closure has a risk of device movement, embolization, and infective endocarditis, which may preclude duties in a high-performance airframe.

TIA/CVA are generally incompatible with aviation duties. All aeromedical instructions in this waiver guide regarding PFO associated with CVA/TIA apply equally to ASA associated with CVA/TIA. Lastly, there is often aeromedical concern regarding increased shunts related to Valsalva-like $+G_z$ straining maneuver and positive pressure breathing. There is no data to support or refute this in aircrew without a hemodynamically significant shunt and thus no restrictions are necessary UNLESS there is a history of TIA/CVA or closure device which may preclude high performance flight.

Pulmonary Stenosis
Pulmonary stenosis can occur independently or with other defects such as Tetralogy of Fallot. It is a spectrum of disease, which is generally valvular but may also impact the right ventricular infundibulum and the supra-valvular pulmonary artery with multiple stenoses throughout the entire pulmonary tree. This latter disease type is generally incompatible with flying duties. All disease forms are progressive and milder forms that were not treated in childhood with balloon valvuloplasty are typically discovered during the initial aircrew assessment with a systolic murmur. Risks include atrial arrythmia secondary to right atrial dilation, right ventricular hypertrophy, heart failure, and infective endocarditis risk.[1] Those with pulmonary valve replacement may have recurrences as well as pulmonary regurgitation. Due to the progressive nature, recurrence rates and risks, pulmonary stenosis is typically not compatible with aircrew duties but should be reviewed on case-by-case basis.

Coronary Artery Anomalies
Detection of anomalous coronary arteries incidence is increasing with the use of CT coronary angiography, however, the baseline in the general population is reported at 1%.[22] There are many clinically non-significant low risk variations, yet exercise induced flow-limiting anomalies exist, including retro-aortic and pre-pulmonary anomalous coronary arteries. High risk or malignant variants include single coronary arteries, coronary atresia, intramural to the aortic wall and passing between the right ventricular outflow tract and aortic root, which likely require restrictions or disqualification. These high risk variants, and those with associated symptoms, require negative perfusion imaging and appropriate postoperative investigations following a surgical intervention to return to flight duties.[23] While investigations are being completed, aircrew should remain DNIF/DNIC.

Marfan syndrome
Marfan syndrome includes a variable spectrum of disease including cardiac, ophthalmologic, musculoskeletal, and systemic manifestations. Aircrew with Marfan syndrome may have a cardiac murmur such as aortic or mitral regurgitation. Marfan syndrome is associated with dilation of the aortic root and ascending aorta with effacement of the sinotubular junction, thus the entire thoracic aorta must be evaluated. If normal, along with no other systemic involvement, return to restricted, dual operator, non-high performance, and non-flight-critical aircrew roles may be possible, with annual follow-up. While investigations are being completed, aircrew should remain DNIF/DNIC.

Ebstein's anomaly
Ebstein's anomaly occurs in only 0.005% of live births.[24] It varies in severity with involvement of the tricuspid valve leaflets, which are displaced towards the apex of the right ventricle resulting in a large right atrium, small right ventricle, and abnormalities of the conduction system. It can occur with other defects including ASD, VSD, and PS and typically presents with palpitations secondary to AV node re-entry tachycardia, atrial fibrillation, or atrial flutter, and clinical symptoms of fatigue, reduced exercise tolerance, dyspnea on exertion, cyanosis, or heart failure. Half of individuals with Ebstein's anomaly have ASD or PFO. Aircrew should remain DNIF/DNIC during investigations and interventions. Restrictions to dual operated, non-high performance, and non-flight-critical aircrew roles may be possible.

Complex CHD
The only exception that may be considered for civilian aircrew duties is tetralogy of Fallot as surgical interventions have resulted in near normal life expectancy.[25] However, these conditions are generally incompatible with military aircrew duties.

Review of the AIMWTS database from Mar 2020 through Mar 2023 revealed 60 cases of CHD with a diagnosis of ASD, VSD, PFO, PDA, coarctation, or other congenital cardiac anomalies. The breakdown of the number of waivers and number of total cases are tabulated below. Of the 5 DQs, only 1 was specific to the congenital cardiac abnormality and/or associated complications.

Please use only *these* ICD-10 codes for AIMWTS coding purposes		(# of waivers / total # of cases)					
		FC I/IA	FC II	FC III	ATC	GBO	SWA
Q21.0	Ventricular septal defect	0/0	7/7	1/1	0/0	1/1	0/0
Q21.1	Atrial septal defect, patent foramen ovale, ostium primum atrial septal defect, and ostium secundum atrial septal defect	1/2	18/19	11/12	0/0	6/6	4/4
Q21.9	Congenital malformation of the cardiac septum, unspecified	0/0	0/0	0/0	0/0	0/0	0/0
Q22.5	Ebstein's abnormality	0/0	0/0	0/0	0/0	0/0	0/0
Q24.5	Malformation of coronary vessels	2/2	0/0	0/0	0/0	0/0	0/0
Q24.9	Congenital malformation of heart, unspecified	0/0	0/0	0/0	0/0	0/0	0/0
Q25.0	Patent ductus arteriosus	1/1	2/3	1/2	0/0	0/0	0/0
Q25.1	Coarctation of aorta	0/0	0/0	0/0	0/0	0/0	0/0
Q25.6	Stenosis of pulmonary artery	0/0	0/0	0/0	0/0	0/0	0/0
Q87.4	Marfan syndrome	0/0	0/0	0/0	0/0	0/0	0/0

IV. References

1. Stout, K. K. *et al.* 2018 AHA/ACC Guideline for the Management of Adults With Congenital Heart Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines | Circulation. *Circulation* **139**, 698–800 (2018).
2. Baumgartner, H., Bonhoeffer, P., De Groot, N. M. S. & et al. ESC guidelines for the management of grown-up congenital heart disease (new version 2010). The task force on the management of grown-up congenital heart disease of the European Society of Cardiology (ESC). *Eur Heart J* **31**, 2915–57 (2010).
3. Dolbec, K. & Mick, N. Congenital Heart Disease. *Emerg Med Clin N Am* **29**, 811–27 (2011).
4. Asirvatham, S., Connolly, H., McLeod, C. & et al. Atrial arrhythmias (including AV block) in congenital heart disease. *UpToDate* (2013).
5. Warnes, C., Williams, R., Bashore, T. & et al. ACC/AHA 2008 Guidelines for the Management of Adults with Congenital Heart Disease. *J Am Coll Cardiol* **52**, e143-263 (2008).
6. Marelli, A., Gilboa, S., Owen, D. & et al. Estimating the Congenital Heart Disease Population in the United States in 2010 – What are the Numbers? *J Am Coll Cardiol* **59**, e787-788 (2012).
7. Nicol, E. D., Manen, O., Guettler, N., Bron, D., Davenport, E. D., Syburra, T., Gray, G., d'Arcy, J., & Rienks, R. (2019). Congenital Heart Disease in aircrew. *Heart*, *105*, s1–s73.
8. Marelli, A. in *Congenital Heart Disease in Adults. Ch. 69* (Saunders, 2011).

9. Kruyer, W. B. & Davenport, E. D. Cardiology. in *Rayman's Clinical Aviation Medicine, 5th Ed* 106–15 (Castle Connolly Graduate Medical Publishing, 2013).
10. Maron, B. J. & Zipes, D. P. Eligibility recommendations for competitive athletes with cardiovascular abnormalities. in *J Am Coll Cardiol* vol. 45 (8) 1326–1333 (2005).
11. Gray G, Davenport E, Nicol E. Aerospace Cardiology in *Fundamentals of Aerospace Medicine, 5th ed*., Philadelphia: Lippincott Williams & Wilkins, 2022
12. Perloff, J. K. & Marelli, A. Ch 17: Ventricular Septal Defect. in *Clinical Recognition of Congenital Heart Disease* 283–316 (Elsevier Health Sciences, 2011).
13. Baumgartner, H., De Backer, J., Babu-Narayan, S. V. & et al. 2020 ESC Guidelines for themanagement of adult congenital heart disease. *European Heart Journal* **42**, 563–645 (2021).
14. Menting, M. E. *et al.* The unnatural history of the ventricular septal defect: outcome up to 40 years after surgical closure. *J Am Coll Cardiol* **65**, 1941–1951 (2015).
15. Marelli, A., Beauchesne, L., Colman, J. & et al. Canadian Cardiovascular Society 2022 Guidelines for Cardiovascular Interventions in Adults with Congenital Heart Disease. *Canadian Journal of Cardiology* **38**, 862–96 (2022).
16. Aboulhosn, J. & Child, S. J. Left ventricular outflow obstruction: subaortic stenosis, bicuspid aortic valve, supravalvar aortic stenosis, and coarctation of theaorta. *Circulation* **114**, 2412–22 (2006).
17. Webb, G. Congenital Heart Disease Ch 62. in *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine, 10th Ed* (Saunders Elsevier, 2014).
18. Joint Aviation Authorities JAA. Manual of Civil Aviation Medicine. (2009).
19. Furlan, A., Reisman, M., Massaro, J. & et al. A Prospective Multicenter, Randomized Controlled Trial to Evaluate the Safety and Efficacy of the STARflex Septal Closure System Versus Best Medical Therapy in Patients with a Stroke or Transient Ischemic Attached due to Presumed PAradoxical Embolism Through a Patent Foramen Ovale. *Stroke* **41**, 2872–83 (2010).
20. Meier, B., Kalesean, B., Mattle, H. P. & et al. Percutaneous Closure of Patent Foramen Ovale in Cryptogenic Embolism. *N Eng J Med* **368**, 1083–1100 (2013).
21. Carroll, J. D., Saver, J. L., Thaler, D. E. & et al. Closure of Patent Foramen Ovale versus Medical Therapy after Cryptogenic Stroke. *N Eng J Med* **368**, 1092–1100 (2013).
22. Yamanaka, O. & Hobbs, R. E. Coronary artery anomalies in 126,595 patients undergoing coronary arteriography. *Cathet Cardiovasc Diagn* **21**, 28–40 (1900).
23. Guettler, N., Nicol, E., D'Arcy, J. L. & et al. Non-coronary cardiac surgery and interventional cardiology procedures in aircrew. *Heart* (2018).
24. Lupo, P. J., Langlois, P. H., Mitchell, L. E. & et al. Epidemiology of Ebstein anomaly: Prevalence and patterns in Texas, 1999–2005. *Am J Med Genet Part A* **155A**, 1007–14 (2011).
25. Murphy, J. G., Gersh, B. J., Mair, D. D. & et al. Long-term outcome in patients undergoing surgical repair of tetralogy of Fallot. *N Eng J Med* **329**, (1993).

Aerospace Medicine Waiver Guide

Coronary Artery Calcium Testing

Revised: Aug 2022
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Significant Changes: This edition includes updated waiver authorities, submission requirements, AIMWTS data, aeromedical concerns, and updated suggested readings.

I. Waiver Consideration

Any degree of coronary artery disease is disqualifying for all flying classes, to include ATC, GBO, and SWA personnel. Coronary Artery Calcium Scores (CACS) of 10 or greater are considered abnormal and requires waiver submission. For the purpose of aeromedical disposition, scores of 0-9 are considered normal and therefore meets standards for all classes of flying duties. A positive CACS is a non-invasive assessment of the presence of CAD, therefore even if additional cardiac testing is negative, waiver and ongoing follow-up are still necessary. Aviators who received a CACS test as part of a local evaluation for symptoms suggestive of CAD should complete their evaluation as directed by the local cardiologist.

Table 1: Waiver Potential for Coronary Artery Calcium Testing

CAC Score	Flying Class	Waiver Potential Waiver Authority	Required ACS Review and/or ACS Evaluation
0-9	FC I/IA/II/ III	No waiver necessary[1]	No
10-99	FC I/IA	No AFRS/CMO	No
	II, GBO, ATC, SWA and III	Yes MAJCOM	Yes - evaluation initially and every 1-4 years thereafter[2, 3]
100-399	FC I/IA	No AFRS/CMO	No
	II, GBO, ATC, SWA, and III[4]	Yes MAJCOM	Yes - evaluation initially and then every 1-3 years[2, 3]
400+	FC I/IA	No AFRS/CMO	No
	II, GBO, ATC, SWA, and III[4]	Yes MAJCOM	Yes - evaluation initially with mandatory coronary angiography; re-evaluation annually[2]

1. Reminder: All cardiology tests (e.g., Holter, CAC testing, echocardiogram, ECG, treadmill, cardiac catheterization) on all flying classes must be sent to the ECG Library.
2. Need for coronary angiography will be based on Astro-CHARM calculation and results of non-invasive testing
3. If coronary angiography is accomplished (invasive or CT coronary angiography) then follow Coronary Artery Disease waiver guide. All images regardless of outcome need to be sent to ECG Library / ACS for review.
4. Waiver for untrained FC II and FC III unlikely.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Complete history and physical examination – to include detailed description of any symptoms, exercise history, and CAD risk factors (positive and negative). *Include the reason the CAC test was obtained.*
2. Report of the CAC score and images if available. Please also include all reports, images, and tracings of any other cardiac tests performed locally for clinical assessment (e.g. echocardiography, treadmill, Holter, or angiography).
3. All CACS ≥10 require imaging stress testing (stress echocardiogram or nuclear stress test), and fasting lipids to calculate an ACC/AHA and Astro-CHARM 10 year risk score (Astro-CHARM includes CACS in the scoring).
4. Additional local cardiac testing is not routinely required but may be requested in individual cases.
5. Alternatively, for all CACS 10, CT coronary angiography can be done in addition to or in place of all other testing.

B. Renewal Waiver Request:

1. History – brief summary of previous CT results and findings at ACS. Address interim cardiac symptoms (including negatives), exercise/activity level, coronary artery risk factors, and all medications.
2. Local follow-up cardiac testing is not routinely required prior to ACS re-evaluation. If requested for individual cases, it will have been specified in the report of the previous ACS evaluation.
3. Copies of reports and tracings of any other cardiac tests if performed locally for clinical assessment (e.g. echocardiography, treadmill, Holter, or angiography).

All original cardiac imaging and electrical tracings must be submitted to ACS. For image submission process, refer to page 2.

III. Aeromedical Concerns

Coronary artery calcium (CAC) testing has emerged as a helpful tool in cardiac risk stratification, prevention, and shared decision making regarding initiation of statin therapy. The presence of any amount of coronary artery calcium confirms the presence of atherosclerotic coronary artery disease. As such, CAC-testing is simply a non-invasive assessment of the presence of coronary artery disease. It is important to note that while the presence of CAC confirms the diagnosis of coronary artery disease, the converse is not true: it is possible to have coronary atheromas that have not calcified and thus are not detected by this type of testing.

The MESA (Multi-Ethnic Study in Atherosclerosis) trial demonstrated a strong and graded association between CAC scores and 10-year ASCVD risk. For every doubling of CAC scores, the 10-year ASCVD risk rose 14% in this prospective study that followed patients for an average of 10.2 years. Higher CAC scores indicate detection of greater amounts of calcium and larger overall burden of coronary artery disease. The reported CAC score is a total CAC burden, the sum of the scores of all individual calcium deposits.

Even minor amounts of detectable coronary artery calcium result in significant coronary event rates, while more substantial CAC results in higher event rates. This predictive value of CAC testing is particularly useful for younger, asymptomatic populations with low to moderate risk score profiles (such as Framingham). In particular, the Prospective Army Coronary Calcium (PACC) project noted that in a healthy cohort of roughly 2,000 active-duty army personnel, the presence of any amount of detectable coronary artery calcium increased coronary heart events by nearly 12-fold. All the events in this cohort occurred in personnel between ages 40 and 50 years old with a Framingham risk score less than 10%, and with CAC scores as low as 10.

In addition to the ACC/AHA 10-year ASCVD Pooled Cohort Equation, the Astronaut Cardiovascular Health and Risk Modification (Astro-CHARM) includes CAC scoring in the risk calculation. Astro-CHARM also incorporates family history of CAD as well as optional high-sensitivity C-reactive protein (CRP) lab results. Unlike other risk scores, Astro-CHARM was validated utilizing data from a cohort resembling military aircrew. Astro-CHARM is validated for individuals' 40-years old and older.

Screening aircrew with CACS if not low risk (>6-10% ten-year cardiovascular event rate) using a validated risk score is appropriate based on international aerospace cardiology consensus and many published guidelines. The aeromedical concerns surrounding abnormal CAC tests are the same as those for individuals with angiographically proven asymptomatic CAD. The major aeromedical concerns are myocardial ischemia presenting as sudden cardiac death, acute myocardial infarction, stable or unstable angina, or ischemic dysrhythmias; any of which could cause sudden incapacitation or significantly impair flying performance or mission completion. Additional concerns surround the need for invasive cardiac procedures and revascularization, frequent contact with cardiac specialists, and comprehensive medication regimens. At present, there is no reliable method of detecting asymptomatic progression of CAD short of frequent non-invasive monitoring, combined with periodic invasive testing.

Review of AIMWTS data from August 2011 through September 2021 revealed a total of 20 waiver packages for CACS only. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use only this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)				
		IFC I/IA	FC II	FC III	GBO	SWA
Z13.6	Encounter for screening for cardiovascular disorders	0	11/13	4/4	1/1	1/2

IV. Suggested Readings / References

1. Budoff, M. J., Young, R., Burke, G., Jeffrey Carr, J., Detrano, R. C., Folsom, A. R., Kronmal, R., Lima, J., Liu, K. J., McClelland, R. L., Michos, E., Post, W. S., Shea, S., Watson, K. E., & Wong, N. D. (2018). Ten-year association of coronary artery calcium with atherosclerotic cardiovascular disease (ASCVD) events: the multi-ethnic study of atherosclerosis (MESA). *European heart journal*, *39*(25), 2401–2408. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6030975/pdf/ehy217.pdf
2. Taylor AJ, Bindeman J, Feuerstein I, Cao F, Brazaitis M, O'Malley PG. Coronary calcium independently predicts incident premature coronary heart disease over measured cardiovascular risk factors: mean three-year outcomes in the Prospective Army Coronary Calcium (PACC) project. J Am Coll Cardiol. 2005;46(5):807-814. https://www.sciencedirect.com/science/article/pii/S0735109705012672?via%3Dihub
3. Khera, A., Budoff, M. J., O'Donnell, C. J., Ayers, C. A., Locke, J., de Lemos, J. A., Massaro, J. M., McClelland, R. L., Taylor, A., & Levine, B. D. (2018). Astronaut Cardiovascular Health and Risk Modification (Astro-CHARM) Coronary Calcium Atherosclerotic Cardiovascular Disease Risk Calculator. *Circulation*, *138*(17), 1819–1827. https://www.ahajournals.org/doi/10.1161/CIRCULATIONAHA.118.033505?url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&rfr_dat=cr_pub++0pubmed&
4. Gray G, Davenport ED, Bron D, Rienks R, d'Arcy J, Guettler N, Manen O, Syburra T, Nicol ED. The challenge of asymptomatic coronary artery disease in aircrew; detecting plaque before the accident. *Heart*. 2019;105 (suppl 1);s17-s24. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6256297/pdf/heartjnl-2018-313053.pdf
5. Davenport ED, Gray G, Rienks R, Bron D, Syburra T, d'Arcy J, Guettler NJ, Manen O, Nicol ED. Management of established coronary artery disease in aircrew without myocardial infarction or revascularization. *Heart*. 2019;105 (suppl 1);s25-s30. https://heart.bmj.com/content/heartjnl/105/Suppl_1/s25.full.pdf
6. Davenport ED, Syburra T, Gray G, Rienks R, Bron D, Manen O, d'Arcy J, Guettler NJ, Nicol ED. Management of established coronary artery disease in aircrew with previous myocardial infarction or revascularization. *Heart*. 2019;105 (suppl 1);s31-s37. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6256305/pdf/heartjnl-2018-313055.pdf
7. Lloyd-Jones D, Lewis C, Schreiner P, Shikany J, Sydney S, Reis J. The Coronary Artery Risk Development In Young Adults (CARDIA) Study. JACC. 2021 Jul, 78 (3) 260-277. https://www.jacc.org/doi/epdf/10.1016/j.jacc.2021.05.022

WAIVER GUIDE
Updated: Dec 2015
Supersedes Waiver Guide of Mar 2012
By: Lt Col Hui Ling Li (RAM 16) and Dr Dan Van Syoc
Reviewed by: Lt Col Eddie Davenport, Chief ACS Cardiologist

CONDITION:
Coronary Artery Disease (Dec 2015)

I. Waiver considerations.

Coronary Artery Disease (CAD) is disqualifying for all classes of flying duties to include GBO, ATC, and SWA personnel. CAD is disqualifying for retention if associated with myocardial infarction, major rhythm disturbances, congestive heart failure, angina, silent ischemia or for maintenance on any medication for prevention of angina, CHF or rhythm disturbance. Waiver is not recommended for FC I/IA or for unrestricted FC II/III duties. Severity of disease is defined below and categorized as Luminal irregularities only (LI), Mild or minimal (MinCAD), Moderate (MODCAD) or Severe (SCAD). Depending on the severity and extent of disease, waiver may be considered for categorical FC II/III duties (restricted to low performance aircraft defined as <2.5 sustained +Gz). Waiver may be considered for Initial FC II for Flight Surgeons, but will be similarly restricted. The only exception is that luminal irregularities (LI) only may be considered for unrestricted FC II/III duties. Additionally, modifiable risk factors **must** be acceptable, including but not limited to no use of tobacco products, no diabetes, controlled hypertension (per ACC/AHA guidelines), acceptable lipid profile (treated or untreated per ACC/AHA guidelines), and compliance with medications. These risk factors **must** be acceptable to both gain **and** maintain the waiver. Degree of coronary

Table 1: Summary of CAD Categories and ACS Requirements

CAD Category Classification	Flying Class	Waiver Potential Waiver Authority	Required ACS Review and/or ACS Evaluation
Luminal irregularities (LI) only (no graded % stenoses) $*	FC II/III ATC/GBO/SWA	Yes MAJCOM	ACS evaluation initially and four years later, then every two years**
MinCAD$# Aggregate <50% No left main disease	FC IIA rated aviators GBO ATC SWA Restricted FC III	Yes AFMRA Yes MAJCOM	ACS evaluation initially and annually ACS evaluation initially and annually**
ModCAD$+@ Aggregate ≥50% and <120%, and/or any gradable left main disease	FC IIC pilots FC IIA navigators & flight surgeons Restricted FC III GBO/ATC SWA	Yes AFMRA Yes MAJCOM	ACS evaluation initially and annually ACS evaluation initially and annually
SCAD$∫ Aggregate ≥120% or max lesion >70% or left main ≥50%	All Flying Classes	No AFMRA	N/A
Any CAD	FC I and FC IA Initial FC II/III, SWA, ATC, and GBO	No AETC	N/A

* Luminal irregularity only is eligible for unrestricted FC II/III waiver.
** ACS annual evaluation not required for LI or MinCAD for ATC/GBO/SWA personnel unless requested by waiver authority.
# MinCAD is eligible for FC IIA waiver.
+ ModCAD is eligible for FC IIC waiver for pilots, limited to low performance aircraft with another qualified pilot. For navigators and flight surgeons, waiver is FC IIA.
@ MinCAD and ModCAD are eligible for restricted FC III waiver, limited to low performance aircraft.
∫ SCAD (aggregate ≥120%) is disqualifying without waiver recommended. SCAD with a maximum lesion >70% (SCAD>70) and CAD with a left main coronary lesion ≥50% are also disqualifying without waiver recommended.
$ No indefinite waivers

Individuals with a waiver for LI only will be reevaluated at the ACS four years after diagnosis, then every two years thereafter. Individuals with a waiver for MinCAD and ModCAD will be reevaluated at the ACS annually. Successful modification of cardiac risk factors must be demonstrated for LI only, MinCAD and ModCAD. Additional criteria for waiver of LI only and

MinCAD include, but may not be limited to: no history suggestive of ischemic symptoms, no prior cardiac events (e.g. unstable angina, myocardial infarction) and normal left ventricular function. Repeat coronary angiography will not be required for LI only or for MinCAD in the absence of any suggestion of CAD progression or symptoms suggestive of ischemia. Additional criteria for waiver of ModCAD include, but may not be limited to: only one lesion of 50-70% stenosis, normal nuclear stress imaging study in the distribution of the 50-70% lesion, no history suggestive of ischemic symptoms, no prior cardiac events (e.g. unstable angina, myocardial infarction) and normal left ventricular function. Follow-up coronary angiography will be performed for ModCAD every five years routinely, or sooner depending on degree of risk factor improvement, complexity of disease, or for symptoms suggestive of ischemia or deterioration in noninvasive testing.

AIMWTS review in Dec 2015 revealed a total of 246 cases with known coronary artery disease. This total includes those with MI and revascularization as well. Breakdown of cases was as follows: 160 FC II cases (56 disqualifications), 75 FC III cases (29 disqualifications), 6 ATC/GBC cases (2 disqualifications), and 5 MOD cases (2 disqualifications). Of the total of 89 disqualified cases, the vast majority were disqualified primarily for cardiac disease.

II. Information Required for Waiver Submission.

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines/recommendations.

The AMS for initial waiver for coronary artery disease should contain the following information:
A. Complete history and physical exam – to include description of any symptoms, blood pressure, medications, and activity level.
B. Cardiology consult.
C. Electrocardiogram (ECG).
D. Report and copy of coronary angiography to the ACS.
E. Copies of reports and tracings/images of any other cardiac tests performed locally for clinical assessment (e.g. treadmill, cardiac cath, cardiac CT or MRI). If reports not attached in AIMWTS, send to the ACS.
F. Results of MEB or worldwide duty evaluation (for ARC members), if required (e.g. on medications or MI, etc.).

The AMS for waiver renewal should contain the following information:
A. Complete history and physical exam – to include description of any symptoms, medications, and activity level.
B. Electrocardiogram (ECG).
C. Additional local cardiac testing is not routinely required for re-evaluation cases followed at the ACS but may be requested in individual cases. If so, the previous ACS evaluation/review will specify details regarding any requested local testing.

D. Copies of reports and tracings/images of any other cardiac tests performed locally for clinical assessment (e.g. treadmill, Holter monitor, cardiac cath, cardiac CT or MRI). If reports not attached in AIMWTS, send to the ACS.

For image submission process, refer to page 2.

III. Overview.

This waiver guide addresses only asymptomatic coronary artery disease that has not been treated by revascularization (e.g. stent, bypass surgery). Refer to the Coronary Artery Revascularization waiver guide for revascularization cases.

Coronary artery disease (CAD) is the result of coronary artery plaque development, reducing oxygen supply to the myocardium.[1] It is the leading cause of death and premature, permanent disability of American males and females.[2, 3] It accounts for approximately 16% of all deaths each year.[4] In spite of tremendous progress regarding CAD therapy, about 50% of initial and recurrent acute events continue to be fatal. Risk factors included older age, male sex, hypertension, hyperlipidemia, diabetes, obesity, smoking, and sedentary lifestyle.[5, 6] Initial symptoms may include incapacitating angina, dyspnea, arrhythmia with altered consciousness or sudden death. Heat stress, hypoxia, high +Gz maneuvers and other features of the unique military cockpit/aircraft environment may provoke ischemia in individuals with pre-existing coronary artery lesions. CAD is the leading cause of disqualification for aviators.[7]

Coronary angiography is the golden standard for determining the presence and extend of CAD.[6] Clinically, significant CAD is defined as one or more lesions with ≥50% stenosis (diameter reduction) by coronary angiography.[7] In the clinical literature, such disease is nearly always symptomatic, since it would rarely be identified otherwise. When treated medically, patients with this degree of disease are reported to show >5% per year annual cardiac event rates in favorable prognostic subgroups. Although the term significant coronary artery disease (SCAD) has historically also been applied to aviators discovered to have a maximal stenosis ≥50%, event rates encountered in the clinical population may not accurately predict prognosis in the younger and relatively healthier aviator population with *asymptomatic* CAD.

To evaluate the actual risk associated with asymptomatic CAD, the Aeromedical Consultation Service (ACS) analyzed initial and long-term follow-up data from approximately 1,500 asymptomatic military aviators with coronary angiography. For aviators with SCAD as defined above, average annual cardiac event rates exceeded 2.5% per year at 2, 5 and 10 years of follow-

up. To further stratify risk, the SCAD group was divided into two subsets of SCAD severity, SCAD50-70 (worst lesion 50-70%) and SCAD>70 (worst lesion >70%). Detailed examination of the SCAD50-70 subset revealed that extent of disease (aggregate of lesions) at the time of index coronary angiography could further be stratified into a low-risk versus high-risk subjects. This new stratification used an aggregate of lesions defined as the arithmetic sum of all graded lesions, e.g. 60% lesion + 20% lesion + 30% lesion = aggregate of 110%. Aggregate <120% identified a lower-risk SCAD50-70 subgroup with an average annual event rate <1% per year at ten years of follow-up. Subsequent analysis of the group with minimal coronary disease (MCAD, defined at that time as maximal stenosis <50%) also showed that aggregate was significantly predictive of events albeit low.

Because aggregate successfully stratified cardiac risk, all groups with any CAD (combined SCAD and MCAD) with a maximal lesion $\leq$70%, was submitted to a similar analysis. In this combined group, aggregate was highly predictive of event-free survival ($p<0.00004$). Specifically, aviators with an aggregate <50% showed an average annual event rate of 0.6% per year, while those with an aggregate $\geq$50% but <120% had an average annual event rate of 1.1% per year. (Although a rate of 1.1% slightly exceeds the 1%/year threshold, the data reviewed predated the routine use of lipid-lowering therapy for secondary prevention, which would be expected to reduce events by an additional 30-40%).

By way of comparison, clinical literature reports annual cardiac event rates of about 0.5% per year in general population studies of apparently healthy asymptomatic males aged 35-54 years. Similarly, follow-up studies of male subjects with normal coronary angiography, who in most cases presented with a chest pain syndrome, report annual cardiac event rates of 0.2-0.7% per year. Annual cardiac event rates in apparently healthy USAF aviators have been reported by the ACS as $\leq$0.15% per year for males aged 35-54 years although more recent data approaches the expected 0.5% per year rate.

From this database analysis, the current aeromedical classification of asymptomatic CAD is based on aggregate, with minimal CAD (MinCAD) defined as an aggregate <50%, and moderate CAD (ModCAD) defined as an aggregate $\geq$50% but <120%. Significant CAD is now defined as an aggregate $\geq$120%. A demonstrated maximum lesion >70% is also considered SCAD.

Graded lesions in the left main coronary artery are treated more cautiously due to the unfavorable prognosis associated with left main disease. Left main coronary artery lesions <50% stenosis are defined as ModCAD, assuming that other criteria for that classification are met. Left main lesions $\geq$50% stenosis are considered SCAD.

An additional category of CAD was more recently identified from the ACS database – luminal irregularities (LI) only. LI only describes coronary angiography with irregular arterial edges due to atherosclerotic plaque but less than gradable 10-20% stenosis (diameter reduction). LI only represents a subset of CAD with event rates higher than those with truly normal coronary angiography (smooth arterial edges). A review of the ACS database showed that aviators with LI only on coronary angiography had no events in the first five years after diagnosis. However, between 5 and 10 years follow-up, cardiac event rates were 0.54% per year compared to 0.1%

per year for those with truly normal coronary angiography. This represents a risk similar to MinCAD in the first five years of follow-up.

IV. Aeromedical Concerns.

The aeromedical concern is myocardial ischemia presenting as sudden cardiac death, acute myocardial infarction, stable or unstable angina or ischemic dysrhythmias, any of which could cause sudden incapacitation or significantly impair flying performance. At present, there is no reliable method of detecting asymptomatic progression of CAD short of frequent noninvasive monitoring, combined with periodic invasive testing.[8]

Because cardiac catheterization of asymptomatic aviators with abnormal noninvasive testing is only recommended if the risk of CAD exceeds a predetermined threshold, local catheterization of asymptomatic aircrew for aeromedical indications alone is strongly discouraged. Where catheterization is indicated for clinical reasons, then of course the aviator should be managed as any other clinical patient would be.

ICD 9 Codes for Coronary Artery Disease	
414	Other forms of chronic ischemic heart disease
414.0	Coronary atherosclerosis
414.8	Other specified forms of chronic ischemic heart disease
414.9	Chronic ischemic heart disease, unspecified

ICD 10 Codes for Coronary Artery Disease	
I25.89	Other forms of chronic ischemic heart disease
I25.10S	Atherosclerotic heart disease of native coronary artery without angina pectoris
I25.9	Chronic ischemic heart disease, unspecified

V. References.

1. Pflieger, M, Winslow BT, Mills K and Dauber I. Medical Management of Stable Coronary Artery Disease. Am Fam Physician, 2011; 83 (7): 819-26.
2. Go AS, Mozaffarian D, Roger VL, et al. Heart Disease and Stroke Statistics – 2014 Update: A Report from the American Heart Association. Circulation, 2013; 129: e28-e292.

3. American Heart Association. *2014 Heart and Stroke Statistical Update.* Dallas, Texas: American Heart Association, 2015.
4. Screening for Coronary Heart Disease with Electrocardiography: Recommendation Statement. Am Fam Physician, 2014; 89(2): 136A-136C.
5. The Guide to Clinical Preventive Services 2014. U.S. Preventive Service Task Force, pp 25-26.
6. Hall SL and Lorenc T. Secondary Prevention of Coronary Artery Disease. Am Fam Physician, 2011, 83(7): 819-826.

7. Davis JR, Johnson R, Stepanek J, and Fogarty JA. Clinical Aerospace Cardiovascular Medicine. Ch.13 in *Fundamentals of Aerospace Medicine*, 4rd ed., Lippincott Williams & Wilkins, 2008.
8. Kruyer WB and Davenport ED. Cardiology. Ch. 2 in *Rayman's Clinical Aviation Medicine*, 5th ed., New York: Castle Connolly Graduate Medical Publishing, LTD, 2013.

Additional References:

Barnett S, Fitzsimmons P, Thompson W, Kruyer W. The natural history of minimal and significant coronary artery disease in 575 asymptomatic male military aviators. *Aviat Space Environ Med*, Mar 2001; 72(3): 229-30. Abstract

Fitzsimmons PJ, Thompson WT, Barnett S, Kruyer WB. Natural history of asymptomatic angiographic coronary artery disease in 575 young men: Long-term study of 15 years. J Am Coll Cardiol, 2001; 37 (2) Suppl A: 235A. Abstract

Kruyer W, Fitzsimmons P. Coronary artery disease and aerospace medicine – A review of 1504 asymptomatic military aviators with coronary angiography and clinical follow-up. Aviat Space Environ Med, 2001; 72 (3): 229-30. Abstract

Pickard JS, Fitzsimmons PJ, Kruyer WB. Risk stratification of asymptomatic male military aviators with 50-70% maximal coronary stenoses. Aviat Space Environ Med, 2002; 73(3): 287. Abstract

Pickard J, Fitzsimmons P, Kruyer WB. Risk stratification of asymptomatic male military aviators with minimal and moderate coronary artery disease. Aerospace Medical Association 74th Annual Scientific Meeting, May 2003. Abstract published Aviat Space Environ Med, 2003; 74 (4): 459. Abstract

Zarr SP, Pickard J, Besich WJ, Thompson BT, Kruyer WB. Normal coronary angiography versus luminal irregularities only: Is there a difference? Aerospace Medical Association 75th Annual Scientific Meeting, May 2004. Abstract published Aviat Space Environ Med, 2004; 75 (4, Suppl II): B91. Abstract

WAIVER GUIDE
Updated Jun 2016
Supersedes Waiver Guide of Aug 2012
By: *Lt Col (Dr.) Paul De Florio, Lt Col (Dr.) Eddie Davenport (ACS Chief Cardiologist) and Dr. Dan Van Syoc*

CONDITION:
Coronary Artery Revascularization (Jun 2016)

I. Waiver Considerations.

Coronary artery disease and coronary artery revascularization are disqualifying for all classes of flying duty and retention. The events triggering revascularization are critical, as there is greatly increased morbidity and mortality in the setting of MI. If there is evidence of myocardial infarction (ECG changes, or cardiac enzymes elevation) then they must meet criteria for the myocardial infarction waiver policy. In general, revascularization should not be done for asymptomatic coronary artery disease. ACS review and evaluation is required for waiver consideration. Waiver restricted to low performance aircraft may be considered for all flying classes. Coronary artery revascularization is also disqualifying for ATC/GBO/SWA duty as well as for retention purposes, and MEB and waiver is required before return to duty.

Waiver for pilots, limited to FC IIC (low performance aircraft with another qualified pilot) was approved by the Aerospace Medicine Corporate Board in 2008. Criteria for waiver consideration for all aviators include (must meet all of the below):
A. Normal left ventricular wall motion and systolic function,
B. Complete revascularization; all lesions with $\geq$50% stenosis successfully treated,
C. The sum of all remaining stenosis should be less than 120%,
D. No reversible ischemia on noninvasive testing (off cardioactive medicines),
E. For PCI, no restenosis over 50%,
F. Successful risk factor modification,
G. A minimum DNIF observation period of six months post procedure.

ACS evaluation for initial waiver consideration will include complete noninvasive testing and follow-up coronary angiography. If waiver is recommended and granted, waiver will be valid for one year with annual ACS re-evaluation required for waiver renewal consideration. In addition, routine serial coronary angiography *is required at five year intervals*. Follow-up coronary angiography may be recommended sooner if indicated by symptoms, noninvasive test results, or failure to control risk factors.

Table 1: Coronary Artery Revascularization and Waiver Potential

Flying Class	**Waiver Potential** **Waiver Authority**	**ACS** **Review/Evaluation**
I/IA	Not Waiverable	NA
II (unrestricted)	Not Waiverable	NA
IIA (flight surgeon) IIC (pilot)	Yes* AFMRA	Yes, Annual
III	Yes* MAJCOM**	Yes, Annual
ATC/GBO/SWA	Yes* MAJCOM**	Review possible***

* Must meet following criteria for consideration: 100% revascularization, <50% single lesion, <120% aggregate, normal LVEF, no wall motion abnormality. Adequate medical management may include statin, aspirin, nitroglycerin, and/or ACE inhibitor, as clinically appropriate. Additionally, patient must have controlled hypertension, no diabetes, no other significant co-morbidities, and controlled risk factors. Low performance aircraft defined as <2.5 sustained G, with another qualified pilot. No altitude restriction in low performance aircraft.
** AFMRA is the waiver authority for all initial waivers.
*** Annual testing may be done locally and sent to ACS for review at the request of the MAJCOM, alternatively all testing and follow-up can be done during annual ACS evaluations.

AIMWTS review through Jun 2016 revealed 143 submitted cases with a history of revascularization. There were 0 FC I/IA cases; 89 FC II cases (39 disqualified), 48 FC III cases (18 disqualified); 4 ATC/GBC cases (disqualified); and two MOD cases (one disqualified).

II. Information Required for Waiver Submission.

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines/recommendations.

The AMS for the initial waiver for coronary artery revascularization should include the following:
A. List and fully discuss all clinical diagnoses requiring a waiver.
B. A complete discussion of the history of CAD and procedures.
C. Consultation notes from a cardiologist.
D. Imaging: Copy of the cardiac catheterization report and copy of the images; copy of the revascularization procedure report (CABG or PCI) and for PCI copy of the images; copies of reports and tracings of any other cardiac tests performed locally for clinical assessment (e.g. electrocardiogram, treadmill, nuclear myocardial stress perfusion imaging).
E. Additional local cardiac testing is not routinely required, but may be requested in individual cases. Copies of reports of any such testing will be required.
F. Results of MEB returning member to worldwide duty.

The AMS for waiver renewal for coronary artery revascularization should include the following:

A. Interval history since last waiver.
B. All applicable and imaging tests and reports that have been completed since last waiver/renewal. If annual ACS evaluation is required, no local testing is required unless clinically indicated as follow-up testing will be done at annual ACS evaluation.
C. Consultation (any follow-up exams) from local cardiologist.

For image submission process, refer to page 2.

III. Overview.

Coronary artery revascularization addresses occlusive coronary artery disease (CAD) via either coronary artery bypass graft (CABG) surgery or percutaneous coronary intervention (PCI), which most commonly includes the catheter-based techniques of angioplasty and stent placement. Because these techniques are palliative, not curative, any new cardiac events 6-12 months after successful revascularization are primarily caused by progression of disease.[1]

Two large trials with long term follow up were designed to compare outcomes of PCI versus CABG.[2-3] With a median follow up of 4.6 years, the BEST trial measured a primary end point of death, myocardial infarction (MI), and target-vessel revascularization. The PCI group rate was 15.3%, and the CABG rate was 10.6% at 4.6 years.[3] The SYNTAX trial reported five year event data, with a composite end point of death, MI, stroke, and repeat revascularization. Their PCI group suffered events at a rate of 37.3%, with the CABG group reported as 26.9%.[2] For both trials revascularization drove the primary endpoint and neither death nor MI were independently significantly different with MI and mortality rates of approximately less than 2% per year. Kaplan-Meier curves in both trials also showed an early spike in complication rates, with a more linear curve after 6-12 months, which reinforces historical waiver guide recommendations that patients only be assessed after a minimum of six months post-procedure. Although both trials favor CABG over PCI, it is important to note this was driven by target vessel revascularization and reinforces policy that either CABG or PCI can be done in aviators. Data with newer-generation drug-eluting stents is ongoing.

The applicability of these and similar trials to the military aviator is very limited, as they universally study older patients with high rates of comorbidities. In addition, they also record post-intervention complications that fall within the first 6-12 months, which would not be applicable to military aviators. In an attempt to address these shortcomings, one older study re-examined the large post-CABG database and extracted a “simulated aviator population” of males

under 60 with no history of cardiovascular comorbidities and no major complications within 12 months. Of these, the two youngest cohorts (ages 20-39 and 40-49) best resemble the military aviator population. Their five year cardiac event-free rate was found to be 94 +/-3% and 91 +/-2% respectively.[4]

A retrospective review of ACS data studied 122 former military aviators with no prior cardiac events who underwent coronary artery revascularization.[5] About half the group had CABG and the other half had PCI, primarily angioplasty. There were no cardiac deaths within five years and only two myocardial infarctions, both beyond two years follow-up. After excluding repeat revascularization within six months of the index revascularization, cardiac event rates at one, two, and five years were 1.0%, 2.7% and 3.6% per year respectively. Individuals meeting the below waiver criteria have estimated cardiac event rates of 2-3% per year for up to five years after revascularization.

Recently a selected group of 30 aviators that presented to ACS (2000-2008) while on active duty, after having had coronary revascularization, were chosen for a retrospective study to determine the time to event and resulting annual event rate. Out of these, only two progressed requiring revascularization.[6] There were no deaths and no MIs. The annual event rate was 2.1% (CI 1.2% - 3.0%). The event free survival was 97% at two years and 88% at 5 years. Both of these patients needing repeat intervention would likely have been identified during the annual ACS reevaluation as required by policy. Neither would have manifested as an incapacitating event.

IV. Aeromedical Concerns.

The aeromedical concern is myocardial ischemia presenting as sudden cardiac death, myocardial infarction, angina or ventricular dysrhythmias, all of which may cause sudden incapacitation or seriously impact performance of flight duties. Detecting the asymptomatic progression of CAD reliably without frequent invasive testing or noninvasive monitoring is the aeromedical challenge.

ICD-9 Codes for coronary artery disease	
414.00	Coronary artery disease
36.10	Coronary artery bypass graft (CABG)
36.06	Coronary artery stent placement
36.09	Coronary artery angioplasty

ICD-10 Codes for coronary artery disease	
I25.10	Coronary artery disease without angina
Z95.1	Coronary artery bypass graft (CABG)
Z98.61	Coronary artery angioplasty with or without stent placement

V. References.

1. Strader JR, Jr, Gray GW, Kruyer WB. Clinical Aerospace Cardiovascular Medicine. In: Davis JR, et al eds. Fundamentals of Aerospace Medicine, 4th ed. Philadelphia: Lippincott Williams & Wilkins, 2008; 323-331.

2. Mohr FW, Morice MC, Kappetein AP, et al. Coronary artery bypass graft surgery versus percutaneous coronary intervention in patients with three-vessel disease and left main coronary disease: 5-year follow-up of the randomised, clinical SYNTAX trial. Lancet, 2013; 381: 629-38.

3. Park SJ, Ahn JM, Kim YH, et al. Trial of Everolimus-Eluting Stents or Bypass Surgery for Coronary Disease. N Engl J Med, 2015; 372: 1204-12.

4. Chaitman BR, Davis KB, Dodge HT, et al. Should Airline Pilots Be Eligible to Resume Active Flight Status After Coronary Bypass Surgery?: A CASS Registry Study. J Am Coll Cardiol, 1986; 8(6): 1318-24.

5. Barnett SL, Fitzsimmons PJ, Kruyer WB. Coronary artery revascularization in aviators: outcomes in 122 former military aviators. Aviat Space Environ Med. 2003; 74(4): 389- abstract for 2003 Meeting.

6. Kruyer WB and Waddell GA. Coronary artery revascularization in military aviators and suitability for return to flying. Minutes of the Aerospace Medicine Corporate Board; Oct 8-9, 2008; Hurlburt Field, FL.

7. Betriu A, Masotti M, Serra A, et al. Randomized Comparison of Coronary Stent Implantation and Balloon Angioplasty in the Treatment of De Novo Coronary Artery Lesions (START): A Four-Year Follow-up. J Am Coll Cardiol, 1999; 34(5): 1498-1506.

8. Khan M and Amroliwalla F. Flying Status and Coronary Revascularization Procedures in Military Aviators. Aviat Space Environ Med, 1996; 67(11): 165-70.

9. Cutlip DE, Chhabra AG, Baim DS, et al. Beyond Restenosis: Five-Year Clinical Outcomes From Second-Generation Coronary Stent Trials. Circulation, 2004; 110: 1226-30.

10. Dargie HJ. First European Workshop in Aviation Cardiology. Late results following coronary artery bypass grafting. Eur Heart J, 1992; 13(suppl H): 89-95.

11. Goy JF, Eekhout E, Moret C, et al. Five-Year Outcome in Patients With Isolated Proximal Left Anterior Descending Coronary Artery Stenosis Treated by Angioplasty or Left Internal Mammary Artery Grafting. Circulation, 1999; 99: 3255-59.

12. Henderson RA, Pocock SJ, Clayton TC, et al. Seven-Year Outcome in the RITA-2 trial: Coronary Angioplasty Versus Medical Therapy. J Am Coll Cardiol, 2003; 42(7): 1161-70.

13. Hueb WA, Lopes NH, Gersh BJ, et al. Five-Year Follow-Up of the Medicine, Angioplasty, or Surgery Study (MAS II): A Randomized Controlled Clinical Trial of 3 Therapeutic Strategies for Multiveseel Coronary Artery Disease. Circulation, 2007; 115: 1082-89.

14. Joy, Michael. Cardiovascular disease. In:, *Ernsting's Aviation Medicine*, 4th ed. London: Hodder Education, 2006; 568-679.

15. Kruyer WB and Davenport ED. Cardiology. Ch. 2 in: *Rayman's Clinical Aviation Medicine*, 5th ed., New York: Castle Connolly Graduate Medical Publishing, LTD, 2013.

16. Moorman DL, Kruyer WB, and Jackson WG. Percutaneous Transluminal Coronary Angioplasty (PTCA): Long-Term Outcome and Aeromedical Implications. Aviat Space Environ Med, 1996; 67(10): 990-96.

17. Webb-Peploe MM. Second European workshop in aviation cardiology. Late outcome following PTCA or coronary stenting: Implications for certification to fly. Eur Heart J, 1999; 1(suppl D): D67-D77.

ECG Findings in USAF Aircrew, Disposition of (Jan 2019)

The following guidelines standardize the aeromedical evaluation and recommendations for 12-lead electrocardiographic (ECG) findings of individuals who must qualify for any class of flying duties. One goal is to streamline the local evaluation and minimize testing and travel to the Aeromedical Consultation Service (ACS). Aircrew with normal or normal variant ECG findings **as reviewed by the ECG Library** require no further evaluation or follow-up and no waiver action. Additional local studies or an ACS evaluation may be requested by the ECG Library on all individuals with borderline or abnormal ECG findings which are new or not previously evaluated. Originals of all ECGs and any other cardiovascular studies (even if normal) must be forwarded to the ECG Library for review and image storage per AFI.

If additional studies are performed at the local level and reviewed through the ECG Library as normal or normal variant, no further workup is needed. If the additional studies are reviewed as borderline or abnormal, further evaluation will be directed through the ECG Library. Unless specified otherwise, borderline and abnormal ECG findings that require additional local workup do not require waiver if the additional workup is reviewed by the ECG Library as acceptable (normal/normal variant). If ACS evaluation or AFMOA/MAJCOM waiver is required for any of the findings, the ECG Library will indicate this in its correspondence. **Unless indicated clinically, only the tests requested by the ECG Library need to be performed.**

In general, these recommendations are intended to guide the aeromedical evaluation of the asymptomatic aviator with an electrocardiographic finding. **The aviator who presents with symptoms, signs or findings of potential clinical significance must first be managed locally as a clinical patient.** These ECG guidelines are based on historic ACS data as well as the 2017 International criteria for ECG interpretation in athletes. *denotes new aircrew disposition guidelines based on published and ACS data since the last ECG disposition guide.

Electronic submission of cardiac studies to the ECG Library is preferred with average disposition time in less than 24 hours. For image submission process, see page 2.

Normal or Normal Variant ECG Findings

The following are considered normal or normal variants in our aviator population. **No further evaluation** or follow up is needed for these findings **IF ISOLATED** (two or more normal variant or borderline findings requires additional testing after ACS ECG Library disposition).*

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700. Normal ECG

002. Sinus bradycardia (30 to 50 beats per minute)
Note: Aeromedically, normal sinus rhythm is defined as 50-100 bpm

007. Sinus arrhythmia

028. Ectopic atrial rhythm

040. Accelerated junctional rhythm

080. Supraventricular rhythm at a rate of less than 100 bpm

085. Wandering atrial pacer

104. Second degree AV block, Mobitz Type I (Wenckebach)

121. Incomplete right bundle branch block

123. Terminal conduction delay (S wave in the lateral leads $\geq$ 40 msec)

132. Nonspecific intraventricular conduction delay, QRS $\geq$ 100 but < 120 msec

204. ST segment elevation due to early repolarization

221. Persistent juvenile T-waves (T wave inversions in V1-3 in an otherwise normal ECG that have been present on all previous ECG's)

737. Indeterminate QRS axis

743. S1, S2, S3 pattern (S waves in the inferior limb leads)

744. S1, S2, S3 pattern with RSR' pattern in V1 or V2 with QRS < 120 msec

755. R > S in V1 without other evidence of right ventricular hypertrophy

764. RSR' pattern in V1 or V2 with QRS < 120 msec

721. Right ventricular hypertrophy (R wave in V1 plus S wave in V5 or V6 > 10.5mV1)

Abnormal or Possibly Abnormal ECG Findings

The following are abnormal or possibly abnormal ECG findings with brief explainations and disposition. Each disposition if based on the associated finding **in isolation** (two or more abnormal findings requires ACS ECG Library review).

Marked Sinus Bradycardia: Sinus bradycardia refers to heart rate less than 60 bpm with marked sinus bradycardia heart rate less than 30bpm. Marked sinus bradycardia is usually the result of athletic conditioning with increased vagal tone and is not associated with an adverse prognosis. Past evaluation of this finding in asymptomatic aviators by the ECG Library has consistently failed to uncover evidence of sinus node dysfunction unless heart rate is less than 30bpm. Further evaluation should be pursued as clinically indicated and/or requested by the ECG Library and commonly includes verification of increased heart rate with exercise.

A02. Marked sinus bradycardia (<30 bpm)*

Sinus Tachycardia: Sinus tachycardia may be transient and due to anxiety, fever, pain, etc. It may occasionally be an indicator of underlying heart disease or a metabolic abnormality. If sinus tachycardia is noted on an ECG, a repeat ECG should be obtained. If this is a persistent finding on the repeat ECG, a Holter monitor should be obtained while the aviator remains on flying status (no DNIF). If sinus tachycardia persists on the Holter, further evaluation should be pursued as clinically indicated and/or requested by the ECG Library.

001. Sinus tachycardia (resting heart rate > 100 bpm)

Short PR Interval:
Short PR interval (PR < 120 msec) may be a normal variant but is occasionally evidence for a bypass tract, even without an accompanying delta wave. Before diagnosing short PR interval, one must assure that it is truly sinus rhythm with sinus origin P waves, rather than ectopic atrial or other rhythm. For a PR interval between 100 and 120 msec, it is most likely a normal variant, but could represent a bypass tract. For these cases, a thorough history should be obtained locally with specific questions aimed at the detection of tachyarrhythmias, to include palpitations, rapid heart beat sensations, lightheadedness or syncope. If the history is unremarkable with no suggestion of a possible tachyarrhythmia, then no further evaluation is indicated and the finding should be considered a normal variant. For a PR interval less than 100 msec, the possibility of a bypass tract is much greater and further evaluation should be pursued as clinically indicated and/ or requested by the ECG Library

029. Short PR interval (PR interval < 120 msec in all leads)

Wolff-Parkinson-White:
Ventricular Pre-excitation to include Wolff-Parkinson-Whitepattern on ECG requires ACS evaluation/review. The aviator/aircrew should be placed DNIF pending ACS evaluation/review. See the *Wolff-Parkinson-White (WPW) and Other Pre-excitation Syndromes* Waiver Guide for further details.

704. Wolff-Parkinson-White pattern
705. Lown-Ganong-Levine pattern

Prolonged QT Interval:*
Perform a repeat fasting ECG on a separate day and submit both ECGs to the ECG Library with a list of any prescription or over-the-counter medications and supplements used. Electrolytes to include potassium, magnesium, and calcium should also be checked. Further guidance will follow ECG Library review of this information. Per new ECG guidelines in athletes, corrected prolonged QTc duration has increased from prior guidelines.

215. Prolonged QT defined as a QTc >470 msec in males or >480 msec in females.

Atrial Enlargement/Abnormality:*
The following are nonspecific as isolated ECG findings in isolation. Additional testing (echocardiogram +/- stress test) is necessary only when accompanied by axis deviation, fasicular block, or bundle branch block. Further testing necessary is based on clnical indications by the interpreting physician at the ECG Library.

500. Left atrial enlargement

501. Right atrial enlargement

503. Biatrial enlargement

Ventricular Hypertrophy: An echocardiogram is required for evaluation of all ventricular hypertrophy with the exception of isolated right ventricular hypertrophy. If the echocardiogram is normal or normal variant by ECG Library review, no further workup is necessary. Since the specificity of these findings on ECG is poor, the aviator does not need to be DNIF pending our interpretation of the echocardiogram. For any left ventricular hypertrophy also provide a detailed exercise and blood pressure history for the past 6-12 months.

720. Left ventricular hypertrophy by voltage criteria with associated ST segment abnormalities

727. Biventricular hypertrophy

729. Left ventricular hypertrophy by voltage alone (sum of the S wave voltage in V1 or V2 plus the R wave voltage in V5 or V6 > 55 millivolts for individuals 35 years old or younger or > 45 millivolts for individuals older than 35 years of age).

First Degree AV Block:
First degree AV block is most often the result of athletic conditioning with increased vagal tone. This finding is common and not associated with an adverse prognosis. Past evaluation of this finding by the ECG Library has consistently failed to uncover evidence of conduction system disease. Therefore, evaluation of this finding is only required if requested by the interpreting physician or for very prolonged PR interval (>400ms).*

100. First degree AV block. (PR interval $\geq$ 220 msec.)

Second Degree Mobitz Type II, and Third Degree AV Block:
The following abnormalities, if confirmed by the ECG Library or local consultant, are disqualifying for flying duties and waiver is not recommended. ACS evaluation is not required. Local medical evaluation and management is mandatory. Mobitz Type I second degree AV block (Wenckebach block) is considered a normal variant and is listed as such above.

105. Second degree AV block, Mobitz Type II

108. Complete heart block. This must be differentiated from A-V dissociation due to sinus bradycardia with a competing junctional rhythm, which may be a normal variant finding.

Right Bundle Branch Block:
This recommendation includes new complete right bundle branch block or complete right bundle branch block that has progressed from previous incomplete right bundle branch block. An echocardiogram is required for evaluation. If a previous echocardiogram is on file at the ACS, it may be acceptable per judgment of the ECG Library physician. The aviator does not need to be DNIF during this evaluation. Reminder - incomplete right bundle branch block in isolation is a normal variant and does not require evaluation.

120. Right bundle branch block with normal QRS axis.

Left Bundle Branch Block:
Left bundle branch block requires ACS evaluation and waiver. The aviator/aircrew should be placed DNIF pending ACS evaluation. The primary physician should insure that the aviator is clinically stable prior to arranging an ACS evaluation. See the *Left Bundle Branch Block* Waiver Guide for further details.

124. Left bundle branch block

Fascicular blocks and Axis Deviation:
Isolated Axis deviation is a normal variant unless accompanied by any other abnormal, borderline, or even normal variant ECG finding (such as complete or incomplete RBBB, atrial enlargement, or ventricular enlargement) then further evaluation should be pursued as requested by the ECG Library.* Fascicular blocks require echocardiogram at all ages and if age >35 then exercise stress. Waiver is no longer required unless the echo or stress test are abnormal after ACS/ECG Library review.

The diagnostic criteria and evaluation of hemiblocks and left axis deviation are as follows:

126. Left anterior fasicular block (LAFB):
Displacement of the mean QRS axis in the frontal plane to between -45° and -90°, and
A qR complex in leads I and AVL, an rS complex in leads II, III and AVF, and
normal or only slightly prolonged QRS duration.

128. Left posterior fasicular block (LPFB):
Displacement of the mean QRS axis in the frontal plane to between +120° and +180°, and
An rS complex in leads I and AVL, a qR complex in leads II, III and AVF, and
normal or only slightly prolonged QRS duration

735. Left axis deviation (LAD):
QRS axis -30° or more negative without full criteria for LAH as above.

736. Right axis deviation (RAD)
QRS axis +120° or more positive without criteria for left posterior hemiblock

Supraventricular and Ventricular Ectopy and Pairing: Holter monitor is required for one or more paired premature beats and for two or more isolated premature beats on a single page of ECG paper, 12- lead or rhythm strip, regardless of the age of the aviator/aircrew.* Further evaluation should be pursued as clinically indicated and/or requested by the ECG Library after holter monitor review.

023. Premature atrial beat (PAC), two or more on a single page of ECG paper, 12- lead or rhythm strip

043. Premature junctional beat (PJC), two or more on a single page of ECG paper, 12-lead or rhythm strip

083. Premature supraventricular beat, two or more on a single page of ECG paper, 12-lead/rhythm strip

063. Premature ventricular beat (PVC), two or more on a single page of ECG paper, 12- lead/rhythm strip

032. Paired atrial premature beats, one or more pairs on a single page of ECG paper

046. Paired junctional premature beats, one or more pairs on a single page of ECG paper

072. Paired ventricular premature beats, one or more pairs on a single page of ECG paper

Supraventricular Tachycardias & Arrhythmias:
Any individual with documented supraventricular tachycardia (three or more supraventricular premature beats in a row at a rate exceeding 100 bpm) or multifocal tachycardia requires holter monitor. Member need not routinely be placed DNIF if there are no associated hemodynamic symptoms. Atrial fibrillation and atrial flutter require cardiology evaluation and DNIF.

021. Atrial tachycardia

026. Atrial fibrillation

027. Atrial flutter

036. Multifocal atrial tachycardia (MAT)

041. Junctional tachycardia (> 100 bpm)

081. Supraventricular tachycardia

Ventricular Tachycardia: An aviator/aircrew with asymptomatic nonsustained ventricular tachycardia should be placed DNIF. One 24 hour Holter monitor should be obtained. ACS review/evaluation is required for waiver consideration of any ventricular tachycardia.

061. Ventricular tachycardia (three or more ventricular beats in a row at a rate > 100 bpm)

Ventricular Fibrillation and Ventricular Flutter: The following abnormalities are disqualifying for continued flying duties. Waiver is not recommended, and ACS evaluation is not required.

066. Ventricular fibrillation

067. Ventricular flutter

Findings Suggestive of Myocardial Infarction:
ECG findings diagnostic for or very suggestive of myocardial infarction are disqualifying for continued flying duties pending further evaluation. The individual should have a cardiology evaluation to insure that he is clinically stable. If a true myocardial infarction is confirmed, this is disqualifying for flying duties but may be waiver eligible after ACS evaluation (see waiver guide).

All 600 series codes. Myocardial infarction

The aviator may remain on flying status during evaluation of the following more nonspecific findings:

739. Non-diagnostic Q waves. No further evaluation is required unless directed by the ECG Library.

759. Poor R wave progression. This finding may be due to incorrect chest lead placement or can be a normal variant. It can also be seen in myocardial infarction. Evaluation consists of repeat ECG with attention to chest lead placement and other testing as directed by the ECG Library. Echocardiogram may be requested to rule out wall motion abnormalities.

18. **ST Segment and T Wave Abnormalities:**
The following diagnoses may be normal variants, or may be findings associated with myocardial ischemia, cardiomyopathy and other disorders. The nonfasting state may cause nonspecific ST-T wave changes on ECG. If these findings represent a serial change and persist after repeat fasting ECG, a treadmill exercise tolerance test and echocardiogram should be performed on aviators aged 35 or older. For aviators younger than 35 years, an echocardiogram should be performed. If a previous screening echocardiogram is on file at the ACS, it may be acceptable per judgment of the ECG Library physician. Since mild ST segment and T wave abnormalities are not very specific, the aviator does not need to be DNIF during this evaluation. However, judgment should be exercised in aviators with more than mild changes or compelling coronary risks.

200. Low T waves less than 2 mm in chest leads V3-V6 or less than 0.5 mm in limb leads I and II.

201. Nonspecific T wave abnormalities

203. Nonspecific ST segment depression

19. **Cardiac Inflammation (Pericarditis and Myocarditis):**
If pericarditis or myocarditis is clinically present, the aviator should be placed DNIF and should be treated as indicated by the clinical condition. Confirmation should be done locally and studies sent to ACS ECG Library for review. If asymptomatic, ECG confirmation can be done throught ECG Library and further evaluation pursued as clinically indicated and/or requested by the ECG Library.

706. Compatible with pericarditis

707. Compatible with myocarditis

Miscellaneous

Treadmill Test Results:
In order to insure a consistent interpretation of all studies and to attain the highest sensitivity, the following criteria were established for classifying treadmill exercise tolerance test results. The ST segment depression will be read at 80 msec after the J point irrespective of ST segment slope. The PQ segment will be used as the baseline. Tests showing less than 0.5 mm of ST segment depression are considered normal. Tests showing 0.5 to 0.9 mm of ST segment depression are considered borderline. Tests showing 1 mm or more of ST segment depression are abnormal. Any studies considered to be abnormal by review at the ECG Library will require an ACS evaluation.

Treadmill testing may also be suggestive of organic heart disease due to findings other than ST segment depression. These may include exercise-induced chest discomfort, hypotensive blood pressure response to exercise, chronotropic incompetence with decreasing heart rate at peak exercise or exercise-induced dysrhythmias. Exercise-induced dysrhythmias should be treated as described in the appropriate sections of this document and corresponding waiver guide.

The treadmill test should be performed in the fasting state. Baseline ECGs should be obtained supine, standing, and after hyperventilation. If ST segment depression is present on any baseline ECG, 1 mm of additional ST segment depression beyond the baseline ST segment will be required to be considered abnormal. The **raw unprocessed tracings and interpreted report** must be forwarded to the ECG Library for review.

Holter Monitor Findings:
A Holter monitor is generally performed to evaluate rhythm or conduction disturbances found on physical exam or 12-lead ECG or subjective complaints of palpitations. It might be requested by the ECG Library or ordered by a local provider. The following discussion assumes no associated hemodynamic symptoms and addresses the aeromedical disposition of isolated ectopy and ectopic pairs. Disposition of other findings, such as supraventricular tachycardia, are discussed in appropriate sections of this document.

By ECG Library review, if isolated ectopic beats on the Holter are frequent or less ($\leq$ 10% of total beats) and if ectopic pairs are occasional or less (10 total pairs or fewer), no further testing is required and the findings are aeromedically acceptable without waiver.

If ectopic beats are very frequent (>10% of total beats) and/or ectopic pairs are frequent (>10 pairs total), a treadmill test and echocardiogram should be performed with appropriate reports and tracings/images referred to the ECG Library for review. The aviator does not need to be DNIF during this assessment.

Echocardiograms:*
Actual echocardiogram images must be sent to the ACS for review. Reports without images are not accepted. Echocardiograms must include at minimum M-mode, 2-dimensional and Doppler studies. Studies should be saved in a digital format and preferably uploaded into the ECG Library system as above. For image submission process, see page 2.

Published by the US Air Force Aeromedical Consultation Service Central Electrocardiographic Library **Last updated: Nov 2017 (Note: This reference is published as a guide only, final ECG disposition recommendations are determined by the ECG Library as per AFI 48-123.)**

WAIVER GUIDE
Updated: Sep 2015
Supersedes Waiver Guide of Mar 2011
By: Dr Dan Van Syoc
Reviewed by Lt Col Eddie Davenport, Chief ACS Cardiologist

CONDITION:
Ectopy, Supraventricular and Ventricular, and Pairing (Sep 2015)

I. Waiver Consideration.

Symptomatic ectopy which is significant enough to interfere with satisfactory performance of duty or requiring any medication for control is disqualifying for all flying classes as well as retention. For asymptomatic ectopy, waiver is not required if further evaluation specified by and reviewed by the ECG Library discloses no other disqualifying conditions.

Table 1: Policy for asymptomatic supraventricular and ventricular ectopy and pairing

Findings on 24-hour Holter	**Additional Local Testing**	**Flying Class/ Waiver Required Waiver Authority#**	**ECG Library makes final determination**	**ACS Review/ Evaluation**
PACs/PVCs ≤10% and/or 1-10 pairs	None	FC I/IA No AETC FCII/III and ATC/GBO/SWA No MAJCOM	Yes Yes	No No
PACs/PVCs >10% and/or >10 pairs	Echocardiogram and treadmill test*	FC I/IA, II/III No (if normal studies) AETC ATC/GBO/SWA No (if normal studies) MAJCOM	Yes Yes	Yes No

* Studies to be submitted to the ECG Library, if found aeromedically acceptable no further work-up required.

AIMWTS search in Sep 2015 revealed 155 cases carrying a diagnosis of supraventricular and ventricular ectopy and pairing. There were 22 cases that were disqualified. Breakdown of the cases revealed: 4 FC I/IA cases (3 disqualified), 102 FC II cases (13 disqualified), 42 FC III cases (4 disqualified), 6 ATC/GBC cases (2 disqualified), and 1 MOD cases. Most of the disqualifications were due to other cardiac diagnoses.

II. Information Required for Waiver Submission.

None, unless other disqualifying findings are found on further evaluation performed clinically or as specified by the ECG Library. In those cases, refer to the applicable waiver guide and/or as directed by the ECG Library. For symptomatic ectopy/pairing that is significant enough to interfere with satisfactory performance of duty, ensure MEB results are included in AMS.

III. Overview.

This waiver guide discusses isolated ectopy and paired ectopy (pairs, couplets) and assumes no associated hemodynamic symptoms. Supraventricular and ventricular tachyarrhythmias are discussed in separate waiver guides. Ectopy and pairs include premature supraventricular and premature ventricular contractions (PVCs). In this discussion, the term ectopy will refer to both supraventricular and ventricular ectopy unless otherwise specified. Supraventricular ectopy includes premature atrial contractions (PACs) and premature junctional contractions (PJCs). The term PAC will be used to refer to all supraventricular ectopy.

Ectopy is quantified as a percentage of total beats on a Holter monitor and is graded as rare (<0.5%), occasional (0.5% - 1%), frequent (>1%), and very frequent (>10%). Pairs are similarly graded as rare, occasional, or frequent by total number of pairs on a Holter monitor. Aeromedical disposition is determined by the grading of ectopy and pairs on a Holter monitor. Typically, Holter monitor will have been requested to evaluate ectopy on a 12-lead electrocardiogram, ectopy appreciated during physical examination, or to evaluate subjective complaints of palpitations.

On 12-lead electrocardiogram (ECG), PACs have been reported in about 0.6% of aviators and 0.4%-3.0% of civilian populations. PVCs have been reported in about 0.8% of aviators and 2.0%-7.0% of various civilian populations. Evaluating ectopy on 12-lead ECG is thus not a problem of large numbers but is nevertheless made difficult by the significant frequency of ectopy reported on 24-hour Holter monitors performed on apparently healthy subjects. Holter findings were reported on 303 male military aviators with no structural heart disease and no referral diagnoses of arrhythmia; only 12% had no ectopy. Rare and occasional PACs and PVCs occurred in about 75% and 50%, respectively. Frequent PACs and PVCs only occurred in about 2.5% and 3.5%, respectively. PAC pairs occurred in about 15%. Otherwise, more complex ectopy was unusual.

The presence of more than one PAC and/or PVC in 10 seconds (standard 12-lead ECG page) requires additional evaluation with a 24-hour Holter as outlined in the following table. DNIF is not required pending the 24-hour Holter.

Table 2: Guide to necessity for Holter monitor

ECG/Rhythm Strip	24-hour Holter Required[1]
PACs, PJCs < 2 PACs, PJCs ≥2	No Yes
Paired PAC, PJC or PVC ≥ 1	Yes

Holter results to include interpreted report summary, representative tracings, and patient diary must forwarded to ECG Library.

In summary, Holter monitor is required for two or more isolated premature beats and for one or more paired premature beats on a standard (10-second) single page of ECG paper, 12- lead or rhythm strip, regardless of the age of the aviator/aircrew. Holter monitor is no longer required for one isolated atrial, junctional or ventricular premature beat on a single page of ECG paper, 12-lead or rhythm strip.

The results of the 24-hour Holter will determine requirement for further work-up. IAW AF policy, waiver for isolated and paired ectopy is not required for any class of flying duties if local evaluation specified by and reviewed by the ECG Library discloses no other disqualifying findings. By ECG Library review, if isolated ectopic beats on the Holter are frequent or less (< 10% of total beats) and if ectopic pairs are occasional or less (10 total pairs or fewer), no further testing is required and the findings are aeromedically acceptable and considered normal variant. If ectopic beats are very frequent (>10% of total beats) and/or ectopic pairs are frequent (>10 pairs total), a treadmill test and echocardiogram should be performed with appropriate reports and tracings/images referred to the ECG Library for review. The aviator does not need to be DNIF during this assessment.

IV. Aeromedical Concerns.

If isolated or paired ectopy itself causes hemodynamic symptoms, then aeromedical disposition is determined by the symptoms as well as by the presence and severity of underlying heart disease. In the absence of hemodynamic symptoms, there are three basic aeromedical concerns. One, does the ectopy represent a risk for sustained tachydysrhythmias? Two, does the ectopy represent a risk for cardiac events? And three, does the ectopy predict underlying cardiac disease?

In an ACS database of 430 aviators evaluated for nonsustained or sustained supraventricular tachycardia (SVT), frequent PACs, PAC pairs and nonsustained SVT were not predictive of hemodynamically symptomatic SVT or of recurrent sustained SVT. In a similar database of 193 aviators with nonsustained ventricular tachycardia, neither frequent PVCs nor PVC pairs predicted sustained ventricular tachycardia or associated hemodynamic events. These data suggest that frequent isolated ectopy and paired ectopy do not present an increased risk for tachyarrhythmic events in the absence of structural heart disease.

The predictive value of ectopy for underlying cardiac disease is less clear. The considerable frequency and variability of ectopy in normal subjects makes it difficult to determine its predictive value for disease. PACs may occur in association with some disease states, such as mitral valve prolapse, but prognosis is not related to the PACs. On the other hand, frequent and complex PVCs in the presence of coronary and some other heart diseases clearly confer a poorer prognosis. This is true in clinical populations with significant, usually symptomatic disease. It may be less so in asymptomatic populations such as aircrew. However, some ACS databases do suggest increased prevalence of cardiac disease in the presence of significant ectopy.

ICD-9 Codes for Supraventricular and Ventricular Ectopy And Pairing	
427.60	Premature beats unspecified
427.61	Supraventricular premature beats
427.69	Other premature beats

ICD-10 Codes for Supraventricular and Ventricular Ectopy And Pairing	
I49.4	Unspecified premature depolarization
I49.1	Atrial premature depolarization
I49.2	Junctional premature depolarization
I49.49	Other premature depolarization

V. References.

1. Kruyer WB and Davenport ED. Cardiology. Ch. 2 in *Rayman's Clinical Aviation Medicine*, 5th ed., Castle Connolly Graduate Medical Publishing, LTD, 2013; 14-15.

2. Strader JR, Gray GW, and Kruyer WB. Clinical Aerospace Cardiovascular Medicine. Ch. 13 in *Fundamentals of Aerospace Medicine,* 4th ed., 2008.

3. Clinical Sciences Division, Internal Medicine Branch. Disposition of ECG Findings in USAF Aircrew, Feb 2009, Posted on the Waiver Guide Knowledge Exchange.

4. Folarin VA, Fitzsimmons PJ, and Kruyer WB. Holter Monitor Findings in Asymptomatic Male Military Aviators without Structural Heart Disease. Aviat Space Environ Med, 2001; 72(9): 836-38.

5. Dionne MV, Kruyer WB, and Snyder QC. Results of Holter Monitoring U.S. Air Force Aircrew with Ectopy on 12-Lead Electrocardiograms. Aviat Space Environ Med, 2000; 71(12): 1190-96.

6. Gardner RA, Kruyer WB, Pickard JS, and Celio PV. Nonsustained Ventricular Tachycardia in 193 U.S. Military Aviators: Long-Term Follow-Up. Aviat Space Environ Med, 2000; 71(8): 783-90.

7. Frolkis JP, Pothier CE, Blackstone EJ, and Lauer MS. Frequent Ventricular Ectopy after Exercise as a Predictor of Death. N Engl J Med, 2003; 348: 781-90.

8. Hebbar AK and Hueston WJ. Management of Common Arrhythmias: Part II. Ventricular Arrhythmias and Arrhythmias in Special Populations. AmFam Physician, 2002; 65(12): 2491-96.

9. Katritsis DG and Camm AJ. Nonsustained ventricular tachycardia: where do we stand? Europ Heart J, 2004; 25:1093-99.

Hypertension (Apr 2020)
Reviewed: Lt Col Michael Crowder (RAM 21), Dr. Dan Van Syoc (ACS Waiver Guide coordinator), Lt Col Eddie Davenport (chief ACS cardiologist), and Lt Col David Gregory (AFMRA Physical Standards Development Chief)
Significant Changes: New Format, Table 1 changes to reflect special warfare and RPA. Addressing multi-agent therapy.

I. Waiver Consideration

Hypertension that is not controlled with a single approved agent or with lifestyle changes is disqualifying for FC I/IA, FC II, FC III, and ATC/GBC personnel. Aviators with hypertension responsive to lifestyle modifications should have serial BP rechecks quarterly to semi-annually during the first year to assure success of the lifestyle modifications. Failure to achieve blood pressure control with lifestyle modifications, or an initial blood pressure average exceeding 160 mmHg systolic or 100 mmHg diastolic, requires initiation of pharmacotherapy. The rated or non-rated aviator (to include ATC/GBO personnel) with a history of isolated HTN who remains normotensive using lifestyle modifications or one of the following approved medications as monotherapy (thiazide, with or without triamterene, ACEi [lisinopril or ramipril], or ARB [losartan or telmisartan]) does not require a waiver. The aviator requires a minimum of seven days grounding after initiation of pharmacotherapy. Their BP should be controlled below 140/90 mmHg (or below 150/90 mm Hg if 60 years of age or older), and they should be free of medication side effects prior to return to full duty; this includes all subsequent dose adjustments. For retention purposes, hypertensive cardiovascular disease is disqualifying for all classes to include ATC/GBO/SWA personnel.

Table 1: Waiver potential for anti-hypertension medications and waiver authority

Flying Class (FC)	Medication(s)	Waiver Potential Waiver Authority	ACS Review or Evaluation
I, IA	HTN, if controlled with a thiazide[1] (HCTZ or chlorothiazide), lisinopril, ramipril[2], losartan or telmisartan	Waiver not required	N/A
	HTN, if controlled on other medication than listed above and/or in combination.	No AETC	
II	HTN, if controlled with a thiazide[1] (HCTZ or chlorothiazide), lisinopril, ramipril[2], losartan or telmisartan	Waiver not required	N/A
	HTN, if controlled on HCTZ combined with lisinopril, ramipril[2], losartan or telmisartan; atenolol[3] alone or in combination; nifedipine (coat-core or GITS) alone or in combination; or amlodipine alone or in combination	Yes[4, 5] AFMRA	Up to 3 years
III/ATC	HTN, if controlled with a thiazide[1] (HCTZ or chlorothiazide), lisinopril, ramipril[2], losartan or telmisartan	Waiver not required	N/A
	HTN, if controlled on HCTZ combined with lisinopril, ramipril[2], losartan or telmisartan; atenolol[3] alone or in combination; nifedipine (coat-core or GITS) alone or in combination; or amlodipine alone or in combination	Yes[5] MAJCOM	Up to 3 years
SWA/GBO	HTN, if controlled on medical therapy including combination therapy. Waiver required only if evidence of end organ damage.	Waiver not required	N/A
	HTN with associated end organ damage (outlined below); controlled on HCTZ combined with lisinopril, ramipril[2], losartan or telmisartan; atenolol[3] alone or in combination; nifedipine (coat-core or GITS) alone or in combination; or amlodipine alone or in combination	Yes MAJCOM	Up to 3 years

Note: Uncontrolled hypertension is disqualifying for all aircrew, wavier eligible only if controlled.
1 With or without triamterene. If potassium is added, a waiver will be required.
2 Ramipril restricted to dosages of 5 mg to 20 mg.
3 Third line drug, used after all others failed or were not tolerable. For aviators not required to fly in high-G aircraft.
4. FC II aviators on these medications can be waived, but only for FC IIA.
5. Waiver authority for initial FC II and FC III is AETC

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines & recommendations. Waiver is required for hypertension only if pharmacotherapy involves more than one medication (with the exception of HCTZ and triamterene) or the use of one of the following (alone or in combination with another approved medication): atenolol, amlodipine, and nifedipine.

A. Initial Waiver Request:

1. List and fully discuss all clinical diagnoses requiring a waiver.
2. History - summary of blood pressures, risk factors/co-morbidities including negatives [diet (especially, alcohol and sodium intake), botanicals/supplements, cigarette smoking/ tobacco use, physical activity level, family history of premature cardiovascular disease, dyslipidemia, diabetes mellitus, sleep apnea (snoring, observed apneas)], symptoms including negatives (flushing, headaches, nocturia, chest pain, and claudication), previous treatments, medications and side effects. Any consultation reports, including follow-up notes with examination findings after disease resolution.
3. Physical - weight (BMI), fundus for hypertensive retinal changes, thyroid, heart, lungs, auscultation for carotid, abdominal, and femoral bruits, abdominal exam for enlarged kidneys, masses, and abnormal aortic pulsation, lower extremity exam for edema and pulses and neurological assessment. Documentation of return to full physical activity, including specific comments regarding any activity limitations.
4. Labs - hematocrit/hemoglobin, fasting glucose, serum electrolytes, serum calcium, blood urea nitrogen (BUN), serum creatinine (Cr), lipid profile, thyroid stimulating hormone (TSH), and urinalysis.
5. Resting electrocardiogram (ECG).
6. 3-day blood pressure check demonstrating BP stable at goal at least one week after medication initiated.
7. FL4 with RTD and ALC status, if member did not meet retention status.
8. If the local base is unable to provide all required items, they should explain why to the waiver authority.

Renewal Waiver Request:

1. Interval history - summary of the intervening blood pressure control, symptoms related tocoronary artery disease or medications, diet (e.g., alcohol and sodium intake) and supplements, cigarette smoking/tobacco use, physical activity level, other co-morbid medical conditions since last waiver granted.

2. Physical - blood pressure readings over the course of the previous waiver, weightchanges, hypertensive retinal changes, auscultation for carotid, abdominal, and femoral bruits, heart and lungs, abdominal exam for enlarged kidneys, masses, and abnormal aortic pulsation, lower extremity exam for edema and pulses, and neurological assessment.
3. Labs - for all medications a renal panel (to include Cr and potassium) annually.
4. 3-day blood pressure check.
5. If the local base is unable to provide all required items, they should explain why to the waiver authority.

III. Aeromedical Concerns

Hypertension is almost never a risk factor for sudden incapacitation, particularly if it is controlled. However, the secondary complications of hypertension are of aeromedical significance. The long-term vascular complications of HTN are an increased risk of cardiovascular events such as myocardial infarction and stroke, potentially resulting in sudden incapacitation, or death. Hypertension in aircrew should be diagnosed and treated per the most recent ACC/AHA guidelines, with a strong preference to monotherapy[2]. Because lifestyle modifications are considered first line interventions and are associated with negligible aeromedical side effects, each aviator should be individually evaluated for potential benefit from lifestyle modifications, used alone or in combination with medication(s). While numerous medications are effective in lowering BP, some drugs have modes of action that may adversely affect the flyer. Medications that act via direct vasodilatation or autonomic vasoregulation are avoided in favor of those that work via volume reduction, such as diuretics, or via the renin-angiotensin axis, such as angiotensin converting enzyme inhibitors (ACEi), or angiotensin receptor blockers (ARB). Medications that affect cognitive capacity (e.g., central α-adrenergic agonists) should also be avoided.

The classes of antihypertensive agents available to USAF aviators include diuretics (thiazides, with or without triamterene), ACEi (lisinopril or ramipril) and ARB (losartan or telmisartan). These drugs are effective as monotherapy and when used as such do not require a waiver as long as the blood pressure is controlled and there are no adverse effects from the medication. All other medications will require a waiver. Recent society guidelines after JNC 8 recommend multi-agent therapy as initial therapy in certain instances, but this is not recommended for special duty personal covered by this guide given hypotension can be more acutely problematic in aircrew. However, if multi-agent therapy is needed, the combination of diuretic with ACEi or ARB is synergistic and usually very effective at lowering BP and waiver often granted restricted to non-high-performance aircraft. Calcium channel antagonists (specifically coat-core and GITS [Adalat CC® and Procardia XL®, respectively] and amlodipine [Norvasc®]) are also approved in aviators; whether used alone or in combination, they are restricted to non-high-performance aviators. Beta-blockers are often poorly tolerated in aviators due to decrease in heart rate (chronotropy) and stroke volume (inotropy) which limits high performance flight and can manifest as fatigue, reduced exercise capacity, and impotence. Beta-blockers should only be used for a specific indication and whether used alone or in combination, waiver is required and will be restricted to non-high-performance aviators.

AIMWTS review in Apr 2020 for the previous five years revealed 445 members with a disposition containing the diagnosis of hypertension. Fifty of these cases resulted in a disqualified disposition. Breakdown was a follows: 2 FC I/IA cases, 172 FC II cases (15 disqualified), 210 FC III cases (30 disqualified), 37 GBO cases (3 disqualified), 21 ATC cases (2 disqualified) and 3 Special Warfare cases. All of the disqualified cases were due to other medical issues or to use of a non-approved medication.

ICD-9 codes for hypertension	
401.0	Malignant essential hypertension
401.1	Benign essential hypertension
401.9	Unspecified essential hypertension
405.0	Malignant secondary hypertension
405.1	Benign secondary hypertension
405.9	Unspecified secondary hypertension

ICD-10 codes for hypertension	
I10	Essential (primary) hypertension
I15.8	Other secondary hypertension
I15.9	Secondary hypertension, unspecified

IV. Suggested Readings

1. James PA, Oparil S, Carter BL, et al. 2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults: Report From the Panel Members Appointed to the Eighth Joint National Committee (JNC8). JAMA, 2013; published online 18 Dec 2013.

2. Whelton PK, Carey, RM, Aronow, WS, et al. 2017. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults. Hypertension, 2017; DOI: 10.1161/HYP.0000000000000065

WAIVER GUIDE
Updated: May 2017
Supersedes Waiver Guide of Dec 2013
By: Lt Col Robert McCoy (RAM 18) and Dr. Dan Van Syoc
Reviewed by Dr. Edwin Palileo & Lt Col Eddie Davenport (Chief Cardiologist ACS)

CONDITION:
Left Bundle Branch Block (May 2017)

I. Waiver Consideration.

Left Bundle Branch Block (LBBB) is disqualifying for all classes of flying duties, to include ATC, GBO and SWA duties. It may be waiver eligible for any class of unrestricted flying duties after evaluation. All flyer cases that are being considered for a waiver MUST be seen at the Aeromedical Consultation Service (ACS). Angiography is preferably done during the ACS evaluation. If coronary angiography is normal, waiver is usually recommended for unrestricted flying duties. If angiography is abnormal, waiver status will be determined primarily by the extent of CAD and the CAD waiver policy. Re-evaluations for LBBB without CAD are typically at three-year intervals and are primarily to follow for the possible development of cardiomyopathy.

Table 1: Waiver potential for Left Bundle Branch Block

Flying Class (FC)	**Waiver Potential** **Waiver Authority**	**ACS Review/Evaluation**
I/IA	Yes AETC	Yes
II/III	Yes MAJCOM	Yes
ATC/GBO/SWA	Yes MAJCOM	Yes

AIMWTS search in Jan 2017 revealed a total of 72 cases carrying the diagnosis of LBBB with 8 total disqualifications. Breakdown of the cases was as follows: 8 FC I/IA cases (1 disqualified), 40 FC II cases (4 disqualified), 23 FC III cases (3 disqualified), and 1 ATC/GBC case. Of the disqualified cases, only two were disqualified for a cardiac reason; one for cardiomyopathy and the other for valvular disease.

II. Information Required for Waiver Submission.

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines/recommendations. All aircrew with LBBB require ACS evaluation prior to waiver consideration.

The AMS for the initial waiver for LBBB should include the following:
A. List and fully discuss all clinical diagnoses requiring a waiver.
B. History of symptoms along with a good time line of events.
C. List all treatments (medications if any) attempted with response.
D. Original copy of the 12-lead ECG or other ECG tracing documenting LBBB.
E. Reports of any local consultations.
F. Copies of reports and tracings of any other cardiac tests performed locally for clinical assessment (e.g. electrocardiogram, treadmill, stress nuclear imaging).

The AMS for waiver renewal for LBBB should include the following:
A. Interim history since last waiver submission to include symptoms.
B. Treatments – current medications for the condition, if any.
C. Recent 12-lead ECG.
D. Reports of any local consultations.

III. Overview.

LBBB is a pattern seen on electrocardiogram (ECG) when there is delayed conduction throughout the ventricles with characteristic ECG appearance. The normal heart's electrical impulse originates in the sinus node, spreads across the atria, and travels through the atrioventricular node. The impulse penetrates into the ventricles via the His bundle where it then enters the two bundle branches. Soon after, the right and left bundle branches transmit the electrical impulse to the right and left ventricle, respectively. This entire process of ventricular depolarization is completed within about 100 msec, and thus the normal width of the QRS complex is less than 100 msec. In a normally functioning heart, the ventricles contract nearly simultaneously.[1] LBBB usually reflects intrinsic intraventricular impairment of conduction in the left bundle system. The electrical impulse is transmitted through the right bundle branch and myocardium normally while activation of the left ventricle is delayed primarily within the myocardium and occurs after most of the right ventricle has been activated. The impairment can be chronic or transient. It may also appear only when the heart rate exceeds some critical value (rate- or acceleration-dependent LBBB) likely secondary to imbalance in the refractory periods between the two bundle branches. A much less common type is bradycardia-dependent LBBB, in which LBBB occurs only at low heart rates; the responsible mechanism for this seemingly paradoxical situation is not known.[2] Careful examination of the QRS complex and axis (or expert consultation) should be made as an accessory pathway with aberrant ventricular conduction (not a LBBB) can cause a widened QRS complex occurring only at lower heart rates.

The total time for left ventricular depolarization is prolonged with LBBB and leads to prolongation of the QRS interval and sometimes to alterations in the QRS vector. The ECG patterns most commonly seen in LBBB are the characteristic monophasic R wave in I, aVL, and V6 (sometimes M-shaped), and QS (sometimes W-shaped) QRS complex in lead V_1.[4] The degree of prolongation depends upon the severity of the impairment.[3] A QRS interval greater than or equal to 120 msec is considered a complete LBBB while incomplete LBBB has a shorter 100 – 120 msec interval.

Unlike right bundle branch block, LBBB is more often a sign of organic heart disease. LBBB is often a marker of one of four underlying conditions: advanced coronary heart disease, long-standing hypertension (with or without left ventricular hypertrophy), aortic valve disease, or cardiomyopathy. More than one contributing factor may be identified.[4] In military aviators we found 10% of those with LBBB had significant CAD on coronary angiography, 2% had dilated cardiomyopathy, and 1% required permanent pacemaker. Over 16 years of follow-up, another 8.5% developed CAD, and 5% developed cardiomyopathy with no additional pacemaker requirements. This increased risk of CAD was also seen in The Women's Health Initiative which followed women with asymptomatic LBBB over a fourteen year time span and showed a hazard ratio of CHD death of 1.43 (95% confidence interval 1.11 to 1.83, $p<0.01$).[5] In a report from the HOPE trial looking at patients with LBBB over a 4.5 year time period, patients with LBBB compared to those without LBBB, were older, had higher systolic blood pressure and were more likely to be female.[6] Thus LBBB is an important clinical consideration as it may be the first clue to previously undiagnosed, but clinically important abnormalities.

The incidence of LBBB increases with age.[7] It has been reported in 0.01%-0.1% of healthy military aviators versus 0.2%-0.7% of various civilian populations, increasing to over 2% of those over age 75 and over 5% prevalence over age 80 suggestive of a degenerative disease of the conduction system.[8, 9] In the non-aviator population, there was an incidence rate of 7/1000 in men and women developing a LBBB before the age of 60.[10] Rate- or acceleration-dependent LBBB has also been shown to be associated with a greater degree of underlying coronary artery disease.[11]

IV. Aeromedical Concerns.

The prognosis of isolated LBBB in young men is generally benign.[12] Traditionally, there have been two major aeromedical concerns for LBBB. First, does LBBB increase the risk for progressive conduction system disease? And second, is LBBB predictive of current or future underlying cardiac disease? The risk of progressive conduction system disease for newly diagnosed LBBB has not been shown to be increased in otherwise apparently healthy young males.[13] However, acquired LBBB may be the result of advanced and advancing coronary artery disease (CAD).[14] A study in 2012 demonstrated that adjusted mortality rates for patients with new onset LBBB were similar to patients with ST-segment elevation myocardial infarction.[15] In the USAF male aviator population aged 35-55 years, estimated background prevalence of significant CAD is about half that of those with LBBB (5% vs. 10%).[8] Thus LBBB has a two-fold increase in risk of underlying significant CAD. Many studies have shown increased major adverse cardiovascular event and increased mortality when LBBB is accompanied by any structural heart disease, congestive heart failure, or coronary artery disease. Thus echocardiography and an ischemic evaluation is absolutely necessary for all cases of LBBB. However, considering the possibility of underlying coronary heart disease and the inaccuracy of many noninvasive tests in the presence of LBBB, invasive coronary angiography might be warranted for definitive diagnosis, especially in older or high-risk aviators.[16] Noninvasive coronary angiography (i.e. CT coronary angiography) is aeromedically acceptable to exclude coronary heart disease for age under 35 as the risk of significant CAD in this population is well less than 5%. In the absence of underlying cardiac disease, return to unrestricted flying is

acceptable. Finally, more recent data suggests there may be structural and functional changes in contractility with increased ventricular dyssynchrony as seen in LBBB and therefore even without CAD or valvular disease, echocardiography at regular intervals is recommended to ensure absence of cardiomyopathy.

ICD-9 code for Left Bundle Branch Block	
426.3	Left bundle branch block

ICD-10 code for Left Bundle Branch Block	
I44.7	Left bundle branch block, unspecified

V. References.

1. Davies MJ, Anderson RH, Becker AE. *The Conduction System of the Heart*. Butterworth, London, 1983.

2. Massumi RA. Bradycardia-Dependent Bundle-Branch Block. Circulation, 1968; 38: 1066-73.

3. Mirvis DM and Goldberger AL. Electrocardiography. Ch. 13 in *Bonow: Braunwald's Heart Disease – A Textbook of Cardiovascular Medicine*, 9th ed., Saunders, 2012.

4. Goldberger AL, Goldberger ZD, and Shvilkin A, editors. Ventricular Conduction Disturbances: Bundle Branch Blocks and Related Abnormalities. Ch. 7 in *Goldberger: Clinical Electrocardiography: A Simplified Approach*, 8th ed., Saunders, 2012.

5. Zhang, Z, Rautaharju, P, Soliman EZ, et al. Mortality Risk Associated With Bundle Branch Blocks and Related Repolarization Abnormalities (from the Women's Health Initiative [WHI]). Am J Card, 2012, 110: 1489-95.

6. Sumner, G, Salehian, O, Yi Q, et al. The Prognostic Significance of Bundle Branch Block in High-Risk Chronic Stable Vascular Disease Patients: A Report from the Hope Trial. J Cardiovasc Electrophysiol, 2009, 20: 781-87.

7. Imanishi R, Seto S, Ichimaru S, et al. Prognostic Significance of Incident Complete Left Bundle Branch Block Observed Over a 40-Year Period. Am J Cardiology, 2006; 98: 644-48.

8. Rotman M and Triebwasser JH. A Clinical and Follow-up Study of Right and Left Bundle Branch Block. Circulation, 1975; 51(3): 477-84.

9. Hiss RG and Lamb LE. Electrocardiographic Findings in 122,043 Individuals. Circulation, 1962; 25(6): 947-61.

10. Imanishi, R, Seto, S, Ichimaru, S, et al. Prognostic Significance of Incident Complete Left Bundle Branch Block Observed Over a 40-Year Period. Am J Card, 2006, 98: 644-48.

11. Grady TA, Chiu AC, Snader CE, et al. Prognostic Significance of Exercise-Induced Left Bundle-Branch Block. JAMA, 1998; 279(2): 153-56.

12. Eriksson P, Wilhelmsen L, and Rosengren A. Bundle-branch block in middle-aged men: risk of complications and death over 28 years: The Primary Prevention Study in Göteborg, Sweden. Euro Heart J, 2005; 26: 2300-06.

13. Palm-Leis A, Fitzsimmons PJ, Kruyer WB. Natural history of new left bundle branch block in 134 apparently healthy males: Mean follow-up of 16 years. J Am Coll Cardiology, 2003; 41(6), (Suppl A): 104A

14. Schneider JF, Thomas HE, Kreger BE, et al. Newly Acquired Left Bundle Branch Block. The Framingham Study. Ann Int Med, 1979; 90: 303-10.

15. Yeo KK, Li S, Amsterdam EA, et al. Comparison of Clinical Characteristics, Treatments and Outcomes of Patients With ST-Elevation Acute Myocardial Infarction With Versus Without New or Presumed New Left Bundle Branch Block (from NCDR®). Am J Card, 2012; 109: 497-501.

16. Kruyer WB and Davenport ED. Cardiology in: Rayman RB, et al. *Clinical Aviation Medicine*, 5th ed., New York: Castle Connolly Graduate Medical Publishing, LLC, 2013; p. 12.

WAIVER GUIDE
Initial Version: Jan 2016
Supersedes Waiver Guides of Aug 2014 (Mitral Regurgitation), Jul 2014 (Mitral Valve Prolapse), and Feb 2011 (Misc. Valvular Heart Disorders)
By: Dr Dan Van Syoc and Lt Col Steven M. Gore
Reviewed by: Lt Col Eddie D. Davenport, ACS Chief Cardiologist

CONDITION:
Mitral, Tricuspid, and Pulmonic Valve Disorders (Jan 2016)

I. Waiver Consideration.

Per Air Force Instruction, any history of valvular heart disease to include mitral valve prolapse, mitral, pulmonic, and tricuspid valve regurgitation with a severity greater than mild, and any degree of valvular stenosis is disqualifying. ACS evaluation is required for waiver consideration. For most aircrew, moderate to severe mitral regurgitation of any etiology is disqualifying if symptomatic or associated with subnormal ejection fraction. Symptomatic MVP requiring treatment is also disqualifying.

A. Mitral Regurgitation:

1. Moderate MR may be eligible for an unrestricted FC II, FC III, ATC/GBO/SWA waiver.
2. Asymptomatic severe MR that does not meet ACC/AHA guideline criteria for surgery may be considered for a waiver restricted to low performance aircraft.
3. Asymptomatic severe MR that meets ACC/AHA guideline criteria for surgical repair/replacement and symptomatic severe MR are disqualifying without waiver recommendation.[9]

ACS re-evaluations will typically be performed at 1-3 year intervals, depending on the degree of MR and other associated findings such as cardiac chamber dilation and left ventricular dysfunction. The use of approved ACE inhibitors for afterload reduction is acceptable in aviators with moderate or asymptomatic severe MR. Waivers may be considered after surgery. Refer to the "Valve Surgery – Replacement or Repair" waiver guide. For further details of waiver criteria for MR, see Table 1.

B. Mitral Valve Prolapse (MVP):

1. MVP with MR mild or less in severity is eligible for FC I/IA waiver.
2. MVP with MR moderate or less in severity is eligible for unrestricted FC II, ATC/GBO/SWA or FC III waiver.
3. MVP with MR that is severe, but asymptomatic, and does not meet ACC/AHA guideline criteria for surgery may be considered for a waiver restricted to low performance aircraft.[9]
4. MVP with MR that is either "severe and symptomatic" or "severe and asymptomatic", but meets ACC/AHA guideline criteria for surgical repair or replacement, is disqualifying without waiver recommendation.[2]

ACS re-evaluations will be performed at 1-3 years intervals, depending on the degree of MR and other associated findings such as cardiac chamber dilation and left ventricular dysfunction. The use

of approved ACE inhibitors for afterload reduction is acceptable in aviators with MVP and moderate or asymptomatic severe MR. For further details of waiver criteria for MVP, see Table 2.

C. Miscellaneous Heart Valve Disorders:

For retention purposes, severe valve or sub-valvular pulmonic stenosis is disqualifying in addition to most cases of symptomatic mitral stenosis. Table 3 summarizes disposition recommendations for several of these valve disorders. Due to the rarity of these valve disorders in our population, they will also be considered on a case-by-case basis.

Additional findings considered in waiver recommendations, include but are not limited to, normal atrial and ventricular size, normal ventricular function, no prior thromboembolic events, no associated tachydysrhythmias and no symptoms attributable to the specific valve disorder. Waivers may be considered after surgery. Refer to the "Valve Surgery – Replacement or Repair" waiver guide.

Table 1: Summary of Associated Clinical Conditions and ACS Requirements for Mitral Regurgitation

Degree of Primary Mitral Regurgitation (MR) Graded on Echocardiogram	Flying Class (FC)	Waiver Potential Waiver Authority	ACS Review and/or Evaluation Required
Trace or mild MR (normal variant)	FC I/IA/II/GBO	Qualified* N/A	ACS review
	FC III, ATC/SWA	Qualified* N/A	No ACS review required
Moderate MR	FC I/IA	No AETC	ACS review
	FC II/III	Yes MAJCOM	ACS evaluation
	ATC/GBO/SWA	Yes MAJCOM	ACS Review
Severe MR – asymptomatic and nonsurgical per guidelines	FC I/IA	No AETC	ACS review
	FC IIA only	Maybe AFMSA	ACS evaluation
	GBO	Maybe MAJCOM	ACS evaluation
	FC IIIC (low performance only)	Maybe AFMRA	ACS evaluation
	ATC/SWA	Yes MAJCOM	ACS evaluation
Severe MR – symptomatic or surgical per guidelines &	FC I/IA	No AETC	ACS review
	FC II/RPA Pilot/III	No AFMRA	ACS review
	ATC/GBO/SWA[&]	Maybe AFMRA	ACS evaluation

*Qualified means no waiver required, however, for FC I/IA/II/RPA Pilot individuals, echos read locally as trace or mild MR require ACS review via the ECG Library. The report images are required for confirmation and to exclude underlying pathology such as MVP.

**No waiver required if member asymptomatic and has a normal ejection fraction.

[&] Successful mitral repair with preservation of ejection fraction, no need for anticoagulants or anti-arrhythmics may be waived if exercise tolerance is normal, but DAWG review (with MEB/IRILO as appropriate) must precede surgery.

Table 2: Waiver Potential for MVP

MVP and Associated Levels of Mitral Regurgitation (MR) Documented by Echocardiogram	Flying Class	Waiver Potential Waiver Authority†	Required ACS Review and/or ACS Evaluation
MVP with mild or less MR	FC I /IA	Yes AETC	ACS evaluation
	FC II/III	Yes* MAJCOM	ACS evaluation
	ATC/GBO?SWA	Yes AFGSC	ACS review
MVP with moderate MR	FC I/IA	No AETC	ACS review
	FC II//III	Yes* MAJCOM	ACS evaluation
	ATC/GBO/SWA	Yes MAJCOM	ACS review
MVP with severe MR - asymptomatic and nonsurgical MR per guidelines	FC I/IA	No AETC	ACS review
	FC IIA only	Maybe* AFMSAAFMRA	ACS evaluation
	FC IIIC (low performance only)	Maybe* AFMSA	ACS evaluation
	ATC/GBO/SWA	Maybe MAJCOM	ACS review
MVP with severe MR – symptomatic or surgical MR per guidelines	FC I/IA	No AETC	ACS review
	FC II//III	No MAJCOM	ACS review
	ATC/GBO/SWA	Maybe MAJCOM	ACS review
MVP: clinical (auscultation) only without a positive echo	FC I/IA/II/III ATC/GBO/SWA	Yes MAJCOM	After 3 ACS evaluations/reviews without a positive echo, an indefinite waiver is recommended

* Waiver in untrained FC II and III individuals unlikely.

Table 3: Summary of Associated Clinical Conditions and ACS Requirements

Type and Degree of Valvular Disease Graded on Echocardiogram	Flying Class	Waiver Potential Waiver Authority	ACS Review/Evaluation Required
Trace or mild PI and TR	FC I/IA	Qualified N/A	ECG Library review
	FC II/III ATC/GBO/SWA	Qualified N/A	FC II - ECG Library review, FC III, ATC/GBO/SWA not required
Moderate PI and TR	FC I/IA	Maybe AETC	ACS evaluation
	FC II//III ATC/GBO/SWA	Maybe MAJCOM	ACS evaluation#
Severe PI and TR – asymptomatic and nonsurgical per guidelines	FC I/IA	No AETC	ACS review
	FC IIA only	Maybe* AFMRA	ACS evaluation
	FC IIIC (low performance only)	Maybe* AFMRA	ACS evaluation
	ATC/GBO/SWA	Maybe* MAJCOM	ACS evaluation#
Congenital mild PS	FC I/IA	Yes AETC	ACS evaluation
	FC II/III ATC/GB)/SWA	Yes MAJCOM	ACS evaluation
Any degree of mitral or tricuspid valve stenosis	FC I/IA	No AETC	ACS review
	FC II RPA Pilot//III	No MAJCOM	ACS review
	ATC/GBC MOD	Maybe MAJCOM	ACS review

*Waiver for untrained FC II and III individuals unlikely.
#ACS evaluation not required for ATC/GBC personnel and waiver may be recommended based on ACS review.

AIMWTS search in Jan 2016 revealed 304 Air Force members with a waiver disposition for mitral valve, tricuspid valve, or pulmonic valve disorders. There were 41 disqualifications (one was

eventually given an ETP – FC III). Breakdown of the cases revealed 19 FC I/IA cases (4 disqualified), 162 FC II cases (13 disqualified), 113 FC III cases (21 disqualified), 5 ATC/GBC cases (1 disqualified), and 5 MOD cases (2 disqualified). Approximately 50% of the disqualified cases were due in part to the valvular disease.

II. Information Required for Waiver Submission.

ACS review/evaluation is required for diagnosis confirmation and aeromedical disposition. The aeromedical summary should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines/recommendations.

ACS review/evaluation is required at least once for all classes of flying duties for moderate or severe MR with waiver renewals recommended based on local studies. No additional studies are routinely required prior to ACS review/evaluation. If the treating physician deems it clinically necessary to perform additional studies, it is required that all studies be forwarded to the ACS for review. There is no minimum required nonflying observation period for ACS review/evaluation.

For initial ACS evaluation the aeromedical summary should contain the following information:

A. List and fully discuss all clinical diagnoses requiring a waiver.
B. Complete history and physical examination – to include detailed description of symptoms, medications, activity level and CAD risk factors (positive and negative).
C. Formal report and complete tracings of the echo documenting the findings. Copies of reports and tracings of any other cardiac tests performed locally for clinical assessment (e.g. holter, treadmill, stress echocardiogram).
D. Additional local cardiac testing is not routinely required, but may be requested on a case by case basis.
E. Medical evaluation board (MEB) reports and narrative if applicable.

For follow-up ACS evaluations (re-evaluations) the aeromedical summary should contain the following information:

A. Complete history and physical examination – to include detailed description of symptoms, medications, activity level, and interval history
B. All applicable labs and imaging tests as required in the initial aeromedical summary.
C. Local follow-up cardiac testing is not routinely required prior to ACS re-evaluation. If requested for individual cases, it will have been specified in the report of the previous ACS evaluation.
D. Copies of reports and tracings of any other cardiac tests performed locally for clinical assessment (e.g. holter, treadmill, stress echocardiogram).

For image submission process, refer to page 2.

III. Overview.

This waiver guide will combine three previous guides; mitral regurgitation, mitral valve prolapse, and miscellaneous valve disorders, which comprises disorders of the tricuspid and pulmonary valves as well as mitral stenosis.

A. Mitral Regurgitation - Abnormalities of the mitral valve annulus, the valve leaflets, the chordae tendinae, or the papillary muscles can cause mitral regurgitation (MR). In assessing a patient with mitral regurgitation, it is important to distinguish between primary (degenerative) MR or secondary (functional) MR. In primary MR, the pathology of ≥1 of the components of the valve (leaflets, chordae tendinae, papillary muscles, annulus) causes valve incompetence with systolic regurgitation of blood from the left ventricle to the left atrium. Younger populations usually present with severe myxomatous degeneration with gross redundancy of both the anterior and posterior leaflets and chordal apparatus. Older populations present with fibroelastic deficiency in which lack of connective tissue leads to chordal rupture.

In the United States and much of the Western world, the most common cause of MR is mitral valve prolapse (MVP), accounting for as much as one-half to two-thirds of cases. In the aircrew population, clinically significant MR is also most commonly associated with MVP/myxomatous mitral valve disease. Other causes of primary MR include rheumatic heart disease, infective endocarditis, collagen vascular disease, and cleft mitral valve and radiation heart disease. Causes of secondary MR include ischemic and idiopathic myocardial disease leading to a dilated cardiomyopathy.[1, 2] Aeromedical considerations for all etiologies of MR will be addressed by the underlying disease process in this waiver guide. Symptom manifestation depends on the etiology and severity of MR. Moderate or less MR should not cause symptoms. Symptoms due to chronic MR are related to progressive volume overload resulting in pulmonary congestion and left ventricular dysfunction. Symptoms of severe MR include reduced exercise tolerance, chronic weakness, fatigability, exertional dyspnea, dyspnea at rest, and orthopnea. However, some subjects with severe MR and associated left ventricular dysfunction may be asymptomatic, with symptom onset being insidious and not appreciated by the patient. A careful history is important to elicit subtle symptoms or lifestyle changes due to the patient "slowing down" or "not being in shape". Atrial fibrillation may be a resultant complication associated with severe MR.[1, 2]

In the aircrew population, MR is typically diagnosed by an echocardiogram (echo) ordered for murmur evaluation or for a variety of other clinical or aeromedical indications, such as an abnormal electrocardiogram. MR is graded on echo as trace, mild, moderate or severe. MR graded on echo as trace or mild is considered to be a normal variant (not disqualifying) and no waiver is required.

For FC I/IA/II/RPA Pilot individuals, echocardiogram studies read locally as trace or mild MR require Aeromedical Consultation Service (ACS) review via the ECG Library. The formal report and images are required to confirm the local read and to exclude underlying pathology such as MVP. ACS review for trace to mild MR is optional for FC III, and can be requested by the local flight surgeon or the waiver authority if desired. A waiver is required for all classes of flying duties when MR is graded moderate or severe.

B. Mitral Valve Prolapse (MVP) - The prevalence of MVP is reported to be 2-5% in the general U.S. population. The prevalence of MVP utilizing data from the USAF database of Medical Flight Screening (MFS) echocardiograms performed on pilot training candidates, was about 0.5% in males and females.[1, 2] The lower prevalence seen in the USAF database may be due to the young age of this population and elimination of some of the more obvious cases during the examination process. MVP may be diagnosed or suggested by the typical auscultatory findings of a mid-systolic click with or without a late systolic murmur, but is more typically diagnosed by echocardiography (echo) evaluation. The current echocardiographic definition of MVP is billowing of any portion of the mitral leaflets $\geq$ 2 mm above the annular plane in a long axis (parasternal or apical 3-chamber) view.[4] Echo criteria have evolved over the years, but current standards are widely accepted and unlikely to significantly change in the near future. These criteria have been followed by the ACS for over a decade since their earliest acceptance by the academic cardiology community, but many civilian cardiologists may not adhere to the currently defined strict criteria. Therefore, verification of a local MVP diagnosis needs to be completed by the ACS in all cases.

Historically, there have been reports of a possible association between panic disorder or social anxiety disorder and MVP. The purported relationship between these conditions is most likely a matter of chance and the result of a confluence of factors.[7] Additionally, other symptoms to include palpitations, dyspnea, exercise intolerance, dizziness, numbness or tingling, skeletal abnormalities, and abnormal resting and exercise electrocardiograms have been attributed to MVP. Recent investigations into these associations have not conclusively shown a direct link between and reassurance about the benign nature of MVP is usually enough to reduce the severity of associated symptoms.[8]

Progressive mitral regurgitation is one of the primary clinical and aeromedical concerns with MVP due to morphologic changes of the valve leaflets and chordae tendinae. In the aircrew population, clinically significant MR is commonly associated with mitral valve prolapse/myxomatous mitral valve disease. Given the progression rates, all MVP requires waiver for flight duties even if no associated regurgitation or stenosis. Despite some risk of progression to severe MR, most aviators with MVP can be reassured the condition (and associated MR) is not life threatening.[6]

C. Misc. Valvular Heart Disorders

1. Regurgitation/insufficiency of the tricuspid (TR) and pulmonic (PI) valves
2. Mitral stenosis (MS), Tricuspid stenosis (TS) and Pulmonic stenosis (PS)

These disorders are commonly asymptomatic and thus found incidentally during echocardiography evaluation for other reasons. The natural history and progression of disease depends on the underlying cause.[9, 10] These valve disorders will be rarely, if ever, seen in our aviator population. The most common pathology seen in the AIMWTS database search is TR with the majority being graded as trace to mild in severity, thus considered a normal variant.[1, 2]

In the aircrew population, regurgitation/insufficiency or stenosis of these cardiac valves will typically be diagnosed by an echocardiogram (echo) ordered for cardiac murmur evaluation or a variety of other clinical or aeromedical indications, such as an abnormal electrocardiogram. As with mitral regurgitation, tricuspid and pulmonic regurgitation is graded as trace, mild, moderate or severe. In the absence of morphologic valve pathology, tricuspid and pulmonic valve regurgitation graded as trace or mild are considered normal variants. They are not disqualifying and a waiver is not required. Conversely, any degree of mitral, tricuspid or pulmonary valve stenosis is considered abnormal.[1, 2]

For FC I/IA/II/RPA Pilot individuals, echocardiograms interpreted locally as trace or mild TR and/or PI (i.e. normal variants) require review and confirmation via the Aeromedical Consultation Service (ACS) ECG Library. The formal report and images are required for confirmation in order to exclude underlying pathology such as valve prolapse. If ACS ECG Library review confirms trace or mild PI and/or TR with no valve pathology, a letter to this affect will be sent and incorporated into the patient's medical record. The individual is considered medically qualified and no waiver or further work-up is required. If ACS ECG Library review determines TR and/or PI severity is worse than trace or mild, a letter will be sent directing the need for a waiver. ACS ECG Library review of trace to mild TR and/or PI is optional for FC III, but may be requested by the local flight surgeon or the waiver authority if desired. Locally interpreted echocardiograms with moderate or greater TR and/or PI and any degree of mitral, tricuspid, or pulmonic stenosis, will require ACS evaluation. The formal report and images copy are required for confirmation.

In early 2007, the American Heart Association published new infective endocarditis guidelines that are dramatically different from past recommendations.[3] Endocarditis prophylaxis is recommended only for specified high risk groups, and only for specified dental procedures, respiratory tract procedures, and procedures on infected skin, skin structures or musculoskeletal tissue. The high risk group was limited to prosthetic cardiac valves, previous endocarditis, select congenital heart conditions and cardiac transplant patients with valvulopathy. Prophylaxis was no longer recommended for gastrointestinal or genitourinary procedures. Conditions commonly seen by most aerospace medicine practitioners were not included in the list of high risk conditions. Common conditions no longer recommended for endocarditis prophylaxis included, but are not limited to, mitral valve prolapse, bicuspid aortic valve, mitral or aortic regurgitation with normal valve morphology and uncorrected small defects of the atrial and ventricular septum.

IV. Aeromedical Concerns.

A. Mitral Regurgitation and Mitral Valve Prolapse (MVP): Two categories of aeromedical events must be considered with MVP and moderate or severe MR. First, events which might occur abruptly and impact flying performance include sudden cardiac death, cerebral ischemic events, syncope, presyncope and sustained supraventricular and ventricular tachydysrhythmias. Second, progression to severe MR, requirement for surgical mitral valve repair or replacement, other thromboembolic events and non-sustained tachydysrhythmias are of aeromedical concern.

ACS experience with moderate and severe primary MR is very limited. However, a review of the ACS experience with 404 trained aviators with MVP is applicable.[11, 12] This review yielded event rates of 1.5% per year for all aeromedical endpoints examined. Most of these could be readily

tracked by serial evaluations and represented a low risk for sudden incapacitation. For events which might suddenly impact flying performance, the rate was only 0.3% per year. The majority of the MVP subjects in this review had less than moderate or severe MR. The primary aeromedical concern of moderate to severe MR would be the development of symptoms and progression to severe MR that meets guideline criteria for surgical repair or replacement of the mitral valve. Fortunately, surgical criteria can be tracked and followed by serial echocardiogram studies and patients who are followed closely will usually be identified before symptom onset and elective surgery can be scheduled.

In general, exercise produces no significant change or a mild decrease in MR because of reduced systemic vascular resistance. However, patients with elevation of heart rate or blood pressure as a result of static or isometric exercise may manifest increased MR and pulmonary capillary pressures. Static exercises that increase arterial pressure are potentially deleterious. Ejection fraction usually does not change or decreases slightly with exercise. However, the ejection fraction response may be completely normal in younger asymptomatic subjects. These latter concerns may be more theoretical than clinically relevant, but nonetheless result in a recommendation for restricting static exercise in competitive athletes with significant MR.[9] In the aeromedical environment, "pulling Gs" is a similar situation and reduced +Gz tolerance and +Gz-induced tachydysrhythmias are of concern with severe MR. In an ACS MVP database review, 95 aviators had a monitored centrifuge assessment. Non-sustained supraventricular tachycardia and non-sustained ventricular tachycardia each occurred in one individual (1/95, 1%). G-loss of consciousness occurred in two individuals (2/95, 2%) without an associated cardiac dysrhythmia in either case. These occurrences are less than previously reported for apparently healthy centrifuge subjects or trainees.[13] Notably, a slight reduction in +Gz tolerance has been reported for MVP, but was operationally nonsignificant.[14-17] Therefore, monitored centrifuge assessment is no longer required for MVP or primary MR, but may be used on a case by case basis as deemed necessary by the ACS. An unrestricted waiver may be considered for moderate MR, but waiver consideration for severe MR is limited to low performance aircraft.

Medications that reduce afterload, such as ACE inhibitors, have a documented clinical benefit in acute MR and chronic aortic insufficiency. However, no studies have shown a clinical benefit for MVP or chronic primary MR. Although some studies have shown hemodynamic improvement and relief of symptoms, medication use has not been shown to delay the need for surgery or improve surgical outcome, in contrast to that seen for severe aortic insufficiency. Use of afterload reducing medications in symptomatic MR is appropriate, but at this stage, the aviator should be disqualified and aeromedical disposition should be secondary to clinical disposition regarding proper timing of valve surgery. The use of approved ACE inhibitors is acceptable in aviators with asymptomatic moderate or severe MR.[1]

B. Miscellaneous Heart Valve Disorders: In general, aeromedical concerns for these various valve disorders include progression of the regurgitation and/or stenosis, requirement for surgical or catheter-based valve repair or replacement, underlying or associated disease processes, thromboembolism and arrhythmias.[1, 2, 9, 10]

ICD-9 codes for mitral valve and misc. valve disorder	
394.0	Mitral Stenosis
394.1	Rheumatic mitral insufficiency
394.9	Other and unspecified mitral valve disease
397.0	Diseases of the Tricuspid Valve
397.1	Rheumatic diseases of the Pulmonary Valve
424.0	Mitral valve disorders
424.2	Tricuspid Valve disorders, specified as non-rheumatic
424.3	Pulmonary Valve disorders
742.02	Congenital Pulmonary Stenosis
746.02	Stenosis of Pulmonary Valve
746.6	Congenital mitral insufficiency

ICD-10 codes for mitral valve and misc. valve disorder	
I05.0	Rheumatic Mitral Stenosis
I05.1	Rheumatic mitral insufficiency
I07.8	Other rheumatic tricuspid valve diseases
I09.89	Other specified rheumatic heart diseases
I34.0	Nonrheumatic mitral (valve) insufficiency
I34.1	Nonrheumatic mitral (valve) prolapse
I34.8	Other nonrheumatic mitral valve disorders
I36.9	Other nonrheumatic tricuspid valve disorders
I37.7	Other nonrheumatic pulmonary valve disorders
Q23.2	Congenital mitral stenosis
Q23.3	Congenital mitral insufficiency

V. References.

1. Kruyer WB and Davenport ED. Cardiology. In *Rayman's Clinical Aviation Medicine*, 5th ed. New York: Castle Connolly Graduate Medical Publishing, LTD., 2013; 58-60.

2. Strader JR, Gray GW, Kruyer WB. Clinical Aerospace Cardiovascular Medicine. Ch. 13 in *Fundamentals of Aerospace Medicine*, 4th ed., Philadelphia: Lippincott Williams & Wilkins, 2008; 335-336.

3. Wilson W, Taubert KA, Gewitz M, et al. Prevention of Infective Endocarditis: Guidelines from the American Heart Association: A Guideline From the American Heart Association Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group. Circulation, 2007; 116: 1736-54.

4. Pislaru S and Enriquez-Sarano M. Definition and diagnosis of mitral valve prolapse. UpToDate. Jul 2013.

5. Addetia K, Mor-Avi V, Weinert L, et al. A New Definition for an Old Entity: Improved Definition of Mitral Valve Prolapse Using Three-Dimensional Echocardiography and Color Coded Parametric Models. J Am Soc Echocardiography, 2014; 27(1): 8-16.

6. Brinkley DM and Gelfand EV. Valvular Heart Disease: Classic Teaching and Emerging Paradigms. Am J Med, 2013; 126: 1035-42.

7. Filho AS, Maciel BC, Romano MMD, et al. Mitral valve prolapse and anxiety disorders. Br J Psychiat, 2011; 199: 247-48.

8. Sorrentino MJ. Mitral valve prolapse syndrome. UpToDate. Jun 2014.

9. Bonow RO, Cheitlin MD, Crawford MH, and Douglas PS. 36th Bethesda conference: Eligibility Recommendations for Competitive Athletes with Cardiovascular Abnormalities. Task Force 3: Valvular Heart Disease. J Am Coll Cardiol, 2005; 45: 1334-40.

10. Nishimura RA, Otto CM, Bonow RO, et al. 2014 ACC/AHA Guidelines for the Management of Patients With Valvular Heart Disease. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol, 2014; 63(22): e57-e185.

11. Osswald SS, Gaffney FA, Kruyer WB, et al. Military Aviators with Mitral Valve Prolapse: Long-Term Follow-Up and Aeromedical Endpoints. Aviat Space Environ Med, 2007; 78(9): 845-51.

12. Osswald SS, Gaffney FA, Hardy JC. Mitral Valve Prolapse in Military Members: Long-term Follow-up and Clinical Risk Analysis. J Am Coll Cardiol, 1997; 29(Suppl A): 506A.

13. Whinnery JE. Dysrhythmia comparison in apparently healthy males during and after treadmill and acceleration stress testing. Am Heart J. 1983; 105: 732-37.

14. McKenzie I and Gillingham KK. Incidence of Cardiac Dysrhythmias Occurring During Centrifuge Training. Aviat Space Environ Med, 1993; 64(8): 687-91.

15. Whinnery JE. Acceleration Tolerance of Asymptomatic Aircrew with Mitral Valve Prolapse. Aviat Space Environ Med, 1986; 57(10): 986-92.

16. Whinnery JE and Hickman JR. Acceleration Tolerance of Asymptomatic Aircrew with Mitral Valve Prolapse and Significant +Gz-induced Ventricular Dysrhythmias. Aviat Space Environ Med, 1988; 59(8): 711-17.

17. Whinnery JE. Acceleration-Induced Ventricular Tachycardia in Asymptomatic Men: Relation to Mitral Valve Prolapse. Aviat Space Environ Med, 1983; 54(1): 58-64.

18. Osswald SS, Gaffney FA, Kruyer WB, et al. Analysis of aeromedical endpoints and evaluation in USAF aviators with mitral valve prolapse. Submitted for publication.

19. Osswald SS, Gaffney FA, Hardy JC, Jackson WG. Mitral Valve Prolapse in Military Members: Long-term Follow-up and Clinical Risk Analysis. J Am Coll Cardiol. 1997 Feb; 29(Suppl A): 506A.

Aerospace Medicine Waiver Guide

Myocardial Infarction

Revised: Jun 2023
Reviewed: Col Eddie Davenport (ACS Chief Cardiologist), LtCol Maryrose Chuidian (RAM 23) and Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Restructured waiver guide, updated AIMWITS waiver review, updated data on risk of recurrence for major cardiac event among aircrew with history of MI

I. Waiver Consideration

Myocardial infarction (MI) is disqualifying for all classes of flying duty as well as retention. ACS review and evaluation are required, in all cases, for waiver consideration. If granted, waiver is restricted to non-high performance aircraft (defined as < 2.5 sustained +Gz) and may be considered for all trained aircrew. For pilots, the waiver is additionally restricted to flying with another qualified pilot. Myocardial infarction is also listed specifically as disqualifying for ATC, GBO, and SWA duties. MI waiver for trained aircrew was approved by the Aerospace Medicine Corporate Board in 2008.

For flyers and operators, criteria for waiver consideration include normal left ventricular systolic function at rest and exercise (normal ejection fraction), adequate medical management (lipids, aspirin use, blood pressure control, without evidence of diabetes), restricted to non-high performance aircraft (<2.5 Gz and with another qualified pilot), patent infarct-related artery, no evidence of reversible ischemia off cardioactive medications at rest and at peak stress, and successful risk factor modification during initial and subsequent ACS evaluations. If revascularization has been performed, please refer to the *Coronary Artery Revascularization* waiver guide. Additionally, if aircrew member has residual coronary artery disease, please refer to the *Coronary Artery Disease* waiver guide. Recommend initial minimum post-MI DNIF observation period of six-months. ACS evaluation for initial waiver consideration will include complete noninvasive testing and repeat coronary angiography post-revascularization. If waiver is recommended and granted, waiver will be valid for one year with annual ACS re-evaluation required for waiver renewal consideration. In addition, routine serial coronary angiography will be required at five-year intervals. This is based on a review of ACS database of repeat angiography, which showed disease progression in aircrew post revascularization at 6-months and at the five-year mark. Follow-up coronary angiography may be recommended sooner if indicated by symptoms, noninvasive test results, or failure to control risk factors.

Table 1: Waiver potential for Myocardial Infarction

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA/III	Highly Unlikely	AFRS/CMO	N/A
Trained FC II[1]	Yes	AFMRA	Yes, Annual Visit
Trained FC III[1]	Yes	AFMRA	Yes, Annual Visit
GBO[3]	Yes[2]	AFGSC	Maybe
ATC[3]/SWA[3]	Yes[2]	MAJCOM	Maybe

1. Restricted to non-high performance aircraft with another qualified pilot. Non-high performance aircraft defined as <2.5 sustained G with another qualified pilot. No altitude restriction in non-high performance aircraft.
2. Aircrew must meet all of the following criteria for consideration: normal LVEF, no wall motion abnormality, adequate medical management (including statin, aspirin, nitroglycerine (PRN), ACE inhibitor and/or β blocker as clinically appropriate), controlled hypertension, no diabetes, or other co-morbidities.
3. Annual testing may be done locally and sent to ACS for review at the request of the MAJCOM, alternatively all testing and follow-up can be done during annual ACS evaluation.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. Complete history of event, emergency and all follow-on care rendered regarding event.
2. Reports of any pertinent laboratory and imaging studies, including copies of images.[2]
3. Report and imaging of cardiac catheterization.[2]
4. Additional local cardiac testing is not routinely required but may be requested in individual cases.
5. Copies of reports and tracings of any other cardiac tests performed locally for clinical assessment.[2]
6. Documentation of return to physical activity, including specific comments regarding any activity limitations.
7. Current physical examination findings.
8. FL4 with RTD and ALC status, if member did not meet retention status.
9. List and fully discuss all clinical diagnoses requiring a waiver.

B. Renewal Waiver Request:

1. Interval history since last waiver: include any chest discomfort, dyspnea, or fatigue.
2. Recent ECGs and any other applicable cardiac testing.[2]
3. Report and imaging of repeat cardiac catheterization (required at five-year intervals from original event date).[2]

Note 1: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

Note 2: All studies should be submitted electronically to the ECG Library. See page 2 of the waiver guide compendium for additional details. If this is not possible, items can be mailed via FedEx. If mailed, include patient's name, SSN, and POC at the base. State in AMS when studies were sent to ACS.

III. Aeromedical Concerns

The aeromedical concern related to myocardial infarction is recurrent myocardial ischemia resulting in sudden cardiac death, second myocardial infarction, angina, or ventricular dysrhythmias, all of which may cause sudden incapacitation or seriously impact performance of flight duties. Up to 70% of fatal events occur secondary to atherosclerotic plaque occlusion. Therefore, it is important to routinely screen aviators with a history of MI, and CAD, with coronary angiography. Additionally, identifying the risk factors for CAD and medically optimizing treatment, are important in reducing the aeromedical concerns related to MI. Modifiable risk factors include physical activity level, history of tobacco use, hypertension, obesity, diabetes, elevated LDL, cholesterol, and triglyceride levels. Age, sex, and family history of the aviator are non-modifiable risk factors, however important when considering the overall risk stratification.[1] Of note, an estimated 25% of people have "silent" myocardial infarctions and are unaware of the MI event which can be concerning among aircrew and the consequences related to a "silent" MI.[2]

In the military flying population, MIs are far less common than in the general population. Among this specific sub-population, MI presents as it does in the general population, either as an acute, symptomatic event or as a silent event. Silent MIs are usually discovered as a result of cardiac testing performed for other indications, such as evaluation of an asymptomatic aircrew member diagnosed with abnormal screening ECGs during a flight physical. Their ability to return to flying duties depends on the specific type of revascularization, expected reoccurrence and residual disease burden. Disease burden can be estimated through evaluation of ejection fraction, left ventricular function, severity of remaining coronary artery disease, and risk factors including smoking, dyslipidemia, diabetes, hypertension, obesity, and physical activity.[5]

Prior to 2008, history of myocardial infarction among aircrew members was not a waiverable condition. However, analysis of the Aeromedical Consultation Service (ACS) coronary angiography database provided data from former USAF aircrew. Between 1971 and 1999, 1487 asymptomatic male military aviators had an occupational coronary angiogram and were followed for cardiac endpoints of cardiac death, nonfatal MI, and coronary artery revascularization. During the follow-up, 57/1487 aviators (3.8%) had an MI as their first cardiac event. Their MI date was defined as the index date and post-MI events were calculated at one-, two-, and five-year intervals. No cardiac deaths or second MIs occurred within the 5 years of follow-up; all events were revascularizations. The calculated event rates were 4.0% per year at one year, 2.3% per year at two years and 2.4% per year at five years.[4]

Additionally, the ACS conducted a more recent, retrospective study of their database looking at aircrew with a history of coronary artery disease (CAD) evaluated for waiver recommendation. The chart review conducted between 1968 and 2021 found 298 aircrew with a history of CAD, of which 58 (19.5%) had a history of MI. Additional analysis was conducted among the study group to evaluate for cardiac death, non-fatal second MI, repeat revascularization, or disapproval of flying waiver. The retrospective study looked at one and five-year interval from initial event. The outcome of significant cardiac events were 2.6% at year one and 1.6% at year five. None of

the significant outcome events in this study demonstrated second MI or cardiac deaths. Rather, progression of coronary artery disease or repeat revascularization were the primary drivers of flying disqualification.[3] Furthermore, all of the significant outcome events were detected by coronary angiography prior to recurrence of MI, angina, or anginal equivalent symptoms.[3] The ACS data supports conducting routine angiography during the initial ACS waiver evaluation at six-months post-MI and at five-year intervals for flyers.[4] The short term and long-term mortality risk for aviators with prior MI are consistently shown to be between 2-5%. Even 15 years post-MI, the mortality rate is approximately 2%. However, the mortality rate drastically increases to 45% at 15-years if individual has a history of tobacco use, diabetes, low ejection fraction or other signs of heart failure. Aircrew members with a history of diabetes, significant CAD, signs of heart failure and continued tobacco use are not recommended to return to flying duties after suffering an MI.[4]

In summary, the post-MI event rate in the medical literature is about 2-3% per year in subgroup populations similar to USAF flyers and operators. Low risk outcomes are attained by careful evaluation for comorbid conditions such as diabetes, left ventricular systolic dysfunction, or significant dysrhythmias following an MI along with aggressive reduction of modifiable risk factors such as hypertension, dyslipidemia, complete smoking cessation, weight control, dietary changes, and regular physical activity.

AIMWITS review in January 2023 found 102 aircrew who were evaluated for history of myocardial infarction. Of the 102 members evaluated, 58 were granted flying waivers. The breakdown of the number of waivers and number of total cases is tabulated below.

Please use only these ICD-10 codes for AIMWTS coding purposes		(# of waivers / total # of cases)					
		FC I/IA	FC II	FC III	ATC	GBO	SWA
I21	Acute Myocardial Infarction (MI)						
I21.0	ST elevation (STEMI) MI; anterior wall						
I21.01	ST elevation (STEMI); Left main coronary artery		2/2	0/1			
I21.02	STEMI; L anterior descending coronary artery			2/2			1/1
I21.09	STEMI MI; other coronary artery of anterior wall		6/15	1/12	1/4	3/3	0/1
I21.1	STEMI MI; inferior wall						
I21.11	STEMI MI; right coronary artery		3/6	1/2			
I21.19	STEMI MI; other coronary artery of inferior wall		4/8	1/4		1/1	
I21.2	STEMI; other sites						
I21.21	STEMI; left circumflex artery						
I21.29	STEMI; other sites		0/1				
I21.3	STEMI; unspecified site	1/1	5/13	6/11		3/3	
I21.4	Non-ST elevation MI		3/4	8/14	2/3	2/2	2/2
I21.9	Acute MI, unspecified						
I21.A	Other type of MI						

IV. Suggested Readings

1. *Acute myocardial infarction - statpearls - NCBI bookshelf*. (Aug 2022). Retrieved January 29, 2023, from https://www.ncbi.nlm.nih.gov/books/NBK459269/

2. Centers for Disease Control and Prevention. (2022, October 14). *Heart disease facts*. Centers for Disease Control and Prevention. Retrieved January 29, 2023, from https://www.cdc.gov/heartdisease/facts.htm

3. Database. USAFSAM/FEC (Clinical Sciences Division), Wright Patterson Air Force Base, OH.

4. Davenport, E. D., Syburra, T., Gray, G., Rienks, R., Bron, D., Manen, O., d'Arcy, J., Guettler, N. J., & Nicol, E. D. (2018). Management of established coronary artery disease in aircrew with previous myocardial infarction or revascularisation. *Heart*, *105*(Suppl 1). https://doi.org/10.1136/heartjnl-2018-313055

5. Sutton, N. R., Banerjee, S., Cooper, M. M., Arbab-Zadeh, A., Kim, J., Arain, M. A., Rao, S. V., & Blumenthal, R. S. (2021). Coronary artery disease evaluation and management considerations for high risk occupations: Commercial vehicle drivers and pilots. *Circulation: Cardiovascular Interventions*, *14*(6). https://doi.org/10.1161/circinterventions.120.009950

Pericardial and Myocardial Disorders, Including Pericarditis, Myopericarditis, and Myocarditis (Jan 2021)

Authors/Reviewers: Lt Col Eddie Davenport and Dr. Edwin Palileo (ACS Cardiology); Dr. Christopher Keirns, Maj Laura M. Bridge and Lt Col Amy Hicks (Technical Editors)

Significant Changes: Content updated and revised to reflect current standards of care and to include information pertaining to COVID-19 myocarditis.

I. Waiver Consideration

Any history of pericarditis, myocarditis, or myopericarditis is disqualifying for all flying classes and SWA duties. Chronic pericarditis or myocarditis with degeneration of the myocardium is disqualifying for all flying classes, GBO, ATC, and SWA duties, as well as for retention. Any history of heart surgery or pericardial procedure is disqualifying for all flying classes, GBO, ATC, and SWA duties, as well as for retention. Disqualifying procedures include, but are not limited to, pericardial drainage, pericardiotomy, pericardial window, or pericardiectomy. DNIF/DNIC/DNIA is required at the onset of symptoms of pericardial/myocardial disease. Appropriate medical management follows established national or international guidelines under the care of a local specialist (e.g., cardiologist). Generally, a waiver will be considered once the inflammatory process and resulting pericardial/myocardial injury are resolved, treatment is complete, and recovery of normal physiology and operational functionality is demonstrated by local testing (see II.A.4.).

For pericarditis, first line treatment includes the combination of a non-steroidal anti-inflammatory medication (NSAID) and colchicine. NSAID therapy is typically continued for at least 7 days after symptom resolution. Colchicine is continued for a total of at least 3 months from initiation of treatment. Premature discontinuation of therapy results in increased risk for recurrence and will not be considered favorably for waiver. For myocarditis, a waiver will not be entertained until completion of a structured rehabilitation program, which should not begin until after a 3-6 month period of complete activity and exercise restriction. Earlier return to activity or more aggressive activity progression than is clinically warranted will not be considered favorably for a waiver due to the increased risk of detrimental health and operational outcomes.

Table 1: Waiver potential for pericardial and myocardial disorders

Flying Class	Condition[1]	Waiver Potential Waiver Authority	ACS Review or Evaluation
FC I/IA	Uncomplicated acute idiopathic/viral pericarditis, off all medication and ≥3 months from initiation of treatment	Yes AFRS/CMO	Yes
	Complicated pericarditis, including pericarditis with effusion and myopericarditis, off all medication for ≥6 months from initiation of treatment	Yes AFRS/CMO	Yes
	Myocarditis[2,3]	Yes AFRS/CMO	Yes
FC II/III/SWA	Uncomplicated acute idiopathic/viral pericarditis[4]	Yes MAJCOM	Yes
	Complicated or chronic pericarditis, including pericarditis with effusion and myopericarditis[2,3]	Yes MAJCOM	Yes
	Myocarditis[2,3]	Yes MAJCOM	Yes
ATC/GBO	Uncomplicated acute idiopathic/viral pericarditis or myocarditis	N/A	N/A
	Complicated or chronic pericarditis, including pericarditis with effusion and myopericarditis[2]	Yes MAJCOM	No
	Complicated myocarditis	Yes MAJCOM	No

1. Waiver will not be considered for any untrained asset if there is evidence of persistent cardiac dysfunction, residual symptoms, or evidence of chronic inflammation.
2. Waiver may be submitted after the necessary recovery period (3-6 months, depending on severity of illness).
3. Cardiac MRI is required for FCI/IA applicants. For all other waiver classes, submission of a cardiac MRI will facilitate the waiver review process and is highly recommended.

4. For a trained asset with acute, uncomplicated idiopathic or viral pericarditis treated with NSAIDs and colchicine, treatment should be continued for at least 12 weeks (3 months), but a waiver request may be submitted as soon as 1 month following complete resolution of symptoms.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

NOTE: *It is required that all original cardiac imaging and electrical tracings be submitted to ACS Cardiology for independent review. For image submission process, refer to* *page 2*.

Initial Waiver Request:

1. Information to include in history:
2. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
3. Medical history, medications, and activity level prior to onset of symptoms.
4. Summary of disease course, including list of all treatments administered.
5. Consultation report from the treating cardiologist and all subsequent consultation notes.
6. Results of all testing performed to establish the diagnosis of pericarditis, myopericarditis, or myocarditis (see note above).
7. Results of current local testing to confirm recovery from pericarditis, myopericarditis, or myocarditis (see note above). The below-listed studies must be included. *For the diagnosis of myocarditis, restriction from exercise for at least 3 months is required prior to completion of follow-up testing.*
8. Electrocardiogram (ECG)
9. Echocardiogram
10. Exercise stress test
11. Additional requirements for myocarditis or myopericarditis:
12. Ambulatory heart monitor (e.g., 24-hour Holter monitor)
13. Troponin level
14. Cardiac MRI (required for FC I/IA; will expedite review process for all other waiver classes and is highly recommended)
15. Any other ancillary test results pertinent to the diagnosis or management of pericarditis, myopericarditis, or myocarditis (e.g., coronary artery catheterization, cardiac CT scan, endocardial biopsy, etc.)
16. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.
17. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination.
    b. Complete list of current medications with dates of initiation, doses, and all adverse effects.
    c. Documentation of medication adherence.
    d. Report of any new subjective symptoms.
    e. Documentation of current activity level, to include most recent Air Force Physical Fitness Assessment (AF PFA) score with explanation of any component exemptions.
2. Current ECG.
3. All interval consultation reports from all treating providers.
4. Additional local cardiac testing is not routinely required for re-evaluation but may be requested in individual cases based on prior abnormal testing. If so, the previous ACS evaluation/review will specify details regarding the necessary local testing. Exercise testing is not required if AF PFA was accomplished without exemption in the interval following the previous waiver recommendation. However, the waiver package must include any and all interval laboratory and ancillary test results pertinent to the diagnosis of myopericarditis that were obtained in the course of clinical care (e.g., cardiac stress test, echocardiogram, ambulatory heart monitor, coronary artery catheterization, electrophysiology study, cardiac CT, cardiac MRI) (see note above).
5. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.
6. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

B. **Aeromedical Concerns**

The aeromedical concerns associated with diseases of the pericardium and myocardium relate to the symptoms of the condition itself, complications or sequelae arising from the inflammatory process, and adverse effects of treatment. Symptoms that may adversely affect duty performance in the aviation or operational environment include chest pain, fatigue, or decreased exertional capacity. Examples of complications of aeromedical importance include heart failure and arrhythmia, which may lead to performance decrement, incapacitation, or sudden cardiac death.

Pericarditis and Myopericarditis

Pericarditis is an inflammatory process affecting the pericardium, which is typically either idiopathic or associated with a trigger such as vaccination or viral illness. Symptoms include pleuritic chest pain, and respiratory involvement is also possible. At a minimum, these symptoms can be distracting in an aviation or operational setting. While severe symptoms can cause incapacitation, most cases of acute pericarditis resolve within several days to weeks with the use of

anti-inflammatory medications. Treatment with an NSAID or aspirin plus colchicine is first line for uncomplicated acute disease. In certain specific situations, systemic glucocorticoids may be indicated, although this class of medication is not routinely used due to the association with an increased incidence of recurrent events. All of these medications used to treat pericarditis can cause adverse effects of aeromedical significance. In some instances, these adverse effects may be severe. Careful long-term monitoring after recovery from acute pericarditis is vitally important due to the high rate of disease recurrence. An estimated 15-30% of individuals will develop recurrence, and the most common risk factor is premature cessation of treatment. Therefore, NSAID therapy should continue for at least 7 days after complete resolution of symptoms, and colchicine should be continued for a total of at least 3 months. Refer to established guidelines and local cardiology recommendations for specific management decisions.

In the setting of pericarditis complicated by significant pericardial effusion or myocardial inflammation, the aeromedical risks increase due to the impact on myocardial cellular function and cardiac output. Myopericarditis is a condition in which the inflammation of the pericardium spreads to the underlying myocardial tissue. It is characterized by elevated blood levels of cardiac enzymes. Myocardial wall-motion abnormalities may be detected on dynamic imaging studies, although the left ventricular systolic function is typically preserved. Myopericarditis typically resolves with anti-inflammatory therapy. It is important to distinguish primary myocarditis from myocarditis secondary to pericarditis, because the clinical and aeromedical implications of these two distinct entities differ. Myocarditis is more likely to be associated with global hypokinesis and/or impaired LV systolic function, either of which portend a poorer prognosis and heightened risks in the aviation or operational environment.

Myocarditis

Myocarditis is an inflammatory process of the myocardium that results in myocyte degeneration and non-ischemic necrosis. The morbidity and mortality of myocarditis is much higher than pericarditis. For example, heart failure stemming from myocarditis is one of the most frequent precipitators of heart transplantation. Most commonly, myocarditis arises in the setting of either an acute infection or a post-infectious auto-immune response. Non-infectious etiologies include drug-induced hypersensitivity, giant cell myocarditis, and systemic autoimmune diseases. Any infection may trigger myocarditis. Viral pathogens are the most common, and it is estimated that myocarditis complicates approximately 1% of severe viral infections. Interestingly, early studies of the novel coronavirus SARS-CoV-2 demonstrate myocardial involvement in 7-15% of diagnosed individuals. Among those with COVID-19 of sufficient severity to warrant hospitalization, the observed rate of myocardial involvement may surpass 20%. Myocardial injury is detected in 80% of COVID-19 fatalities. Myocardial injury related to SARS-CoV-2 can also occur without cardiopulmonary symptoms or other signs of myocardial inflammation. These findings underscore that cardiac screening is often indicated in the setting of SARS-CoV-2 infection. (For guidance, refer to the comprehensive return to duty and return to flight guidelines following SARS-CoV-2 infection and the DoD Clinical Practice Guideline for COVID-19, which are listed in the "Suggested Readings" section.)

In addition to viral pathogens, bacterial, fungal, protozoal, rickettsial, or helminthic infections can also precipitate myocarditis. In the case of post-infectious myocardial inflammation, the antecedent illness may have been subclinical or asymptomatic and gone unnoticed by the infected individual.

Up to 8% of the cases of exertional sudden cardiac death in athletes are attributed to myocarditis, making this disease of particular relevance to a military population. Almost exclusively, sudden cardiac death in athletes due to myocarditis occurs without prior knowledge of the condition. The mechanism of sudden death in these cases is presumably malignant arrhythmias. Arrhythmias occur in more than one third of patients with myocarditis and is one of the leading causes of prolonged recovery. These arrhythmias may manifest even after resolution of inflammation and structural abnormalities. For this reason, an assessment of cardiac electrical activity is required for waiver consideration. At a minimum, this assessment includes ambulatory monitoring (e.g., 24-hour Holter monitor) and exercise stress testing.

Endomyocardial biopsy (EMB) is NOT necessary or recommended for waiver consideration. Echocardiographic imaging is sufficient to exclude concomitant endocarditis, pericarditis, or effusion and to ensure normal systolic and diastolic cardiac function, chamber sizes, wall thickness, and regional wall motion. The most recent medical literature suggests that cardiac MRI (also referred to as cardiovascular MRI or CMR) is the best prognostic assessment following myocarditis. In addition, cardiac MRI can differentiate between and exclude other causes of chest pain with elevated troponin, such as infarction, cardiac muscle spasm, or embolism. Therefore, it is preferred over the classic gold standard EMB. Cardiac MRI is required for all FC I/IA applicants and is highly recommended in all other service members. Given the limitations of EMB, which include sampling error, inter-observer variability, and peri-procedural risks of cardiac tamponade or death, this procedure is NOT recommended in aircrew unless otherwise indicated based on published guidelines.

Regardless of the underlying trigger for myocarditis, up to one third of individuals may experience long-term complications, including arrhythmias. Therefore, initial waivers for myocarditis are typically limited to a duration of one year, and annual non-invasive testing is a requirement for renewal consideration (e.g., ECG and functional assessment such as AF PFA or exercise stress test). Additional testing may be clinically warranted, and it is recommended that long-term follow-up be overseen by a local primary cardiologist. After a period of demonstrated stability, waivers of longer duration may be recommended, and those assessed as being at lowest risk may be considered for an indefinite waiver. Some individuals may experience residual cardiac dysfunction following an episode of myocarditis; in this situation, a waiver may be considered on a case-by-case basis.

Review of AIMWTS data from October 2015 through October 2020 revealed a total of 118 waiver packages involving pericarditis and myocarditis. Of that total, 14 were FC I/IA (1 disqualified), 58 were FC II (1 disqualified), 30 were FC III (1 disqualified), 2 were ATC (0 disqualified), 5 were GBO (2 disqualified), and 9 were SWA (0 disqualified).

Please use *only* these ICD-10 codes for AIMWTS coding purposes	
I30.9	Acute, uncomplicated pericarditis
I31.9	Chronic and/or complicated pericarditis
I40.9	Myocarditis

IV. Suggested Readings

1. Return to Flight Status Following COVID-19 Illness. Department of the Air Force Memorandum from HAF/SG3P. Available at https://kx.health.mil/kj/kx4/FlightMedicine/Documents/Policy/2020/RTFS%20post%20COVID%20guidance%20memo.pdf. Accessed 28 October 2020. NOTE: To access this document, the user must first log into the USAF Knowledge Exchange at https://kx.health.mil.
2. Return to Flight and Special Operator Duty Guidance Post SARS-CoV-2 Infection. Available at https://kx.health.mil/kj/kx4/FlightMedicine/Documents/Policy/2020/ACS%20RTFS%20Post-COVID-19%20Guidance%20%20(3%20Sep%2020).pdf. Last accessed 28 October 2020. NOTE: To access this document, the user must first log into the USAF Knowledge Exchange at https://kx.health.mil.
3. Department of Defense COVID-19 Practice Management Guide. Available at https://www.milsuite.mil/book/docs/DOC-760845. Accessed 6 October 2020.y
4. D'Arcy JL, Manen O, Davenport ED, et al. Heart muscle disease management in aircrew. Heart 2019;105:s50-s60. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6256300/pdf/heartjnl-2018-313058.pdf. Accessed 28 October 2020.
5. Pellicia A, Solberg EE, Papadakis M, et al. Recommendations for participation in competitive and leisure time sport in athletes with cardiomyopathies, myocarditis, and pericarditis: position statement of the Sport Cardiology Section of the European Association of Preventive Cardiology (EAPC). Eur Heart J 2019;40:19-33. Available at https://academic.oup.com/eurheartj/article/40/1/19/5248228. Accessed 28 October 2020.
6. Adler Y, Charron P, Imazio M, et al. 2015 ESC Guidelines for the diagnosis and management of pericardial diseases: The Task Force for the Diagnosis and Management of Pericardial Diseases of the European Society of Cardiology (ESC). Eur Heart J 2015;36:2921-2964. Available at https://academic.oup.com/eurheartj/article/36/42/2921/2293375. Accessed 28 October 2020.
7. Kociol RD, Cooper LT, Fang JC, et al. Recognition and Initial Management of Fulminant Myocarditis: A Scientific Statement From the American Heart Association. Circulation 2020;141:e69-e92. Available at https://www.ahajournals.org/doi/10.1161/CIR.0000000000000745. Accessed 28 October 2020.
8. Maron BJ, Udelson JE, Bonow RO, et al. Eligibility and Disqualification Recommendations for Competitive Athletes With Cardiovascular Abnormalities: Task Force 3: Hypertrophic Cardiomyopathy, Arrhythmogenic Right Ventricular Cardiomyopathy and Other Cardiomyopathies, and Myocarditis: A Scientific Statement From the American Heart Association and American College of Cardiology. Circulation 2015;132:e273–e280. Available at https://www.ahajournals.org/doi/10.1161/CIR.0000000000000239. Accessed 28 October 2020.
9. Caforio ALP, Pankuweit S, Arbustini E, et al. Current state of knowledge on aetiology, diagnosis, management, and therapy of myocarditis: a position statement of the European Society of Cardiology Working Group on Myocardial and Pericardial Diseases. Eur Heart J 2013;34:2636-2648. Available at https://academic.oup.com/eurheartj/article/34/33/2636/408735. Accessed 28 October 2020.

Aerospace Medicine Waiver Guide

Supraventricular Tachycardia

Revised: Apr 2023

Reviewed: Col Eddie Davenport (ACS Chief Cardiologist), Maj Catherine Blasser (RAM '23) and Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: New format and content updated.

I. Waiver Consideration

Supraventricular tachycardia is disqualifying for all classes of flying duties and in some cases for retention in the United States Air Force if the condition cannot adequately be controlled with catheter ablation or medications. An ACS evaluation may be required depending on flying class and characteristics of the condition. A single episode of non-sustained asymptomatic Supraventricular Tachycardia (SVT) lasting no greater than 10 beats may be considered for an indefinite waiver with ACS review. A single episode of sustained SVT without hemodynamic symptoms may be considered for FC II, FC III, or GBO waiver without catheter ablation on a case-by-case basis. SVT associated with hemodynamic symptoms is typically not considered for waiver unless successful ablation has been performed. Waivers for FC I/IA and untrained FC II, and FC III will be considered on a case-by-case basis. Recurrent SVT that is not controlled by catheter ablation, or that requires antiarrhythmic medication for control is highly unlikely to be considered for a waiver. Please refer to the *Catheter Ablation of Tachyarrhythmias and Pre-Excitation (WPW)* waiver guide for further details pertinent to waiver submission after successful catheter ablation. Atrial fibrillation and atrial flutter are covered separately in the *Atrial Fibrillation and Atrial Flutter* waiver guide. Lastly, SVT associated with ventricular pre-excitation with bypass tract is addressed in the *Wolff-Parkinson-White (WPW) and Other Pre-Excitation Syndromes* waiver guide.

Table 1: Waiver potential for Supraventricular Tachycardia

SVT (symptoms refers to hemodynamic symptoms)	Flying Class	Waiver Potential/ Waiver Authority	ACS Review or ACS Evaluation
Asymptomatic, single episode of 3-10 beats duration	FC I/IA/II/Initial FC III/GBO/ATC/SWA[4]	Yes[1] AFRS/CMO	ACS review
	FC II/III/ GBO/ATC/SWA	Yes[1] MAJCOM	ACS review
Asymptomatic, recurrent non-sustained SVT or single episode non-sustained SVT >10 beats duration	FC I/IA/II/Initial FC III/GBO/ATC/SWA[4]	Maybe AFRS/CMO	ACS evaluation
	FC II/III/ GBO/ATC/SWA	Yes[2] MAJCOM	ACS evaluation
Asymptomatic sustained SVT (>10 minutes duration), single episode, no ablation	Initial FC I/IA/II/III/ GBO/ATC/SWA[4]	Unlikely AFRS/CMO	ACS review
	FC II/III/ GBO/ATC/SWA	Maybe MAJCOM	ACS evaluation
Recurrent sustained SVT or any degree of SVT associated with hemodynamic symptoms, no ablation	Initial FC I/IA/II/III/ GBO/ATC/SWA[4]	Unlikely[3] AFRS/CMO	ACS review
	FC II/III/ GBO/ATC/SWA	Unlikely[3] MAJCOM	ACS review
Any degree of SVT requiring antiarrhythmic medication for suppression	All initial and trained flying and special duty classes[4]	Unlikely MAJCOM	ACS review

1. Indefinite waiver possible for asymptomatic, single episodes of SVT of less than10 beats duration.
2. Waiver in untrained FC II, III, and GBO applicants will be on a case-by-case basis.
3. Waiver is possible after successful ablation. Refer to the Catheter Ablation of Tachyarrhythmias and Pre Excitation (WPW) waiver guide.
4. Waiver authority for all untrained assets is AFRS/CMO.

II. Information Required for Waiver Submission

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations. Refer to the Disposition of ECG Findings in USAF Aircrew waiver guide for additional criteria.

A. Initial Waiver Request:

1. A complete history and physical examination, to include detailed descriptions of symptoms, medications, activity level, and guideline based risk stratification for coronary artery disease.
2. ECG, echocardiogram, and ambulatory event monitor are required at minimum. Include original or legible copies of all cardiac studies performed locally for clinical assessment (ECGs, rhythm strips, treadmill stress tests, 2D echocardiograms, event monitors, etc.).
3. Include copies of reports and actual images and tracings.
4. Any reports and consultations including follow-up notes, particularly regarding any recurrence of the condition and treatments that were used.
5. Any specific diagnostic tests or studies (such as EP study) performed, before and after treatment (as indicated).
6. Documentation of return to full physical activity, including specific comments regarding any activity limitations.

B. Renewal Waiver Request:

1. A complete history and physical examination, to include detailed description of symptoms, medications, and activity level.
2. Local follow-up cardiac testing is not routinely required prior to ACS re-evaluation. If requested for individual cases, it will have been specified in the report of the previous ACS review/evaluation.
3. Copies of reports and tracings of any previously specified cardiac tests performed locally for clinical assessment (Holter, stress test, echo, etc.).

Note 1: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

Note 2: All studies should be submitted electronically to the ECG Library. If this is not possible, items can be mailed via FedEx. If mailed, include patient's name, SSN, and POC at the base. See page 2 of the waiver guide compendium for additional details.

Note 3: State in AMS when studies were sent to the ACS.

III. Aeromedical Concerns

The aeromedical concerns associated with SVT include hemodynamic symptoms associated with any degree of sustained or non-sustained SVT, recurrent episodes of sustained SVT, and associated cardiac disease. SVT is defined as 3 or more consecutive supraventricular ectopic beats at a heart rate of 100 beats per minute (bpm) or faster. It is an umbrella term used to describe tachycardias originating in tissue at the level of the His bundle or above. These SVTs include inappropriate sinus tachycardia, atrial tachycardia (AT) (including focal and multifocal AT), macroreentrant AT (including typical atrial flutter), junctional tachycardia, Atrioventricular Nodal Reentrant Tachycardia (AVNRT), and various forms of accessory pathway-mediated reentrant tachycardias. Various antiarrhythmic medications may be used clinically to attempt suppression of SVT. Medication concerns include side effect and safety profiles of the medications, proarrhythmic effects, and patient compliance in taking the medication every day.

SVTs can have widely variable symptoms and effects, ranging from an asymptomatic three-beat run that is unnoticed by the individual to a sustained arrhythmia with hemodynamically significant symptoms such as syncope or very rarely, sudden cardiac death. Approximately 60% of SVTs are due to a reentry mechanism within the AV node termed an AVNRT, while 30% of SVTs are associated with a bypass tract. The other 10% of SVTs are a variety of mechanisms, including automatic foci in the atria causing focal atrial tachycardia, multifocal atrial tachycardia, and sinus node reentrant tachycardia.[2]

Acceptable control with medication may not be achieved with tolerable side effects and the arrhythmia may "break through" and recur on medical therapy. SVT that is otherwise disqualifying would thus still be disqualifying on antiarrhythmic medication. Many antiarrhythmics have a proarrhythmic effect, meaning that they also precipitate tachyarrhythmias, usually ventricular tachyarrhythmias. Given the current high success and low complication rates of ablation, SVT that previously required suppression will now preferentially be referred for ablation.

A meta-analysis of the efficacy and safety of ablation for the treatment of supraventricular tachycardia shows that this is a safe and effective procedure for our aviators who truly have symptomatic episodes of SVT. There is a greater than 95% success rate with the first ablation treatment for SVT with a rate of adverse events of less than 3%and thus often eligible for waiver[6]. See the Catheter Ablation of Tachyarrhythmias waiver guide for additional guidance.

A complete review of AIMWTS through January 2023 revealed 180 cases of supraventricular tachycardia. The breakdown of the number of waiver and number of total cases is tabulated below. Of the 12 permanently disqualified cases, concomitant cardiomyopathy, hemodynamic symptoms, or the need for ongoing pharmacologic treatment were associated factors for disqualification.

Please use only *this* ICD-10 codes for AIMWTS coding purposes		(# waivers / # cases)					
		IFC I/IA	FC II	FC III	ATC	GBO	SWA
I47.1	Paroxysmal Supraventricular Tachycardia	16/17	71/71	53/62	6/7	12/13	10/10

IV. Suggested Readings

1. Page R, Joglar J, Caldwell M, et al. 2015 ACC/AHA/HRS Guideline for the Management of Adult Patients With Supraventricular Tachycardia. *J Am Coll Cardiol.* 2016 Apr, 67 (13) e27–e115. 2015 ACC/AHA/HRS Guideline for the Management of Adult Patients With Supraventricular Tachycardia: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society | Journal of the American College of Cardiology (jacc.org)

2. Gray GW, Davenport ED, and Nicol ED. *Fundamentals of Aerospace Medicine.* 5th ed. Chapter 2: Clinical Aerospace Cardiovascular Medicine. Wolters Kleuwer: 25-56.

3. Kruyer WB and Davenport ED. Cardiology. Chapter 2: *Rayman's Clinical Aviation Medicine*, 5th ed., Chapter 2Castle Connolly Graduate Medical Publishing, LTD, 2013.

4. Guettler N, Bron D, Manen O, et al. Management of cardiac conduction abnormalities in aircrew. Heart 2019; 105:s38-49. https://pubmed.ncbi.nlm.nih.gov/30425085/

5. Appelboam A, Reuben A, Mann C, Gagg J, Ewings P, Barton A, Lobban T, Dayer M, Vickery J, Benger J; REVERT trial collaborators. Postural modification to the standard Valsalva manoeuvre for emergency treatment of supraventricular tachycardias (REVERT): a randomized controlled trial. Lancet. 2015 Oct 31;386(10005):1747-53. doi: 10.1016/S0140-6736(15)61485-4. Epub 2015 Aug 24. PMID: 26314489. https://pubmed.ncbi.nlm.nih.gov/24622951/

6. Spector P, Reynolds MR, Calkins H, et al. Meta-Analysis of Ablation of Atrial Flutter and Supraventricular Tachycardia. Am J Cardiology, 2009; 104: 671-77. https://pubmed.ncbi.nlm.nih.gov/19699343/

Syncope (Mar 2019)
Reviewed: Dr. Roger Hesselbrock (ACS Neurologist), Dr. Edwin Palileo (ACS Cardiologist), Dr. Dan Van Syoc (ACS Division Deputy Chief), and Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes:
Restructuring of Waiver Guide, Updated Table 1 and References

I. Waiver Consideration

Air Force aviators with recurrent vasodepressor syncope or symptomatic orthostatic hypotension are disqualified for all flying classes. Careful evaluation is necessary before consideration of aeromedical waiver. Waiver consideration is limited to cases in which the risk of recurrence is low and/or the underlying condition or triggering factor can be adequately controlled. Benign syncope limited to predictable settings may be recommended for waiver if there is negligible risk of recurrence in the aviation environment. If a treatable etiology for syncope is found, then correction of the underlying condition may allow a return to flying status. However, certain conditions (e.g., arrhythmia) and/or medications may pose unacceptable risks of recurrence or side effects that could preclude waiver suitability. If the etiology of syncope remains unknown despite extensive diagnostic evaluation, then a clinical judgment based on careful consideration of all available information must be made before allowing a flyer to return to the cockpit. Unexplained or recurrent syncope is disqualifying for retention, and a Medical Evaluation Board is indicated in such cases.

Table 1: Waiver potential for syncope

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	Yes	AETC	Yes
FC II/III	Yes	MAJCOM	Yes
ATC/GBO/SWA	Yes	MAJCOM	At discretion of waiver authority

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed, all appropriate treatments have been initiated using best current clinical guidelines and recommendations, and the member is clinically stable.

A. Initial Waiver Request:

1. Complete history and physical exam, including orthostatic blood pressure/pulse readings, cardiovascular exam assessing pulses for rate, rhythm and differences between extremities and auscultation for murmurs or abnormal heart sounds, and neurologic exam assessing mental status, cranial nerves, motor and sensory function, reflexes, plantar reflexes, coordination, gait and Romberg test. The history is the most important component and should include: a complete description of the syncopal episode to include posture, pre-syncopal symptoms, duration, pre- or post-syncopal amnesia, convulsive accompaniments; any precipitating factors such as venipuncture, medical procedure or standing in formation; other contributory factors (dehydration, inadequate nutrition, strenuous exercise, fatigue, recent illness, etc.) and documentation of any previous syncopal or near-syncopal episodes. Reports from witnesses and first responders are important to obtain and review. A history of

previous episodes or any other features exceeding the parameters described above, require a waiver. To the extent possible, details of the syncopal episode such as pre-and post-syncopal appearance and behavior, duration of loss of consciousness, post-syncopal posture and any convulsive accompaniments should be based on reliable witness observations. If the episode was unwitnessed, then duration and other details of the syncopal episode cannot be verified.

2. If possible, the flight surgeon should interview witnesses personally and the AMS should indicate which elements of the history were provided by witnesses. Past medical history, medications, allergies, and family history (especially of sudden death, arrhythmia or epilepsy) should be documented.
3. Reports of consultations and diagnostic testing. Cardiology consultation is required if cardiac etiology is suspected or etiology is unknown. If clinically indicated, tertiary testing such as echocardiogram, Holter or event monitor, tilt-table testing, stress-test, electrophysiology studies, etc. may be necessary. Neurology consultation should be obtained if the LOC cannot be attributed to syncope and/or neurologic deficits are identified or suspected. If clinically indicated, tertiary testing such as neuroimaging or EEGs, etc. may be necessary. Psychology or psychiatry consultation should be obtained if psychogenic factors are suspected. Documentation should include the ECG and results of any laboratory or imaging studies, cardiodiagnostic testing, and neurologic tests such as imaging or EEGs. For cases sent to the ACS for review or evaluation, original images, tapes, etc. will be required.
4. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

B. Renewal Waiver Request:

1. Interval history and level of symptom resolution.
2. Copies of any applicable interim specialty reports, labs, imaging reports and images.
3. Current physical and neurologic exam findings.
4. f the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

III. Aeromedical Concerns

Syncope is a common clinical problem, and has been estimated to account for 3-5 percent of emergency room visits and 1 percent of hospital admissions. Any underlying condition that predisposes an aviator to suffer syncopal attacks could lead to incapacitation and loss of aircraft control. For this reason, loss or disturbances of consciousness, symptomatic orthostatic hypotension, or recurrent vasodepressor syncope are all disqualifying. Careful evaluation is required to determine the etiology, risk for recurrence, or long-term complications. Unfortunately, even after thorough evaluation, the cause of syncope remains unknown in many cases. Any aviator being treated with beta blockers, scopolamine, paroxetine, fludrocortisone, or alpha-agonists will not be eligible for a waiver as these medications are not approved for aviation duties in the US Air Force. The evaluation for G-LOC has additional requirements. In-flight G-LOC must be reported as a physiologic event. Evaluation should include a description of the sequence of events and

careful video tape recorder (VTR) review for adequacy of anti-G straining maneuver. Cases in which G-LOC continues to occur despite correction of underlying factors and/or additional and training conducted by an aerospace physiologist are managed IAW AFI 11-4-4, *Centrifuge Training for High-G Aircrew*.

Review of AIMWTS in Jan 2019 revealed a total of 509 waivers submitted with the diagnosis of syncope. Of this total, 61 were FC I/IA (19 disqualified), 158 were FC II (25 disqualified), 21 were RPA pilots (1 disqualified), 200 were FC III (77 disqualified), 46 were ATC/GBC (21 disqualified), and 23 were MOD (4 disqualified). There were a total of 100 disqualifications. Most of the DQ cases were for issues related to syncope – some were on beta blockers, others had unexplained etiologies and others had ongoing issues with syncope. About 20 percent of the DQ cases were disqualified for issues other than syncope.

ICD-9 code for syncope	
780.2	Syncope and collapse

IC-10 code for syncope	
R55	Syncope and collapse

IV. Suggested Readings

1. Benditt D. Syncope in adults: epidemiology, pathogenesis and etiologies. UpToDate, Nov 15, 2018. Link: https://www.uptodate.com/contents/syncope-in-adults-epidemiology-pathogenesis-and-etiologies?search=syncope&source=search_result&selectedTitle=5~150&usage_type=default&display_rank=5

2. Benditt D. Syncope in adults: management. UpToDate, Mar 6, 2019. Link: https://www.uptodate.com/contents/syncope-in-adults-management?search=syncope&source=search_result&selectedTitle=6~150&usage_type=default&display_rank=6

3. Benditt D. Syncope in adults: clinical manifestations and diagnostic evaluation. UpToDate, Sep 24, 2018. Link: https://www.uptodate.com/contents/syncope-in-adults-clinical-manifestations-and-diagnostic-evaluation?search=syncope&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1

4. Cheshire WP. Syncope. Continuum (Minneap Minn) 2017; 23(2):335-358.

5. Ropper AH, Samuels MA, Klein JP (Ed). Faintness and syncope. *Adams and Victor's Principles of Neurology, Tenth Edition, McGraw-Hill Education*, 2014:383-394.

6. Kuriachan V, Sheldon RS, and Platonov M. Evidence-based treatment for vasovagal syncope. Heart Rhythm 2008; 5(11):1609-1614.

7. Link MS and Estes M. How to Manage Athletes with Syncope. Cardiol Clin 2007; 25:457-66.

WAIVER GUIDE
Updated: May 2017
Supersedes Waiver Guide of Jan 2011
By: Lt Col Cindy Harris Graessle (RAM 2017) and Dr Dan Van Syoc
Reviewed by: Dr. Edwin Palileo and Lt Col Eddie Davenport (Chief Cardiologist ACS)

CONDITION:
Valve Surgery - Replacement or Repair (May 2017)

I. Waiver Consideration.

Cardiac valve replacement or repair by surgery or catheter-based technique is disqualifying for all classes of flying duties as well as retention in most cases. ACS review/evaluation is required for initial and renewal waiver considerations. The ACS will make recommendations based on the successfulness of the procedure/surgery and residual valve hemodynamics and cardiac function.

Table 1: Waiver potential for various valve replacements and repairs.

Flying Class (FC)	Condition	Waiver Potential Waiver Authority	ACS Evaluation/Review
I/IA	Mitral valve, aortic valve and tricuspid valve surgery	No AETC	No
	Pulmonic valvuloplasty	Maybe AFMRA	Yes
II/III	Mitral valve prosthetic (mechanical or biological)	No AFMRA	No
	Mitral valve annuloplasty or repair	Maybe AFMRA	Yes
	Aortic valve (mechanical)	No AFMRA	No
	Aortic valve (biological)	Maybe AFMRA	Yes
	Other procedures or valves	Maybe AFMRA	Yes
III* ATC/GBO/SWA*	Mitral valve prosthetic (mechanical or biological)	No AFMRA	No
	Mitral valve annuloplasty or repair	Maybe AFMRA	Yes
	Aortic valve (mechanical)	No AFMRA	No
	Aortic valve (biological)	Maybe AFMRA	Yes
	Other procedures or valves	Maybe AFMRA	Yes

*Waiver authority for all initial certification is AETC.

II. Information Required for Waiver Submission.

Complete MEB prior to waiver submission. Prior to waiver submission for valve replacement or repair there is a minimum nonflying observation period of six months. After the six-month observation period, submit an aeromedical summary (AMS) with the following information:

A. Complete history and physical exam – to include description of symptoms before and after surgery, cardiovascular risks (family history, smoking status, lipids, and history of rheumatic disease), medications, and activity level.

B. Copy of pre- and post-procedure local echocardiogram reports. For all FC II and RPA Pilots and for FC I and III individuals requiring ACS evaluation, send echocardiographic images to the ACS.

C. Copy of the formal operation/procedure report and follow-up progress notes by the attending cardiovascular specialists.

D. Copies of reports and tracings of any other cardiac tests performed locally for clinical assessment (e.g. electrocardiogram, treadmill, Holter monitor). For all FC II and RPA Pilots and for FC I and III individuals requiring ACS evaluation if reports or tracings not attached in AIMWTS then send to ACS.

E. Results of medical evaluation board MEB) (worldwide duty evaluation for ARC members).

F. Additional local cardiac testing is not routinely required but may be requested in individual cases.

For image submission process, refer to page 2.

III. Overview.

Replacement or repair of a cardiac valve is a complicated aeromedical subject and disposition consideration.[1-4] This is largely considered a surgical procedure; however, catheter-based techniques are presently being performed in certain cases.[5, 6] In the military aviator/aircrew population valve replacement or repair will usually be for severe regurgitation of the aortic or mitral valve.[7-8] In the older aviator population with bicuspid aortic valve, significant aortic valve stenosis is an unusual possibility. Procedures for mitral stenosis and tricuspid valve disease are very rare. One occasional consideration in candidates for initial flying training may be balloon valvuloplasty of congenital pulmonary valve stenosis performed during childhood. Due to the broad spectrum of procedures, types of valve prostheses and other considerations, valve replacement/repair considered for waiver must be evaluated by the Aeromedical Consultation Service (ACS) (See Table 1). Information in this waiver guide will thus be very general.

IV. Aeromedical Concerns.

Aeromedical concerns include thromboembolic events, anticoagulation and/or antiplatelet medications, infective endocarditis, dysrhythmias, residual or progressive post-procedure valvular regurgitation and/or stenosis, and short- and long-term durability of the procedure, especially prostheses. The etiology of the underlying valve disease is also a consideration as it may affect procedure outcomes (e.g. repair of severe mitral regurgitation (MR) due to myxomatous disease has a much better prognosis than severe MR due to rheumatic disease).

Prosthetic valves are of two basic types, mechanical (primarily metal) and biological (human and nonhuman tissue).[9] Regardless of valve type, valve prostheses in the mitral position have higher thromboembolic rates than those in the aortic position and are thus unacceptable for military aviation. Mechanical valves have higher thromboembolic rates than biological valves and require chronic anticoagulation therapy, with associated risk of major hemorrhage.[10] The combined risk is considered unacceptable for military aviation. Biological valve prostheses are of several tissue types and designs and do not require chronic warfarin therapy unless there is some other indication, such as chronic atrial fibrillation.[11-13] These valves in the aortic position may be a consideration for waiver. Mitral valve repair and annuloplasty for severe MR due to a myxomatous valve (i.e. mitral valve prolapse) also may be favorably considered for waiver. Valve prostheses with residual regurgitation or other concerns regarding long-term durability will likely be restricted to low performance aircraft. Select architecturally intact valves with no residual regurgitation may be considered for unrestricted waiver on a case-by-case basis.

V. References.

1. Bonow RO, Carabello B, DeLeon AC, et al. ACC/AHA guidelines for the management of patients with valvular heart disease. A report of the American College of Cardiology/American Heart Association task force on practice guidelines (committee on management of patients with valvular heart disease). J Am Coll Cardiol, 1998; 32: 1486-1588.

2. Bonow RO, Carabello BA, Chatterjee K, et al. ACC/AHA 2006 guidelines for the management of patients with valvular heart disease. A report of the American College of Cardiology/American Heart Association task force on practice guidelines (writing committee to revise the 1998 guidelines for the management of patients with valvular heart disease). Circulation, 2006; 114: e84-e231.

3. Bonow RO, Cheitlin MD, Crawford MH, and Douglas PS. 36th Bethesda conference: Eligibility recommendations for competitive athletes with cardiovascular abnormalities. Task force 3: Valvular heart disease. J Am Coll Cardiol, 2005; 45: 1334-40.

4. Cheitlin MD, Douglas PS, and Parmley WW. 26th Bethesda conference: Recommendations for determining eligibility for competition in athletes with cardiovascular abnormalities. Task force 2: Acquired valvular heart disease. J Am Coll Cardiol, 1994; 24: 874-80.

5. Holmes DR, Mack MJ, Kaul S, et al. 2012 ACCF/AATS/SCAI/STS Expert Consensus Document on Transcatheter Aortic Valve Replacement. J Thoracic Cardiovasc Surg, 2012; 144(3): e29-84

6. Leon MB, Smith CR, Mack MJ, et al. Transcatheter or Surgical Aortic-Valve Replacement in Intermediate-Risk Patients. N Engl J Med, 2016; 374(17): 1609-20.

7. Kruyer WB and Davenport ED. Cardiology. In *Rayman's Clinical Aviation Medicine*, 5th ed., Castle Connolly Graduate Medical Publishing, LTD, New York, 2013, 47-70.

8. Strader JR, Gray GW, and Kruyer WB. Clinical Aerospace Cardiovascular Medicine. In *Fundamentals of Aerospace Medicine*, 4th ed. Philadelphia: Lippincott Williams & Wilkins, 2008; 333-38.

9. Vahanian A, Alfieri O, Andreotti F, et al. Guidelines on the management of valvular heart disease (Version 2012). The Joint Task Force on the Management of Valvular Heart Disease of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS). Euro J Cardio-Thoracic Surg, 2012; 42. S1-S44.

10. Nishimura RA, Otto CM, Bonow RO, et al. 2014 AHA/ACC Guideline for the Management of Patients with Valvular Heart Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol, 2014; 63(22): e57-e185.

11. Peltz M. Surgery for Valvular Heart Disease. Ch. 46 in *Cardiovascular Therapeutics: A Companion to Braunwald's Heart Disease*, 4th ed., Saunders, 2012.

12. Algarni KD, Suri RM, and Schaff H. Minimally invasive mitral valve surgery: Does it make a difference? Trends Cardiovasc Med, 2015; 25. 456-45.

13. O'Gara PT, Calhoon JH, Moon MR, and Tommaso CL. Transcatheter Therapies for Mitral Regurgitation. J Am Coll Cardiol, 2014; 63(8) 841-52.

Ventricular Tachycarhia (Dec 2019)
Reviewed: Capt Mitchell Radigan (RAM 20), Lt Col Eddie Davenport (ACS Cardiology), Dr. Dan Van Syoc (ACS Waiver Guide Coordinator, and Lt Col David Gregory (AFMRA Physical Standards Development Chief)

Significant Changes:
Updated content and format

I. Waiver Consideration

Ventricular tachycardia (VT) is the most malignant of arrhythmias which can degenerate into ventricular fibrillation and sudden death; therefore immediate DNIF is required in all documented VT until a complete investigation can be completed. VT may be symptom of structural heart disease, ischemia, infarction, cardiomyopathy, or channelopathy. A history of symptomatic or asymptomatic ventricular tachycardia is disqualifying for all classes of flying duties. VT is defined as 3 or more consecutive complexes originating in the ventricles at a rate of >100bpm and can be sustained (>30 sec or requiring termination due to hemodynamic compromise) or non-sustained (terminating spontaneously) and monomorphic (stable morphology) or polymorphic (changing or multiform QRS from beat to beat). VT is considered significant and disqualifying if associated with hemodynamic symptoms, an underlying cardiac disorder, is longer than 11 beats, or when there are more than 4 episodes of VT in a single exercise stress test or during a 24 hour Holter monitor. VT that can be treated via aeromedically approved medications or ablation is waiverable for all flying classes in asymptomatic aircrew with a structurally normal heart. Given the complexity of cases, ACS review is recommended in all VT waivers. FC I, FC II and FC III waivers for VT require ACS evaluation/review.

Table 1 summarizes the current approved aeromedical policy.

Table 1: Waiver potential for Ventricular Tachycardia

Flying Class (FC)	Disease/Condition	Waiver Authority Waiver Potential	ACS Review/ Evaluation
I/IA Untrained II, RPA pilot, and III	Nonsustained idiopathic VT (max duration ≤11 beats, ≤4 episodes per study)	Maybe AETC	Yes
	Nonsustained idiopathic VT (max duration >11 beats, >4 episodes per study) or sustained VT after ablation	Maybe AETC	Yes
	Nonsustained VT with underlying cardiac disorder[1]	No AETC	No
	Sustained VT or any duration VT with associated hemodynamic symptoms not treatable with ablation.	No AETC	No
II/III	Nonsustained idiopathic VT (max duration ≤11 beats, ≤4 episodes per study)	Yes MAJCOM	Yes
	Nonsustained idiopathic VT (max duration >11 beats, >4 episodes per study) or sustained VT after ablation	Maybe MAJCOM	Yes
	Nonsustained VT with underlying cardiac disorder[1]	Maybe MAJCOM	Yes
	Sustained VT or any duration VT with associated hemodynamic symptoms not treatable with ablation.	No MAJCOM*	No
ATC GBO SWA	Any sustained VT with or without medical treatment or ablation	Yes MAJCOM	Yes
	Any Nonsustained VT	Yes	At the discretion of the waiver authority

1. Cardiac disorders that are unlikely to be waived include moderate and significant coronary artery disease, hypertrophic or dilated cardiomyopathy, and electrical or ion-channel abnormalities (unless potentially curable with ablation).

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. Summary of presentation, course, and treatment, including:
    a. Detailed description of VT and of symptoms before and after the acute episode
    b. Medications, lab values
    c. Activity level
    d. CAD risk factors (positive and negative)
    e. Electrophysiology Reports if performed

    There is no minimum required nonflying observation period for waiver consideration for nonsustained VT.
2. Reports of any pertinent laboratory studies and actual ECG tracings and images (as indicated). Include diagnostic tests and procedures performed to include EKG, ambulatory ECG monitor, treadmill test, echocardiogram, cardiac MRI/CT, EP studies etc. No additional studies are required, unless specifically requested on a case by case basis, prior to ACS evaluation. If however, the treating physician deems it clinically necessary to perform additional studies, it is required that all studies be forwarded to the ACS for review.
3. Any consultation reports, including follow-up notes with examination findings after disease resolution.
4. Documentation of return to full physical activity, including specific comments regarding any activity limitations.
5. Current physical examination findings.
6. FL4 with RTD and ALC status, if member did not meet retention status
7. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

B. Renewal Waiver Request:

1. Summary of interim course and treatment including:
    a. Change in symptoms
    b. Medications
    c. Activity level
    d. CAD risk factors (positive and negative).
2. Reports of any pertinent laboratory studies or cardiac imaging studies that have been done since initial waiver. No additional studies are required, unless specifically requested on a case-by-case basis, prior to ACS evaluation. If however, the treating physician deems it clinically necessary to perform additional studies, it is required that all studies be forwarded to the ACS for review.
3. Any follow-up or new consultation reports.
4. Documentation of degree of physical activity, including specific comments regarding any activity limitations.
5. Current physical examination findings.

6. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

For image submission process, refer to page 2.

III. Aeromedical Concerns

Ventricular tachycardia is second only to ventricular fibrillation as the most common cause of sudden cardiac death. In rare instances, VT can be associated with treatable electrolyte abnormalities and/or electrical re-entry which can be ablated and therefore waiverable. However, more often VT is the result of structural heart disease, ischemia, infarction, cardiomyopathy or channelopathy that in not compatible with ongoing flight duties given risk of hemodynamic symptoms that may render an individual incapable of remaining in control of an aircraft or supporting the flying mission. Though sudden cardiac death related to sustained VT would be an obvious and dramatic explanation for such an event, a less dramatic near syncopal episode is also likely to result in sudden incapacitation or interference with duty performance. Permanent disqualification for aircrew is recommended for VT, which is sustained or symptomatic, if antiarrhythmics are necessary for control, with AICD implantation, if associated with underlying myocardial disease, or when ablation is done for failed medical therapy in prior infarct/scar related VT.

When there is no underlying cardiac disease or other obvious etiology, the arrhythmia is termed *idiopathic VT*. Cardiac literature does support a benign prognosis for infrequent episodes of short-duration asymptomatic VT in structurally normal hearts. In USAF aviators with asymptomatic idiopathic non-sustained VT, the annual event rate for sudden cardiac death, syncope, presyncope, or sustained VT was less than 0.5% per year during a mean follow-up of approximately 10 years with the majority having VT runs of only three beats' duration and only one VT episode per 24-hour ambulatory ECG recording. Only 10% had more than four episodes of non-sustained VT per 24-hour ambulatory recording and only 3% had VT episodes longer than ten beats duration. International consensus is that asymptomatic VT with a duration of 11 beats or less and no more than 4 runs in a 24 hour period is acceptable for return to flight duties in otherwise structurally normal hearts. Idiopathic VT that responds well to antiarrhythmic therapy is limited by the side effect profile, pro-arrhythmic, and hemodynamic effects of antiarrhythmics. The only antiarrhythmic approved in aircrew is beta-blocker use in non-high performance airframes.

Review of AIMWTS waiver submissions for ventricular tachycardia in Nov 2019 for the previous 5 years showed 33 waivers submitted. Breakdown of the cases was as follows: 1 FC I/IA case (0 disqualified), 16 FC II cases (0 disqualified). 12 FC III cases (2 disqualified), 3 ATC/GBC cases (0 disqualified), and 1 SWA case (0 disqualified). There were a total of 2 submissions that resulted in

a disqualification. These were complex cases. One was associated with significant heart defects and the other had multiple comorbidities.

ICD-9 codes for Disease/Condition	
427.1	Paroxysmal ventricular tachycardia

ICD-10 codes for Disease/Condition	
I47.2	Ventricular tachycardia

IV. Suggested Readings

1. Kruyer WB and Davenport ED. Cardiology. In: Rayman 's *Clinical Aviation Medicine*, 5th ed. New York: Castle Connolly Graduate Medical Publishing, LTD, 2013; 81-7.

2. Guettler N, Bron D, Manen O, et al. Management of cardiac conduction abnormalities and arrhythmia in aircrew. Assessing aeromedical risk: a three-dimensional risk matrix approach. Heart 2019;105:s38–s49

3. Sharma, S, Drezner J, Baggish A, Papadakis M et al. International Recommendations for Electrocardiographic Interpretation in Athletes. J Am Coll Cardiol 2017;69:1057–75

4. Marine, JE. Nonsustained ventricular tachycardia in the normal heart. Cardiac Electrophysiology Clinics, 2016; 8(3): 525-543.

5. Gardner RA, Kruyer WB, Pickard JS, and Celio PV. Nonsustained Ventricular Tachycardia in 193 U.S. Military Aviators: Long-Term Follow-Up. Aviat Space Environ Med, 2000; 71(8): 783-90.

6. Ramirez, A, Alvarado, RL, Lopez, FM, et al. A comparison of nonsustained ventricular tachycardia in military aviators with and without underlying structural heart disease. Aviat Space Environ Med, 2007; 78(3): 311.

7. Walker J, Calkins H and Nazarian S. Evaluation of Cardiac Arrhythmias Among Athletes. Am J Med, 2010; 123 1075-81.

8. Hoffmayer KS and Gerstenfeld EP. Diagnosis and Management of Idiopathic Ventricular Tachycardia. Curr Probl Cardiol, 2013; 28: 131-58.

9. Olgin J and Zipes DP. Specific Arrhythmias: Diagnosis and Treatment. Ch. 39 in *Bonow: Braunwald's Heart Disease – A Textbook of Cardiovascular Medicine*, 9th ed., 2011, Saunders.

11. Huikuri HV, Castellanos A, and Myerburg RJ. Sudden Death Due to Cardiac Arrhythmias. N Engl J Med, 2001; 345(20): 1473-82.

Wolff-Parkinson-White (WPW) and other Pre-Excitation Syndromes (Aug 2020)
Reviewed: Lt Col Eddie Davenport (ACS Chief Cardiologist), Dr. Edwin Palileo (ACS cardiologist), Dr. Dan Van Syoc (ACS waiver guide coordinator), and Lt Col Ric Speakman (AFMRA Physical Standards Development Chief)

Significant Changes:
Updated content and format

I. Waiver Consideration

Per MSD H14, WPW pattern is disqualifying for all classes of flying duties in the US Air Force.

Table 1: Waiver potential for WPW and related syndromes

Flying Class (FC)	Waiver Potential Waiver Authority	ACS Evaluation/Review
I/IA	Yes[1] AETC	Yes
II/III	Yes[1] MAJCOM	Yes
ATC/GBO/SWA	Yes[1] MAJCOM	Yes

1. FCI candidates will require EP study; all others will require Holter monitor and treadmill testing.

II. Information Required for Waiver Submittal

Aeromedical disposition and waiver submission should be done after administrative and clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines/recommendations.

A. Initial Waiver Request:

1. Complete history and physical exam – to include description of symptoms (positive and negative) as well as medications, treatments, and activity level.
2. Cardiology consultation
3. Electrocardiogram (ECG), all ECGs if multiple.
4. Copies of reports and all tracings/images of any other cardiac tests performed locally for clinical assessment (e.g. treadmill, Holter monitor, cardiac cath, cardiac CT or MRI).
5. Electrophysiologist consultation if done, if electrophysiology study and/or catheter ablation is done then procedure report(s) should be submitted.
6. RTD and ALC status, if member did not meet retention status.
7. If the local base is unable to provide all required items, they should explain why to the waiver authority

B. Renewal Waiver Request:

1 Complete updated history and physical exam – to include description of any symptoms, medications, and activity level.
2 Electrocardiogram (ECG).
3 Additional local cardiac testing is not routinely required for re-evaluation but may be requested in individual cases. If so, the previous ACS evaluation/review will specify details regarding any requested local testing.
4 Local studies done since prior waiver or waiver renewal should be sent to ACS for review even if not requested by ACS. (e.g. stress test, echocardiogram, Holter monitor, cardiac cath, EP study, cardiac CT or MRI).
5 If the local base is unable to provide all required items, they should explain why to the waiver authority

All studies should be submitted electronically to the ECG Library. For image submission process, refer to page 2.

III. Aeromedical Concerns

Aeromedical concerns with WPW (Pattern and Syndrome) involve the risk of recurrent arrhythmia with symptoms that range from palpitations that would adversely affect flying performance to sudden cardiac death. Fortunately, WPW is often successfully treated with ablation which decreases risk to less than 1% and thus eligible for unrestricted waiver.

WPW Syndrome vs Pattern Only

WPW pattern (also commonly referred to as ventricular pre-excitation) is characterized on the ECG by a short PR interval (less than 0.12 seconds) due to more rapid AV conduction through an accessory pathway AND a prolonged QRS complex (> 0.12 seconds) due to a slow initial phase due to ventricular muscle to muscle conduction (often referred to as a delta wave) followed by more rapid ventricular activation via the His-Purkinje fibers. WPW Pattern is the term often used to indicate the presence of ventricular pre-excitation on EKG in the absence of any symptoms consistent with tachydysrhythmias. WPW Syndrome, on the other hand refers to ECG evidence of pre-excitation and presence of signs (including arrhythmia and/or aborted sudden cardiac death) or symptoms consistent with tachydysrhythmia. WPW syndrome is disqualifying for all flying classes unless ablated (see ablation waiver guide). WPW pattern only may be acceptable for continued flight duties if low risk.

Risk of WPW pattern is determined best by EP study but can also be inferred by absence of high-risk features on ECG monitoring. High risk findings in EP studies include the ability for fast

conduction over the accessory pathway at very short coupling interval (referred to as a short refractory period), presence of multiple pathways, and/or the ability to conduct retrograde (thus allowing for AV re-entry tachycardias). Utilizing non-invasive modalities such as Holter monitoring or stress testing, if the WPW pattern resolves with increased heart rates (i.e., PR interval lengthens and delta wave disappears), it is commonly assumed that the pathway is "weak" and cannot conduct at shorter intervals which equates with fast heart rates. However, this is not fool-proof as this only reflects antegrade accessory pathway conduction and does not rule out the possibilities of retrograde conduction (of a manifest or concealed accessory pathway) or the presence of multiple pathways, which require an EP study to identify. Moreover, younger age such as the pediatric population has been shown to have increased risk of significant tachyarrhythmias when compared to older populations. Systematic review, in conjunction with the ACC/AHA/HRS guidelines, showed that the occurrence of arrhythmias in untreated asymptomatic individuals in the general population could be as high as 77% over five years; however always with highest risk at younger ages.

The most current guidelines give a class IIA recommendation for all patients with asymptomatic WPW pattern to undergo EP study to risk-stratify arrhythmic events and treatment with catheter ablation if the EP study identifies high risk; however, they also give a IIA recommendation for observation without further evaluation. Most importantly, the same guideline gives an IIA recommendation to treat with ablation in "asymptomatic patients if the presence of pre-excitation precludes specific employment (such as with pilots)." Given the low level of evidence supporting this employment recommendation, the USAF reviewed 60 years of aircrew data in over 200 cases of WPW Pattern which demonstrated a less than 1% annual risk of SVT and less than 0.03% risk of SCD; these risks were highest in the youngest and healthiest aircrew and lowest in aircrew over age 35. We therefore reserve EP study for those at high risk (any symptoms, arrhythmia, and/or persistent pre-excitation with exercise) or young age (most initial applicants).

Pilot candidates (FCI/IA) are higher risk given age and have a somewhat increased lifetime risk given their longer duration of possible service. Therefore, an EP study is recommended in ALL untrained pilot candidates and ablation is required if the EP study reveals any high-risk pathway. See ablation waiver guide for more details regarding waiver after ablation.

While all initial FCI/IA aircrew must undergo EP study, all other aircrew may demonstrate lower risk via loss of ventricular pre-excitation on ECG. The minimum acceptable diagnostic work up these airmen with WPW pattern is exercise stress testing and a Holter monitor looking for loss of pre-excitation with increased heart rate. Absence of these inferred "low-risk" findings will require an EP study for evaluation (with ablation if high risk pathway).

Electrophysiologic testing (EP) and Ablation

Recommendations by the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society in 2015 suggest the usefulness of electrophysiologic (EP) studies of both symptomatic and asymptomatic persons with WPW pattern on EKG. The effectiveness and risks of treatment of high-risk accessory pathways with radiofrequency (RF) catheter ablation was reviewed in a systematic review in conjunction with the ACC/AHA/HRS guidelines. This review showed the complication rate of RF ablation to be between 0.9% and 1% of cases (these included ablation induced right bundle branch block, complete heart block, access site complications, and pneumothorax). In five years of follow-up,

those that underwent RF ablation had a 7% incidence of arrhythmic events and those who did not undergo ablation had an incidence of 77%. Owing to the high success rate of RF ablation in high-risk accessory pathways and the low incidence of complications, this is currently the preferred treatment modality and in most guidelines considered first line treatment. ANY AIRCREW may CHOOSE to undergo EP study and ablation, even if low risk, and will be eligible for unrestricted waiver if successful. While most cases of WPW are sporadic, there is a familial tendency in about 3.4% of all cases. Studies have shown that this is from a mutation in the PRotein Kinase, AMP-activated, Gamma 2 non-catalytic subunit (PRKAG2) gene. In familial WPW, there is a higher risk of multiple accessory pathways and high-risk pathways. Routine genetic testing for WPW is not currently recommended nor does it change the waiver process.

AIMWTS review in Jul 2020 for the previous five years resulted in 135 members with a diagnosis of WPW. Breakdown of the cases revealed: 23 FC I/IA cases (4 disqualified), 53 FC II cases (1 disqualified), 36 FC III cases (4 disqualified), 2 ATC cases, 16 GBO cases, and 5 SWA cases.

ICD-9 codes for WPW	
426	Conduction disorders
426.7	Anomalous atrioventricular excitation

ICD-10 codes for WPW	
I45.89	Other specified conduction disorders
I45.6	Pre-excitation syndrome

IV. Suggested Readings

1. Al-Khatib SM, Arshad A, Balk EM, et al. Risk Stratification for Arrhythmic Events in Patients With Asymptomatic Pre-Excitation: A Systematic Review for the 2015 ACC/AHA/HRS Guideline for the Management of Adult Patients With Supraventricular Tachycardia: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society. Circulation, 2016; 133(14): e575-e586.

2. 2019 ESC Guidelines for the Management of Patients With Supraventricular Tachycardia: The Task Force for the management of patients with supraventricular tachycardia of the European Society of Cardiology (ESC): Developed in collaboration with the Association for European Paediatric and Congenital Cardiology (AEPC). Eur Heart J, 2020; 41: 655-720

3. Gray GW, Davenport ED, Nicol ED. Clinical Aerospace Cardiovascular Medicine. Ch. 13 in: *Fundamentals of Aerospace Medicine*, 5th ed. In press, pending publication 2020.

4. Strader JR, Jr, Gray GW, Kruyer WB. Clinical Aerospace Cardiovascular Medicine. Ch. 13 in: *Fundamentals of Aerospace Medicine*, 4th ed. Philadelphia: Lippincott Williams & Wilkins, 2008; 344-45.

5. Kruyer WB and Davenport ED. Cardiology. Ch. 2 in: *Rayman's Clinical Aviation Medicine*, 5th ed., Castle Connolly Graduate Medical Publishing, LTD, 2013; 75-79.

6. Guettler N, Bron D, Manen O, et al. Management of cardiac conduction abnormalities and arrhythmia in aircrew. Heart 2019;105:s38-49

7. Munger TM, Packer DL, Hammill SC, et al. A population study of the natural history of Wolff-Parkinson-White syndrome in Olmsted County, Minnesota, 1953-1989. Circulation, 1993; 87(3): 866-73.

8. Davenport ED, Rupp KAN, Palileo E, and Haynes J. Asymptomatic Wolff-Parkinson-White pattern ECG in USAF aviators. Aerosp Med Hum Perform, 2017; 88(1): 56–60

9. Fitzsimmons PJ, McWhirter PD, Peterson DW, and Kruyer WB. The natural history of Wolff-Parkinson-White syndrome in 228 military aviators: A long-term follow-up of 22 years. Am Heart J, 2001; 142(3): 530–36.

10. Obeyesekere MN, Leong-Sit P, Massel D, et al. Risk of Arrhythmia and Sudden Death in Patients with Asymptomatic Preexcitation: A Meta-Analysis. Circulation, 2012; 125: 2308-15.

Aerospace Medicine Waiver Guide

Acne

Revised: Sept 2022
Reviewed: Col Emily Wong (AF/SG Dermatology Consultant), Col Jon Ellis (Chief, ACS Ophthalmology), Dr. Max Lee (ACS Waiver Guide Coordinator), Lt Col Paul Vu (AFMRA Medical Standards Policy Chief)

Significant Changes:
Updated references, waiver no longer required for isotretinoin after 2 week ground trial, electroretinogram no longer required for uncomplicated isotretinoin use.

I. Waiver Consideration

Severe acne that is unresponsive to treatment and interfering with the satisfactory performance of duty or wear of the uniform or use of military equipment requires an evaluation for retention. Waiver is required for mild to moderate acne in flyers and operators if the condition is chronic or of a nature that requires frequent specialty medical care or interferes with the satisfactory performance of military duty if it is severe enough to cause recurrent grounding from flying duties. Treatment with approved topical agents does not require a waiver for any flying or special duty personnel. The local flight surgeon plays an important role in assessing for potential interference with use of aviation equipment and adverse effects of medication used to treat acne.

Systemic maintenance agents such as oral erythromycin, tetracycline, and trimethoprim-sulfamethoxazole require a waiver for FC I/IA, FC II, FC III, ATC, GBO, and SWA personnel. If acne does not interfere with the use of life support equipment, treatment with doxycycline does not require a waiver for any flying or special duty personnel. These oral agents are compatible with flying once it is confirmed that side effects are absent or of minimal and acceptable aeromedical risk.

Use of isotretinoin no longer requires a waiver for all flying and special duty operations classes after a 2-week minimum DNIF period to assess for side-effects. Due to the drying effects of isotretinoin on the mucosal surfaces, the local flight surgeon will need to determine, on a case-by-case basis, the impact of the disease and medications on the operator's flying duties. Baseline electroretinography (ERG) for use of isotretinoin in pilots and operators is no longer required unless requested for clinical reasons by the treatment team. Complications related to isotretinoin including alteration in night vision, visual field changes, visual acuity, and other mucocutaneous complications will require waiver adjudication.

Aeromedical waivers are highly unlikely for acne treated with minocycline due to unacceptable risk of vestibular side-effects. Therapy with oral contraceptives may be considered and waiverable for women. Although spironolactone is sometimes used in conjunction with oral contraceptives for management of acne, due its diuretic effects and potential for hyperkalemia, waiver consideration is limited to non high-performance aircraft.

Table 1: Waiver potential for acne

Flying Class (FC)	Acne Treatment	Waiver Potential Waiver Authority[1]
I/IA II/III ATC/SWA	Topical treatment – topical retinoids (tretinoin, adapalene, tazarotene), benzoyl peroxide, salicylic acid, azelaic acid, topical antibiotics (clindamycin, erythromycin, sulfacetamide-sulfur)	N/A
	Oral contraceptive (female only)	N/A
	Oral antibiotics – tetracycline, erythromycin, doxycycline, and trimethoprim-sulfamethoxazole[2,3]	Yes MAJCOM
GBO	Topical treatment – topical retinoids (tretinoin, adapalene, tazarotene), benzoyl peroxide, salicylic acid, azelaic acid, topical antibiotics (clindamycin, erythromycin, sulfacetamide-sulfur)	N/A
	Oral contraceptive (female only)	N/A
	Oral antibiotics – tetracycline, erythromycin, doxycycline, and trimethoprim-sulfamethoxazole[2,3]	N/A

1. Waiver authority for untrained applicants is AFRS/CMO.
2. Minocycline is "Non-Waiverable" under the Aircrew and GBO Med List.
3. No waiver is necessary for doxycycline if used for acne.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial/Renewal Waiver Request:

1. History of acne problem, age at onset, extent and location(s) of lesions, and a description of current and past therapy. Include all medications including dosage, and frequency, and side effects. In adult women, address menstrual regularity and presence or absence of hirsutism.
2. Comments addressing interference with use of flight or other equipment.
3. Dermatology consult if individual has recalcitrant moderate to severe inflammatory or severe/nodulocystic acne.
4. Medical evaluation board (MEB) reports and narrative, if required.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Acne is a follicular disease with the principal abnormality being impaction and distention of the pilosebaceous unit with up to 85% incidence in the adolescent population. It typically appears at puberty and lessens in severity during the course of adolescence. Although initial manifestation of acne occurs during the second decade of life, the mean age at presentation to a physician is 24 years and is estimated that 33 percent of people ages 15 to 44 years-old are affected by acne. Adolescent acne has a male predominance, but post-adolescent disease predominately affects women. The social, psychological, and emotional impairment that can result from acne has been reported to be similar to epilepsy, asthma, diabetes, and arthritis.

Acne treatment goals are to relieve clinical symptoms and to prevent scarring. Dermatologists strongly encourage patients to obtain early treatment as the extent and severity of scarring are associated with acne severity and longevity prior to therapy.

The primary aeromedical events of concern are interference with the wear of protective aviation equipment, acne exacerbation due to rubbing, pressure and/or exposure to hot and humid environments, psychological factors, use of acne medications that are incompatible with flying duties, and extended grounding due to a difficult or prolonged treatment course. Lesions on the face may interfere with mask or respirator seal and helmet wear (chin straps). Lesions on the shoulder, chest, and back may cause discomfort and distraction when wearing restraint or parachute harnesses or with prolonged sitting. Repeated or prolonged rubbing or pressure against the skin can produce or exacerbate an eruption (mechanical acne) with striking inflammation.

Aeromedical events of concern regarding the use of isotretinoin are the known and common side effects of mucosal surface dryness, photosensitivity, and possible impact on visual acuity. The demato-photosensitizing effects of isotretinoin are moderate and not usually as significant as that seen with doxycycline (also used in flyers for malaria prophylaxis and acne). The impact on visual acuity, especially night vision, is not well understood as there are no studies that specifically evaluate this. The most common side effect of isotretinoin is skin dryness and mucosal membranes. The lips tend to be the most significantly affected surface, but the eyes and nares can also be affected. Any patient on isotretinoin must be evaluated every month by an iPledge REMS^{TM} provider. Though rare, it is critical that the desiccating effect of isotretinoin, its potential for visual impairment, and wear of aircrew flight equipment must be carefully assessed during clinical follow-ups.

AIMWTS review from Nov 2015 to Feb 2022 revealed 119 Air Force flyers and operators with a diagnosis of acne. The breakdown of the number of waivers and number of total cases are tabulated below. Reassuringly, only 3 were disqualified primarily as the result of acne with 2 disqualifications related to the flyers' personal choice for continuing to take aeromedically unapproved medications for acne and 1 for isotrentinoin use which now has waiver potential.

Please use only these ICD-10 codes for acne for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
L70.0	Acne vulgaris	5/6	27/28	2/8	63/65	3/5	6/6
L70.8	Other acne						

IV. Suggested Readings

1. Webster GF. Acne vulgaris. BMJ. 2002 Aug 31;325(7362):475-9. PMID: 12202330; PMCID: PMC1123998. https://www.bmj.com/content/325/7362/475.1.long

2. Graber, E. Acne vulgaris: Overview of management. UpToDate. Topic update Oct 26, 2021. Accessed Mar 1 2022. https://www.uptodate.com/contents/acne-vulgaris-overview-of-management

3. Li C, Chen J, Wang W, Ai M, Zhang Q, Kuang L. Use of isotretinoin and risk of depression in patients with acne: a systematic review and meta-analysis. BMJ Open. 2019 Jan 21;9(1):e021549. doi: 10.1136/bmjopen-2018-021549. Erratum in: BMJ Open. 2019 Mar 15;9(3):e021549corr1. PMID: 30670500; PMCID: PMC6347928.
https://bmjopen.bmj.com/lookup/pmidlookup?view=long&pmid=30670500

4. Mollan SP, Woodcock M, Siddiqi R, Huntbach J, Good P, Scott RA. Does use of isotretinoin rule out a career in flying? Br J Ophthalmol. 2006 Aug;90(8):957-9. doi: 10.1136/bjo.2006.092833. Epub 2006 May 24. PMID: 16723361; PMCID: PMC1857209.
https://bmjopen.bmj.com/lookup/pmidlookup?view=long&pmid=30670500

Eczematous Dermatitis (Eczema) / Atopic Dermatitis

Reviewed: May 2023
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Stacey Aycock (ACS Aerospace Medicine Specialist); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Updated to reflect current MSD.

I. Waiver Consideration

Chronic eczematous dermatitis (eczema), also referred to as atopic dermatitis, is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention if it is severe enough to interfere with proper wear of military uniform or equipment, *or* requires frequent absences from duty, *or* requires a duty limitation, *or* if frequent exacerbations occur despite treatment. Atopic dermatitis that requires the chronic use of topical corticosteroid preparations is disqualifying for all flying class and SWA duties. Although not specifically identified in the Medical Standards Directory, the chronic use of topical corticosteroid preparations and topical calcineurin inhibitors (i.e., tacrolimus and pimecrolimus) would also be disqualifying for all flying class and ATC personnel. Finally, *any* verified history of eczema or atopic dermatitis after the 12th birthday is disqualifying for flying class I/IA applicants and SWA personnel that require clearance for jump duties.

The use of any medication not included on the career field-approved medication list is independently disqualifying. Systemic therapy with oral glucocorticoids, non-targeted immunosuppressive agents (e.g., cyclosporine, methotrexate, azathioprine, mycophenolate mofetil), or psoralen plus ultraviolet A (PUVA) photochemotherapy for disease control are unlikely to receive a waiver. Broad-spectrum ultraviolet B (UVB) phototherapy is less toxic than PUVA phototherapy and may be considered on a case-by-case basis. The use of newer biologic agents such as dupilumab (Dupixent®) may also be considered for waiver on a case-by-case basis for trained individuals, particularly in lower risk career fields. Untrained assets requiring use of biologic agents are unlikely to be considered favorably for waiver based on both the underlying disease severity and the risks associated with treatment. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of dermatitis in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Factors considered when assessing suitability for waiver include the severity of disease, evidence of active lesions, the risk associated with specific medication(s), the individual service member's tolerance of the medication(s) and adherence to therapy, and the presence of comorbid conditions (e.g., other atopic conditions such as asthma, allergic rhinitis, or food allergies).

Untrained applicants with mild eczematous or atopic dermatitis may be eligible for an initial waiver on a case-by-case basis. For aeromedical and operational purposes, mild disease is defined as eczema controllable with the use of emollients, with or without the occasional (i.e.,

intermittent or as needed) use of low-to-moderate potency steroids or topical calcineurin inhibitors, in the absence of other significant disqualifying comorbidities, and without requiring dermatology follow-up more than annually. Moderate or more severe disease would be any degree of dermatitis that requires continuous use of any potency topical steroid or intermittent use of a high potency topical steroid, *or* disease that is treated with systemic medications or phototherapy, *or* disease that interferes with sleep, *or* disease that interferes wearing of military uniform or operational equipment, *or* disease associated with significant disqualifying comorbidities, *or* disease requiring dermatology follow-up more frequently than annually.

To be eligible for waiver, the service member must demonstrate clinical stability with absence of distracting symptoms, demonstrate non-interference with the wear/use of military equipment, and be evaluated for tolerability of a maintenance treatment regimen. FC I/IA applicants also require pre- and post-bronchodilator spirometry testing prior to waiver submission to exclude the presence of comorbid pulmonary dysfunction. Abnormal pulmonary screening results should prompt full pulmonary function testing and further evaluation.

Table 1: Waiver potential for Eczema/Atopic Dermatitis

Flying Class	Condition[1]	Waiver Potential Waiver Authority[2]	ACS Review or Evaluation
FC I/IA	History of eczema or atopic dermatitis after the 12th birthday	Yes[3] AFRS/CMO	Yes
	Active eczema or atopic dermatitis, mild[4]	Yes[3] AFRS/CMO	Yes
	Active eczema or atopic dermatitis, moderate to severe[4]	No AFRS/CMO	No
FC II/III ATC/GBO OSF/SWA	Active eczema or atopic dermatitis treated with topical steroids, topical pimecrolimus, or topical tacrolimus[4,5]	Yes MAJCOM	No
	Chronic eczema/atopic dermatitis interfering with wear of military uniform or equipment or resulting in frequent absences from duty, duty limitation, or frequent exacerbations despite adequate treatment	No MAJCOM	No

1. Use of any medication not included on the career field-approved medication list is independently disqualifying.
2. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMRA.
3. FC I/IA applicants require pre- and post-bronchodilator spirometry testing prior to waiver submission.
4. Untrained applicants with mild disease may be considered for waiver on a case-by-case basis. Untrained applicants with moderate or severe disease are unlikely to be recommended for waiver. Refer to Section I: Waiver Considerations for aeromedical and operational definitions of mild vs. moderate-severe disease.
5. A diagnosis of eczema and atopic dermatitis is NOT always disqualifying for continued operational duties. Please cross-reference the Medical Standards Directory and career field-approved medication list to properly identify all potentially disqualifying conidtions or medications.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the servicemember is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative). Include symptoms associated with episodes, duration of episodes, and frequency of recurrences.
    b. Summary of diagnostic evaluation, including list of all procedures with dates.
    c. List exacerbating/triggering factors (if known).
    d. Summary of all treatments and their effectiveness.
    e. Document all comorbidities (e.g., food allergies, asthma, eczema, etc.).
    f. List current medications with dosages.
2. Consultation report from the treating all treating specialists (e.g., dermatologist, allergist) and all subsequent consultation notes. These notes must include the following:
    a. Subjective symptoms and objective physical exam findings to include skin exam.
    b. Date of last recurrence.
    c. Current treatment or prophylaxis recommendations.
        i. Include tolerability and doses.
        ii. For topical steroids, include formulation, potency, total dose, treatment duration, site of application, and any side effects (e.g., skin thinning, telangiectasias, etc.).
3. Results of all testing performed during diagnosis, evaluation, and management of eczema/atopic dermatitis, including laboratory studies and ancillary studies. For FC I/IA applicants, must include pre- and post-bronchodilator spirometry results.
4. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination, including skin examination.
    b. Specify any interval recurrences or flares.
    c. Complete list of current medications with dates of initiation, dosages, and all adverse effects. For topical steroids, include formulation, potency, total dose, treatment duration, site of application, and any side effects (e.g., skin thinning, telangiectasias, etc.).
2. Any interval consultation reports from specialty providers (e.g., dermatologist, allergist).
3. Results of all interval testing performed for condition evaluation and management.
4. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Eczematous dermatitis (eczema), also called atopic dermatitis, is a relatively common condition characterized by chronic inflammation of the skin. It is predominantly a disease of prepubescence, but it can persist into or develop in adolescence or adulthood. Presentations vary broadly in severity, with milder cases often controllable with topical emollients alone, while refractory disease may necessitate systemic immunotherapy for control. The typical rash is dry and pruritic. Although any area of the body may be affected, common areas of involvement include flexural surfaces, the hands, neck, and face. When uncontrolled, the discomfort from pruritis or pain may be substantial and result in distraction that could jeopardize flight or operational safety. Active rashes may interfere with the safe and effective wear of operational or flight equipment. Additionally, the environmental conditions and stressors encountered in the flying or operational environment and deployments to austere conditions may exacerbate symptoms.

Atopic dermatitis is associated with other atopic conditions of aeromedical and operational importance, including asthma, allergic rhinitis, and food allergies. A thorough evaluation should be completed to assess for these concomitant atopic diseases. A 2017 retrospective study involving 3,966 children found that those who developed atopic dermatitis in adolescence had a 30% cumulative incidence of developing asthma. Thus, FC I/IA applicants with any history of eczema or atopic dermatitis after the twelfth birthday are required to undergo pre- and post-bronchodilator spirometry prior to waiver consideration. Any abnormal spirometry results must be evaluated with appropriate clinical work-ups.

Generally, the use of systemic treatments such as oral glucocorticoids, cyclosporine, or psoralen plus ultraviolet A (PUVA) photochemotherapy are not considered favorably for aeromedical or operational waiver due to their adverse effect profiles as well as the underlying severity of the dermatitis indicated by the need for these interventions. Short-term side effects of PUVA therapy include nausea, dizziness, headache, and photosensitivity. Long-term side effects of PUVA therapy include pruritus, skin damage, and increased skin cancer risk. Broad-spectrum ultraviolet B (UVB) phototherapy may be better tolerated without the adverse effect profile of PUVA. Aeromedical safety concerns for UVB phototherapy have been deemed acceptable, and there is waiver potential for its use. However, UVB phototherapy may require several treatments per week which may create mobility and readiness concerns when ongoing therapy is necessary to maintain disease control.

Topical corticosteroids and topical calcineurin inhibitors are frequently used to treat atopic dermatitis and are typically well tolerated. Prolonged use of a topical steroid increases the risk of systemic adverse effects such as suppression of the hypothalamic-pituitary-adrenal axis, iatrogenic Cushing's syndrome, avascular necrosis, or glaucoma. Low or moderate potency steroids and intermittent use mitigates these risks. Due to the increased risks for adrenal suppression, the systemic use of glucocorticoids is unlikely to be considered compatible with active flying or operational duties. Please refer to the Aerospace Medicine Waiver Guide chapter on *Systemic Glucocorticoid (Steroid) Therapy* for additional information.

The use of newer non-aeromedically approved biologic agents such as dupilumab (Dupixent®) may be considered clinically for refractory eczema or atopic dermatitis that does not respond to less potent agents. However, recourse to such therapeutic interventions might not be amenable to waiver, particularly in untrained assets, as utilization of biologic agents is indicative of the severity of the underlying condition. The biologic agents themselves may also be associated with significant aeromedical and operational risks. Therefore, cases involving the use of immunologic agents will be considered for waiver on a case-by-case basis in trained personnel.

Review of the AIMWTS database from May 2020 through May 2023 revealed 72 cases with a diagnosis of atopic dermatitis. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		FC I/IA	FC II	FC III	GBO	ATC	SWA
L20.9	Atopic dermatitis, unspecified (includes eczema)	28/29	26/26	12/12	1/1	1/1	3/3

IV. Suggested Readings

1. Davis DMR, Drucker AM, Alikhan A, et al. American Academy of Dermatology Guidelines: Awareness of comorbidities associated with atopic dermatitis in adults. J Am Acad Dermatol 2022; 86:1335-1336.e18. Available at https://www.sciencedirect.com/science/article/pii/S0190962222000809?via%3Dihub. Accessed 18 May 2023.
2. Drucker AM, Eyerich K, de Bruin-Weller MS, et al. Use of systemic corticosteroids for atopic dermatitis: International Eczema Council consensus statement. Br J Dermatol 2018; 178:768-775. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5901393/pdf/BJD-178-768.pdf. Accessed 18 May 2023.
3. Misery L, Belloni Fortina A, El Hachem M, et al. A position paper on the management of itch and pain in atopic dermatitis from the International Society of Atopic Dermatitis (ISAD)/Oriented Patient-Education Network in Dermatology (OPENED) task force. J Eur Acad Dermatol Venereol 2021; 35:787-796. Available at https://onlinelibrary.wiley.com/doi/10.1111/jdv.16916. Accessed 18 May 2023.
4. Sidbury R, Alikhan A, Bercovitch L, et al. Guidelines of care for the management of atopic dermatitis in adults with topical therapies. J Am Acad Dermatol 2023; DOI: 10.1016/j.jaad.2022.12.029. Available online ahead of print at https://www.sciencedirect.com/science/article/pii/S019096222300004X?via%3Dihub. Accessed 18 May 2022.

Aerospace Medicine Waiver Guide

Psoriasis and Psoriatic Arthritis

Reviewed: Sep 2024
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (Aerospace Medicine Branch Chief)

Significant Changes: More discretion to waiver authority without ACS review (see Table 1).

I. Waiver Consideration

Any history of psoriasis is disqualifying for all flying class and SWA duties. Psoriasis that requires either ultraviolet light therapy or a systemic medication (i.e., oral or parenteral) to maintain disease control is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. Psoriasis not controlled by treatment is likewise disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention.

Psoriatic arthritis may occur with or without skin involvement. Although psoriatic arthritis is not specifically disqualifying, psoriasis is disqualifying, as described above. Additionally, arthritis of any type that interferes with the ability to follow a physically active lifestyle or that may be reasonably expected to preclude the satisfactory performance of aviation or operational duties is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention.

The medications used to treat psoriasis or psoriatic arthritis may require a waiver. Several topical and systemic therapies are approved for the treatment of psoriasis and psoriatic arthritis in aircrew and GBO personnel, with an appropriate waiver. The use of any medication not included on the career field-approved medication list is independently disqualifying. Use of non-approved medications may be considered on a case-by-case basis under unique circumstances and in otherwise low-risk individuals functioning in low-risk operational environments. Waivers for the use of aeromedically unapproved medications are generally not considered in untrained applicants. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of psoriasis and psoriatic arthritis in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Factors weighed when assessing suitability for waiver include the severity of disease at diagnosis, evidence of sustained stable disease remission, tolerance of a maintenance therapeutic regimen, adherence to treatment recommendations and whether treatment and monitoring are appropriate in the context of nationally or internationally recognized guidelines, the risk associated with treatment, and the cumulative risk of all comorbidities, complications, and/or extra-articular manifestations. A waiver may be considered once an individual is in disease remission on a stable, career field-approved medication regimen, without adverse effects.

Table 1: Waiver potential for Psoriasis and Psoriatic Arthritis

Flying Class	Condition[1]	Waiver Potential[2] Waiver Authority[3]	ACS Review or Evaluation
IFC I/IA	Any history of psoriasis or psoriatic arthritis	Unlikely[2] AFRS/CMO	No
FC II/III/SWA	Psoriasis with only dermatologic symptoms, in remission and stable on career field-approved maintenance medications, without complication	Yes[2] MAJCOM	No
	Psoriatic arthritis, in remission and stable on career field-approved maintenance medications, without complication	Yes[2] MAJCOM	Yes
ATC/GBO/OSF	Psoriasis or psoriatic arthritis, in remission and stable on career field-approved maintenance medications, without complication[4]	Yes[2] MAJCOM	No

1. Use of any medication not included on the career field-approved medication list is independently disqualifying.
2. Untrained personnel with a history of uncomplicated, isolated guttate psoriasis may be considered eligible for waiver, including FC I/IA. Otherwise, untrained personnel are unlikely to receive a waiver.
3. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMED.
4. Psoriasis and psoriatic arthritis are only disqualifying for ATC, GBO, and OSF duties if the service member also does not meet retention standards. However, medications used in the treatment of psoriasis and psoriatic arthritis may necessitate a need for waiver consideration. Please reference the applicable career field-approved medication list.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
        i. include frequency of flares and date of last flare
        ii. include thorough skin and joint examination
    b. Include description of areas of skin involvement and total extent of body surface area (BSA) involved at time of diagnosis (estimate 1% BSA equivalent to palm of patient's hand).

    c. Specify presence or absence of ongoing symptoms (e.g., skin lesions, joint pain or stiffness, joint swelling, back or neck pain or stiffness, etc.).
    d. Summary of diagnostic evaluation and treatment history, including list of any/all procedures with dates.
    e. List current medications with dosages.
1. Consultation report from the treating dermatologist and all subsequent consultation notes. These notes must include the following:
    f. Subjective symptoms and objective physical exam findings to include thorough skin exam.
    g. Discussion of current treatment, including dose, frequency, formulation, and all appropriate monitoring with schedule for follow-up (e.g., biologic agents require laboratory studies with a metabolic panel and CBC every 3-6 months and annual tuberculosis testing).
    h. Detailed plan of ongoing treatment and monitoring.
2. If any history of psoriatic arthritis, then a consultation report from a rheumatologist is required, along with all subsequent consultation notes. These notes must include the following:
    a. Subjective symptoms and objective physical exam findings to include thorough spine and joint exam.
    b. Discussion of current treatment, including dose, frequency, formulation, and all appropriate monitoring with schedule for follow-up (e.g., biologic agents require laboratory studies with a metabolic panel and CBC every 3-6 months and annual tuberculosis testing).
    c. Detailed plan of ongoing treatment and monitoring.
3. Laboratory studies required:
    a. Current CBC, CMP, erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP) level
4. Imaging studies are required if any history of joint pain, back pain, neck pain, or known history of psoriatic arthritis (radiology reports are sufficient).
5. Results of any other testing performed during diagnosis, evaluation, and management of psoriasis or psoriatic arthritis, including laboratory studies and other ancillary studies.
6. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. <u>Renewal Waiver Request</u>:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms, objective findings, or interval flares.
    b. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
2. All relevant interval consultation reports from the treating dermatologist.
3. If any history of psoriatic arthritis, then interval consultation reports from the treating rheumatologist are required.

4. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, and other ancillary tests.
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Psoriasis is a chronic inflammatory condition that principally affects the skin but is also frequently associated with multisystem chronic inflammation and various comorbidities. Presentations vary, and characteristic subtypes of skin involvement include plaque psoriasis, guttate psoriasis, pustular psoriasis, and erythrodermic psoriasis. Inflammatory arthritis is a common comorbid condition. Psoriatic arthritis most often develops after onset of skin lesions, but it may also occur prior to or in the absence of skin involvement.

The skin lesions of psoriasis are of aeromedical and operational concern for several reasons. Active symptoms may include pain and pruritis that could distract from aircrew or operational duties, causing subtle performance decrement. Depending on the area of involvement, lesions may interfere with the performance of essential duties, particularly if involving the palms or soles. Likewise, skin lesions may inhibit proper wear of aviation or military equipment. Friction from wear/frequent use of military equipment such as helmets, gloves, straps, harnesses, and other gear may result in new outbreaks of active lesions, a reaction known as the Koebner phenomenon.

The clinical course of psoriasis is chronic and unpredictable. In addition to being precipitated by physical trauma, as described above, skin exacerbations may be triggered by events such as cold temperatures, stress, infection, or medication exposure/withdrawal (e.g., lithium, beta-adrenergic blockers, antimalarial agents, angiotensin-converting enzyme inhibitors, and corticosteroid withdrawal). Many of these triggers are inherent to the aviation and operational environments. Beyond the expected physical and psychological stressors of the aviation and operational environments, it is important to note that chloroquine and hydroxychloroquine antimalarial prophylaxis can have unpredictable results in the dermatologic manifestation of psoriasis, which may limit the servicemember's worldwide readiness.

Psoriatic arthritis is an inflammatory arthropathy that is associated with psoriasis and shares features with both rheumatoid arthritis (RA) and ankylosing spondylitis (AS). It generally affects multiple joints and can involve both the axial and peripheral musculoskeletal system. It may present as symmetric inflammatory polyarthropathy that may be clinically indistinguishable from RA or AS. Symptoms associated with inflammatory arthritis include prolonged morning stiffness, joint swelling, and erythema. Inflammatory back pain is characteristically associated with morning stiffness, pain that improves with activity and worsens or is not improved with rest, and nocturnal pain. Psoriatic arthritis may result in aggressive joint destruction, deformity, loss of function, and disability. Erosive disease is common and may be rapidly progressive, especially in individuals who are untreated or undertreated, with even low levels of ongoing active inflammation. In an aviation or operational environment, the symptoms of psoriatic arthritis may be distracting or lead to a decrement in duty performance. At worst, pain or loss of

joint mobility and function may result in an inability to perform essential duties, may interfere with wear of aviation or military equipment, and may inhibit safe egress in the event of an emergency.

In addition to the skin lesions and arthropathy of psoriasis, the chronic systemic inflammation of this disease is associated with a high risk of other comorbid conditions, especially inflammatory bowel disease, eye conditions (e.g., uveitis, blepharitis, conjunctivitis, etc.), early coronary artery disease, other atherosclerotic cardiovascular disease (i.e., cerebrovascular disease, peripheral vascular disease), renal disease, and liver disease. There is a link between psoriasis, excess adiposity/larger body habitus, metabolic syndrome, and the diseases related to these conditions (e.g., diabetes, non-alcoholic fatty liver disease, hypertension, obstructive sleep apnea, etc.). Any of these complications or comorbid conditions conveys unique risks in the aviation or operational environment and may be independently disqualifying. Please cross-reference the Medical Standards Directory for all potentially disqualifying conditions.

The primary goals of treatment for psoriasis and psoriatic arthritis are to minimize symptoms and control inflammation. In the case of psoriatic arthritis, treatment objectives are to control symptoms, preserve function, and prevent progressive joint destruction. With these goals in mind, therapy is tailored based upon extent/severity of disease and whether joint involvement or other comorbid conditions are present. Several medications utilized in the treatment of psoriasis and psoriatic arthritis are approved for use in flyers, ATC, and GBO personnel, either with or without a waiver. Medications that are not officially approved for use may be considered for waiver on a case-by-case basis.

First-line therapy for psoriatic skin lesions is topical corticosteroids. Prolonged use of a topical steroid increases the risk of systemic adverse effects such as suppression of the hypothalamic-pituitary-adrenal axis, iatrogenic Cushing's syndrome, avascular necrosis, or glaucoma. The chronic use of topical steroids is approved for use in all flying class and ATC personnel with an appropriate waiver. The chronic use of topical steroids does not require a waiver for GBO duties. Topical calcineurin inhibitors (tacrolimus and pimecrolimus) are commonly utilized to minimize chronic topical corticosteroid use, particularly on the face and intertriginous areas, and do not require a waiver for flying or operational duties.

Patients with cutaneous disease that is refractory to topical steroids alone but not severe enough for systemic therapy may be treated with a topical vitamin D analog or a topical retinoid. The topical vitamin D analog calcipotriene is approved for use in all flying class and ATC personnel in restricted potency and dose with an appropriate waiver. Likewise, the topical retinoid tazarotene is approved for use in all flying class and ATC personnel in restricted potency with an appropriate waiver. The use of these medications does not require a waiver for GBO duties. Other topical medications are not officially approved for use, including alternative topical retinoids, and newer topical agents such as the aryl hydrocarbon receptor-modulating agent tapinarof and the phosphodiesterase 4 inhibitor roflumilast.

Individuals with more extensive, severe, or refractory cutaneous psoriasis may undergo treatment with ultraviolet light. Both broad-spectrum ultraviolet B (UVB) phototherapy and psoralen plus ultraviolet A phototherapy (PUVA) are utilized clinically, depending on unique patient

characteristics. Psoralen plus ultraviolet A (PUVA) photochemotherapy utilized for disease control is unlikely to receive a waiver due to the anticipated adverse effects following such therapy. UVB phototherapy is less toxic than PUVA phototherapy and may be considered on a case-by-case basis.

With regards to psoriatic arthritis, the approach to the treatment is like that of rheumatoid arthritis and other inflammatory spondyloarthritis. Mild arthritis pain may be managed with chronic non-steroidal anti-inflammatory drugs (NSAIDs). The non-selective NSAIDs ibuprofen and naproxen are approved for chronic use with a waiver in aircrew and ATC personnel. Celecoxib and meloxicam may be used chronically without a waiver. Other NSAIDs are not formerly approved for chronic use in aircrew or ATC personnel. The chronic use of NSAIDs (except for ketorolac) does not require a waiver for GBO personnel.

Individuals with psoriasis and psoriatic arthritis who require systemic therapy for the control of symptoms may be candidates for biologic agents. Several biologic agents are approved for use with an appropriate waiver, including the TNF-alpha inhibitors adalimumab, etanercept, and infliximab. Other biologics that can be used in the treatment of psoriasis and psoriatic arthritis such as an anti-interleukin 12/23 antibody (ustekinumab), anti-interleukin 17 antibody (secukinumab or ixekizumab), anti-interleukin 17 receptor antibody (brodalumab), anti-interleukin 23/39 antibody (guselkumab, tildrakizumab, or risankizumab), or Janus Kinase (JAK) inhibitor (tofacitinib or upadacitinib) are not formally approved for use in USAF aviator and special duty personnel. However, the use of these non-approved biologic agents may be considered for waiver on a case-by-case basis. Similarly, the use of a phosphodiesterase-4 enzyme inhibitor (apremilast) may be considered for waiver on a case-by-case basis. Please note that recourse to non-approved interventions may be indicative of the severity of the underlying condition, which might not be amenable to waiver. The aeromedical and operational risk of the medication will also be carefully weighed.

Some conventional first-line disease-modifying antirheumatic drug (DMARD) agents used to treat psoriasis and psoriatic arthritis may not be compatible with aviation or enhanced operational duties. One such agent that may be utilized first-line is methotrexate. Due to the potential for toxicity to multiple organ systems of aeromedical and operational concern, the use of methotrexate is often considered incompatible with a waiver. With respect to the potential toxic effects of methotrexate, the risk to the pulmonary system is considered of greatest aeromedical and operational import. It is possible for an individual taking methotrexate to develop pulmonary toxicity rapidly, and the onset may develop at any point during treatment, even after prolonged stability on the medication. Like methotrexate, other alternative nonbiologic DMARD therapies (e.g., cyclosporine, leflunomide, and azathioprine) are not viewed favorably for waiver consideration.

Lastly, active treatment with systemic glucocorticoids is unlikely to be considered compatible with active flying or operational duties. The previous use of systemic glucocorticoids for more than three consecutive weeks in any 12-month period is independently disqualifying and requires demonstration of an intact hypothalamic-pituitary-adrenal (HPA) axis prior to waiver consideration. Please refer to the Aerospace Medicine Waiver Guide *Systemic Glucocorticoid (Steroid) Therapy* chapter.

It should be noted that service members who elect to under-treat their psoriasis/psoriatic arthritis with the aim of avoiding non-approved medications will not be considered for a flying or operational waiver. Under-treatment of psoriasis/psoriatic arthritis may result in mild chronic active inflammation or frequent recurrent active inflammation and substantially increases the likelihood of both symptomatic acute flares and disease complications.

Review of the AIMWTS database from May 2020 through May 2023 revealed 77 waiver packages with a diagnosis of psoriasis and psoriatic arthritis. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		FC I/IA	FC II	FC III	GBO	ATC	SWA
L40.9	Psoriasis, unspecified	2/9	21/21	21/22	7/7	1/1	2/2
L40.50	Arthropathic psoriasis, unspecified	0/0	6/6	5/5	4/4	0/0	0/0

IV. Suggested Readings

1. Elmets CA, Korman NJ, Farley E, et al. Joint AAD–NPF Guidelines of care for the management and treatment of psoriasis with topical therapy and alternative medicine modalities for psoriasis severity measures. J Am Acad Dermatol 2021; 84:432-470. Available at https://www.jaad.org/article/S0190-9622(20)32288-X/fulltext. Accessed 26 May 2023.
2. Elmets CA, Leonardi CL, Davis DMR, et al. Joint AAD-NPF guidelines of care for the management and treatment of psoriasis with awareness and attention to comorbidities. J Am Acad Dermatol 2019; 80:1073-1113. Available at https://www.jaad.org/article/S0190-9622(18)33002-0/fulltext. Accessed 26 May 2023.
3. Elmets CA, Lim HW, Stoff B, et al. Joint American Academy of Dermatology–National Psoriasis Foundation guidelines of care for the management and treatment of psoriasis with phototherapy. J Am Acad Dermatol 2019; 81:775-804. Available at https://www.jaad.org/article/S0190-9622(19)30637-1/fulltext. Accessed 26 May.
4. Menter A, Gelfand JM, Connor C, et al. Joint American Academy of Dermatology–National Psoriasis Foundation guidelines of care for the management of psoriasis with systemic nonbiologic therapies. J Am Acad Dermatol 2020; 82:1445-1486. Available at https://www.jaad.org/article/S0190-9622(20)30284-X/fulltext. Accessed 26 May 2023.
5. Menter A, Strober BE, Kaplan DH, et al. Joint AAD-NPF guidelines of care for the management and treatment of psoriasis with biologics. J Am Acad Dermatol 2019; 80:1029-1072. Available at https://www.jaad.org/article/S0190-9622(18)33001-9/fulltext. Accessed 26 May 2023.
6. Singh JA, Guyatt G, Ogdie A, et al. 2018 American College of Rheumatology/National Psoriasis Foundation Guideline for the Treatment of Psoriatic Arthritis. Arthritis Rheumatol 2019; 71:5-32. Available at https://onlinelibrary.wiley.com/doi/10.1002/art.40726. Accessed 26 May 2023.

Abnormal Liver Enzymes and Gilbert Syndrome

Revised: January 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick and Maj Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver guide restructured.

I. Waiver Consideration

Any type of chronic liver inflammation or chronic liver disease that reaches the threshold of clinical or operational significance is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Disqualifying conditions may include (but are not limited to) viral hepatitis, drug-induced or toxin-induced hepatitis, alcoholic hepatitis, autoimmune hepatitis, or non-alcoholic steatohepatitis (NASH). More specifically, any liver disease that meets any one of the following criteria is considered disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention:

A. There is resultant impairment in liver synthetic function, **or**,
B. There are resultant complications (e.g., portal hypertension, esophageal varices, bleeding dyscrasias, etc.), **or**,
C. Requires specialty follow-up beyond six months.

In isolation, abnormal liver enzymes (e.g., elevations in aminotransferase levels, alkaline phosphatase, gamma-glutamyl transpeptidase (GGT), 5'-nucleotidase, or lactate dehydrogenase (LDH)) are not disqualifying. However, identification of abnormal liver tests necessitates further evaluation to determine a causative etiology, and the underlying diagnosis may be disqualifying. Asymptomatic Gilbert syndrome is not disqualifying, provided all clinically appropriate evaluation is complete and no other pathology is demonstrated.

Likewise, an isolated finding of asymptomatic hepatic steatosis on imaging is not disqualifying in the absence of hepatic inflammation or liver injury. To exclude ongoing inflammation or underlying injury, it is essential to demonstrate normal liver enzymes and synthetic function (i.e., normal AST, ALT, alkaline phosphatase, total and direct bilirubin, GGT, LDH, albumin, prothrombin time (PT), and INR). It is also essential that secondary causes of hepatic steatosis be appropriately excluded. For example, all patients with an incidental finding of hepatic steatosis on imaging warrant further testing for chronic viral hepatitis, screening for excessive alcohol consumption, screening for potential offending medications, supplements, or toxins, and other testing as the clinical scenario indicates (e.g., testing for iron overload, autoimmune hepatitis, etc.).

Cirrhosis that is associated with abnormal liver function studies or that requires specialist follow-up is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention, and it is generally not considered compatible with a waiver. Please refer to the Air Force Waiver Guide chapter *Hepatic Cirrhosis*. As above, other specific causes of liver disease may be disqualifying for certain career field duties and/or for retention. Please cross-reference

the Medical Standards Directory and Air Force Waiver Guide, including chapters *Chronic Viral Hepatitis* and *Hemochromatosis*. Sequelae of chronic liver disease may also be independently disqualifying. Please cross-reference the Medical Standards Directory for all potentially disqualifying conditions.

II. Information Required for Waiver Submission

Not applicable. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for specific waiver submission requirements.

III. Aeromedical Concerns

Liver enzymes that are commonly measured in the blood on laboratory testing include the aminotransferases (alanine aminotransferase (ALT) and aspartate aminotransferase (AST)), alkaline phosphatase, GGT, LDH, and 5'-nucleotidase. Abnormal liver enzymes are not disqualifying when considered in isolation. However, these enzymes are released into the blood stream when hepatocytes are injured or destroyed. The underlying disease states that result in elevations of liver enzymes may be associated with increased aeromedical or operational risk and thus be disqualifying for continued duty or for retention. Therefore, it is appropriate to consider abnormal liver studies as markers of acute or chronic medical conditions with potential serious aeromedical implications. It is essential that the etiology of aminotransferase elevations be elucidated in order to properly assess aeromedical and operational risk.

Common causes of elevated aminotransferase levels include the following: excessive alcohol consumption, chronic viral hepatitis, non-alcoholic fatty liver disease (NAFLD), steatohepatitis, hemochromatosis, toxins, drugs, ischemia, and celiac sprue. Other causes include Wilson disease, alpha-1 antitrypsin deficiency, and autoimmune hepatitis. Certain causes of liver injury resulting in elevations of liver enzymes are potentially reversible with removal of the offending agent, such as drug-induced liver injury, alcohol-related liver injury, and toxin-associated hepatitis. Other conditions are more chronic and often lead to progressive liver impairment, especially in the absence of optimal treatment. Such conditions as chronic viral hepatitis, hemochromatosis, Wilson disease, alpha-1 antitrypsin deficiency, autoimmune hepatitis, and celiac disease are all independently disqualifying and are associated with unique waiver considerations. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for additional information, including Air Force Waiver Guide chapters *Hepatic Cirrhosis*, Chronic *Viral Hepatitis*, and *Hemochromatosis.*

Symptoms or acute or chronic hepatitis may include fatigue, malaise, nausea, vomiting, diarrhea, and abdominal pain. Severe illness can lead to encephalopathy. Some individuals will progress to fulminant hepatic failure. At a minimum, these symptoms pose a risk of distraction from aviation and operational duties. Failure to appropriately diagnose the underlying etiology of abnormal liver studies and to perform risk stratification increases the chances of progression and complication of clinical and aeromedical or operational significance.

Gilbert syndrome is a benign condition characterized by isolated unconjugated (indirect) hyperbilirubinemia due to abnormal bilirubin glucuronidation. Typically, individuals are asymptomatic, although they may present with jaundice triggered by certain physiologic stressors such as dehydration, fasting, acute illness, menses, and physical exertion. A minority of patients may experience mild symptoms of vague abdominal discomfort, nausea, diarrhea, constipation, fatigue, or malaise. The hyperbilirubinemia of Gilbert syndrome is associated with increased risk of cholelithiasis. Asymptomatic Gilbert syndrome is not disqualifying, provided all clinically appropriate evaluation is complete and no other pathology is demonstrated. Individuals with symptoms require further evaluation to assess the impact of symptoms on duty performance.

Please use *only* these ICD-10 code for AIMWTS coding purposes	
R74.0	Nonspecific elevation of levels of aminotransferase or lactic acid dehydrogenase [LDH]
E80.7	Disorder of bilirubin metabolism, unspecified

IV. Suggested Readings

1. Chalasani N, Younossi Z, Lavine JE, et al. The Diagnosis and Management of Nonalcoholic Fatty Liver Disease: Practice Guidance From the American Association for the Study of Liver Diseases. Hepatology 2018;67:328-357. Available at http://aasldv2019stg.aasld.org/sites/default/files/2019-06/NAFLD%20Guidance%202018.pdf. Accessed 12 January 2022.
2. Kwo P, Cohen SM, Lim JK. ACG Clinical Guideline: Evaluation of abnormal liver chemistries. Am J Gastroenterol 2017;112:18-35. Available at https://journals.lww.com/ajg/fulltext/2017/01000/acg_clinical_guideline__evaluation_of_abnormal.13.aspx. Accessed 12 January 2022.
3. Oh RC, Hustead TR, Ali SM, and Pantsari MW. Mildly elevated liver transaminase levels: causes and evaluation. Am Fam Physician 2017;96:709-715. Available at https://www.aafp.org/afp/2017/1201/p709.html. Accessed 12 January 2022.

Aerospace Medicine Waiver Guide

Celiac Disease

Reviewed: Sep 2021
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Maj Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: AIMWTS database review table.

I. Waiver Consideration

Celiac disease is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. Additionally, any malabsorption syndrome is disqualifying for all flying class and SWA duties. Malabsorption syndromes become disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention when they meet any one of the following criteria:

A. Require a specialized diet that is not compatible with prolonged subsistence on meals-ready-to-eat (MREs), **or**,
B. Symptoms persist despite medical treatment, **or**,
C. Require frequent medical appointments, **or**,
D. Result in ongoing specialist follow-up, **or**,
E. Result in frequent missed duty time.

Symptoms associated with celiac disease may be independently disqualifying. For example, recurrent abdominal pain of sufficient severity to preclude satisfactory performance of duties, require frequent absences from duty, or necessitate frequent specialist follow-up is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. Chronic diarrhea, regardless of cause, is disqualifying for all flying class and SWA duties. The use of any medication or supplement for symptom control that is not included on the applicable career field medication list is disqualifying for ongoing aviation or operational duty and would necessitate a waiver.

Please cross-reference the Medical Standards Directory, Air Force Waiver Guide, and appropriate career field medication list for all potentially disqualifying conditions and treatments. There is no career field medication list for OSF or SWA personnel. However, as with the use of any medication or supplement in military members, the use of a prescription medication or supplement in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

In general, untrained personnel with a confirmed diagnosis of celiac disease are unlikely to be considered for an aeromedical waiver. Trained aircrew, GBO personnel, and special duty operators may be considered for a waiver after demonstrating adherence to a gluten-free diet and a period of asymptomatic stability.

Table 1: Waiver potential for Celiac disease

Flying Class	Condition	Waiver Potential Waiver Authority	ACS Review or Evaluation
FC I/IA	Any history of celiac disease	Unlikely AFRS/CMO	No
FC II/III/ATC/ GBO/OSF/SWA	Celiac disease, adherent to a gluten-free diet, asymptomatic without complications or sequelae[2]	Yes[1] MAJCOM[3]	Yes[1]

1. Generally, untrained personnel are unlikely to receive an aeromedical waiver. An ACS review/evaluation is not required prior to disqualification.
2. Service member must be asymptomatic on a gluten-free diet and must demonstrate the ability to adhere to a gluten-free diet under the expected rigors of aviation and operational conditions.
3. Certification authority for untrained assets is AFRS/CMO, waiver authority for aeromedically unapproved medication use is AFMRA.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. List current medications with dosages.
    c. Summarize diagnostic evaluation, including list of any/all procedures with dates.
2. Consultation report from the treating gastroenterologist and all subsequent consultation notes. These notes must include the following:
    a. Discussion of presentation and diagnostic evaluation, to date.
    b. Assessment of adherence to and response to gluten-free diet. Include discussion of current degree of symptom control.
    c. Physical examination, including thorough skin examination.
3. Laboratory studies required:
    a. Current CBC and CMP.
4. Results of all testing performed in the course of diagnosis, evaluation, and management of celiac disease, including laboratory studies, imaging, endoscopy or colonoscopy reports, biopsy results (if performed), and any other ancillary studies.
    a. Examples of additional studies that are often obtained in the evaluation of celiac disease include, but are not limited to, the following: esophagoduodenoscopy (EGD) with tissue biopsy, colonoscopy with tissue biopsy, total immunoglobulin A (IgA) level, anti-tissue transglutaminase (tTG) antibody, anti-endomysial antibody, and anti-gliadin antibody. These studies are not mandatory for waiver submission, all relevant test results should be forwarded with the waiver package.
5. Form FL4 with return to duty and ALC status, if member didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include thorough skin examination.
    b. Re-assessment of adherence to and response to gluten-free diet. Include discussion of current degree of symptom control.
    c. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
2. All relevant interval consultation reports from the treating gastroenterologist, if applicable.
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, interval endoscopy or colonoscopy reports, biopsy results (if performed), and any other ancillary tests. The following must be included:
    a. Current CBC and CMP.
4. Form FL4 with return to duty and ALC status, if member didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Celiac disease is an autoimmune condition that primarily causes gastrointestinal inflammation; however, extra-intestinal manifestations are not uncommon. Celiac disease may result in symptoms of abdominal discomfort or pain, bloating, and diarrhea. Additionally, it frequently leads to malabsorption that can precipitate weight loss and deficiencies of essential vitamins and nutrients, including vitamins A, D, E, K, B6, and B12, copper, zinc, thiamine, folic acid, ferritin, iron, magnesium, and selenium. The metabolic consequences of these deficiencies are manifold, with impacts on almost every organ system. Of particular aviation and operational concern are the risks of anemia, peripheral neuropathy, and osteoporosis. Anemia due to a combination of chronic inflammation and insufficient nutrients such as iron or vitamin B12 may be of insidious onset and result in subtle performance decrements, including reduced exertional capacity and impaired ability to tolerate hypoxia. Likewise, peripheral neuropathy may have a subtle onset and lead to loss of fine motor dexterity. Extra-intestinal symptoms of celiac disease include fatigue, headaches, neuropathy, neuropsychiatric disturbances, and rash (dermatitis herpetiformis). Rarely, occult gastrointestinal malignancies develop. Celiac disease may be associated with other autoimmune conditions such as type 1 diabetes mellitus or Hashimoto's thyroiditis. Although celiac disease is unlikely to result in sudden incapacitation, intestinal and extra-intestinal manifestations carry the potential to substantially interfere with the effective performance of aviation and operational duties.

Adherence to a gluten-free diet is the only validated method of eliminating inflammation and thereby controlling symptoms. Strict adherence to a gluten-free diet may be difficult or impossible under the rigors of an aviation or operational environment due to lack of access to gluten-free foods or lack of control over food sources. Symptom recurrence is usually due to poor dietary adherence or incidental exposure to gluten.

Review of the AIMWTS database from Sep 2019 through Sep 2022 revealed 34 cases with a diagnosis of celiac disease. The breakdown of the number of waivers and number of total cases are tabulated below. None of the four disqualifications were for reasons associated with the diagnosis of celiac disease.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
K90.0	Celiac Disease	0/1	13/13	12/13	2/3	2/3	1/1

IV. Suggested Readings

1. Bai JC, Ciacci C, et al. World Gastroenterology Organisation Global Guidelines: Celiac Disease. July 2016. Available at https://www.worldgastroenterology.org/guidelines/celiac-disease/celiac-disease-english. Accessed 6 September 2022.
2. Hill ID, Fasano A, Guandalini S, et al. NASPGHAN Clinical Report on the Diagnosis and Treatment of Gluten-related Disorders. J Pediatr Gastroenterol Nutr 2016;63:156-65. Available at https://www.naspghan.org/files/documents/pdfs/position-papers/NASPGHAN_Clinical_Report_on_the_Diagnosis_and.28.pdf. Accessed 6 September 2022.
3. Rubio-Tapia A, Hill ID, Kelly CP, et al. ACG Clinical Guidelines: Diagnosis and Management of Celiac Disease. Am J Gastroenterol 2013;108:656-676. Available at https://gi.org/guideline/diagnosis-and-management-of-celiac-disease/. Accessed 6 September 2022.

Chronic Viral Hepatitis

Revised: January 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick and Maj Laura Bridge (ACS Internal Medicine); Capt Robert Wright (RAM 2023); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver guide restructured.

I. Waiver Consideration

Chronic hepatitis of any etiology is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties when there is either impairment in liver synthetic function or a need for specialty follow-up beyond six months. Chronic hepatitis that meets either of these criteria is also disqualifying for retention. Additionally, any viral hepatitis carrier state is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention, regardless of the presence or absence of liver dysfunction or the frequency of follow-up required. Generally, chronic viral hepatitis is not considered amenable for waiver in untrained assets. An aeromedical or operational waiver may be considered for trained assets after resolution of the acute phase of viral infection and following a period of demonstrated stability. A favorable waiver recommendation depends upon absence of any ongoing symptoms or sequelae of aeromedical concern, such as active hepatic inflammation or ongoing hepatocyte injury (characterized by transaminase elevations), functional hepatic impairment, or neuropsychiatric symptoms.

Cirrhosis secondary to chronic viral hepatitis that is associated with abnormal liver synthetic function, medical complications (e.g., portal hypertension, esophageal varices, bleeding dyscrasias, etc.), or that requires specialist follow-up is also disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Chronic viral hepatitis that has resulted in the development of liver cirrhosis is generally not considered compatible with a waiver.

Any medication used to treat chronic viral hepatitis that is not included on the career field-specific approved medication list is independently disqualifying. Waiver for such medications can be considered on a case-by-case basis for a waiver. However, it should be noted that individuals actively undergoing finite time-limited treatment courses for chronic viral hepatitis B or C (i.e.,pegylated interferon for the treatment of chronic hepatitis B or novel antiviral combination therapies for the treatment of chronic hepatitis C), are not amenable to any class of aeromedical or operational waiver during active treatment. Indefinite courses of daily oral nucleoside/nucleotide analogues (e.g., entecavir and tenofovir) used in the immunologic viral suppression of certain individuals with chronic hepatitis B have been waived on rare occasions.

Table 1: Waiver potential for Chronic Viral Hepatitis

Flying Class	Condition	Waiver Potential Waiver Authority[1]	ACS Review or Evaluation
FC I/IA	Chronic Viral Hepatitis	No AFRS/CMO	No
FC II/III/ ATC/GBO/ OSF/SWA	Chronic Viral Hepatitis	Yes[2] MAJCOM	Yes

1. Certification authority for untrained assets is AFRS/CMO.
2. Waiver may be considered after resolution of acute phase of viral infection and following a period of demonstrated stability without any persistent sequelae of aeromedical concern. Untrained applicants are generally considered not to have waiver potential.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of how the diagnosis was established, presenting features, and all pertinent physical findings (positive and negative).
    b. Specify presence or absence of pertinent symptoms, including neuropsychiatric symptoms and fatigue, and comment on any impact to quality of life or occupational performance.
    c. List all co-morbid conditions.
    d. List all past treatments for hepatitis or its complications, including all medications, dosages, dates of administration, and any adverse effects.
    e. List all current medications, dosages, dates of initiation, and any adverse effects.
2. Consultation reports from all treating specialists (e.g., gastroenterologist, hepatologist, infectious diseases specialist) and all subsequent consultation notes. These notes must include the following:
    a. Description of any past treatment, with outcomes.
    b. Recommendations for ongoing specialist follow-up, if any.
3. Laboratory studies required:
    a. Current liver function tests, including both total and direct bilirubin
    b. Current gamma-glutamyl transpeptidase (GGT)
    c. Current lactate dehydrogenase (LDH)
    d. All past liver function tests, with dates
    e. Current prothrombin time and INR
    f. Current CBC
    g. Hepatitis B virus screening serologies:
        i. Hepatitis B surface antigen
        ii. Hepatitis B surface antibody

iii. Hepatitis B core antibody

h. If evidence of hepatitis B acute or chronic infection, the following is also required:
    i. Hepatitis B e antigen
    ii. Hepatitis B e antibody
    iii. Hepatitis B core antibody (IgM)
    iv. Total hepatitis B core antibody (IgM + IgG)
    v. Quantitative hepatitis B viral DNA

i. Hepatitis C antibody (screening)

j. If history of hepatitis C viral infection, the following is also required:
    i. Quantitative hepatitis C viral RNA (if treated for hepatitis C viral infection, include hepatitis C viral RNA level from 12 weeks post-treatment completion)
    ii. Hepatitis C genotyping

k. Hepatitis A antibody (IgG)

l. HIV 1 and 2 viral screening immunoassay

4. Results of any other testing performed in the course of diagnosis, evaluation, and management of hepatitis, including any other laboratory studies, all imaging reports (e.g., liver ultrasound, CT, MRI, and/or elastography), biopsies/pathology results (if performed), and any other ancillary studies.
5. Form FL4 with return to duty and ALC status.
6. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. List all current medications, dosages, dates of initiation, and any adverse effects.
    c. Describe any plans for ongoing surveillance/monitoring. Include any specialist clinical re-evaluations, laboratory studies, and/or imaging studies, and specify follow-up intervals.
2. All relevant interval consultation reports from specialty providers (e.g., gastroenterologist, hepatologist, infectious diseases specialist).
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, and any other ancillary tests.
4. Form FL4 with return to duty and ALC status.
5. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

III. Aeromedical Concerns

Aeromedical concerns related to viral hepatitis differ depending on whether the infection is acute or chronic in nature. Acute viral hepatitis causes a range of symptoms that may negatively impact aviation or operational duty performance. At best, mild symptoms may be distracting or result in mild impairment. At worst, the complications of acute viral hepatitis may be incapacitating. Symptoms include malaise, nausea, vomiting, diarrhea, and abdominal pain. When severe illness occurs, infected individuals may demonstrate encephalopathy and jaundice. Some individuals will progress to fulminant hepatic failure. In addition to symptom-directed supportive care, close monitoring is essential. As with any acute viral illness, a period of DNIF/DNIC/DNIA is advised until after complete resolution of symptoms. It is recommended that return to full operational status not be granted until after the complete resolution of both clinical and biochemical indicators of acute infection and hepatocyte injury (e.g., absence of symptoms and normalization of transaminase levels). Additionally, prior to return to full operational status, service members should undergo screening to exclude chronic viral carriage, which is observed following about 1-2% of acute hepatitis B infections and greater than 50% of acute hepatitis C infections.

Chronic hepatitis B or C viral infection is defined as a persistent carrier state beyond six months. Many individuals are asymptomatic. However, there is a high risk of progression to cirrhosis and hepatocellular carcinoma. About 25-40% of individuals with chronic hepatitis B and about 20-25% of individuals with chronic hepatitis C will eventually develop cirrhosis. These complications are not compatible with sustained aviation or operational duties. In order to optimize both the health of the infected service member and the possibility for a favorable waiver outcome, it is essential that individuals receive appropriate treatment, followed by surveillance for ongoing liver inflammation/hepatocyte destruction, as well as appropriate screening for progression or development of new complications. To optimize health outcomes and minimize occupational risk, individuals with chronic viral hepatitis should be appropriately immunized against pathogens that might precipitate further hepatic insult (e.g., hepatitis B or C, hepatitis A, influenza, and *S. pneumoniae*). Likewise, risk is mitigated by avoidance of other hepatotoxins (e.g., alcohol, excessive acetaminophen use). Risk is increased when other pathologic processes contribute to hepatic injury (e.g., hepatic steatosis, co-infection with HIV or another viral hepatitis).

With respect to chronic hepatitis B viral infection (HBV), in addition to the hepatic complications of the disease process, aeromedical concerns include extrahepatic sequelae and the adverse effects of treatment. Chronic HBV can be associated with immune-complex deposition. Depending on the organ systems affected, manifestations of immune-complex deposition include urticaria, arthritis, vasculitis, polyneuropathy, and glomerulonephritis. Any one of these syndromes may be incompatible with sustained flying or operational duties. The decision to treat chronic HBV depends upon multiple factors, including the presence or absence of cirrhosis, severity of alanine transaminase (ALT) elevation, quantitative viral load, and underlying patient-specific indications. Treatment for HBV requires careful management by a hepatologist or an experienced gastroenterologist. The goal of therapy is immunologic suppression, characterized by an undetectable quantitative HBV DNA titer and clearance of HBV surface antigen (HBsAg), as well as clearance of HBV e antigen (HBeAg) in those who were initially HBeAg positive.

HBV treatment regimens are complex and include weekly injections of subcutaneous pegylated interferon alfa-2a for 48 weeks or an indefinite course of a daily oral nucleoside/nucleotide analogue (e.g., entecavir, tenofovir alafenamide, tenofovir disoproxil fumarate, etc.). Side effects from any of these regimens pose serious aeromedical and operational risks, and active treatment may not be compatible with a waiver. Adverse effects while on pegylated interferon alfa-2a may include flulike illness, mood disturbance, cytopenias, infection, ischemic events, thyroid dysfunction, seizure, and hemorrhagic stroke. The use of oral nucleoside/nucleotide analogues can be associated with renal toxicity, lactic acidosis, pancreatitis, myopathy, headache, and fatigue, among other complications. These medications require close monitoring and follow-up with a specialist to assess for disease-related events and adverse effects of treatment, per guidelines established by the American Association for the Study of Liver Diseases (AASLD).

Like chronic HBV, chronic hepatitis C viral infection (HCV) is usually asymptomatic but can result in symptoms, sequelae, and extrahepatic manifestations that are not compatible with aviation or operational duties. Possible complications include, but are not limited to, vasculitis, kidney disease, diabetes, thyroid disease, and fatigue. Novel antiviral combination therapies such as glecaprevir-pibrentasvir, ledipasvir-sofosbuvir, and sofosbuvir-velpatasvir are associated with a favorable side effect profile and result in cure in more than 95% of patients. Similar to treatment for HBV, treatment for HCV requires close monitoring by an experienced specialist. However, the course of treatment with a novel antiviral regimen is shorter at 8-12 weeks. Individuals with diabetes or who are taking anticoagulant medications require closer monitoring due to hypoglycemia and bleeding risks. Waiver may be considered as early as 12 weeks following treatment completion for those individuals with an undetectable HCV RNA titer, normalization of liver function tests, and no other symptoms or complications related to the HCV infection or to antiviral therapy.

Cirrhosis and hepatic fibrosis are unfortunate consequences of chronic viral hepatitis that are not generally considered compatible with an aeromedical or operational waiver when there is evidence of abnormal synthetic liver function or serious complications. Serious sequelae include, but are not limited to, hepatic encephalopathy and variceal bleeding. Due to the associated complications that may arise suddenly and result in incapacitation with little or no warning, waivers are generally not entertained for chronic viral hepatitis that has resulted in the development of liver cirrhosis.

Review of the AIMWTS database from Jan 2019 through Jan 2022 revealed just 4 cases with a diagnosis of chronic viral hepatitis. A breakdown of the cases was as follows: 0 FC I/IA cases, 2 FC II cases (0 disqualified), 2 FC III cases (0 disqualified), 0 ATC cases, 0 GBO cases, and 0 SWA cases.

Please use *only* this ICD-10 code for AIMWTS coding purposes	
B18.1	Chronic Viral Hepatitis B
B18.2	Chronic Viral Hepatitis C
B18.8	Other Chronic Viral Hepatitis

IV. Suggested Readings

1. AASLD-IDSA. Recommendations for testing, managing, and treating hepatitis C. Available at http://www.hcvguidelines.org. Accessed 12 January 2022.
2. Ghany MG, Morgan TR, and the AASLD-IDSA Hepatitis C Guidance Panel. Hepatitis C Guidance 2019 Update: American Association for the Study of Liver Diseases–Infectious Diseases Society of America Recommendations for Testing, Managing, and Treating Hepatitis C Virus Infection. Hepatology 2020;71:686-721. Available at https://aasldpubs.onlinelibrary.wiley.com/doi/full/10.1002/hep.31060. Accessed 12 January 2022.
3. Terrault NA, Lok ASF, McMahon BJ, et al. Update on Prevention, Diagnosis, and Treatment of Chronic Hepatitis B: AASLD 2018 Hepatitis B Guidance. Hepatology 2018;67:1560-1599. Available at https://aasldpubs.onlinelibrary.wiley.com/doi/epdf/10.1002/hep.29800. Accessed 12 January 2022.
4. Wilkins T, Sams R, and Carpenter M. Hepatitis B: screening, prevention, diagnosis, and treatment. Am Fam Physician 2019;99:314-323. Available at https://www.aafp.org/afp/2019/0301/p314.html. Accessed 12 January 2022.

Aerospace Medicine Waiver Guide

Crohn's Disease

Reviewed: Oct 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Suggested readings (Section IV) updated.

I. Waiver Consideration

Crohn's disease is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. Generally, it is unlikely for untrained personnel to be considered eligible for aviation or operational duties. For trained personnel, factors that are considered when assessing suitability for waiver include, but are not limited to, the severity of the disease at time of diagnosis, whether there is evidence of clinical and endoscopic remission, whether treatment and monitoring are appropriate in the context of nationally or internationally recognized guidelines, the individual service member's adherence to clinically indicated therapy, the individual's tolerance of treatment, the unique risks associated with the specific maintenance medication(s) utilized, and the cumulative risk of all associated complications and/or extra-intestinal disease manifestations.

Waiver may be considered once a service member is in disease remission on a stable, career field-approved medication regimen, without adverse effects. Individuals who are not adherent to an appropriate treatment regimen will not be considered waiver-eligible. Use of any medication not included on the career field-approved medication list is independently disqualifying and will be reviewed on a case-by-case basis.

There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of Crohn's disease in OSF and SWA personnel must be carefully evaluated for potential side-effects that might impact individual health or mission safety.

The presence of persistent endoscopic disease is associated with a higher risk of symptomatic recurrence, even when Crohn's disease is otherwise clinically quiescent. For this reason, individuals who achieve clinical remission but fail to demonstrate endoscopic remission are unlikely to be considered eligible for a waiver. For aeromedical and operational purposes, endoscopic remission is assessed either after completion of definitive treatment or while on stable maintenance therapy. For waiver consideration, endoscopic remission verification should include both visual (i.e., colonoscopic inspection) and histologic (i.e., tissue biopsy) demonstration of mucosal healing without evidence of active inflammation.

Any degree of small bowel involvement, including disease of the ileocolon, portends a higher risk of intestinal complications and generally proves more difficult to treat than Crohn's disease that is isolated to the colon. Computed tomography enterography (CTE) or magnetic resonance enterography (MRE) are often used during the initial phase of evaluation to assess for the presence of small bowel disease and to guide clinical decision-making. Prior to waiver

consideration, individuals with any history of small bowel involvement must demonstrate at least six months of asymptomatic stability and be without active intestinal complications (i.e., stricture, abscess, or fistula). Individuals with more than two prior surgeries for Crohn's disease is unlikely to be considered for waiver due to the high risk for future complications. Initial waivers for trained pilots with small bowel involvement and less than 12 months of demonstrated asymptomatic stability will be restricted to multi-place aircraft with another qualified pilot. Pilots who are granted an initial restricted waiver may be reconsidered for an unrestricted aeromedical waiver after 12 months of asymptomatic stability.

Table 1: Waiver potential for Crohn's disease

Flying Class	Condition	Waiver Potential Waiver Authority	ACS Review or Evaluation
FC I/IA	Crohn's disease of any degree	Unlikely AFRS/CMO	No
FC II/III/ATC/ GBO/OSF/SWA	Crohn's disease isolated to colon[2,3,4]	Yes[1] MAJCOM[6]	Yes[1]
	Crohn's disease with small bowel involvement (i.e., proximal GI, terminal ileum, or ileocolonic)[2,3,4,5]	Yes[1] MAJCOM[6]	Yes[1]

1. Generally, it is unlikely for untrained personnel to be considered eligible for aviation or operational duties.
2. For trained personnel, factors that are considered when assessing suitability for waiver include, but are not limited to, the severity of the disease at time of diagnosis, whether there is evidence of clinical and endoscopic remission, whether treatment and monitoring are appropriate in the context of nationally or internationally recognized guidelines, the individual service member's adherence to clinically indicated therapy, the individual's tolerance of treatment, the unique risks associated with the specific maintenance medication(s) utilized, and the cumulative risk of all associated complications and/or extra-intestinal disease manifestations.
3. Clinical and endoscopic remission should be demonstrated prior to waiver consideration. For aeromedical and operational purposes, endoscopic remission is assessed either after completion of definitive treatment or while on stable maintenance therapy. For waiver consideration, endoscopic remission verification should include both visual (i.e., colonoscopic inspection) and histologic (i.e., tissue biopsy) demonstration of mucosal healing without evidence of active inflammation.
4. Use of any medication not included on the career field-specific approved medication list is independently disqualifying.
5. Individuals with small bowel involvement must be asymptomatic for six months, with no active intestinal complications (i.e., stricture, abscess, fistula), and with no more than two prior surgeries. Pilots with small bowel involvement will initially be considered for a restricted waiver to multi-place aircraft with another qualified pilot. An unrestricted waiver for pilots with small bowel involvement can be considered after 12 months of asymptomatic stability.
6. Certification authority for untrained assets is AFRS/CMO. Waiver authority for aeromedically unapproved medication use is AFMRA.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Specify presence or absence of ongoing symptoms (e.g., abdominal pain, diarrhea, stool frequency, hematochezia, melena, weight loss, frequency of exacerbations/pattern of recurrence, any known exacerbating factors, etc.).
    c. Specify presence or absence of complications (e.g., bleeding, perforation, fistula, stricture, abscess, etc.).
    d. Specify presence or absence of extra-intestinal manifestations (e.g., joint involvement, skin involvement, eye involvement, etc.).
    e. Summary of diagnostic evaluation and treatment history, including list of any/all procedures with dates.
    f. List current medications with dosages.
2. Consultation report from the treating gastroenterologist and all subsequent consultation notes. These notes must include the following:
    a. Summarization of presentation, evaluation, and treatment course (including any history of surgery).
    b. Discussion of current treatment, including dose, frequency, formulation, and all appropriate monitoring with schedule for follow-up (e.g., biologic agents require laboratory studies with a metabolic panel and CBC every 3-6 months and annual tuberculosis testing).
    c. Documentation of the presence or absence of complications.
    d. Documentation of the presence or absence of extra-intestinal manifestations.
    e. Detailed plan of ongoing treatment and monitoring.
3. Laboratory studies required:
    a. Current CBC.
    b. Current CMP.
    c. Current erythrocyte sedimentation rate (ESR).
    d. Current C-reactive protein (CRP) level.
4. Results of any other testing performed in the course of diagnosis, evaluation, and management of Crohn's disease (i.e., laboratory studies, imaging, ancillary studies).
    a. Include procedural reports and pathology results from any and all diagnostic or surveillance colonoscopies/endoscopies that were performed.
    b. Must include a repeat colonoscopy while clinically stable with visual and histologic demonstration of endoscopic remission.
    c. Include radiology reports of any and all CTE and/or MRE studies performed.
5. Form FL4 with return to duty and ALC status.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms, objective findings, or interval flares.
    b. Specify presence or absence of complications (e.g., bleeding, perforation, fistula, stricture, abscess, etc.).
    c. Specify presence or absence of extra-intestinal manifestations (e.g., joint involvement, skin involvement, eye involvement, etc.).
    d. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
2. All relevant interval consultation reports from the treating gastroenterologist.
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, interval colonoscopy/endoscopy reports and biopsy results, and any other ancillary tests. The following must be included:
    a. Current CBC.
    b. Current CMP.
    c. Current erythrocyte sedimentation rate (ESR).
    d. Current C-reactive protein (CRP) level.
4. Form FL4 with return to duty and ALC status.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Crohn's disease is a chronic inflammatory disease that may affect any portion of the gastrointestinal (GI) tract. It generally follows a relapsing and remitting course. The "skip lesions" of Crohn's disease are one of multiple features that distinguishes it from ulcerative colitis (UC), which follows a contiguous pattern, usually beginning at the rectum. Crohn's disease may be isolated to the small bowel (i.e., proximal GI tract and/or terminal ileum), the large bowel, or may involve both the small and large bowel. Crohn's disease that is isolated to the large bowel may be referred to as colonic disease, whereas Crohn's disease involving both the small and large bowel is described as ileocolonic. Additionally, extra-intestinal manifestations of Crohn's disease are common. Systems that are often affected include the eyes (e.g., uveitis, iritis), skin (e.g., erythema nodosum, pyoderma gangrenosum), and musculoskeletal structures (e.g., arthritis, ankylosing spondylitis).

For clinical or investigational purposes, the severity of Crohn's disease and degree of disease activity/control at a given point in time may be assessed with a formulaic grading system. A commonly employed grading system is the Crohn's disease activity index (CDAI). This index combines subjective and objective information to generate a quantitative score. However, for aeromedical and operational purposes, these values are not routinely utilized.

The aeromedical and operational hazards associated with Crohn's disease stem from the unpredictability of the disease, its symptoms, and the risks associated with treatment regimen,

which may adversely affect duty performance, mission completion, and safety. Common symptoms of Crohn's disease include abdominal pain, bloating, diarrhea, hematochezia, weight loss, and fatigue. Adequate treatment that results in complete clinical and endoscopic remission with full suppression of active inflammation (e.g., negative serum inflammatory markers) can mitigate aeromedical and operational risk, provided that the potential consequences of maintenance therapy do not exceed acceptable waiver tolerances and there are no other complications of aeromedical or operational concern.

Several medications that are frequently used in the management of Crohn's disease are associated with a rate of severe adverse effects or with a need for clinical and laboratory monitoring that may not be compatible with sustained aviation or operational duty. Among these medications are systemic glucocorticoids, azathioprine, and 6-mercaptopurine. With the exception of time-limited utilization of some oral budesonide formulations, active treatment with systemic glucocorticoids is not amenable to aeromedical waiver. Additionally, the previous use of systemic glucocorticoids for more than three consecutive weeks in any 12 month period is independently disqualifying and requires demonstration of an intact hypothalamic-pituitary-adrenal (HPA) axis prior to waiver consideration. Please refer to the Aerospace Medicine Waiver Guide for *Systemic Glucocorticoid (Steroid) Therapy.* Waiver for azathioprine and 6-mercaptopurine use may rarely be considered on a case-by-case basis for certain low-risk personnel (e.g., ATC and GBO duties). In other individuals, the risk of severe myelosuppresion, pancreatitis, and hepatotoxicity must be examined closely for compatibility with continued aviation or operational duty. The likelihood of myelosuppression is greatest during the first year of treatment, and testing for thiopurine methyltransferase (TPMT) enzyme activity may assist with identifying individuals at highest risk of severe myelosuppression.

It should be noted that service members who elect to under-treat their Crohn's disease with the aim of avoiding non-approved medications will not be considered for an aviation or operational waiver. Though use of any medication not included on the career field-approved medication list is independently disqualifying, there are several effective medications that are approved for maintenance therapy of Crohn's disease in aircrew, ATC, and GBO personnel. These medications include mesalamine, sulfasalazine, infliximab, and adalimumab. Under-treatment of Crohn's disease leads to mild chronic active inflammation or frequent recurrent active inflammation and substantially increases the likelihood of both symptomatic acute flares and disease complications. At a minimum, symptoms such as fatigue, abdominal pain, and increased stool frequency would be expected to distract from the safe performance of aviation or operational duties. At worst, an acute flare of severe abdominal pain or diarrhea could be suddenly incapacitating. Furthermore, anemia due to a combination of chronic inflammation and/or occult blood loss may be of insidious onset and result in subtle performance decrements, including reduced exertional capacity and impaired ability to tolerate hypoxia.

In additional to the risk of chronic, low-grade symptoms and the increased likelihood of severe acute flares, individuals with under-treated or sub-optimally controlled Crohn's disease are more likely to develop intestinal complications as a result of chronic or recurrent inflammation. The risk of intestinal complication is also higher when small bowel involvement is present. These complications include perforations, fistulas, abscesses, and strictures. These intestinal complications, especially strictures, increase the risk of small bowel obstruction (SBO).

Recurrent abdominal surgery is another risk factor for SBO. Due to gas expansion at altitude, intraluminal gas and partial SBO may become acutely symptomatic, with sudden onset of severe and incapacitating abdominal pain and vomiting.

Historical estimates place the 10-year cumulative risk that those with small bowel involvement will requiring a major abdominal surgery between 40-55%. Newer data from the era of biologic therapy places this risk closer to 30%. Due to the high rate of acute complication with the potential for serious aviation or operational consequences, any history of small bowel involvement necessitates a waiver restriction for pilots (multi-place aircraft, with another qualified pilot). An unrestricted waiver for pilots with small bowel involvement can be considered after 12 months of asymptomatic stability. The risk of complication after repeated small bowel surgery are often considered to exceed waiver risk tolerances. Therefore, any service member with two or more small bowel surgeries for Crohn's disease will unlikely be considered eligible for aeromedical waivers.

For Crohn's disease, GI involvement may not be contiguous, and surgical resection is not considered curative. This lack of contiguous GI involvement contrasts with ulcerative colitis, which is characterized by an absence of skip lesions, and in which colectomy is often a definitive treatment. However, if a service member is treated with partial or total colectomy for Crohn's disease, a waiver may be considered, provided that the individual is asymptomatic without post-operative complication or persistent ostomy. Presence of a persistent ostomy is generally felt to be incompatible with continued aviation or operational duties.

In general, individuals pursuing a waiver for Crohn's disease are expected to demonstrate asymptomatic clinical stability, passing four or fewer bowel movements daily, without active complications, with normal inflammatory markers, and with no adverse effects of treatment that might significantly impact the performance of aviation or operational duties. Prior to waiver request, demonstration of clinical and endoscopic remission is required, regardless of whether remission is maintained spontaneously or through the use of career field-approved medications. Once an individual is asymptomatic (i.e., in clinical remission), endoscopic remission must be confirmed. Although repeat endoscopy to assess for mucosal healing is not always performed in clinical practice, the risk of disease flare-up or long-term complication is increased in individuals who do not achieve endoscopic remission, despite absence of symptoms.

Review of the AIMWTS database from Oct 2019 through Oct 2022 revealed 25 cases with a diagnosis of Crohn's disease. The breakdown of the number of waivers and number of total cases are tabulated below. The sole disqualification was not related to the member's diagnosis of Crohn's disease or a related complication.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
K50.9	Crohn's disease, unspecified	0/0	15/15	2/3	7/7	0/0	0/0

IV. Suggested Readings

1. Bernstein CN, Eliakim A, Fedail S, et al; Review Team. World Gastroenterology Organisation Global Guidelines Inflammatory Bowel Disease: Update August 2015. J Clin Gastroenterol 2016;50:803-818. Available at https://www.worldgastroenterology.org/UserFiles/file/guidelines/inflammatory-bowel-disease-english-2015.pdf. Accessed 18 October 2022.
2. Farraye FA, Melmed GY, Lichtenstein GR, Kane SV. ACG Clinical Guideline: Preventive Care in Inflammatory Bowel Disease. Am J Gastroenterol 2017;112:241-258. Erratum in: Am J Gastroenterol 2017;112:1208. Available at https://journals.lww.com/ajg/Fulltext/2017/02000/ACG_Clinical_Guideline__Preventive_Care_in.15.aspx. Accessed 18 October 2022.
3. Lichtenstein GR, Loftus EV, Isaacs KL, et al. ACG Clinical Guideline: Management of Crohn's Disease in Adults. Am J Gastroenterol 2018;113:481-517. Erratum in: Am J Gastroenterol 2018;113:1101. Available at https://journals.lww.com/ajg/Fulltext/2018/04000/ACG_Clinical_Guideline__Management_of_Crohn_s.10.aspx. Accessed 18 October 2022.
4. Torres J, Bonovas S, Doherty G, et al. ECCO Guidelines on Therapeutics in Crohn's Disease: Medical Treatment. J Crohns Colitis 2020;14:4-22. Available at https://academic.oup.com/ecco-jcc/article/14/1/4/5620479?login=false. Accessed 18 October 2022.

Aerospace Medicine Waiver Guide

Diverticular Disease of the Colon

Revised: Aug 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick and Maj Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver guide restructured; updated to reflect the most recent MSD.

I. Waiver Consideration

Any history of diverticulitis, symptomatic diverticulosis, or symptomatic Meckel's diverticulum is disqualifying for all flying class and SWA duties. Diverticulosis that is detected incidentally on imaging or colonoscopy obtained for another indication and that remains asymptomatic is not disqualifying. Diverticulosis and diverticulitis are not specifically disqualifying for GBO, ATC, or OSF personnel. Isolated diverticulosis and diverticulitis are not disqualifying for retention.

The symptoms of diverticular disease, its consequent complications, or its treatments may be disqualifying for continued aviation or operational duties or for retention. For example, gastrointestinal hemorrhage is disqualifying for all flying class, ATC, and SWA duties. Similarly, any history of partial colectomy is disqualifying for all flying class, ATC, and SWA duties. Post-colectomy hyper-defecation or the maintenance of an ostomy following colectomy is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. Recurrent abdominal pain of sufficient severity to preclude satisfactory performance of duties, require frequent absences from duty, or necessitate frequent specialist follow-up is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention.

Other possible complications of diverticular disease that may or may not be disqualifying for continued aviation or operational duties or for retention include, but are not limited to, intestinal strictures, peritoneal adhesions, fistula formation, intestinal perforation, and gastrointestinal bleeding. Please cross-reference the Medical Standards Directory and the appropriate Air Force Waiver Guide for all potentially disqualifying conditions and treatments.

A waiver for a history of symptomatic diverticular disease may be considered after completion of all clinically appropriate interventions and follow-up, as recommended by the treating specialist. Prior to waiver approval, individuals must demonstrate a period of asymptomatic stability, preferably without the need for aeromedically unapproved medications to control symptoms or prevent disease recurrence. To ensure that clinical management was appropriate and follow-up was sufficient, consultation with a gastroenterologist, general surgeon, or colorectal surgeon prior to waiver submission is required.

After resolution of an episode of acute diverticulitis, a colonoscopy to assess the degree of diverticulosis and to exclude colorectal cancer is generally medically recommended. As such, an individual requesting a waiver following an episode of acute diverticulitis will be required to provide a colonoscopy report performed after resolution of infection and inflammation. Please note that a colonoscopy is not required to establish the diagnosis of acute diverticulitis and can increase the risk of perforation if performed in the setting of active inflammation or infection. It

is advised that the follow-up colonoscopy be timed in accordance with specialist recommendations and established treatment guidelines.

Any recurrence of symptoms in an individual who was previously granted a waiver for diverticular disease invalidates the existing waiver, necessitates DNIF/DNIC/DNIA, and requires reconsideration of waiver prior to return to flight or operational status. Since the episodic recurrence may significantly alter the aeromedical or operational risk, all waivers for diverticular disease are invalidated by any symptom recrudescence, including previously granted indefinite waivers. Prior to waiver re-submission, all clinically recommended evaluations and interventions should be completed, and the individual should again demonstrate a period of asymptomatic stability.

Table 1: Waiver potential for Diverticular Disease

Flying Class	Condition	Waiver Potential Waiver Authority	ACS Review or Evaluation
FC I/IA	Active or symptomatic, diverticulitis, diverticulosis, or Meckel's diverticulum[1]	No AFRS/CMO	No
	History of diverticulitis, symptomatic diverticulosis, or symptomatic Meckel's diverticulum, resolved without sequelae	Yes[2] AFRS/CMO	No[4]
FC II/III/SWA	Active or symptomatic, diverticulitis, diverticulosis, or Meckel's diverticulum[1]	No MAJCOM[3]	No
	History of diverticulitis, symptomatic diverticulosis, or symptomatic Meckel's diverticulum, resolved without sequelae	Yes[2] MAJCOM[3]	No[4]
ATC/GBO/OSF	History of diverticulitis, symptomatic diverticulosis, or symptomatic Meckel's diverticulum, resolved without sequelae	N/A[5]	N/A

1. Active, persistent, or chronic symptoms of diverticular disease are not amenable to waiver.
2. A remote history of an isolated episode of diverticular disease may be compatible with an indefinite waiver.
3. Certification authority for untrained assets is AFRS/CMO.
4. ACS review may be requested at the discretion of the waiver authority.
5. While diverticulosis and diverticulitis are not specifically disqualifying for GBO, ATC, or OSF personnel, the symptoms of diverticular disease, its complications, or its treatments may be disqualifying. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide. See "Waiver Considerations," above.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Specify presence or absence of ongoing symptoms.
    c. Specify presence or absence of complications (e.g., bleeding, perforation, fistula, abscess, etc.).
    d. Summary of diagnostic evaluation and treatment history, including list of any/all procedures with dates.
    e. List current medications with dosages.
2. Consultation report from all treating specialists (e.g., gastroenterologist, general or colorectal surgeon), and all subsequent consultation notes.
3. Laboratory studies required:
    a. Current CBC.
    b. Current CMP.
4. Results of all testing performed during diagnosis, evaluation, and management of diverticular disease, including laboratory studies, imaging, and any other ancillary studies. Must include the following:
    a. Colonoscopy report obtained after resolution of active infection and inflammation is required for all cases of acute diverticulitis, unless documentation from treating gastroenterologist or general surgeon supports that a colonoscopy is not clinically indicated, citing medical evidence.
    b. Procedural reports and pathology results from all diagnostic or surveillance colonoscopies that were performed, as applicable.
    c. Associated hospital records (e.g., admission history and physical, discharge summary), as applicable.
5. Form FL4 with return to duty and ALC status, if service member did not meet retention standards for other associated conditions or complications.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Summarize any interval evaluation and/or treatment.
    c. Document the presence or absence of new complications (e.g., bleeding, perforation, fistula, abscess, etc.).
    d. List current medications with dosages.

2. All interval consultation reports from specialty providers (e.g., e.g., gastroenterologist, general or colorectal surgeon).
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, interval colonoscopy reports and biopsy results, and any other ancillary tests.
4. Form FL4 with return to duty and ALC status, if service member did not meet retention standards for other associated conditions or complications.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

The symptoms and complications stemming from diverticular disease place a service member at significant risk of sudden incapacitation during the performance of aviation or operational duties. Symptoms of acute diverticulitis can be severe and disabling, if not life-threatening. The acute infection of diverticulitis may develop with very little prodrome and be rapidly progressive without prompt medical intervention. Initial symptoms may include severe abdominal pain, nausea, vomiting, constipation or diarrhea, and fever. Although mild diverticulitis can be safely treated in an outpatient setting, it requires very close medical monitoring to ensure that the infection is not worsening. Severe diverticulitis requires hospitalization and treatment with intravenous antibiotics to prevent complications such as sepsis, shock, abscess formation, colonic perforation, and even death.

Beyond diverticulitis, another serious, potentially life-threatening complication of diverticular disease that could swiftly lead to incapacitation in an aviation or operational environment is diverticular bleeding. The bleeding associated with diverticular disease tends to occur suddenly, and the amount of blood lost can be profound. Often, individuals are asymptomatic prior to the acute lower GI hemorrhage. With rapid and profuse blood loss, they may develop symptoms of hypovolemia and hemodynamic instability, including lightheadedness or dizziness, pre-syncope, syncope, and death. As with acute diverticulitis, acute diverticular bleeding necessitates immediate medical evaluation and intervention. Though many individuals will experience spontaneous cessation of hemorrhage, many require transfusion, and a single occurrence of diverticular bleeding increases future risk for re-bleeding.

Occasionally, individuals with diverticular disease develop chronic symptoms that might include distracting abdominal pain, constipation, or bloating. Persistent or recurrent inflammation increases the risk of complications, which include colonic strictures, fistulas, and perforations, as well as peritoneal adhesions. Due to the risks associated with both acute and chronic symptomatic diverticular disease, appropriate medical therapy is a priority. During periods of active or symptomatic diverticular disease, the aeromedical and operational risks exceed the acceptable threshold for continued duties, and DNIF/DNIC is necessary for all flying class and SWA personnel while undergoing appropriate medical and/or surgical evaluation and treatment. Given the risks described above, DNIF/DNIC/DNIA is also appropriate for GBO, ATC, and OSF personnel with active or symptomatic diverticular disease, although the condition is not specifically disqualifying for these career fields and does not require a waiver.

The symptoms, complications, and treatments associated with diverticular disease (e.g., recurrent abdominal pain, colectomy with or without colostomy, fistula formation, stricture, colonic perforation, gastrointestinal hemorrhage, etc.) may be independently disqualifying for continued aviation or operational duties or for retention. Please cross-reference the Medical Standards Directory and the appropriate Air Force Waiver Guide for all potentially disqualifying conditions and treatments.

Review of the AIMWTS database from Aug 2019 through Aug 2022 revealed 39 cases with a diagnosis of diverticulitis or diverticulosis. The breakdown of the number of waivers and number of total cases are tabulated below. The two FC II disqualifications were for reasons other than diverticular disease.

ICD-10 Code		(# of waivers / total # of cases)			
		IFC I/IA	FC II	FC III	GBO
K57.80	Diverticulitis of intestine, part unspecified, with perforation and abscess without bleeding	0	20/22	14/14	1/1
K57.81	Diverticulitis of intestine, part unspecified, with perforation and abscess with bleeding				
K57.90	Diverticulosis of intestine, part unspecified, without perforation or abscess without bleeding				
K57.91	Diverticulosis of intestine, part unspecified, without perforation or abscess with bleeding				
K57.92	Diverticulitis of intestine, part unspecified, without perforation or abscess without bleeding				
K57.93	Diverticulitis of intestine, part unspecified, without perforation or abscess with bleeding				

IV. Suggested Readings

1. Francis NK, Sylla P, Abou-Khalil M, et al. EAES and SAGES 2018 consensus conference on acute diverticulitis management: evidence-based recommendations for clinical practice. Surg Endosc 2019;33:2726-2741. Available at https://link.springer.com/content/pdf/10.1007/s00464-019-06882-z.pdf. Accessed 16 August 2022.
2. Hall J, Hardiman K, Lee S, et al., on behalf of the Clinical Practice Guidelines Committee of the American Society of Colon and Rectal Surgeons. The American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for the Treatment of Left-Sided Colonic Diverticulitis. Dis Colon Rectum 2020;63:728-747. Available at https://journals.lww.com/dcrjournal/fulltext/2020/06000/the_american_society_of_colon_and_rectal_surgeons.6.aspx. Accessed 16 August 2022.
3. Murphy T, Hunt RH, Fried M, Krabshuis JH, and the WGO Practice Guidelines Committee. World Gastroenterology Organisation Practice Guidelines: Diverticular Disease. 2007. Available at https://www.worldgastroenterology.org/UserFiles/file/guidelines/diverticular-disease-english-2007.pdf. Accessed 16 August 2022.
4. Stollman N, Smalley W, Hirano I, and AGA Institute Clinical Guidelines Committee. American Gastroenterological Association Institute Guideline on the Management of Acute Diverticulitis. Gastroenterology 2015;149:1944–1949. Available at https://www.gastrojournal.org/article/S0016-5085(15)01432-8/pdf. Accessed 16 August 2022.

Eosinophilic Esophagitis and Other Eosinophilic Gastrointestinal Disorders

Reviewed: Sep 2024
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Maj Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (Aerospace Medicine Branch Chief)

Significant Changes: Updated to reflect the most recent MSD and standards of medical care.

I. Waiver Consideration

Eosinophilic esophagitis (EoE) and other eosinophilic gastrointestinal disorders (i.e., eosinophilic gastritis, eosinophilic enteritis, and eosinophilic colitis) are disqualifying for all flying class, GBO, ATC, and SWA duties, but not for OSF duties or for retention. EoE and other eosinophilic gastrointestinal disorders are disqualifying for all flying class, GBO, ATC, and SWA duties, as well as for OSF duties and for retention when they are complicated by any of the following: persistent symptoms; esophageal stricture; esophageal fibrostenosis; malabsorption that is refractory to treatment or results in malnutrition/weight loss; need for recurrent esophageal dilation or surgery; or frequent specialty follow-up more than annually. Other esophageal disorders, including other forms of esophagitis, anatomic esophageal abnormalities, and esophageal dysfunction including dysmotility may be independently disqualifying. These conditions are beyond the scope of this waiver guide chapter. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for all potentially disqualifying conditions. Please refer to the Waiver Guide chapter on *Esophagitis, Including Gastroesophageal Reflux Disease (GERD).*

Typically, an initial aeromedical waiver is considered once a member is in clinical and histologic remission. Because clinical symptoms may not directly correlate with histologic remission, and because evidence of histologic disease activity increases the risk of both future anatomic esophageal complications and recurrent clinical symptoms, maintenance pharmacologic therapy is required prior to waiver consideration in the absence of histologic remission. For waiver purposes, approved pharmacologic therapy includes acid-suppressing agents, antihistamines, topical corticosteroids administered via swallowed metered dose inhaler actuations, and montelukast. Please refer to the appropriate career field approved medication list. Other factors that are considered when assessing suitability for waiver include presence of anatomic complications (e.g., esophageal stricture, esophageal fibrostenosis, etc.), presence of comorbidities (e.g., food allergies, asthma, eczema, allergic rhinitis), and that treatment and monitoring are appropriate in the context of nationally or internationally recognized guidelines. Waiver for untrained assets in any flying or operational class may be considered on a case-by-case basis.

The use of any medication not included on the career field approved medication list in the treatment or management of EoE and other eosinophilic gastrointestinal disorders is independently disqualifying. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of esophageal gastrointestinal disorders in OSF and

SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Table 1: Waiver potential for Eosinophilic Esophagitis and Other Eosinophilic Gastrointestinal Disorders

Flying Class	Condition	Waiver Potential[1] Waiver Authority[2]	ACS Review or Evaluation
FC I/IA	Eosinophilic esophagitis or any other eosinophilic gastrointestinal disorder	Yes AFRS/CMO	Yes
FC II/III/SWA	Eosinophilic esophagitis or any other eosinophilic gastrointestinal disorder	Yes MAJCOM	Yes
ATC/GBO/OSF[3]	Eosinophilic esophagitis or any other eosinophilic gastrointestinal disorder	Yes MAJCOM	No[4]

1. Untrained assets may be eligible for waiver on a case-by-case basis. In the absence of documented histologic remission, maintenance pharmacologic therapy is required prior to waiver consideration. Use of any medication not included on the career field approved medication list is independently disqualifying and will be considered on a case-by-case basis.
2. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMED.
3. Eosinophilic esophagitis and other eosinophilic gastrointestinal disorders are not disqualifying for OSF duties unless complicated by one of the following: persistent symptoms; esophageal stricture; esophageal fibrostenosis; malabsorption that is refractory to treatment or results in malnutrition/weight loss; need for recurrent esophageal dilation or surgery; or frequent specialty follow-up more than annually.
4. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Specify presence or absence of pertinent symptoms (e.g., dysphagia, food impaction, etc.).
    c. Document all comorbidities (e.g., food allergies, asthma, eczema, etc.)
    d. Medical history and all medications with dosages.
    e. Summary of diagnostic evaluation, including list of any/all procedures with dates.
    f. Specify current treatment regimen, if any. Include dosages, and comment on tolerance of treatment.
2. Consultation report from the treating gastroenterologist and all subsequent consultation notes. These notes must include the following:
    a. Discussion of current treatment (e.g., dietary modifications, acid-suppressing agent, or topical corticosteroids) including dose, frequency, and formulation.

    b. Documentation of the presence or absence of complications (e.g., esophageal stricture or fibrostenosis) and whether esophageal dilation was required.
    c. Recommendations for disease surveillance.
3. If applicable, consultation report from an allergist (may be obtained to evaluate for food allergies).
4. Results of all testing performed during diagnosis, evaluation, and management of EoE or other eosinophilic gastrointestinal disorder, including laboratory studies, imaging, and any other ancillary studies. The below-listed studies must be included:
    a. All laboratory studies (e.g., CBC, CMP, and/or allergy testing (e.g., skin prick testing or serology)).
    b. Radiology reports from all diagnostic or follow-up imaging studies, if applicable.
    c. Procedural and biopsy reports from diagnostic and surveillance endoscopies.
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
    c. Documentation of the presence or absence of complications (i.e., esophageal stricture or fibrostenosis) and whether esophageal dilation was required.
    d. Plan for monitoring of recurrence.
2. All relevant interval consultation reports from specialty providers (e.g., gastroenterology, allergy).
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging reports, interval endoscopy reports and biopsy results, and any other ancillary tests.
4. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.
5. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

III. Aeromedical Concerns

Eosinophilic esophagitis (EoE) and other eosinophilic gastrointestinal disorders (i.e., eosinophilic gastritis, eosinophilic enteritis, and eosinophilic colitis) are characterized by chronic eosinophilic inflammation in the gastrointestinal tract leading to organ dysfunction and clinical symptoms. EoE is the most common disease among the eosinophilic gastrointestinal disorders. The pathogenesis of EoE remains incompletely understood, but it involves a complex interplay of genetic, immune, and environmental factors. Around 75% of individuals are atopic and demonstrate food allergen or aeroallergen sensitization. Other atopic disorders of aeromedical significance may be present (e.g., asthma, eczema, allergic rhinitis).

The diagnosis of EoE is based on the combination of clinical symptoms, histologic demonstration of elevated tissue eosinophils in biopsied mucosa (defined as 15 or more eosinophils per high-power field), and the exclusion of other disorders that could cause or contribute to esophageal eosinophilia. Previously, to establish a diagnosis of EoE, an individual was required to demonstrate failure of improvement with proton-pump inhibitor (PPI) therapy. However, recent guidelines acknowledge that both PPI-responsive esophageal eosinophilia (PPI-REE) and "classic" EoE present with similar clinical, endoscopic, and histologic features. Thus, PPI-REE likely represents a subset of EoE. Gastroesophageal reflux-disease (GERD) is independently associated with esophageal eosinophilia. However, GERD frequently co-exists with EoE and PPI-REE.

The aeromedical and operational risk associated with any untreated eosinophilic gastrointestinal disorder stems from the potential that symptoms or complications may occur during the course of duties, resulting in a threat to flying or operational safety. Individuals with uncontrolled eosinophilic gastrointestinal disorders may experience dysphagia, food impaction, chest pain, emesis, anorexia, abdominal pain, or diarrhea. At the least, symptoms may be distracting and result in impaired duty performance. At the worst, complications such as food impaction may result in acute incapacitation. The long-term complications that may arise in the setting of undertreated disease include esophageal strictures, fibrostenosis, and malabsorption. The longer an eosinophilic gastrointestinal disorder such as EoE remains under-treated, the greater the likelihood for structural complications and the greater the risk for serious events such as dysphagia or food impaction. Under-treated individuals are at higher risk of needing an urgent or emergent endoscopy for indications such as food bolus removal or esophageal dilation. Depending on the local operational environment, these invasive procedures may not be readily available.

The main therapeutic options for EoE are dietary modification or pharmacotherapy with either a PPI, topical corticosteroid, or both. Dietary approaches include the empiric elimination of the six most common food allergens (cow's milk, egg, soy, wheat, peanut/tree nut, and fish/shellfish) or the elimination of specific foods based on the results of allergy testing. Interestingly, a greater percentage of individuals with EoE achieve induction and maintenance of clinical and histologic remission with an empiric six-food elimination diet compared to allergy testing-directed dietary elimination (75% versus 33% of individuals, respectively). However, adherence to a six-food elimination diet is difficult to maintain. More recent data suggest that the sole elimination of mammalian dairy products rather than the strict six-food elimination diet may yield similar results with improved adherence.

PPI therapy results in successful induction of histologic remission in about 40-50% of individuals. Although the dosing and duration of treatment are not well-defined by existing clinical trials, long-term treatment with the lowest effective dose is recommended for aeromedical purposes due to the high percentage of individuals who develop recurrent symptoms after PPI discontinuation. Long-term PPI therapy is typically well tolerated, though there are associated risks of decreased vitamin and mineral absorption (e.g., vitamin B12, magnesium). Data are inconsistent, but this risk is greatest with long term use of high-dose PPI. Therefore, the lowest tolerable dose to maintain symptom-free remission is advised, with regular monitoring for

signs or symptoms of nutritional deficiencies. Other risks of long-term PPI use include enteric complications such as *C. difficile* colitis, atrophic gastritis, and microscopic colitis. With standard dosing, these overall risks remain low.

Topical corticosteroids are effective in inducing and maintaining clinical and histologic remission in a subset of individuals with EoE. Long-term treatment with topical corticosteroids is well tolerated without significant aeromedical adverse effects. Studies examining the long-term consequences of prolonged topical corticosteroid use in pediatric patients demonstrated an association with the development of adrenal insufficiency. However, the risk of adrenal insufficiency in adults is low. Thus, routine testing of the hypothalamus-pituitary-adrenal axis to assess for secondary adrenal insufficiency is not recommended for aeromedical purposes, unless otherwise clinically indicated.

Finally, Dupilumab (Dupixent®), a monoclonal antibody targeting the interleukin-4 receptor, is approved by the FDA for treatment of refractory EoE in the United States. This medication may be considered for waiver on a case-by-case basis in certain low-risk, trained service members who are well-controlled and tolerating the medication without complication. Untrained assets will not be considered eligible for waiver, not only due the potential for adverse effects of the medication itself, but also out of concern for the severity of the underlying disease not responsive to first line therapy.

Review of the AIMWTS database from Aug 2021 through Aug 2024 revealed 244 waiver packages with a diagnosis of EoE or other eosinophilic gastrointestinal disorders that required an aeromedical waiver. The breakdown of the number of approved waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
K20.0	Eosinophilic esophagitis	5/9	127/128	57/61	31/31	6/6	5/6
K52.81	Eosinophilic gastritis or gastroenteritis	0/0	1/1	0/0	1/1	0/0	1/1
K52.82	Eosinophilic colitis	0/0	0/0	0/0	0/0	0/0	0/0

IV. Suggested Readings

1. Dellon ES, Gonsalves N, et al. ACG Clinical Guideline: Evidence Based Approach to the Diagnosis and Management of Esophageal Eosinophilia and Eosinophilic Esopagitis (EoE). Am J of Gastroenterol 2013;108:679-692. Available at https://ncbi.nlm.nih.gov/pubmed/23567357. Accessed 11 September 2024.
2. Lucendo AJ, Molina-Infante J, et al. Guidelines on eosinophilic esophagitis: evidence-based statements and recommendations for diagnosis and management in children and adults. United European Gastroenterol J 2017;5:335-358. Available at https://ncbi.nlm.nih.gov/pmc/articles/PMC5415218/. Accessed 11 September 2024.
3. Hirano I, Cha ES, et al. Clinical Practice Guidelines: AGA Institute and the Joint Task Force on Allergy-Immunology Practice Parameters Clinical Guidelines for the Management of Eosinophilic Esopahgitis. Gastroenterology 2020;158:1776-1786. Available at https://www.gastrojournal.org/article/S0016-5085(20)30265-1/fulltext. Accessed 11 September 2024.

Esophagitis, Including Gastroesophageal Reflux Disease (GERD)

Reviewed: Sep 2024
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Maj Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (Aerospace Medicine Branch Chief)

Significant Changes: Updated to reflect the most recent MSD and standards of medical care.

I. Waiver Consideration

Esophagitis of any etiology that requires treatment beyond the anti-reflux medications included in the appropriate career field approved medication list *or* is associated with anatomic or functional esophageal disease is disqualifying for all flying class, GBO, ATC, and SWA duties, but not for OSF duties or for retention. Examples of disqualifying anatomic or functional complications include, but are not limited to, the following: esophageal diverticulum, varices, fistula, stricture, Barrett's esophagus, pronounced dilation, achalasia, or dysmotility. Esophageal disease is disqualifying for all flying class, GBO, ATC, and SWA duties, as well as for OSF duties and for retention when any one of the following criteria are met: remains uncontrolled despite maximum medical or surgical therapy; results in malnutrition or weight loss; requires frequent specialty follow-up more than annually; results in recurrent esophageal dilation or surgery. Eosinophilic esophagitis and other eosinophilic gastrointestinal disorders, gastritis, and peptic ulcer disease are related conditions that may be independently disqualifying. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for all potentially disqualifying conditions. Please refer to the Waiver Guide chapters on *Eosinophilic Esophagitis and Other Eosinophilic Gastrointestinal Disorders* and *Peptic Ulcer Disease (PUD).*

All duty classes are permitted to make occasional use of career field approved anti-reflux medications. A selection of histamine-2-receptor antagonists (H-2 blockers) and proton pump inhibitors (PPIs) are permitted for intermittent use. For GBO personnel, a three-day ground trial period is required to exclude the potential for idiosyncratic reactions, but no waiver is necessary for chronic use if symptoms are controlled without other disqualifying complications. Aircrew and ATC personnel require flight medicine evaluation if their symptoms of esophagitis or GERD persist beyond 48 hours or if they utilize more than two doses of acid-suppressing medication in a week. However, chronic utilization of career field approved anti-reflux medications for uncomplicated GERD does not require waiver if symptomatic control is confirmed and there is no other disqualifying esophageal disease or complication present.

The use of any medication not included on the career field approved medication list in the treatment or management of esophagitis and GERD is independently disqualifying. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of esophageal gastrointestinal disorders in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

In cases of esophagitis deemed to be disqualifying, aeromedical waivers can be considered once clinical improvement is confirmed. Other factors that are considered when assessing suitability

for a waiver include the presence or absence of anatomic complications (e.g., esophageal stricture, Barrett's esophagus, etc.), whether treatment and monitoring are appropriate in the context of nationally or internationally recognized guidelines, and whether non-approved medications are required to sustain remission.

Table 1: Waiver potential for Esophagitis, including Gastroesophageal Reflux Disease (GERD)

Flying Class	Condition[1]	Waiver Potential[2] Waiver Authority[3]	ACS Review or Evaluation
FC I/IA	GERD treated surgically; GERD requiring unapproved medication(s) for control; or complicated GERD	Unlikely AFRS/CMO	No
	Non-GERD esophagitis[4]	Yes AFRS/CMO	Yes
FC II/III/SWA	GERD treated surgically; non-GERD esophagitis; or complicated GERD[4,5]	Yes MAJCOM	Yes
	GERD requiring unapproved medication(s) for control[6]	Yes AFMED	Yes
ATC/GBO	GERD treated surgically; non-GERD esophagitis; or complicated GERD[4]	Yes MAJCOM	No[7]
	GERD requiring unapproved medication(s) for control[6]	Yes AFMED	No[7]

1. Uncomplicated GERD controlled with approved medications is not disqualifying.
2. Untrained assets may be eligible for waiver on a case-by-case basis.
3. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMED.
4. Waivers for esophagitis due to an etiology other than GERD may be considered on a case-by-case basis. Please cross-reference waiver guide chapters *Eosinophilic Esophagitis and Other Eosinophilic Gastrointestinal Disorders* and *Peptic Ulcer Disease (PUD)*, as appropriate.
5. Unrestricted FC II waivers are unlikely for aviators treated with magnetic sphincter augmentation (LINX®). See the below section on "Aeromedical Concerns" for further discussion.
6. Use of any medication not included on the career field approved medication list is independently disqualifying and will be considered on a case-by-case basis.
7. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Specify presence or absence of pertinent symptoms (e.g., dysphagia, odynophagia, food impaction, emesis, weight loss, anorexia, hematemesis, melena, hematochezia, etc.).
    c. Medical history and all medications with dosages.
    d. Summary of diagnostic evaluation, including list of any/all procedures with dates.
    e. Specify current treatment regimen, if any. Include dosages, and comment on tolerance of treatment.
2. Consultation report from the treating gastroenterologist and all subsequent consultation notes. These notes must include the following:
    a. Discussion of current treatment (e.g., dietary modifications, anti-reflux medication, etc.) including dose, frequency, and formulation.
    b. Documentation of the presence or absence of complications (e.g., esophageal stricture, Barrett's esophagus, history of esophageal dilation, etc.).
    c. Recommendations for disease surveillance.
3. Results of all testing performed during diagnosis, evaluation, and management of esophagitis, including laboratory studies, imaging reports, and any other ancillary studies.
    a. Include procedural reports and pathology results from all diagnostic or surveillance endoscopies that were performed.
    b. Include results of *H. pylori* testing, if available.
4. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
    c. Documentation of the presence or absence of complications (e.g., esophageal stricture, Barrett's esophagus, need for esophageal dilation, etc.).
    d. Plan for monitoring of recurrence.

2. All relevant interval consultation reports from the treating gastroenterologist, if applicable.
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, interval endoscopy reports and biopsy results, and any other ancillary tests.
4. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

   Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Esophagitis refers to inflammation of the esophageal mucosa that can result from the reflux of gastric contents, certain infectious organisms, corrosive agents, irradiation, or direct contact with swallowed pills. The two most common causes of esophagitis in the USAF population are GERD and eosinophilic esophagitis (EoE). Please refer to the Aerospace Medicine Waiver Guide chapter on *Eosinophilic Esophagitis and Other Eosinophilic Gastrointestinal Disorders* for additional information.

The aeromedical and operational concerns related to esophagitis are manifold and range from mildly distracting symptoms to acute complications that might be severe or life-threatening. In many cases, the pain of acid reflux causes mild or moderate annoyance. However, it can also be severe enough to mimic an acute coronary syndrome, and it is a frequent cause of non-cardiac chest pain presenting in an emergency department setting. Likewise, the aspiration of refluxed gastric acid may result in choking or coughing symptoms ranging from mild to incapacitating. Other serious complications of esophagitis include food impaction, esophageal perforation, and massive gastrointestinal hemorrhage. Untreated or under-treated esophagitis can lead to the development of esophageal cancer, which is associated with pain, dysphagia, odynophagia, esophageal obstruction, and hemorrhage. Additional aeromedical concerns depend on the underlying etiology of the esophagitis.

The physiologic stress of the aviation environment can increase intra-abdominal pressure and alter the pressure gradient between the abdomen and thorax, resulting in worsening of gastroesophageal reflux. Among the factors that are implicated in the exacerbation of reflux are increased gravitational forces and abdominal muscle contraction. Flight may provoke symptoms of chest pain, coughing, and choking in under-treated esophagitis. Most often, these symptoms will not result in sudden incapacitation. However, they remain significantly concerning, particularly for pilots of high-performance single-seat aircraft that lack crew redundancy.

Chronic esophagitis can lead to anatomical changes such as stricturing, elevating the risk of dysphagia and food impaction. Chronic esophagitis may also result in Barrett's esophagus, or metaplasia of the esophageal mucosa, which portends a low but increased risk of progression to esophageal adenocarcinoma and merits repeated endoscopic surveillance. Rarely, esophageal perforation or ulceration may cause massive gastrointestinal hemorrhage, which could lead to sudden incapacitation. Without prompt access to definitive medical care, brisk gastrointestinal bleeding can be fatal.

There are multiple medications approved for flight and operational use that can effectively control esophagitis, eliminate symptoms, and mitigate the risk of complications. Examples of approved medications that both control symptoms and prevent functional and anatomic complications include PPIs, H-2 blockers, and sucralfate. Although OTC antacids such as calcium carbonate (e.g., Tums®) or magnesium hydroxide (e.g., Mylanta®, Maalox®) are safe for use in the aeromedical environment, reliance on such medications to treat breakthrough symptoms may indicate ongoing esophageal inflammation that could progress if the underlying cause of the esophagitis is not addressed. It is recommended that any service member requiring frequent OTC antacids be evaluated in the flight medicine clinic and that more aggressive therapy and/or specialist consultation with a gastroenterologist be considered.

Gastroesophageal reflux that is refractory to treatment with PPIs may be intervened upon surgically. Usually, surgical candidates must demonstrate inadequate symptom control or endoscopic findings of persistent esophagitis despite maximal pharmacologic acid suppression. Other complications non-responsive to PPI therapy may warrant surgical intervention, such as chronic cough, asthma, or other respiratory symptoms attributed to GERD. There is no current consensus regarding a best surgical intervention for all patients with treatment-refractory GERD. Factors that influence the choice of procedure include disturbance of esophageal motility, prior surgical history, esophageal length, and the experience of the operating surgeon. For a patient with normal esophageal length and motility, the historical procedure of choice is laparoscopic Nissen fundoplication. While preferable from an efficacy and durability standpoint, Nissen fundoplication also carries a comparatively higher risk of complications such as post-procedure dysphagia, bloating, and difficulty with eructation. Other surgical procedures such as a partial fundoplication or Hill gastropexy may be less efficacious and durable but also convey a lower risk of post-treatment complications.

Magnetic sphincter augmentation (MSA) is an alternative FDA-approved intervention for refractory GERD that has been gaining in popularity since 2012. An implanted MSA device works by augmenting the lower esophageal sphincter (LES) with a ring of magnets. The attraction of the magnets increases the LES closure pressure while permitting the passage of food with swallowing. From an aeromedical perspective, there are concerns about the potential for MSA device migration and resultant complications in high-performance aviation environments. Waivers may be considered on a case-by-case basis for non-high performance aviators after resolution of any post-procedural dysphagia or bloating. Again, there is insufficient evidence to strongly advocate for one surgical procedure over another for the treatment of refractory GERD. Therefore, it is reasonable to weigh an aviator's career field and flight environment in medical decision making under these circumstances.

Review of the AIMWTS database from Aug 2021 through Aug 2024 revealed 15 waiver packages with a diagnosis of esophagitis (excluding eosinophilic esophagitis) that required an aeromedical waiver. The breakdown of the number of approved waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
K20.9	Esophagitis, unspecified	0/0	3/3	2/2	0/0	0/0	0/0
K21.0	Gastro-esophageal reflux disease with esophagitis	0/0	7/7	2/2	0/0	0/0	1/1

IV. Suggested Readings

1. Katz PO, Dunbar KB, Schnoll-Sussman FH, et al. ACG Clinical Guideline for the diagnosis and management of gastroesophageal reflux disease. Am J Gastroenterol 2022;117:27-56. Available at https://journals.lww.com/ajg/fulltext/2022/01000/acg_clinical_guideline_for_the_diagnosis_and.14.aspx. Accessed 11 September 2024.
2. Hunt R, Armstrong D, et al. World Gastroenterology Organization Global Guidelines GERD Global Perspective on Gastroesophageal Reflux Disease. J Clin Gastroenterol 2017;51:467-478. Available at https://journals.lww.com/jcge/fulltext/2017/07000/World_Gastroenterology_Organisation_Global.5.aspx. Accessed 11 September 2024.
3. Slater BJ, Collings A, Dirks R, et al. Multi-society consensus conference and guideline on the treatment of gastroesophageal reflux disease (GERD). Surg Endosc 2023;37:781-806. Available at https://www.sages.org/publications/guidelines/multi-society-consensus-conference-and-guideline-on-the-treatment-of-gerd/. Accessed 11 September 2024.
4. Yadlapati R, Gyawali CP, Pandolfino JE, CGIT GERD Consensus Conference Participants. AGA Clinical Practice Update on the personalized approach to the evaluation and management of GERD: expert review. Clin Gastroenterol Hepatol 2022;20;984-994. Available at https://www.cghjournal.org/action/showPdf?pii=S1542-3565%2822%2900079-9. Accessed 11 September 2024.

Hemochromatosis

Revised: January 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick and Maj Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver guide restructured.

I. Waiver Consideration

Hemochromatosis is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties as well as for retention. FC I/IA applicants are not thought to have waiver potential. Untrained FC III, ATC, GBO, OSF, and SWA applicants may be considered for waiver on a case-by-case basis, provided that there was never evidence of end-organ damage at any time during diagnostic evaluation or throughout course of treatment, and provided that they are stable on a maintenance phlebotomy regimen. Factors considered when assessing suitability for waiver for any individual with hemochromatosis include whether the treatment and monitoring are appropriate in the context of nationally or internationally recognized guidelines, the degree and stability of iron control, the frequency of therapeutic phlebotomy, and the presence of complications (e.g., cirrhosis, diabetes mellitus or other diseases of endocrine dysfunction, cardiac conduction abnormalities or arrhythmias, cardiomyopathy, refractory arthropathy, etc.). The sequelae of iron deposition in various tissues throughout the body may result in complications that are independently disqualifying for continued aviation, ground based, or operational support duties, and/or for retention. Cross-reference the Medical Standards Directory for all potentially disqualifying sequelae.

Periodic phlebotomy to maintain iron stores in an appropriate range and thereby reduce tissue deposition and long-term adverse health outcomes requires a 72-hour DNIF after each phlebotomy in all FC II, FC III, and OSF personnel. An 8-hour DNIF/DNIC is required after each phlebotomy for RPA pilots, ATC, and SWA personnel; and a 4-hour DNIF/DNIA is required after each phlebotomy for RPA sensor operators and MOD personnel.

Table 1: Waiver potential for Hemochromatosis

Flying Class	Condition	Waiver Potential[1] Waiver Authority	ACS Review or Evaluation
FC I/IA	Hemochromatosis	No AFRS/CMO	No
FC II/III	Hemochromatosis, stable, without end-organ dysfunction[2]	Yes AFMRA[3]	Yes
ATC/GBO/OSF/ SWA	Hemochromatosis, stable, without end-organ dysfunction[2]	Yes AFMRA[3]	No[4]

1. FC I/IA applicants are generally not considered eligible for a waiver. Waiver for other untrained individuals may be considered on a case-by-case basis with ACS review.
2. Maintenance phlebotomy requires DNIF, DNIC, or DNIA after each phlebotomy (i.e., 72-hr DNIF for FC II, FC III, and OSF personnel, 8-hr DNIF/DNIC for RPA pilot, ATC, and SWA personnel, and 4-hr DNIF/DNIA for RPA sensor operators and MOD personnel)
3. Certification authority for untrained assets is AFRS/CMO.
4. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

NOTE: *It is required that all original cardiac imaging and electrical tracings be submitted to ACS Cardiology for independent review. For image submission process, refer to* *page 2*.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of how the diagnosis was established, presenting features, and all pertinent physical findings (positive and negative).
    b. Specify the presence or absence of symptoms at initial presentation and throughout evaluation/treatment course; include the original indication for genetic testing.

    c. Include a comprehensive review of symptoms and physical examination addressing the following systems: cardiac, gastrointestinal/abdominal, endocrine, neuropsychiatric, musculoskeletal.
    d. Summary of diagnostic evaluation, including list of any/all treatments with dates.
    e. Medical history and all medications with dosages.
2. Consultation reports from all treating specialists (e.g., gastroenterologist, hepatologist, geneticist if applicable, cardiologist if applicable) and all subsequent consultation notes. These notes must include the following:
    a. Summarization of presentation, evaluation, and treatment course.
    b. Detailed plan of ongoing treatment and monitoring. Include frequency of maintenance phlebotomy, if required.
    c. Specify presence or absence of complications (e.g., hepatic fibrosis, cirrhosis, cardiac conduction abnormalities or arrhythmias, cardiomyopathy, diastolic dysfunction, heart failure, diabetes mellitus, hypothyroidism, other endocrine dysfunction).
    d. If laboratory liver studies are abnormal (e.g., elevations of transaminase levels, alkaline phosphatase, gamma-glutamyl transpeptidase, or lactate dehydrogenase; abnormalities in markers of synthetic liver function such as albumin or prothrombin time) OR if ferritin is greater than 1000 ng/mL, a statement from a gastroenterologist or hepatologist defining criteria for liver biopsy is required.
3. Laboratory studies required:
    a. Current BMP
    b. Current liver function tests, including both total and direct bilirubin
    c. Current gamma-glutamyl transpeptidase (GGT)
    d. Current lactate dehydrogenase (LDH)
    e. Current iron studies, including total serum iron, ferritin, serum transferrin, and transferrin saturation
    f. Current prothrombin time (PT) and INR
    g. Current CBC
    h. Current TSH
    i. All past BMP, liver function tests, GGT, LDH, iron studies, ferritin, PT, INR, CBC, and TSH results, with dates
    j. Genetic test results, if obtained
4. Results of any other testing performed in the course of diagnosis, evaluation, and management of hemochromatosis, including other laboratory studies, all imaging reports (e.g., liver ultrasound, CT, MRI, and/or elastography), biopsies/pathology results (if performed), and any other ancillary studies.
    a. ECG, transthoracic echocardiogram, and 24-hour Holter monitor MUST be included for all FC II waiver requests (see note above).
5. Form FL4 with return to duty and ALC status.
6. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
2. All relevant interval consultation reports from specialty providers (e.g., gastroenterologist, hepatologist). These notes must include the following:
    a. Detailed plan of ongoing treatment and monitoring. Include frequency of maintenance phlebotomy, if required.
    b. Specify presence or absence of complications (e.g., hepatic fibrosis, cirrhosis, cardiac conduction abnormalities or arrhythmias, cardiomyopathy, diastolic dysfunction, heart failure, diabetes mellitus, hypothyroidism, other endocrine dysfunction).
    c. If laboratory liver studies are abnormal (e.g., elevations of transaminase levels, alkaline phosphatase, gamma-glutamyl transpeptidase, or lactate dehydrogenase; abnormalities in markers of synthetic liver function such as albumin or prothrombin time) OR if ferritin is greater than 1000 ng/mL, a statement from a gastroenterologist or hepatologist defining criteria for liver biopsy is required.
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, and any other ancillary tests. The following must be included:
    a. Current BMP
    b. Current liver function tests, including both total and direct bilirubin
    c. Current prothrombin time and INR
    d. Current CBC
    e. Current iron studies, including total serum iron, ferritin, serum transferrin, and transferrin saturation
4. Form FL4 with return to duty and ALC status.
5. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

III. Aeromedical Concerns

Hemochromatosis is a state of excess total body iron (i.e., iron overload). Typically, the term hemochromatosis is used to refer to hereditary hemochromatosis (HH) a genetic disorder characterized by a mutation in the HFE gene that results in an increase in the intestinal absorption of iron. Hereditary hemochromatosis is an autosomal recessive disorder with low penetrance. Many different mutations of the HFE gene are described in medical literature, but not all HFE genotypes lead to phenotypic iron overload. Two of the most common HFE mutations identified in individuals with phenotypic hemochromatosis are C282Y and H63D. Among those with HH, individuals with homozygous C282Y mutations account for more than 90% of those with clinically significant iron overload. There are other genotypes that portend a higher likelihood of clinical disease, including compound heterozygosity for the C282Y and H63D mutations.

HFE gene mutations and their phenotypic expression are of aeromedical and operational significance due to the risk of serious medical complications associated with iron overload. When total body iron is elevated, the excess iron is deposited in various tissues, including cardiac, liver, thyroid, pancreas, pituitary, and joints. Cardiac deposition can result in cardiomyopathy, conduction disturbances (e.g., sick sinus syndrome, heart block, and arrhythmias), diastolic dysfunction, and heart failure. The consequences of cardiac involvement with hemochromatosis include sudden incapacitation. Iron is toxic to the liver, causing inflammation and hepatocyte destruction. Ongoing inflammation can progress to fibrosis and cirrhosis, and chronic inflammation increases the risk of hepatocellular carcinoma. Abnormalities of synthetic liver function can result in coagulopathy, while a combination of factors in decompensated cirrhosis may lead to hepatic encephalopathy, variceal bleeding, ascites, or hepatorenal syndrome. Iron deposition in the pancreas, pituitary gland, or thyroid gland can result in endocrine dysfunction and manifest as diabetes mellitus, hypopituitarism, hypogonadism, and hypothyroidism. A thorough evaluation for end-organ damage should be accomplished prior to waiver submission.

The primary treatment for hemochromatosis is periodic therapeutic phlebotomy to achieve and maintain a serum ferritin between 50-100 µg/L. Studies demonstrate that keeping ferritin at this goal effectively prevents the development and progression of end-organ damage. The burden imposed on operational readiness by treatments such as regular phlebotomy will be taken into consideration at the time of waiver review. Among factors that will be considered include the accessibility/availability of necessary treatment and frequency of required treatment (and thereby, frequency of DNIF/DNIC/DNIA periods).

Review of the AIMWTS database from Jan 2019 through Jan 2022 revealed 21 cases with a diagnosis of hemochromatosis or iron overload. A breakdown of the cases was as follows: 0 FC I/IA cases, 10 FC II cases (0 disqualified), 6 FC III cases (0 disqualified), 2 ATC cases (0 disqualified), 1 GBO cases (0 disqualified), and 2 SWA cases (0 disqualified).

Please use *only* this ICD-10 code for AIMWTS coding purposes	
E83.11	Hemochromatosis

IV. Suggested Readings

1. Bacon BR, Adams PC, Kowdley KV, et al. AASLD Practice Guideline: Diagnosis and Management of Hemochromatosis: 2011 Practice Guideline by the American Association for the Study of Liver Disease. Hepatology 2011;54:328-343. Available at https://www.aasld.org/sites/default/files/2019-06/Hemochromatosis2011.pdf. Accessed 12 January 2022.
2. Kowdley KV, Brown KE, Ahn J, and Sundaram V. ACG Clinical Guideline: Hereditary hemochromatosis. Am J Gastroenterol 2019;114:1202-1218. Available at https://journals.lww.com/ajg/Fulltext/2019/08000/ACG_Clinical_Guideline__Hereditary_Hemochromatosis.11.aspx. Accessed 12 January 2022.
3. European Association for the Study of the Liver. EASL clinical practice guidelines for HFE hemochromatosis. J Hepatol 2010;53:3-22. Available at https://easl.eu/wp-content/uploads/2018/10/Hemochromatosis-English-report.pdf. Accessed 12 January 2022.

Hepatic Cirrhosis

Revised: January 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick and Maj Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver guide restructured.

I. Waiver Consideration

Cirrhosis that is associated with abnormal liver function, medical complication, or that requires specialist follow-up is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention, and it is generally not considered compatible with a waiver. Waivers may be considered for certain low-risk trained individuals on a case-by-case basis after a careful assessment of individualized aeromedical and operational risk. Waivers are not entertained for untrained personnel.

Specifically, any liver disease that meets any one of the following criteria is considered disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention:

A. There is resultant impairment in liver synthetic function, **or**,
B. There are resultant complications (including, but not limited to, portal or portopulmonary hypertension, esophageal varices, bleeding dyscrasias, venous thromboembolism, ascites, spontaneous bacterial peritonitis, encephalopathy, hepatorenal syndrome), **or**,
C. Requires specialty follow-up beyond six months.

Certain disease processes that may ultimately lead to cirrhosis are independently disqualifying. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide, including chapters *Chronic Viral Hepatitis*, *Hemochromatosis*, and *Alcohol Use Disorder*. Sequelae of chronic liver disease may be independently disqualifying. Please cross-reference the Medical Standards Directory for all potentially disqualifying conditions.

Table 1: Waiver potential for Hepatic Cirrhosis

Flying Class	Condition	Waiver Potential Waiver Authority[1]	ACS Review or Evaluation
FC I/IA	Cirrhosis	No AFRS/CMO	No
FC II/III/ ATC/GBO OSF/SWA	Compensated cirrhosis, without synthetic liver dysfunction or ongoing inflammation/injury, without history of complication	Yes[2] AFMRA	Yes[3]

1. Certification authority for untrained assets is AFRS/CMO.
2. No waiver potential for untrained assets. Rarely a waiver may be considered in certain low-risk trained individuals on a case-by-case basis. No indefinite waivers.
3. If waiver authority is interested in considering a waiver for a trained individual, then ACS review is strongly recommended prior to waiver approval.

Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of how the finding of cirrhosis was established, presenting features, and all pertinent physical findings (positive and negative).
    b. Specify the presence or absence of symptoms at initial presentation and throughout disease course.
    c. Describe the diagnostic evaluation and specify the underlying disease process that caused the cirrhosis.
    d. Specify the presence or absence of complications related to cirrhosis (e.g., portal or portopulmonary hypertension, esophageal varices, bleeding dyscrasias, venous thromboembolism, ascites, spontaneous bacterial peritonitis, encephalopathy, hepatorenal syndrome, etc.).
    e. List all past and ongoing treatments for the underlying disease process or for its complications. Include the following: all procedures; all current and historic medications, dosages, dates of administration; any adverse effects or complications stemming from treatment.
    f. Include a comprehensive review of symptoms and physical examination addressing the following systems: cardiovascular, gastrointestinal/abdominal, psychiatric (e.g., mood, fatigue, malaise, cognitive changes), hematologic, neurologic, and musculoskeletal.
    g. Comment on any impact to quality of life or occupational performance.
    h. List all co-morbid conditions.
    i. Medical history and all medications with dosages.
    j. All past and current supplement use.
    k. Quantify lifetime and current alcohol use.
2. Consultation reports from all treating specialists (e.g., gastroenterologist or hepatologist) and all subsequent consultation notes. These notes must include the following:
    a. Summarization of presentation, evaluation, and treatment course.
    b. Detailed plan of ongoing treatment and monitoring.
    c. Specify presence or absence of complications (see above examples).
    d. If laboratory liver studies are abnormal (e.g., elevations of transaminase levels, alkaline phosphatase, gamma-glutamyl transpeptidase, or lactate dehydrogenase; abnormalities in markers of synthetic liver function such as albumin or prothrombin time), a statement from a gastroenterologist or hepatologist defining criteria for liver biopsy is required.
3. Laboratory studies required:
    a. Current BMP
    b. Current liver function tests, including both total and direct bilirubin
    c. Current gamma-glutamyl transpeptidase (GGT)
    d. Current lactate dehydrogenase (LDH)

e. Current prothrombin time and INR
f. Current CBC
g. Iron studies, including total serum iron, ferritin, serum transferrin, and transferrin saturation
h. Fasting lipid panel
i. All past liver function tests, GGT, LDH, PT, INR, and CBC results, with dates
j. Hepatitis A antibody (IgG)
k. Hepatitis B surface antigen, surface antibody, and core antibody
l. Hepatitis C antibody
m. Results of any other clinically indicated laboratory tests performed in the course of diagnosis, evaluation, and management of cirrhosis (e.g., alpha-1 antitrypsin level and genotype, ceruloplasmin, anit-nuclear antibodies, anti-mitochondrial antibodies, anti-smooth muscle antibodies, anti-liver/kidney/microsomal antibodies, immunoglobulins)

4. Results of any other testing performed in the course of diagnosis, evaluation, and management of hepatitis, including all imaging reports (e.g., liver ultrasound, CT, MRI, and/or elastography), biopsies/pathology results (if performed), procedure reports (e.g., esophagoduodenoscopy for surveillance of varices), and any other ancillary studies.
5. Form FL4 with return to duty and ALC status.
6. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
2. All relevant interval consultation reports from specialty providers (e.g., gastroenterologist or hepatologist). These notes must include the following:
    a. Detailed plan of ongoing treatment and monitoring.
    b. Specify presence or absence of complications (e.g., portal or portopulmonary hypertension, esophageal varices, bleeding dyscrasias, venous thromboembolism, ascites, spontaneous bacterial peritonitis, encephalopathy, hepatorenal syndrome).
    c. If laboratory liver studies are abnormal (e.g., elevations of transaminase levels, alkaline phosphatase, gamma-glutamyl transpeptidase, or lactate dehydrogenase; abnormalities in markers of synthetic liver function such as albumin or prothrombin time), a statement from a gastroenterologist or hepatologist defining criteria for liver biopsy is required.
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, and any other ancillary tests. The following must be included:
    a. Current BMP
    b. Current liver function tests, including both total and direct bilirubin
    c. Current prothrombin time and INR
    d. Current CBC

4. Form FL4 with return to duty and ALC status.
5. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

III. Aeromedical Concerns

Hepatic cirrhosis represents the end stage of a continuum of progressive liver injury and fibrosis. Over time, ongoing inflammation, tissue damage, and regeneration leads to nodularity, scarring, and organ dysfunction. As liver disease progresses, it becomes increasingly irreversible, and risks of multisystem complications increase. Aeromedical concerns of chronic liver disease and liver cirrhosis are manifold. Mild symptoms might include fatigue, malaise, and lethargy. Abnormalities of synthetic liver function can result in coagulopathy, low oncotic pressure, fluid shifts, edema, and ascites. A combination of factors in decompensated cirrhosis may lead to hepatic encephalopathy, variceal bleeding, portal hypertension, or hepatorenal syndrome. Other complications include anemia of chronic disease and metabolic bone disease.

The implications of cirrhosis in the aviation or operational environment are myriad. Some complications of cirrhosis, such as variceal bleeding, can occur suddenly with no or little prodrome, resulting in sudden incapacitation or death. Other complications, such as hepatic encephalopathy, may be of more insidious onset, resulting in subtle performance decrement, impaired judgement, delayed reaction time, and impaired executive functioning, with potentially catastrophic consequences in the aviation or operational environment. Impairment in G-tolerance would be expected due to fluid shifts caused by a variety of factors, including decreased oncotic pressure and increased pressure in the portal venous system. Anemia of chronic disease would lead to decreased tolerance of hypoxia.

Many different conditions that cause chronic liver injury or inflammation can lead to cirrhosis. Examples of disparate disease processes that converge on the common endpoint of cirrhosis include medication and toxin effects, autoimmune processes, infections, metabolic processes, and genetic diseases. Specific examples include chronic alcohol abuse, primary biliary cirrhosis, primary sclerosing cholangitis, autoimmune hepatitis, chronic viral hepatitis, hemochromatosis, Wilson's disease, alpha-1 antitrypsin deficiency, and non-alcoholic fatty liver disease (NAFLD). The underlying disease states that result in cirrhosis may be associated with additional symptoms or complications that convey increased aeromedical or operational risk. Therefore, it is essential that the etiology of the cirrhosis be elucidated in order to perform an appropriate risk assessment. Many of these underlying conditions are independently disqualifying for continued duties and are associated with unique waiver considerations. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for additional information, including Air Force Waiver Guide chapters *Chronic Viral Hepatitis* and *Hemochromatosis.*

Review of the AIMWTS database from Jan 2017 through Jan 2022 revealed no cases of chronic liver disease which had progressed to include a diagnosis of hepatic cirrhosis.

Please use *only* these ICD-10 code for AIMWTS coding purposes	
K70.3	Alcoholic cirrhosis
K74.5	Biliary cirrhosis, unspecified
K74.60	Unspecified cirrhosis of liver

IV. Suggested Readings

1. Biggins SW, Angeli P, Garcia-Tsao G, et al. Diagnosis, Evaluation, and Management of Ascites, Spontaneous Bacterial Peritonitis and Hepatorenal Syndrome: 2021 Practice Guidance by the American Association for the Study of Liver Diseases. Hepatology 2021;74:1014-1048. Available at https://aasldpubs.onlinelibrary.wiley.com/doi/epdf/10.1002/hep.31884. Accessed 12 January 2022.
2. European Association for the Study of the Liver. EASL Clinical Practice Guidelines on non-invasive tests for evaluation of liver disease severity and prognosis - 2021 update. J Hepatol 2021; 75:659-689. Available at https://www.journal-of-hepatology.eu/article/S0168-8278(21)00398-6/fulltext. Accessed 12 January 2022.
3. National Guideline Centre (UK). Cirrhosis in Over 16s: Assessment and Management. London: National Institute for Health and Care Excellence (NICE); 2016 Jul. Available at https://www.nice.org.uk/guidance/ng50/resources/cirrhosis-in-over-16s-assessment-and-management-pdf-1837506577093. Accessed 12 January 2022.
4. Smith A, Baumgartner K, Bositis C. Cirrhosis: diagnosis and management. Am Fam Physician 2019;100:759-770. Available at https://www.aafp.org/afp/2019/1215/afp20191215p759.pdf. Accessed 12 January 2022.

Aerospace Medicine Waiver Guide

Irritable Bowel Syndrome (IBS)

Revised: Aug 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Maj Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver guide restructured; updated to reflect the most recent MSD.

I. Waiver Consideration

Irritable bowel syndrome (IBS) with symptoms that cannot be controlled by dietary modification alone is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties. IBS becomes disqualifying for retention if symptoms result in frequent medical appointments, need for ongoing specialty follow-up, or frequent missed duty time. Symptoms associated with IBS may be independently disqualifying. For example, recurrent abdominal pain of sufficient severity to preclude satisfactory performance of duties, require frequent absences from duty, or necessitate frequent specialist follow-up is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. Chronic diarrhea, regardless of cause, is disqualifying for all flying class and SWA duties. The use of any medication or supplement for symptom control that is not included on the applicable career field medication list is disqualifying for ongoing aviation or operational duty and would also necessitate a waiver.

Please cross-reference the Medical Standards Directory, Air Force Waiver Guide, and appropriate career field medication list for all potentially disqualifying conditions and treatments. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of IBS in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

When IBS symptoms are controlled and individuals remain asymptomatic with solely dietary modification, without use of medication, supplement, or other intervention, then the condition is not disqualifying, and no waiver is necessary. Waivers are generally not considered for untrained applicants with IBS that requires more than dietary modification for symptom control or who have ongoing active symptoms. The symptoms of IBS correlate closely with psychological stress. The rigors of training along with the stress of the aviation or operational environment would be expected to exacerbate flares of such duty-limiting or distracting symptoms as severe abdominal pain and diarrhea. Thus, although certain untrained individuals deemed to be low aeromedical risk may be considered for waiver on a case-by-case basis, untrained applicants with active IBS or IBS requiring medication management have limited waiver potential. For trained personnel, waivers may be considered on a case-by-case basis. Weighed factors for waiver consideration include, but are not limited to, historic severity of symptoms, degree of current symptom control at time of waiver submission, duration of stability, and the risks associated with any medication or intervention necessary to maintain symptom control and stability.

Table 1: Waiver potential for Irritable Bowel Syndrome (IBS)

Flying Class	Condition	Waiver Potential Waiver Authority	ACS Review or Evaluation
FC I/IA	IBS not controlled by dietary modification alone[1]	No[2] AFRS/CMO	No
FC II/III/ATC/ GBO/OSF/SWA	IBS not controlled by dietary modification alone[1]	Yes[2,3] MAJCOM[4]	No[5]

1. Mild IBS that is controlled with dietary modification alone is not disqualifying and no waiver is required.
2. In general, waivers for untrained assets are unlikely. A waiver for untrained assets will only be considered in individuals deemed to be low aeromedical risk on a case-by-case basis. No indefinite waivers.
3. Waivers for the use of non-approved medications may be considered on a case-by-case basis.
4. Certification authority for untrained assets is AFRS/CMO. Waiver authority for aeromedically unapproved medication use is AFMRA.
5. ACS review may be requested at the discretion of the waiver authority. ACS review is recommended for untrained assets.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Specify presence or absence of pertinent symptoms (e.g., abdominal pain, bloating, diarrhea, constipation, stool frequency, frequency of exacerbations/pattern of recurrence, duration of exacerbations, exacerbating and alleviating factors, etc.).
    c. Summarize all medications and interventions attempted to treat or alleviate symptoms (pharmacologic and non-pharmacologic), with doses (as applicable), dates and duration of intervention, and effectiveness.
    d. List current medications with dosages.
    e. Summarize diagnostic evaluation, including list of any/all procedures with dates.
2. Consultation report from the treating gastroenterologist and all subsequent consultation notes. These notes must include the following:
    a. Discussion of current treatment (e.g., dietary modifications, pharmacotherapy, etc.) including dose, frequency, and formulation.
    b. Discussion of current degree of symptom control.
3. Results of all testing performed in the course of diagnosis, evaluation, and management of IBS, including laboratory studies, imaging, endoscopy or colonoscopy reports and biopsy results (if applicable), and any other ancillary studies.
4. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
    c. Documentation of interval recurrences, changes in symptom pattern, or treatment.
2. All relevant interval consultation reports from the treating gastroenterologist, if applicable.
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, interval endoscopy or colonoscopy reports and biopsy results, and any other ancillary tests.
4. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Different criteria exist for diagnosing IBS. The most commonly followed diagnostic guidelines are the Rome criteria, but other criteria may also be utilized (e.g., Manning criteria). In general, IBS is associated with symptoms such as abdominal pain, intermittent diarrhea and/or constipation, and bloating. Other symptoms may include fecal urgency, a sense of incomplete evacuation, flatulence, mucus passage with defecation, and pain that is relieved with defecation. Severity of the symptoms vary between affected individuals. A single individual may experience significant fluctuation in symptoms, often experiencing exacerbations in correlation with periods of worsened emotional or psychologic stress. Many individuals with IBS learn to control their symptoms through stress-reduction techniques and dietary modification. Often, foods that are high in fermentable oligosaccharides, disaccharides, monosaccharides, and polyols (FODMAPs) worsen symptoms of IBS. However, a diet of eliminating all high-FODMAP foods is severely restricting and generally not considered sustainable in an operational environment. A FODMAP elimination diet is considered a temporary measure to alleviate symptoms, followed by gradual re-introduction of foods to identify specific triggering foods that may be avoided in order to reduce the recurrence of IBS symptoms.

Those service members with IBS of sufficient severity that dietary modification alone does not control symptoms are disqualified for all flying class, GBO, ATC, OSF, and SWA duties. The predominant aeromedical and operational concerns are that symptoms of IBS are unpredictable, worsen with stress, and may become distracting or even incapacitating during the performance of aviation or operational duties with little or no warning. Symptoms such as bloating and abdominal pain can worsen with altitude changes due to expansion of intraluminal gas. Even with mild symptoms like fecal urgency and frequent defecation may present an inconvenience during extended aviation and operational missions. Furthermore, the stressors of the aviation, space, or other austere living conditions would be expected to exacerbate symptoms.

IBS is usually a chronic, frequently lifelong condition, with a course that may wax and wane over an individual's lifespan. Its chronicity and tendency to worsen with stress is of particular concern when considering an untrained applicant in whom relapses or exacerbations of symptoms may cause significant lost duty over the course of military service.

Many medications used in the treatment of IBS may carry an elevated risk of systemic side effects that could preclude safe performance of aviation or operational duties. In particular, medications with anticholinergic properties are of concern due to their potential to cause systemic complications that include cognitive slowing, mood changes, vision changes, and cardiovascular instability. The use of any medication or supplement in the treatment of IBS is disqualifying and requires a waiver, as it may indicate underlying disease severity. Non-approved medications may not be amenable to waiver, even if other factors related to disease control and stability are favorable. Of note, there is no career field medication list for OSF or SWA personnel. In OSF and SWA personnel, as will all other personnel requiring waiver for medication and/or supplement use in the treatment of IBS, the risks and benefits of each medication/supplement must be considered carefully in the unique clinical and operational context and must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Review of the AIMWTS database from Aug 2019 through Aug 2022 revealed 85 cases with a diagnosis of irritable bowel syndrome. The breakdown of the number of waivers and number of total cases are tabulated below.

ICD-10 Code		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	ATC	GBO	SWA
K58.0	Irritable bowel syndrome w/ diarrhea	2/4	20/24	23/37	1/4	8/11	5/5
K58.1	Irritable bowel syndrome w/ constipation						
K58.2	Mixed irritable bowel syndrome						

IV. Suggested Readings

1. Ford AC, Moayyedi P, Chey WD, et al., for the ACG Task Force on Management of Irritable Bowel Syndrome. American College of Gastroenterology Monograph on Management of Irritable Bowel Syndrome. Am J Gastroenterol 2018;113(Suppl 2):1-18. Available at https://journals.lww.com/ajg/fulltext/2018/06002/american_college_of_gastroenterology_monograph_on.1.aspx . Accessed 17 August 2022.
2. Quigley EM, Fried M, Gwee KA, et al. World Gastroenterology Organisation Global Guidelines Irritable Bowel Syndrome: A Global Perspective Update September 2015. J Clin Gastroenterol 2016;50:704-713. Available at https://www.worldgastroenterology.org/UserFiles/file/guidelines/irritable-bowel-syndrome-english-2015.pdf. Accessed 17 August 2022.
3. Smalley W, Falck-Ytter C, Carrasco-Labra A, et al. AGA Clinical Practice Guidelines on the laboratory evaluation of functional diarrhea and diarrhea-predominant irritable bowel syndrome in adults (IBS-D). Gastroenterology 2019;157:851–854. Available at https://www.gastrojournal.org/action/showPdf?pii=S0016-5085%2819%2941083-4. Accessed 17 August 2022.
4. Weinberg DS, Smalley W, Heidelbaugh JJ, and Sultan S. American Gastroenterological Association Institute Guideline on the pharmacological management of irritable bowel syndrome. Gastroenterology 2014;147:1146–1148. Available at https://www.gastrojournal.org/article/S0016-5085(14)01089-0/pdf. Accessed 17 August 2022.

Aerospace Medicine Waiver Guide

Pancreatitis

Revised: Aug 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Maj Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver guide restructured; updated to reflect the most recent MSD.

I. Waiver Consideration

Any history of either acute or chronic pancreatitis, regardless of cause, is disqualifying for all flying class and SWA duties. A history of acute pancreatitis that is complicated by persistent pancreatic pseudocysts is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. Chronic pancreatitis or recurrent episodes of acute pancreatitis is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention if associated with any one of the following:

A. steatorrhea, **or**,
B. disturbance of glucose metabolism requiring insulin or hypoglycemic agents, **or**,
C. abdominal pain resulting in repeated hospitalization or frequent absences from duty.

The symptoms or complications of pancreatitis may be independently disqualifying for continued aviation or operational duties or for retention. For example, recurrent abdominal pain of sufficient severity to preclude satisfactory performance of duties, require frequent absences from duty, or necessitate frequent specialist follow-up is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. Individuals with chronic pancreatitis are at risk for a variety of complications that may be disqualifying, including sequelae of exocrine insufficiency such as osteoporosis and diabetes mellitus. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for all potentially disqualifying conditions.

Waivers are unlikely for personnel with active symptoms of chronic pancreatitis or evidence of ongoing inflammation. Following resolution of an isolated, uncomplicated case of acute pancreatitis, waiver may be considered for disqualified aviators and SWA personnel, including untrained individuals. Prior to requesting a waiver, it is expected that an individual will demonstrate a period of asymptomatic stability. The risk of recurrent pancreatitis or the development of future complications varies depending upon whether an underlying causative etiology is identified and corrected. The cause of pancreatitis and risk of recurrence will influence waiver eligibility. In general, in untrained applicants with a history of recurrent acute pancreatitis, a history of chronic pancreatitis, or a history of resolved pancreatitis with a persistent complication, a waiver is unlikely to be considered. However, for certain untrained applicants who are determined to be low aeromedical risk after careful review, a waiver may be considered on a case-by-case basis. Likewise, waivers are considered on a case-by-case basis for trained individuals with a history of recurrent acute pancreatitis, a history of resolved chronic pancreatitis, or a history of resolved pancreatitis with persistent complication.

Factors that may influence a waiver decision include, but are not limited to, the underlying cause of the pancreatitis, the likelihood of interventions to reduce future recurrences, need for aeromedically unapproved medications to reduce recurrence or treat sequelae of pancreatitis, and the particular nature and associated risks of any complications or chronic symptoms that may be present (e.g., exocrine insufficiency, malabsorption, pseudocysts, diarrhea, chronic pain, etc.). Idiopathic pancreatitis or pancreatitis due to a hereditary cause is unlikely to be waived. Any history of segmental surgical resection of the pancreas will not be considered favorably.

Table 1: Waiver potential for Pancreatitis

Flying Class	Condition	Waiver Potential Waiver Authority	ACS Review or Evaluation
IFC I/IA	Single episode of acute and uncomplicated pancreatitis, resolved without sequelae	Yes AFRS/CMO	No
	History of chronic pancreatitis, recurrent episodes of acute pancreatitis, or single episode of acute pancreatitis with persistent complication	Unlikely AFRS/CMO	No
FC II/III/SWA	Single episode of acute and uncomplicated pancreatitis, resolved without sequelae	Yes MAJCOM[1]	No[3]
	History of chronic pancreatitis, recurrent episodes of acute pancreatitis, or single episode of acute pancreatitis with persistent complication	Yes[2] MAJCOM[1]	No[3]
ATC/GBO/OSF	History of chronic pancreatitis, recurrent episodes of acute pancreatitis, or single episode of acute pancreatitis with persistent complication	Yes[2] MAJCOM[1]	No[3]

1. Certification authority for untrained assets is AFRS/CMO.
2. Aeromedical waivers may be considered in personnel determined to be low aeromedical risk on a case-by-case basis. No indefinite waivers. Aeromedical waivers for untrained assets and individuals with active chronic pancreatitis are unlikely.
3. ACS review may be requested on a case-by-case basis at the discretion of the waiver authority.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Specify presence or absence of ongoing symptoms.
    c. Specify presence or absence of complications (e.g., pseudocyst, abscess, necrosis, splanchnic venous thrombosis, pseudoaneurysm, abdominal compartment syndrome, prediabetes, diabetes, exocrine pancreatic insufficiency, etc.).
    d. Specify if an underlying cause of the pancreatitis was identified and describe how it was addressed.
    e. Summary of diagnostic evaluation and treatment history, including list of any/all procedures with dates.
    f. List current medications with dosages.
2. Consultation report from the treating gastroenterologist and all subsequent consultation notes. These notes must include the following:
    a. Documentation of the presence or absence of complications (see A.1.c. above).
    b. Documentation of the presence or absence of current symptoms.
    c. Discussion of likelihood of recurrence.
3. Laboratory studies required:
    a. Current CBC.
    b. Current fasting BMP (must include fasting glucose).
    c. Current liver function panel.
    d. Current serum amylase and lipase levels.
    e. Current trypsin level.
    f. Current fasting lipid panel.
4. Results of all testing performed in the course of diagnosis, evaluation, and management of pancreatitis, including laboratory studies, imaging, and any other ancillary studies. Must include the following:
    a. CT scan of the abdomen/pelvis obtained post-recovery (radiology report), which should comment upon the presence of ongoing inflammation, necrosis, pseudocyst formation, or calcifications.
    b. If CT scan does not sufficiently evaluate the gallbladder, then an ultrasound to assess for gallbladder disease (e.g., gallstones, sludge) is required (radiology report).
    c. All procedural reports, operative reports, and pathology results, as applicable.
    d. Associated hospital records (e.g., admission history and physical, discharge summary), as applicable.
5. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Summarize any interval evaluation and/or treatment.
    c. Document the presence or absence of new complications (see A.1.c. above).
    d. List current medications with dosages.
2. All interval consultation reports from the treating gastroenterologist, if applicable.
3. Laboratory studies required:
    a. Current CBC.
    b. Current fasting BMP (must include fasting glucose).
    c. Current liver function panel.
    d. Current serum amylase and lipase levels.
    e. Current trypsin level.
    f. Current fasting lipid panel.
4. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, interval procedure reports, and any other ancillary tests.
5. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

The aeromedical concerns associated with pancreatitis differ slightly depending upon the underlying causative etiology, whether the pancreatitis is acute or chronic, and whether there are any associated complications or sequelae. The most common cause of acute pancreatitis in the United States is cholelithiasis, which accounts for approximately 40-70% of cases. Alcohol consumption accounts for 25-35% of total cases. Hypertriglyceridemia is a recognized but less common cause, accounting for between 1-14% of cases. In order to provoke pancreatitis, triglycerides must be significantly elevated (i.e., greater than 1000 mg/dL). Milder elevations of triglycerides in an individual with a history of acute pancreatitis should prompt an evaluation for another potential underlying etiology. Acute pancreatitis is also a known complication following endoscopic retrograde cholangiopancreatography (ERCP).

Less common causes of pancreatitis include predisposing genetic mutations (e.g., *CFTR* or *SPINK1* genes), medications, and abdominal trauma resulting in pancreatic injury. Rare causes of pancreatitis include biliary sludge, biliary microlithiasis, other forms of biliary obstruction, hypercalcemia, certain infections, toxins, vascular disease, and anatomic abnormalities of the pancreas. About 15-20% of acute pancreatitis is idiopathic, meaning that an underlying etiology is not identified after a thorough investigation that includes advanced diagnostic procedures such as magnetic resonance cholangiopancreatography (MRCP), endoscopic ultrasound, ERCP, analysis of bile for microlithiasis, and sphincter of Oddi manometry.

Depending on the cause of acute pancreatitis, the condition can occur suddenly, without prodrome. The first symptoms of acute pancreatitis may include severe abdominal pain, vomiting, and dyspnea, which may rapidly result in incapacitation. Patients may develop hemodynamic instability, which is at least partly caused by a systemic inflammatory response. Severe acute pancreatitis can quickly progress to multi-organ failure and can become life-threatening if definitive medical care is delayed. Potentially fatal complications of severe acute pancreatitis include acute respiratory distress syndrome and abdominal compartment syndrome.

Chronic pancreatitis is characterized by persistent or frequently recurrent pancreatic inflammation, injury, and dysfunction. Active chronic pancreatitis is generally not felt to be compatible with sustained aviation or operational duties. Symptoms of chronic or recurrent abdominal pain and steatorrhea may be distracting or even incapacitating during the performance of aviation and operational duties. Complications of both acute and chronic pancreatitis include pseudocyst, abscess, necrosis, splanchnic venous thrombosis, pseudoaneurysm, abdominal compartment syndrome, prediabetes, diabetes, and exocrine pancreatic insufficiency. Complications are varied and present unique aeromedical and operational risks, which must be carefully considered in context.

Many of the underlying causes and resultant complications of pancreatitis are independently disqualifying. Please cross-reference the Medical Standards Directory and the pertinent Air Force Waiver Guide for all potentially disqualifying conditions.

Review of the AIMWTS database from Aug 2019 through Aug 2022 revealed 54 cases with a diagnosis of pancreatitis. The breakdown of the number of waivers and number of total cases are tabulated below. Three of the six disqualifications were for reasons associated with the diagnosis of pancreatitis.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)				
		IFC I/IA	FC II	FC III	GBO	ATC
K85.9	Acute pancreatitis, unspecified	1/1	24/27	21/23	2/2	0/1
K86.0	Alcohol-induced chronic pancreatitis					
K86.1	Other chronic pancreatitis					

IV. Suggested Readings

1. Conwell DL, Lee LS, Yadav D, et al. American Pancreatic Association Practice Guidelines in Chronic Pancreatitis: Evidence-Based Report on Diagnostic Guidelines. Pancreas 2014;43:1143-1162. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5434978/. Accessed 30 August 2022.
2. Crockett SD, Wani S, Gardner TB, et al. on behalf of American Gastroenterological Association Institute Clinical Guidelines Committee. American Gastroenterological Association Institute Guideline on Initial Management of Acute Pancreatitis. Gastroenterology 2018;154:1096–1101. Available at https://www.gastrojournal.org/action/showPdf?pii=S0016-5085%2818%2930076-3. Accessed 30 August 2022.
3. Pancreatitis. NICE Guideline. National Institute for Health and Care Excellence. September 2018. Available at https://www.nice.org.uk/guidance/ng104/resources/pancreatitis-pdf-66141537952453. Accessed 30 August 2022.

Aerospace Medicine Waiver Guide

Peptic Ulcer Disease (PUD)

Revised: Aug 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Maj Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver guide restructured; updated to reflect the most recent MSD.

I. Waiver Consideration

For the purposes of this waiver guide, peptic ulcer disease (PUD) refers to ulceration of the lining of the esophagus, stomach, or duodenum. This use of the term PUD is consistent with its usage in the Medical Standards Directory (MSD). Active PUD is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties. Additionally, any history of PUD meeting any one of the following criteria is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties:

A. Previously or currently refractory to treatment, **or**,
B. Associated with complication (including, but not limited to, hemorrhage, stricture, obstruction, or perforation), **or**,
C. Previously or currently necessitating long-term use of acid suppression therapy (e.g., proton pump inhibitor) to prevent recurrence.

PUD is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention, if it meets any of the following criteria:

A. Causes repeated incapacitation, **or**,
B. Causes frequent absences for duty, **or**,
C. Requires frequent specialist follow-up.

The symptoms of PUD or its consequent complications may also be disqualifying. For example, gastrointestinal hemorrhage is disqualifying for all flying class, ATC, and SWA duties. Recurrent abdominal pain of sufficient severity to preclude satisfactory performance of duties, require frequent absences from duty, or necessitate frequent specialist follow-up is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. Gastritis in the absence of ulceration may be disqualifying when chronic or severe, or when treatment necessitates use of medications not included in the applicable career field medication list. Please cross-reference the Medical Standards Directory, Air Force Waiver Guide, and appropriate career field medication list for all potentially disqualifying conditions and treatments. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment or prevention of PUD in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

After treatment for PUD is complete, endoscopic healing is demonstrated, and a period of asymptomatic control is established, then waiver consideration is generally favorable. Complicated PUD (e.g., associated with hemorrhage, stricture, obstruction, or perforation), severe disease, or recurrent disease is scrutinized more carefully prior to the granting of a waiver.

PUD requiring use of aeromedically unapproved medications to maintain asymptomatic remission may not be amenable to waiver. Complicated PUD, severe or refractory disease, and individuals requiring treatment with aeromedically unapproved medications are considered for waiver on a case-by-case basis. If an acid suppression regimen is clinically indicated to reduce the risk of disease recurrence, waiver will not be considered favorably if the service member fails to demonstrate adequate adherence.

Table 1: Waiver potential for Peptic Ulcer Disease (PUD)[1]

Flying Class	Condition[2]	Waiver Potential Waiver Authority	ACS Review or Evaluation
FC I/IA	Active or symptomatic PUD	No AFRS/CMO	No
	History of PUD, with or without complication, adequately treated and resolved, with demonstrated endoscopic healing, including PUD requiring long-term use of acid suppression therapy to prevent recurrence[5]	Yes[3] AFRS/CMO	Yes
FC II/III/ATC/ GBO/OSF/SWA	Active or symptomatic PUD	No MAJCOM[4]	No
	History of PUD, with or without complication, adequately treated and resolved, with demonstrated endoscopic healing, including PUD requiring long-term use of acid suppression therapy to prevent recurrence[5]	Yes[3] MAJCOM[4]	Yes

1. PUD refers to ulceration of the lining of the esophagus, stomach, or duodenum. It may be confirmed by laboratory testing, imaging, or endoscopy.
2. Please refer to the "Waiver Considerations" section for a list of disqualifying criteria.
3. Waivers for the use of non-approved medications may be considered on a case-by-case basis.
4. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMRA.
5. If an acid suppression regimen is clinically indicated to reduce the risk of disease recurrence, waiver will not be considered favorably if the service member fails to demonstrate adequate adherence.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Specify presence or absence of pertinent symptoms (e.g., dysphagia, odynophagia, food impaction, emesis, weight loss, anorexia, hematemesis, melena, hematochezia, abdominal pain, etc.).
    c. Specify presence or absence of exacerbating factors and whether they are controlled (e.g., NSAID use, tobacco use, alcohol consumption).
    d. Specify presence or absence of complications (e.g., bleeding, stricture, obstruction, perforation, etc.).
    e. Medical history and all medications with dosages.
    f. Summary of diagnostic evaluation, including list of any/all procedures with dates.
    g. Specify current treatment regimen, if any. Include dosages, and comment on tolerance of treatment.
2. Consultation report from the treating gastroenterologist and all subsequent consultation notes. These notes must include the following:
    a. Discussion of current treatment (e.g., dietary modifications, anti-reflux medication, etc.) including dose, frequency, and formulation.
    b. Documentation of the presence or absence of complications (see above).
    c. Recommendations for disease surveillance.
3. Results of all testing performed in the course of diagnosis, evaluation, and management of PUD, including laboratory studies, imaging, and any other ancillary studies.
    a. Include procedural reports and pathology results from any and all diagnostic or surveillance endoscopies that were performed.
    b. Include results of *H. pylori* testing, if available (if positive, confirm eradication).
    c. Current CBC.
4. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
    c. Documentation of the presence or absence of complications (e.g., bleeding, stricture, obstruction, perforation, etc.).

    d. Plan for monitoring of recurrence.
2. All relevant interval consultation reports from the treating gastroenterologist, if applicable.
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, interval endoscopy reports and biopsy results, and any other ancillary tests.
4. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

The specific aeromedical concerns and level of risk stemming from PUD vary depending on the causative etiology, severity of symptoms, and response of the disease to medical interventions such as acid suppression therapy. Sudden incapacitation can occur as a result of acute gastrointestinal hemorrhage in the setting of erosion into a blood vessel or due to gastrointestinal perforation. In some cases, blood loss may be chronic and anemia of aeromedical or operational significance anemia may develop insidiously, resulting in subacute symptoms of fatigue, lightheadedness, or decreased G-tolerance that can result in subtle performance decrements. Additionally, anemia impairs an aviator's ability to tolerate hypoxia in the event of an in-flight emergency. Other complications due to PUD may be independently disqualifying for aviation or operational duties or for retention. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for all potentially disqualifying conditions.

In some cases of PUD, medications that are not included in the career field approved medication list may be clinically indicated to control disease or prevent disease recurrence. The use of such medications is disqualifying for continued aviation or operational duties in the absence of a waiver, and the risks and benefits of each medication must be considered carefully in the unique clinical and operational context. Of note, there is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment or prevention of PUD in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Review of the AIMWTS database from Aug 2019 through Aug 2022 revealed 28 cases with a diagnosis of peptic ulcer disease. The breakdown of the number of waivers and number of total cases are tabulated below. The one sole disqualification was for an unrelated medical issue.

ICD-10 Code		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	ATC	GBO	SWA
K27.0	Acute peptic ulcer, site unspecified, with hemorrhage	2/2	11/11	9/9	0/1	1/1	3/3
K27.1	Acute peptic ulcer, site unspecified, with perforation						
K27.2	Acute peptic ulcer, site unspecified, with both hemorrhage and perforation						
K27.3	Acute peptic ulcer, site unspecified, without hemorrhage or perforation						
K27.4	Chronic or unspecified peptic ulcer, site unspecified, with hemorrhage						
K27.5	Chronic or unspecified peptic ulcer, site unspecified, with perforation						
K27.6	Chronic or unspecified peptic ulcer, site unspecified, with both hemorrhage and perforation						
K27.7	Chronic peptic ulcer, site unspecified, without hemorrhage or perforation						
K27.9	Peptic ulcer, site unspecified, unspecified as acute or chronic, without hemorrhage or perforation						
Z87.11	Personal history of peptic ulcer						

IV. Suggested Readings

1. Chey WD, Leontiadis GI, Howden CW, Moss SF. ACG Clinical Guideline: Treatment of *Helicobacter pylori* infection. Am J Gastroenterol 2017;112:212-238. Available at https://journals.lww.com/ajg/Fulltext/2017/02000/ACG_Clinical_Guideline__Treatment_of_Helicobacter.12.aspx. Accessed 17 August 2022.
2. Gralnek IM, Dumonceau JM, Kuipers EJ, et al. Diagnosis and management of nonvariceal upper gastrointestinal hemorrhage: European Society of Gastrointestinal Endoscopy (ESGE) Guideline. Endoscopy 2015;47:1-46. Available at https://www.esge.com/assets/downloads/pdfs/guidelines/2015_s_0034_1393172.pdf. Accessed 17 August 2022.
3. Laine L, Jensen DM. Management of patients with ulcer bleeding. Am J Gastroenterol 2012;107:345–360. Available at http://s3.gi.org/physicians/guidelines/UlcerBleeding.pdf. Accessed 17 August 2022.
4. Tarasconi A, Coccolini F, Biffl WL. Perforated and bleeding peptic ulcer: WSES guidelines. World J Emerg Surg 2020;15:3. doi: 10.1186/s13017-019-0283-9. Available at https://www.wses.org.uk/wp-content/uploads/2020/02/perforated-peptic-ulcers-GL.pdf. Accessed 17 August 2022.

Ulcerative Colitis

Reviewed: Oct 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Suggested readings (Section IV) updated.

I. Waiver Consideration

Ulcerative Colitis (UC) of any severity or distribution is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. In other words, isolated proctitis, UC that is limited to the left side of the colon, as well as extensive or pancolonic disease are all equally disqualifying. It is unlikely for untrained personnel to be considered for waiver eligibility for aviation or operational duties. For trained personnel, factors considered when assessing suitability for waiver include, but are not limited to, the severity of the disease at time of diagnosis, whether there is evidence of clinical and endoscopic remission, whether treatment and monitoring are appropriate in the context of nationally or internationally recognized guidelines, the individual service member's adherence to clinically indicated therapy, the individual's tolerance of treatment, the unique risks associated with the specific maintenance medication(s) utilized, and the cumulative risk of all associated complications and/or extra-intestinal disease manifestations.

Waiver may be considered once a service member is in disease remission on a stable, career field-approved medication regimen, without adverse effects. Individuals who are not adherent to an appropriate treatment regimen will not be considered waiver-eligible. Use of any medication not included on the career field-approved medication list is independently disqualifying and will be reviewed on a case-by-case basis.

There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of UC in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

The presence of persistent endoscopic disease is associated with a higher risk of symptomatic recurrence, even when UC is otherwise clinically quiescent. For this reason, individuals who achieve clinical remission but fail to demonstrate endoscopic remission are unlikely to be considered eligible for a waiver. For aeromedical and operational purposes, endoscopic remission is assessed either after completion of definitive treatment or while on stable maintenance therapy. For waiver consideration, endoscopic remission verification should include both visual (i.e., colonoscopic inspection) and histologic (i.e., tissue biopsy) demonstration of mucosal healing without evidence of active inflammation.

Finally, aeromedical and operational waivers for UC treated with curative surgery are considered on a case-by-case basis, with consideration given to post-operative complications and functional outcomes. Persistent ostomy is generally not considered compatible with aviation and operational duties.

Table 1: Waiver potential for Ulcerative Colitis[1]

Flying Class	Condition	Waiver Potential Waiver Authority	ACS Review or Evaluation
FC I/IA	Any history of ulcerative colitis, regardless of extent or severity	Unlikely AFRS/CMO	No
FC II/III/ATC/ GBO/OSF/SWA	Any history of ulcerative colitis, regardless of extent or severity (exception, UC treated surgically)[3,4,5]	Yes[2] MAJCOM[7]	Yes[2]
	Ulcerative colitis treated with colectomy[6]	Yes[2] MAJCOM[7]	Yes[2]

1. Ulcerative Colitis (UC) of any severity or distribution is equally disqualifying, including proctitis, UC that is limited to the left side of the colon, as well as extensive or pancolonic disease.
2. Generally, it is unlikely for untrained personnel to be considered for waiver eligibility for aviation or operational duties. An ACS review/evaluation is not required prior to permanent disqualification.
3. For trained personnel, factors that are considered when assessing suitability for waiver include, but are not limited to, the severity of the disease at time of diagnosis, whether there is evidence of clinical and endoscopic remission, whether treatment and monitoring are appropriate in the context of nationally or internationally recognized guidelines, the individual service member's adherence to clinically indicated therapy, the individual's tolerance of treatment, the unique risks associated with the specific maintenance medication(s) utilized, and the cumulative risk of all associated complications and/or extra-intestinal disease manifestations.
4. Clinical and endoscopic remission should be demonstrated prior to waiver consideration. For aeromedical and operational purposes, endoscopic remission is assessed either after completion of definitive treatment or while on stable maintenance therapy. For waiver consideration, endoscopic remission verification should include both visual (i.e., colonoscopic inspection) and histologic (i.e., tissue biopsy) demonstration of mucosal healing without evidence of active inflammation.
5. Use of any medication not included on the career field-specific approved medication list is independently disqualifying and will be reviewed by on a case-by-case basis.
6. Waiver may be considered on a case-by-case basis after curative surgery. Factors considered include, but are not limited to, post-operative complications and functional outcomes. Presence of an ostomy is generally not felt to be compatible with sustained aviation or operational duties.
7. Certification authority for untrained assets is AFRS/CMO. Waiver authority for aeromedically unapproved medication use is AFMRA.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).

b. Specify presence or absence of ongoing symptoms (e.g., abdominal pain, diarrhea, stool frequency, hematochezia, melena, weight loss, frequency of exacerbations/pattern of recurrence, any known exacerbating factors, etc.).
c. Specify presence or absence of extra-intestinal manifestations (e.g., joint involvement, skin involvement, eye involvement, etc.).
d. Summary of diagnostic evaluation and treatment history, including list of any/all procedures with dates.
e. List current medications with dosages.

2. Consultation report from the treating gastroenterologist and all subsequent consultation notes. These notes must include the following:
    a. Summarization of presentation, evaluation, and treatment course (including any history of surgery).
    b. Discussion of current treatment, including dose, frequency, formulation, and all appropriate monitoring with schedule for follow-up (e.g., biologic agents require laboratory studies with a metabolic panel and CBC every 3-6 months and annual tuberculosis testing).
    c. Documentation of the presence or absence of extra-intestinal manifestations.
    d. Detailed plan of ongoing treatment and monitoring.
3. Laboratory studies required:
    a. Current CBC.
    b. Current CMP.
    c. Current erythrocyte sedimentation rate (ESR).
    d. Current C-reactive protein (CRP) level.
4. Results of any other testing performed in the course of diagnosis, evaluation, and management of ulcerative colitis, including laboratory studies, imaging, and any other ancillary studies.
    a. Include procedural reports and pathology results from any and all diagnostic or surveillance colonoscopies/endoscopies that were performed.
    b. Must include a repeat colonoscopy while clinically stable with visual and histologic demonstration of endoscopic remission.
5. Form FL4 with return to duty and ALC status.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms, objective findings, or interval flares.
    b. Specify presence or absence of extra-intestinal manifestations (e.g., joint involvement, skin involvement, eye involvement, etc.).
    c. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
2. All relevant interval consultation reports from the treating gastroenterologist.
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, interval

colonoscopy/endoscopy reports and biopsy results, and any other ancillary tests. The following must be included:

a. Current CBC.
b. Current CMP.
c. Current erythrocyte sedimentation rate (ESR).
d. Current C-reactive protein (CRP) level.

4. Form FL4 with return to duty and ALC status.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Ulcerative colitis (UC) is a chronic inflammatory disease that affects the large intestine in a contiguous pattern, usually beginning at the rectum. It generally follows a relapsing and remitting course. The contiguous distribution of UC is one of multiple features that distinguishes it from Crohn's disease, which may affect any portion of the gastrointestinal (GI) tract. Depending upon the degree of colonic involvement, UC may be subdivided into proctitis, left-sided disease, or extensive disease. Additionally, extra-intestinal manifestations of UC are common. Systems that are often affected include the eyes (e.g., uveitis, iritis), skin (e.g., erythema nodosum, pyoderma gangrenosum), and musculoskeletal structures (e.g., arthritis, ankylosing spondylitis).

The aeromedical and operational hazards associated with UC stem from the unpredictability of the disease, its symptoms, and the risks associated with its treatments, which may adversely affect duty performance, mission completion, and safety. Common symptoms of UC include abdominal pain, bloating, diarrhea, hematochezia, weight loss, and fatigue. Adequate treatment that results in complete clinical and endoscopic remission with full suppression of active inflammation (e.g., negative serum inflammatory markers) can effectively mitigate aeromedical and operational risk, provided that the potential consequences of maintenance therapy do not exceed acceptable waiver tolerances and there are no other complications of aeromedical or operational concern.

Several medications that are frequently used in the management of UC are associated with a rate of severe adverse effects or with a need for clinical and laboratory monitoring that may not be compatible with sustained aviation or operational duty. Among these medications are systemic glucocorticoids, azathioprine, and 6-mercaptopurine. With the exception of time-limited utilization of some oral budesonide formulations, active treatment with systemic glucocorticoids is not amenable to any form of waiver. Additionally, the previous use of systemic glucocorticoids for more than three consecutive weeks in any 12-month period is independently disqualifying and requires demonstration of an intact hypothalamic-pituitary-adrenal (HPA) axis prior to waiver consideration. Please refer to the Aerospace Medicine Waiver Guide for *Systemic Glucocorticoid (Steroid) Therapy.* Waiver for azathioprine and 6-mercaptopurine use may rarely be considered on a case-by-case basis for certain low-risk personnel (e.g., ATC and GBO duties). In other individuals, the aeromedical risks of severe myelosuppresion, pancreatitis, and hepatotoxicity must be examined closely for compatibility with continued aviation or operational duty. The likelihood of myelosuppression is greatest during the first year of treatment, and

testing for thiopurine methyltransferase (TPMT) enzyme activity may assist with identifying individuals at highest risk of severe myelosuppression.

It should be noted that service members who elect to under-treat their UC with the aim of avoiding non-approved medications will not be considered for an aviation or operational waiver. Though use of any medication not included on the career field-approved medication list is independently disqualifying, there are several effective medications that are approved for maintenance therapy of UC in aircrew, ATC, and GBO personnel. These medications include mesalamine, sulfasalazine, infliximab, and adalimumab. Under-treatment of UC leads to mild chronic active inflammation or frequent recurrent active inflammation and substantially increases the likelihood of both symptomatic acute flares and disease complications. At a minimum, symptoms such as fatigue, abdominal pain, and increased stool frequency would be expected to distract from the safe performance of aviation or operational duties. At worst, an acute flare of severe abdominal pain or diarrhea could be suddenly incapacitating. Furthermore, anemia due to a combination of chronic inflammation and/or occult blood loss may be of insidious onset and result in subtle performance decrements, including reduced exertional capacity and impaired ability to tolerate hypoxia.

In general, individuals pursuing a waiver are expected to demonstrate asymptomatic clinical stability, having four or fewer bowel movements daily, without active complications, with normal inflammatory markers, and without adverse effects of treatment that might significantly impact the performance of aviation or operational duties. Prior to requesting a waiver, demonstration of clinical and endoscopic remission is required, regardless of whether remission is maintained spontaneously or through the use of career field-approved medications. Once an individual is asymptomatic (i.e., in clinical remission), endoscopic remission must be confirmed. Although repeat endoscopy to assess for mucosal healing is not always performed in clinical practice, the risk of disease flare-up or long-term complication is increased in individuals who do not achieve endoscopic remission, despite absence of symptoms.

About 10 to 15% of individuals with UC require a partial or total colectomy. Often, these resections are curative, and maintenance therapy is no longer required. Provided that an individual is asymptomatic without surgical complication, ileostomy, or colostomy, an aeromedical waiver may be considered. Presence of a persistent ostomy is generally not felt to be compatible with continued aviation or operational duties.

Review of the AIMWTS database from Oct 2019 through Oct 2022 revealed 120 cases with a diagnosis of UC. The breakdown of the number of waivers and number of total cases are tabulated below. All of the 11 disqualifications were for reasons associated with the diagnosis of UC. Four of the 11 disqualifications were in untrained individuals. Three of the 7 remaining disqualifications were subsequently waived once disease control and demonstrated stability.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
K51.9	Ulcerative colitis, unspecified	0/3	62/66	25/27	12/12	3/5	7/7

IV. Suggested Readings

1. Bernstein CN, Eliakim A, Fedail S, et al.; Review Team. World Gastroenterology Organisation Global Guidelines Inflammatory Bowel Disease: Update August 2015. J Clin Gastroenterol 2016;50:803-818. Available at https://www.worldgastroenterology.org/UserFiles/file/guidelines/inflammatory-bowel-disease-english-2015.pdf. Accessed 18 October 2022.
2. Farraye FA, Melmed GY, Lichtenstein GR, Kane SV. ACG Clinical Guideline: Preventive Care in Inflammatory Bowel Disease. Am J Gastroenterol 2017;112:241-258. Erratum in: Am J Gastroenterol 2017;112:1208. Available at https://journals.lww.com/ajg/Fulltext/2017/02000/ACG_Clinical_Guideline__Preventive_Care_in.15.aspx. Accessed 18 October 2022.
3. Feuerstein JD, Isaacs KL, Schneider Y, et al.; AGA Institute Clinical Guidelines Committee. AGA Clinical Practice Guidelines on the Management of Moderate to Severe Ulcerative Colitis. Gastroenterology 2020;158:1450-1461. Available at https://www.gastrojournal.org/article/S0016-5085(20)30018-4/pdf. Accessed 18 October 2022.
4. Ko CW, Singh S, Feuerstein JD, et al.; American Gastroenterological Association Institute Clinical Guidelines Committee. AGA Clinical Practice Guidelines on the Management of Mild-to-Moderate Ulcerative Colitis. Gastroenterology 2019;156:748-764. Available at https://www.gastrojournal.org/action/showPdf?pii=S0016-5085(18)35407-6. Accessed 18 October 2022.
5. Rubin DT, Ananthakrishnan AN, Siegel CA, et al. ACG Clinical Guideline: Ulcerative Colitis in Adults. Am J Gastroenterol 2019;114:384-413. Available at http://s3.gi.org/physicians/guidelines/UlcerativeColitis.pdf. Accessed 18 October 2022.

Anemia, Blood Loss, and Bone Marrow Donation

Reviewed: Apr 2025
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Maj Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (Aerospace Medicine Branch Chief); Lt Col John R. Smith (AFMS Medical Standards Chief)

Significant Changes: Hemoglobin lower limits updated.

I. Waiver Consideration

Hemoglobin measurements that are consistently below the expected lower limit of normal are disqualifying for all flying class and SWA duties. For aeromedical purposes, the lower limit of normal hemoglobin is defined as specified in Table 2 which are consistent with values published in DoDI 6130.03. Regardless of hemoglobin or hematocrit measurements, anemia that meets any one of the following criteria is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention: results in symptoms; *or* is unresponsive to appropriate therapy; *or* requires hematology follow-up more than once annually. Anemia due to a nutritional deficiency that resolves after correction of the deficiency is not disqualifying (e.g., folate, vitamin B12). Note that iron deficiency anemia requires a diagnostic evaluation to determine the cause of the iron deficiency, even if iron levels and anemia are corrected with iron supplementation.

It is of paramount importance that any individual with a hemoglobin that is persistently below the expected lower limit of normal undergo a thorough diagnostic evaluation to determine the underlying cause of the anemia. This diagnostic evaluation is necessary regardless of the presence or absence of symptoms. An appropriate diagnostic evaluation may identify correctable causes of anemia. It is also essential to exclude causative etiologies that may be independently disqualifying for military duties or retention.

The specific clinical evaluation for anemia is individualized based upon the patient presentation. Laboratory testing, ancillary testing, and specialist consultation is guided by a thorough history and physical. Typically, every diagnostic evaluation for anemia will include a complete blood count (CBC) with red blood cell (RBC) indices, a peripheral smear, and a reticulocyte count. Based on the results of the CBC, additional testing may include iron studies (a minimum of total serum iron, total iron binding capacity, and ferritin), measurement of vitamin B12 and folate, hemoglobin electrophoresis, and potentially bone marrow biopsy.

Donation of blood products (500 mL or more) is temporarily disqualifying for all flying class, ATC, GBO, OSF, and SWA personnel. A waiver is not required, but a DNIF/DNIC/DNIA period is necessary after completion of blood product donation. The length of the DNIF/DNIC/DNIA period varies based upon career field. Aviators (FC I/IA, II, III, OSF) require a 72-hour DNIF; RPA pilots, ATC personnel, and SWA personnel require an 8-hour DNIF/DNIC; RPA sensor operators and MOD personnel require a 4-hour DNIF/DNIA.

Table 1: Waiver potential for low hemoglobin after exclusion of a disqualifying cause[1,2]

Flying Class	Condition	Waiver Potential[3] Waiver Authority[4]	ACS Review or Evaluation
FC I/IA	Hemoglobin below aeromedical lower limit threshold, without another underlying disqualifying condition	Yes[5] AFRS/CMO	No[6]
FC II/III/SWA	Hemoglobin below aeromedical lower limit threshold, without another underlying disqualifying condition	Yes[5] MAJCOM	No[6]
ATC/GBO/OSF	Hemoglobin below aeromedical lower limit threshold, without another underlying disqualifying condition	N/A[7]	N/A[7]

1. Refer to Table 2 for lower limit of aeromedical thresholds.
2. All individuals must undergo an appropriate clinical evaluation to elucidate the causative etiology of the anemia. If this evaluation does not identify a diagnosis that is independently disqualifying IAW the most recent version of the MSD, then utilize this table to assess waiver potential. If a disqualifying condition is identified as the underlying cause of the low hemoglobin, refer to the relevant aeromedical standards to assess waiver potential.
3. In the absence of any pathophysiology with the potential to progress or worsen, an indefinite waiver is likely once historical stability of hemoglobin levels is demonstrated.
4. Certification authority for untrained assets is AFRS/CMO.
5. Must be asymptomatic with demonstrated historical stability and without need for hematology follow-up.
6. ACS review may be requested at the discretion of the waiver authority.
7. If the anemia is disqualifying for retention IAW the most recent version of the MSD, then it is also disqualifying for all duties requiring enhanced medical standards (including ATC and GBO), and a waiver is required.

Table 2: Lower limit of normal (LLN) hemoglobin (g/dL), aeromedical standard.

Male LLN	Female LLN
13.5	12.0

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Specify presence or absence of symptoms at initial presentation and throughout evaluation/treatment course.
    c. Summary of diagnostic evaluation, including list of any/all treatments with dates.
    d. Specify presence or absence of any ongoing symptoms.
    e. List all co-morbid conditions.
    f. List current medications with dosages.
2. Laboratory studies required:
    a. Current CBC with RBC indices
    b. Peripheral smear
    c. Reticulocyte count
3. Consultation report from any specialty provider and all subsequent consultation notes (if any). Need for Hematology, Urology, and/or GI consultations are based on clinical indications and are not a universal aeromedical requirement.
4. Results of all other testing performed during diagnosis, evaluation, and management of anemia, including laboratory studies (e.g., iron panel with ferritin, B12/folate, hemoglobin electrophoresis, TSH/T3, urinalysis, alpha thalassemia testing, etc.), imaging, and any other ancillary studies.
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination.
    b. Complete list of current medications with dates of initiation, doses, and all adverse effects.
    c. Documentation of medication adherence, if applicable.
    d. Report of any new subjective symptoms.
2. All relevant interval consultation reports from specialty providers (if any).
3. Results of all interval testing performed in the course of ongoing anemia evaluation and management, including laboratory studies, imaging, and any other ancillary tests.
4. Current CBC with RBC indices.
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Irrespective of the underlying cause, both anemia (defined by low hemoglobin level, as specified in Table 2) and loss of blood volume can lead to reduced tissue oxygenation and end-organ dysfunction. The resulting signs and symptoms include fatigue, generalized weakness, decreased

stamina, lightheadedness, chest pain, and decreased Gz tolerance. In the setting of concomitant hypoxia, there is not only decreased oxygen carrying capacity in the blood but also decreased oxygen available for perfusion. As a result, tissue oxygenation is further compromised. During physical exertion, tissue demands for oxygen are increased. The deficiency of the blood's oxygen carrying capacity may cause a more profound relative impairment in tissue oxygenation. The added physiologic stressors of hypoxia and/or exertion may overwhelm the ability of the body to compensate for anemia, leading to more profound symptomatology and more severe end-organ damage.

When the onset of anemia is gradual, individuals may remain asymptomatic under normal physiologic conditions (i.e., in the absence of hypoxia, altitude-exposure, dehydration, physical exertion, etc.) until hemoglobin levels approach 5-6 g/dL. Anemia of more rapid onset typically results in the manifestation of symptoms at higher hemoglobin concentrations, especially when the loss of hemoglobin or RBC mass is accompanied by an acute loss of intravascular volume. Although individuals under normal physiologic conditions may tolerate an acute loss of up to 20% of intravascular volume without cardiovascular compromise, the multitude of potential physiologic stressors inherent in the aviation or operational environment merit a cautious approach to blood loss. To ensure that a service member will not develop signs or symptoms of anemia while performing essential duties, any acute blood loss of more than 500 mL is an indication for a temporary DNIF/DNIC/DNIA period. For aeromedical purposes, blood loss of 500 mL or more includes donation of whole blood, plasma, or platelets. See the "Waiver Considerations" section for the duration of the DNIF/DNIC/DNIA period specific to particular career fields or refer to the MSD. Provided the service member feels well at the conclusion of the DNIF/DNIC/DNIA period, re-evaluation in the flight medicine clinic is not necessary prior to resuming normal aviation or operational duties.

Bone marrow donation or donation of peripheral blood progenitor cells (PBPCs) is a more involved process than blood product donation. Both traditional bone marrow harvesting and peripheral collection of progenitor cells requires DNIF/DNIC/DNIA for all flying class, ATC, GBO, OSF, and SWA duties until all the following criteria are met:

A. The surgical site is well-healed (if applicable), **and**,
B. Any distracting pain is resolved, **and**,
C. Hemoglobin is stable above 10 g/dL.

A waiver is not required following bone marrow or progenitor cell donation. However, a drop in hemoglobin of several grams (approximately 3 g/dL) is expected immediately following traditional bone marrow donation. It may take several months for the hemoglobin to recover to the pre-donation concentration. Oral iron supplementation is often prescribed to facilitate recovery. After an appropriate ground trial to demonstrate medication tolerance, the use of oral iron is compatible with continued flying and operational duties. If parenteral iron replacement is necessary, it should occur during the DNIF/DNIC/DNIA period.

Peripheral collection of blood progenitor cells necessitates mobilization of progenitor cells through the administration of a granulocyte colony-stimulating factor (G-CSF). Usually, the G-CSF is begun several days prior to the planned collection. Use of G-CSF requires

DNIF/DNIC/DNIA. Individuals who donate PBPCs are at lower risk of developing anemia compared to traditional bone marrow donation. However, service members must be evaluated for potential side effects of the G-CSF prior to return to aviation/operational duties. Aeromedical concerns include the potential for distracting musculoskeletal pain that could interfere with aircrew or operational duties. The majority of PBPC donors experience generalized musculoskeletal pain of mild or moderate intensity within 24 hours of G-CSF administration. This pain usually peaks around the fifth day and resolves within one week.

Review of the AIMWTS database from Aug 2021 through Aug 2024 revealed 87 waiver packages with a diagnosis of anemia that required an aeromedical waiver. The breakdown of the number of approved waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
D50.9	Iron Deficiency Anemia, unspecified	5/7	16/21	21/23	5/5	3/4	1/1
D50.8	Other deficiency anemias	0/0	0/0	0/0	0/0	0/0	0/0
D58.9	Hereditary hemolytic anemia, unspecified	6/6	1/1	11/11	1/1	0/0	3/3
D59.9	Acquired hemolytic anemia, unspecified	0/0	0/0	0/0	0/0	0/0	0/0
D61.89	Other specified aplastic anemias & other bone marrow failure syndromes	1/1	0/0	0/0	0/0	0/0	0/0
D64.9	Anemia, unspecified	0/0	0/0	1/1	1/1	0/0	1/1

IV. Suggested Readings

1. Janz TG, Johnson RL, Rubenstein SD, et al. Anemia in the emergency department: evaluation and treatment. Emerg Med Pract 2013;15:1-15. Available at https://scghed.com/wp-content/uploads/2017/07/Anaemia.pdf. Accessed 11 September 2024.
2. Ko CW, Siddique SM, Patel A, et al. AGA Clinical practice guidelines on the gastrointestinal evaluation of iron deficiency anemia. Gastroenterology 2020;159:1085-1094. Available at https://www.gastrojournal.org/action/showPdf?pii=S0016-5085(20)34847-2. Accessed 11 September 2024.
3. Short MW, Domagalski JE. Iron deficiency anemia: evaluation and management. Am Fam Physician 2013;87:98-104. Available at https://www.aafp.org/pubs/afp/issues/2013/0115/p98.html. Accessed 11 September 2024.

Congenital and Acquired Asplenia

Reviewed: Sep 2024
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Maj Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (Aerospace Medicine Branch Chief)

Significant Changes: Updated to reflect the most recent MSD.

I. Waiver Consideration

Asplenia for any reason, whether post-operative following a splenectomy or due to functional or congenital asplenia, is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Similarly, any congenital abnormality or disease of the spleen is also disqualifying for all flying class and SWA duties. Please note that chronic, inoperable splenomegaly is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention; and transient splenomegaly is disqualifying for all flying class and SWA duties until the cause is corrected. The causes of splenomegaly are beyond the scope of this waiver guide chapter, and splenomegaly will not be addressed here.

Acquired or congenital asplenia or splenic dysfunction may be considered for waiver in both trained and untrained individuals when there are no other medical concerns that would preclude safe performance of duties and when continued service in the career field is thought to not pose an excessive health risk to the service member.

There are many indications for splenectomy; and various diseases may result in splenomegaly, splenic dysfunction, splenic infarction, and functional asplenia. These conditions may be independently disqualifying and include, but are not limited to, autoimmune cytopenias, infiltrative disorders (e.g., sarcoidosis, leukemia, lymphoma, or amyloidosis), sickle cell disease and other disorders of hemoglobin synthesis, splenic abscess, and splenic venous thromboembolism (VTE). Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for all potentially disqualifying conditions.

Requiring an initial waiver for splenectomy/asplenia, followed by regular waiver renewal intervals, provides opportunities to review and update the asplenic individual's immunizations and to confirm access to an un-expired emergency antibiotic for use at the earliest symptom of systemic infection. Periodic waiver reviews also allow for re-education of both flight medicine clinic personnel and the asplenic service member regarding proper medical precautions in asplenia, which not only mitigate the health risk to the affected individual but also ensure optimal aeromedical and operational risk reduction.

Table 1: Waiver potential for Congenital and Acquired Asplenia

Flying Class	Condition	Waiver Potential[1] Waiver Authority	ACS Review or Evaluation
FC I/IA	History of congenital or acquired asplenia / splenectomy for any cause	Yes[2,3] AFRS/CMO	No[4]
FC II/III/ ATC/GBO/ OSF/SWA	History of congenital or acquired asplenia / splenectomy for any cause	Yes[2,3] MAJCOM	No[4]

1. Waiver potential is dependent upon underlying causative etiology of the splenic dysfunction or asplenia. Waivers are considered on a case-by-case basis. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for all potentially disqualifying conditions.
2. No indefinite waivers.
3. Certification authority for untrained assets is AFRS/CMO.
4. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Specify any history of thrombosis, including deep vein thrombosis, mesenteric thrombosis, or proximal venous thrombosis.
    c. Summary of diagnostic evaluation, including list of any/all procedures with dates.
    d. Summary of all treatments/interventions. In case of splenectomy, specify age of splenectomy, and describe post-operative course.
    e. List current medications with dosages. Must include an active prescription for an emergency antibiotic to be taken at first symptom of possible systemic infection.
    f. Document that service member has access to emergency antibiotic, is educated regarding early signs and symptoms of severe systemic infection, and is aware of procedure to follow in that event (e.g., take antibiotic immediately **and** then present immediately to nearest emergency medical care).
2. Consultation report from all treating specialists (e.g., hematologist, surgeon, infectious diseases specialist, and/or immunologist) and all subsequent consultation notes. These notes must include the following:
    a. Discussion of current status and stability, including any ongoing treatments and monitoring, as applicable.
    b. Recommendations for ongoing specialist follow-up, if any.
3. Laboratory studies required:
    a. Current CBC with differential
    b. All past CBC results with dates

4. Vaccination record, which must include the below listed immunizations (provide dates of administration and vaccine lot number). Please note that immunization recommendations are updated by advisory bodies such as the CDC Advisory Committee on Immunization Practices (ACIP) as new vaccines are developed and new evidence emerges. Please consult the most recent ACIP guidance for asplenic individuals. The below requirements are based on the 2022 ACIP recommendations.
    a. Appropriate pneumococcal vaccination
        i. Either 20-valent pneumococcal conjugate vaccine (PCV-20) alone,
        ii. Or 15-valent pneumococcal conjugate vaccine (PCV-15), followed by 23-valent pneumococcal polysaccharide vaccine (PPSV23)
        iii. Consider PPSV23 revaccination every 5-10 years
    b. H. influenzae type B vaccine (Hib), given once
    c. Quadrivalent meningococcal conjugate ACWY vaccine series (MenACWY), followed by revaccination every 5 years
    d. Monovalent meningococcal serogroup B vaccine series (MenB-4C or MenB-FHbp), followed by revaccination every 2-3 years
    e. Seasonal influenza vaccine, updated annually
5. If applicable, results of all testing performed during diagnosis, evaluation, and management of asplenia, including other laboratory studies, all imaging reports, biopsies/pathology results (if performed), and any other ancillary studies.
6. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Specify any interval complications, such as thrombosis (e.g., deep vein thrombosis, mesenteric thrombosis, or proximal venous thrombosis).
    c. Complete list of current medications with dates of initiation, dosages, and all adverse effects. Must include an active prescription for an emergency antibiotic to be taken at first symptom of possible systemic infection.
    d. Document that service member has access to emergency antibiotic, is educated regarding early signs and symptoms of severe systemic infection, and is aware of procedure to follow in that event (e.g., take antibiotic immediately **and** then present immediately to nearest emergency medical care).
2. All relevant interval consultation reports from specialty providers (e.g., hematologist, surgeon, infectious diseases specialist, and/or immunologist).
3. Laboratory studies required:
    a. Current CBC with differential
    b. All past CBC results with dates
4. Vaccination record, which must include the below listed immunizations (provide dates of administration and vaccine lot number). Please note that immunization recommendations are updated by advisory bodies such as the CDC Advisory Committee on Immunization Practices (ACIP) as new vaccines are developed and new evidence emerges. Please

consult the most recent ACIP guidance for asplenic individuals. The below requirements are based on the 2022 ACIP recommendations.

a. Appropriate pneumococcal vaccination
    i. Either 20-valent pneumococcal conjugate vaccine (PCV-20) alone,
    ii. Or 15-valent pneumococcal conjugate vaccine (PCV-15), followed by 23-valent pneumococcal polysaccharide vaccine (PPSV23)
    iii. Consider PPSV23 revaccination every 5-10 years
b. H. influenzae type B vaccine (Hib), given once
c. Quadrivalent meningococcal conjugate ACWY vaccine series (MenACWY), followed by revaccination every 5 years
d. Monovalent meningococcal serogroup B vaccine series (MenB-4C or MenB-FHbp), followed by revaccination every 2-3 years
e. Seasonal influenza vaccine, updated annually

5. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging reports, and any other ancillary tests.
6. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

The spleen is the largest lymphoid organ in the body. Among its many functions, it filters circulating red blood cells (RBCs), removing abnormal RBCs from the circulation to prevent intravascular hemolysis. It also filters and removes freely circulating hemoglobin and iron, serves as a reservoir for platelets, and acts as a giant lymph node, producing antigen-specific immunoglobulin M antibodies that are crucial to the body's early immune response to an infection.

Many distinct etiologies may result in congenital or acquired absence of the spleen or impairment in splenic function (hyposplenism). Likewise, various pathologic processes may result in splenomegaly, splenic dysfunction, splenic infarction, and functional asplenia. These conditions may be independently disqualifying and include, but are not limited to, autoimmune cytopenias, infiltrative disorders (e.g., sarcoidosis, leukemia, lymphoma, or amyloidosis), sickle cell disease and other disorders of hemoglobin synthesis, splenic abscess, and splenic venous thromboembolism (VTE). All individuals with a history of splenectomy, asplenia, or hyposplenism are at risk for myriad serious health consequences, especially thrombotic and immunologic complications, which are addressed below.

Asplenic and hyposplenic individuals are particularly susceptible to severe infection with encapsulated bacteria (e.g., *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Neisseria meningitidis*, *Capnocytophaga spp.*, and *Bordetella spp.*) and parasitic organisms (e.g., *Babesia spp.*, *Plasmodium falciparum*). These infections are more likely to progress rapidly in the absence of intact splenic function, and these individuals are more likely to die from these infections. Severe symptoms of infection may be of such acuity and swift progression that they cause incapacitation within hours of onset, jeopardizing service member health and mission

safety. In addition to standard malaria prophylaxis and mosquito/tick avoidance, appropriate vaccinations against *S. pneumoniae* (pneumococcus), *H. influenzae type B, N. meningitidis* (meningococcus), and seasonal influenza, including re-vaccination at recommended intervals, is essential to reducing infection risk, thereby optimizing aeromedical and operational risk. Other interventions to mitigate risk include education and periodic re-education of the asplenic or hyposplenic individual on self-monitoring for signs and symptoms of early infection. Individuals who undergo surgical splenectomy are often treated with a prophylactic antibiotic for their first post-operative year. Additionally, it is critical that all asplenic and hyposplenic individuals have access to an un-expired emergency antibiotic (typically amoxicillin-clavulanate), know to initiate emergency antibiotic therapy immediately at earliest onset of a possible systemic infection (e.g, fever, chills, rigors, vomiting, or diarrhea), and comprehend the importance of seeking immediate emergency medical care in this event. For individuals who cannot use beta-lactams due to allergy, azithromycin or an extended-spectrum fluoroquinolone such as levofloxacin can be utilized. It is the responsibility of the local flight surgeon's office to ensure that all individuals prescribed emergency antibiotic therapy are keeping their medication on hand while performing operational duties.

The risk of vascular complications in the setting of asplenia or hyposplenia is more difficult to describe, not only because it is less well-defined but also because there are no clear recommendations for anti-platelet or anticoagulation prophylaxis in this population. The rate of thromboembolism varies depending on the underlying disease state (e.g., sickle cell disease vs. post-traumatic splenectomy), and risk of recurrence is higher after an initial event. For those who undergo a surgical splenectomy, the incidence of VTE is greatest in the early postoperative period. The absolute risk of VTE ranges from 3-7%. Malignancy, myeloproliferative neoplasms, and increased platelet counts postoperatively appear to be associated with greater risk. From an operational perspective, any venous or arterial thromboembolic event could result in sudden incapacitation or sudden death. Please cross-reference the Air Force Waiver Guide Chapter *Venous Thromboembolism.*

Splenectomy is associated with pulmonary hypertension. The overall incidence of pulmonary hypertension in individuals following splenectomy is unknown but is likely low.
Although the evidence for a causal relationship between splenectomy and pulmonary hypertension is lacking, given the risks associated with this condition, it is important for the local flight surgeon to remain cognizant of the association and attentive to any signs or symptoms that might suggest an underlying cardiopulmonary condition in an asplenic or hyposplenic individual. Symptoms of pulmonary hypertension are non-specific and may include fatigue, weakness, exertional dyspnea, angina, or syncope. When present, symptoms of pulmonary hypertension are caused by impaired oxygen transport and reduced cardiac output. Unfortunately, individuals are unlikely to manifest symptoms until there is already extensive damage to the pulmonary vasculature. As such, pulmonary hypertension is generally not compatible with continued aviation duties. Therefore, a high level of clinical suspicion on the part of the flight surgeon is of critical importance in early detection of possible pulmonary hypertension, with referral for further evaluation if this condition is suspected.

Review of the AIMWTS database from Aug 2021 through Aug 2024 revealed 18 waiver packages with a diagnosis of asplenia that required an aeromedical waiver. The breakdown of the number of approved waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
Z90.81	Acquired absence of spleen	0/0	9/11	5/5	0/1	0/0	0/0
D73.0	Hyposplenism	0/0	0/0	0/0	0/0	0/0	0/0
Q89.01	Asplenia (congenital)	0/0	1/1	0/0	0/0	0/0	0/0

IV. Suggested Readings

1. Bridgen ML. Detection, education and management of the asplenic or hyposplenic patient. Am Fam Physician 2001;63:499-508. Available at https://www.aafp.org/pubs/afp/issues/2001/0201/p499.html. Accessed 11 September 2024.
2. Centers for Disease Control and Prevention. Immunization Schedules. Table 2: Recommended Adult Immunization Schedule by Medical Condition and Other Indications, United States, 2024. Available at https://www.cdc.gov/vaccines/hcp/imz-schedules/adult-medical-condition.html?CDC_AAref_Val=https://www.cdc.gov/vaccines/schedules/hcp/imz/adult-conditions.html#table-conditions. Accessed 11 September 2024.
3. Davies JM, Lewis MPN, Wimperis J, et al. Review of guidelines for the prevention and treatment of infection in patients with an absent or dysfunctional spleen: Prepared on behalf of the British Committee for Standards in Haematology by a Working Party of the Haemato-Oncology Task Force. Br J Haematol 2011;155:308-317. Available at https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1365-2141.2011.08843.x. Accessed 11 September 2024.

Sickle Cell Disease/Trait and Heterozygous Sickling Disorders

Revised: February 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Maj Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: None.

I. Waiver Consideration

Homozygous sickle cell disease (Hb SS), a history of symptomatic sickle cell trait (Hb AS), or heterozygosity with another mutant beta globin allele such as sickle-β thalassemia (Hb S-β° thal), sickle cell-hemoglobin C disease (Hb SC), and sickle-β+ thalassemia (Hb S-β+ thal) are disqualifying for all flying class, ATC, GBO, OSF, SWA duties as well as retention. All initial flying class physical examinations require documented sickle cell screening and if positive, further characterization with hemoglobin electrophoresis. Asymptomatic Hb AS confirmed on hemoglobin electrophoresis is not disqualifying for any flying class, ATC, GBO, OSF, SWA duties or retention. However, EITHER the absence of symptoms commonly associated with a sickling disorder OR presence of symptoms attributable to intravascular sickling MUST be annotated on the initial flight or special operations physical exam prior to certification by the proper authority. Hb SS, Hb SC, Hb S-β° thal, Hb S-β+ thal, and a history of symptomatic Hb AS are not thought to have aeromedical waiver potential in the manned aviation environment. Aeromedical waiver for ATC and GBO personnel with a history of symptomatic Hb AS may be considered on a case-by-case basis following an accession or retention determination.

Table 1: Waiver potential for Hb SS, Hb SC, Hb S-β° thal, Hb S-β+ thal, and symptomatic Hb AS

Flying Class (FC)	Condition	Waiver Potential Waiver Authority[1]	ACS Review or Evaluation
FC I/IA	Hb SS, Hb SC, Hb S-β° thal, Hb S-β+ thal, and symptomatic Hb AS	No AFRS/CMO	No
	Asymptomatic Hb AS	N/A[2]	N/A
FC II/III/OSF/SWA	Hb SS, Hb SC, Hb S-β° thal, Hb S-β+ thal, and symptomatic Hb AS	No MAJCOM	No
	Asymptomatic Hb AS	N/A[2]	N/A
ATC/GBO	Hb SS, Hb SC, Hb S-β° thal, Hb S-β+ thal, and symptomatic Hb AS	No[3] MAJCOM	No[4]
	Asymptomatic Hb AS	N/A[2]	N/A

1. Certification authority for untrained assets is AFRS/CMO.
2. Asymptomatic sickle cell trait (Hb AS) is not disqualifying. However, either the absence of symptoms associated with a sickling disorder or presence of symptoms attributable to intravascular sickling MUST be annotated on the initial flight or special operations physical exam prior to certification by the proper authority. See below for additional information required for initial physical certification.
3. Aeromedical waiver for both trained and untrained ATC and GBO personnel with a history of symptomatic Hb AS may be considered on a case-by-case basis following an accession or retention determination.
4. ACS review may be requested at the discretion of the waiver authority when waiver consideration is being given to ATC or GBO personnel with a history of symptomatic Hb AS.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations. **The following evaluation is required for <u>ALL</u> service members with sickle cell trait (Hb AS) prior to initial certification of flying class and special operations physical exams via PEPP. <u>ONLY</u> those individuals found to have Hb SS, Hb SC, Hb S-β° thal, Hb S-β+ thal, and <u>symptomatic</u> Hb AS require AMS submission.**

A. <u>Initial Waiver Request:</u>

1. Information to include in history:
    a. Complete history of symptoms with report of any symptomatic vaso-occlusive episodes, episodes of abdominal pain, hematuria, or renal dysfunction, and any history of rhabdomyolysis, splenic infarct, and/or sudden death with prolonged physical activity (e.g., military boot camp, training for athletic competition)
    b. Complete list of all therapies, current medications with dates of initiation, doses, and all adverse effects
2. Consultation reports from all treating providers or specialists during symptomatic episodes:
    a. Consultation report from a hematologist should be included if the diagnosis is uncertain
3. Laboratory studies required:
    a. CBC, BMP, urinalysis, and hemoglobin electrophoresis
    b. All other laboratory and imaging studies ordered by consulting specialist(s), if performed
4. Current physical examination findings.
5. Any other pertinent information.
6. Form FL4 with return to duty and ALC status, if applicable.
7. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

B. <u>Renewal Waiver Request:</u>

1. Updated AMS with interval history, including:
    a. Subjective symptoms with specific comment on any interval symptomatic vaso-occlusive episodes.
    b. Complete list of all therapies, current medications with dates of initiation, doses, and all adverse effects
2. All clinical notes and consultation reports from treating providers or specialists during symptomatic episodes (if applicable)
3. Laboratory studies required:
    a. Updated CBC, BMP, and urinalysis
    b. All other laboratory and imaging studies ordered by treating providers or consulting specialist(s) related to the diagnosis of hemoglobinopathy, if performed
4. Current physical examination findings.

5. Any other pertinent information.
6. Form FL4 with return to duty and ALC status, if applicable.
7. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

III. Aeromedical Concerns

Homozygous sickle cell disease (Hb SS), sickle cell trait (Hb AS), and heterozygosity with another mutant beta globin such as sickle-β thalassemia (Hb S-β° thal), sickle cell-hemoglobin C disease (Hb SC), and sickle-β+ thalassemia (Hb S-β+ thal) are conditions that present aeromedical safety concerns in aviation and austere environments. Hb AS is the only condition that is thought to possess aeromedical waiver potential. With rare exception, Hb AS is not associated with increased risk of intravascular sickling and is not predicted to pose significant aeromedical risk. However, it is still imperative for the flight surgeon to educate aircrew and special duty operators about this condition and specifically emphasize the importance of hydration before rigorous activities.

Until 1982, individuals with Hb AS were restricted from entering military flight training or performing aircrew duties, and they were barred from attendance at the US Air Force Academy due to the rare occurrences of intravascular sickling under conditions of physiologic stress. Specifically, case reports have demonstrated an association of increased rates of intravascular sickling in individuals with Hb AS when placed in settings of dehydration, hypoxia, and/or strenuous exercise. In 1985, the Secretary of Defense ordered that "all military occupational restrictions on sickle cell trait be removed." This decision was considered appropriate, because the majority of individuals with Hb AS remain asymptomatic. In contrast to Hb SS and other heterozygous sickling disorders, Hb AS is a relatively benign condition with a better clinical course and more favorable prognosis. The lower percentage of abnormal hemoglobin molecules in Hb AS relative to other hemoglobinopathies result in less association with anemia, a less pronounced decrease in red blood cell survival, and normal or near-normal life expectancy. In contrast, Hb SS and other heterozygous sickling disorders are associated with a worse prognosis and commonly results in more significant anemia, a more pronounced shortening of red blood cell survival, and reduced life expectancy compared to a healthy control population.

In general, current Air Force guidance allows individuals with Hb S to access. When the percentage of Hb S exceeds 45%, it is typically indicative of an underlying Hb SS and/or other heterozygous sickling disorder. These individuals may be barred from accession to the military because the risk of adverse clinical outcomes is thought to exceed the threshold for military service. The following table summarizes the patterns of electrophoresis in the most common hemoglobinopathies:

Table 2: Adult hemoglobinopathy patterns[1]

Condition	Hb A (%)	Hb S (%)	Hb C (%)	Hb F (%)	Hb A2 (%)
Normal (Hb AA)	95-98	0	0	<2	2-3
Sickle cell trait (Hb AS)	50-60	35-45[2]	0	<2	<3.5
Sickle-β+ thalassemia (Hb S-β+ thal)	5-30	65-90	0	2-10	>3.5
Sickle-β thalassemia (Hb S-β° thal)	0	80-92	0	2-15	>3.5
Sickle-hemoglobin C disease (Hb SC)	0	45-50	45-50	1-5	<3.5
Homozygous sickle cell disease (Hb SS)	0	85-95	0	5-15	<3.5

1. Numbers indicate the percent of total hemoglobin in an untransfused adult patient. Ranges are approximate and may vary depending upon the particular laboratory and assay.
2. Percent Hb S can be as significantly lower in patients with sickle cell trait and concomitant alpha thalassemia.

Review of the AIMWTS database from Jan 2019 through Feb 2022 revealed just 4 individuals (3 untrained & 1 trained) submitted for waiver with a disqualifying diagnosis of symptomatic sickle cell disease/trait. A breakdown of the cases was as follows: 3 FC I/IA cases (3 disqualified), 0 FC II cases, 1 FC III case (0 disqualified), 0 ATC cases, 0 GBO cases, and 0 SWA cases. The 3 untrained individuals who were disqualified from FC I/IA, III, and SWA duties did receive a GBO waiver. The one trained FC III individual who was returned to manned aviation following a symptomatic event had a variety of unique situational contributors that made a sickling recurrence in the aviation environment unlikely.

Please use *only* this ICD-10 code for AIMWTS coding purposes	
D57.0	Sickle cell disease with crisis
D57.1	Sickle cell disease without crisis
D57.2	Sickle cell/Hb-C disease
D57.3	Sickle cell trait
D57.4	Sickle cell thalassemia
D57.8	Other sickle cell disorders

IV. Suggested Readings

1. Centers for Disease Control (CDC) Sickle Cell "Toolkit" and Informational Pages. Available at http://www.cdc.gov/ncbddd/sicklecell/toolkit.html and http://www.cdc.gov/ncbddd/sicklecell/traits.html. Accessed 7 February 2022.
2. National Athletic Trainers' Association Consensus Statement on Sickle Cell Trait and the Athlete. Available at https://www.nata.org/sites/default/files/SickleCellTraitAndTheAthlete.pdf. Accessed 7 February 2022.

Aerospace Medicine Waiver Guide

Thalassemia and Other Disorders of Hemoglobin Synthesis

Reviewed: Sep 2024
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Maj Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (Aerospace Medicine Branch Chief)

Significant Changes: None.

I. Waiver Consideration

Any disorder of hemoglobin synthesis is disqualifying for all flying class and SWA duties. These disqualifying hemoglobin synthesis disorders include the thalassemia syndromes. However, silent thalassemia carrier states (minima), asymptomatic α-thalassemia trait (minor), and asymptomatic β-thalassemia trait (minor) are *not* disqualifying *if* all other aeromedical standards are met. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for all potentially disqualifying conditions.

Sickle cell disease, symptomatic sickle cell trait, heterozygous sickle cell trait combined with another variant hemoglobin (including any form of β-thalassemia), or any other red blood cell (RBC) sickling syndrome are disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. When a silent thalassemia carrier state, asymptomatic α-thalassemia trait, or asymptomatic β-thalassemia trait co-exists with another variant hemoglobin, then this combination is disqualifying for all flying class and SWA duties. Sickle cell disease, symptomatic sickle trait, and other RBC sickling syndromes including heterozygous sickle cell trait with β-thalassemia are addressed in the Waiver Guide chapter *Sickle Cell Disease/Trait & Heterozygous Sickling Disorders*.

Anemia is independently disqualifying for all flying class and SWA duties when the hemoglobin concentration remains consistently below the aeromedical standard. Please refer to the Waiver Guide chapter on *Anemia* for further information

Splenomegaly may complicate some thalassemia syndromes or hemoglobinopathies. The finding of splenomegaly is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Severe or refractory hemoglobinopathies (including thalassemia syndromes) may be treated with splenectomy, which is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Please refer to the Waiver Guide chapter on *Splenectomy* for more information.

Waiver may be considered on a case-by-case basis for individuals with a thalassemia syndrome other than silent carrier states, asymptomatic α-thalassemia trait, and asymptomatic β-thalassemia trait. Waiver may also be considered on a case-by-case basis for individuals with other disorders of hemoglobin synthesis. In general, waivers are not recommended for individuals with disorders of hemoglobin synthesis that result in anemia of aeromedical or operational significance or who are at risk for decompensation during periods of increased physiologic stress.

Table 1: Waiver potential for thalassemia syndromes

Flying Class	Condition[1]	Waiver Potential Waiver Authority[2]	ACS Review or Evaluation
FC I/IA	α-thalassemia or β-thalassemia trait	N/A[3]	N/A
	Hemoglobin H disease	No AFRS/CMO	No
	β-thalassemia intermedia and β-thalassemia major	No AFRS/CMO	No
FC II/III/SWA	α-thalassemia or β-thalassemia trait	N/A[3]	N/A
	Hemoglobin H disease	No MAJCOM	No
	β-thalassemia intermedia or β-thalassemia and major	No MAJCOM	No
ATC/GBO/OSF[4]	N/A	N/A	N/A

1. Thousands of unique genetic mutations that result in abnormal hemoglobin synthesis have been described. Conditions other than silent thalassemia carrier states, asymptomatic α-thalassemia trait, and asymptomatic β-thalassemia trait will be considered for waiver on a case-by-case basis. In general, waivers are not recommended for disorders of hemoglobin synthesis (including the thalassemia syndromes) that result in anemia of aeromedical or operational significance or with the potential for decompensation during periods of increased physiologic stress.
2. Certification authority for untrained assets is AFRS/CMO.
3. Isolated, asymptomatic α-thalassemia and β-thalassemia trait (minor) are not disqualifying if the severity of the resultant anemia meets the aeromedical standard for acceptable lower limit of hemoglobin concentration. Please refer to the Aerospace Medicine Waiver Guide chapter on *Anemia* for further information.
4. Thalassemia is not specifically disqualifying for ATC, GBO, or OSF duties. However, any associated anemia may be independently disqualifying if the individual is symptomatic, the anemia is unresponsive to appropriate therapies, or follow-up with a hematologist is required more frequently than annually.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Specify presence or absence of symptoms at initial presentation and throughout evaluation/treatment course.

    c. Summary of diagnostic evaluation, including list of any/all treatments with dates.
    d. Specify ethnicity, place of ancestral origin, and any family history of anemia, hemoglobinopathy, thalassemia, or other blood disorders.
    e. Indicate presence or absence of a palpable spleen on physical examination.
    f. Specify presence or absence of any ongoing symptoms.
    g. List current medications with dosages.
2. Consultation report from any specialty provider and all subsequent consultation notes.
3. Laboratory studies required:
    a. Current CBC with RBC indices
    b. Peripheral smear
    c. Iron studies (total serum iron, total iron binding capacity, and iron saturation)
    d. Ferritin
    e. Hemoglobin electrophoresis
    f. Reticulocyte count
4. Results of any other testing performed during diagnosis, evaluation, and management of thalassemia/hemoglobinopathy, including laboratory studies, imaging, and any other ancillary studies. If the spleen is palpated on physical exam, an abdominal ultrasound is required (radiology report is sufficient).
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
2. All relevant interval consultation reports from specialty providers.
3. Results of all interval testing performed in the course of ongoing thalassemia/hemoglobinopathy evaluation and management, including laboratory studies, imaging, and any other ancillary tests.
4. Current CBC with RBC indices.
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Of the thousands of different hemoglobin abnormalities that are known, the most common hemoglobin disorders are the thalassemia syndromes and sickle cell disease. The term *thalassemia* refers to a spectrum of diseases that are associated with reduced or absent synthesis of either the α-globin or β-globin chain of the hemoglobin molecule. More common thalassemia syndromes include asymptomatic carrier states (minima), α-thalassemia trait (minor), β-

thalassemia trait (minor), β-thalassemia intermedia, and β-thalassemia major. Other types of thalassemia are rarer, such as delta-beta-thalassemia (δβ-thalassemia).

Due to mutations in one or more of the alleles encoding α- and/or β-globin synthesis, the thalassemia syndromes are characterized by decreased hemoglobin production, resulting in a hypochromic microcytic anemia. Hundreds of genetic mutations have been described. The clinical phenotype varies widely based on the type of mutation and the number of normal alleles. Presentations range from clinically asymptomatic to severe hemolytic anemia with transfusion dependence. In the most severe cases, the condition may not be compatible with life, resulting in fetal demise or stillbirth.

Table 2: Genotypic and phenotypic characteristics of the most common thalassemia syndromes

α-Thalassemia Syndrome	**Genotype**	**Expected Hemoglobin Concentration (g/dL)**	**Typical Phenotype**
Silent carrier state (minima)	αα/α-	Normal	Asymptomatic; may develop mild microcytosis or hypochromia
Trait (minor)	α-/α- OR αα/--	> 10	Asymptomatic; mild microcytosis and hypochromia
Hemoglobin H	α-/--	7-10	Splenomegaly, hemolytic anemia, transfusion dependence develops in 2nd or 3rd decade; hemolysis worsens under oxidative stress
Hydrops fetalis	--/--	Incompatible with life	Death in utero or shortly after birth
β-Thalassemia Syndrome	**Genotype[1]**	**Expected Hemoglobin Concentration (g/dL)**	**Typical Phenotype**
Silent carrier state (minima)	β/β^+	> 10	Asymptomatic; may develop mild microcytosis or hypochromia
Trait (minor)	β/β^0	> 10	Asymptomatic; mild microcytosis and hypochromia
Intermedia	β^+/β^+	7-10	Moderate hemolysis, pronounced microcytic hypochromic anemia, iron overload common
Major	β^+/β^0 OR β^0/β^0	< 7	Transfusion dependent

1. β^+ mutant allele results in reduced β-globin chain synthesis. β^0 mutant allele results in *no* β-globin chain synthesis.

Identification of individuals with a disorder of hemoglobin synthesis is important for optimal clinical management. The genotypic abnormality determines the severity of the phenotypic expression, and detailed genetic analysis may inform the decision-making of affected individuals regarding childbearing. However, for aeromedical purposes, it is the phenotypic expression that is of primary importance. Genotypic analysis is helpful in aeromedical risk assessment insofar as it predicts the potential clinical manifestations that a service member may experience.

Manifestations of clinically symptomatic thalassemia syndromes and other hemoglobinopathies of aeromedical importance include anemia, hemolysis, splenomegaly, RBC sickling, and iron overload. End-organ dysfunction may result from such pathophysiologic mechanisms as decreased tissue oxygenation or excess iron deposition. Aeromedical risks are manifold. For example, symptoms of anemia include fatigue, generalized weakness, decreased stamina, lightheadedness, chest pain, and decreased Gz tolerance. The body's ability to compensate for anemia may be overwhelmed in the setting of hypoxia or the physiologic stress of the aviation or operational environments. Hemolysis may be exacerbated by these same physiologic stressors, and hemolytic crises may be triggered by such mild insults as an acute viral illness or dehydration. For these reasons, conditions associated with anything other than the mildest degree of abnormal hemoglobin synthesis are not thought to carry waiver potential. In particular, individuals requiring transfusion or who may be at risk for decompensation under conditions of physiologic stress are not considered to be eligible for a waiver.

Review of the AIMWTS database from Aug 2021 through Aug 2024 revealed 16 waiver packages with a diagnosis of thalassemia or other hemoglobin disorder that required an aeromedical waiver. The breakdown of the number of approved waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
D56.9	Thalassemia, unspecified	3/4	4/4	1/1	1/1	0/0	0/0
D58.2	Other hemoglobinopathies	0/0	2/2	2/2	1/1	0/0	1/1

IV. Suggested Readings

1. Centers for Disease Control and Prevention. Association of Public Health Laboratories. Hemoglobinopathies: current practices for screening, confirmation and follow-up. December 2015. Available at https://www.cdc.gov/ncbddd/sicklecell/documents/nbs_hemoglobinopathy-testing_122015.pdf. Accessed 11 September 2024.
2. Ryan K, Bain BJ, Worthington D, et al. Significant haemoglobinopathies: guidelines for screening and diagnosis. Br J Haematol 2010;149:35-49. Available at https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1365-2141.2009.08054.x. Accessed 11 September 2024.
3. Taher A, Vichinsky E, Musallam K, et al. Guidelines for the Management of Non Transfusion Dependent Thalassaemia (NTDT). Weatherall D, editor. Nicosia (Cyprus): Thalassaemia International Federation; 2013. Available at https://thalassaemia.org.cy/wp-content/uploads/2017/10/NTDT-final-combined-1.pdf. Accessed 11 September 2024.

Aerospace Medicine Waiver Guide

Thrombocytopenia, Immune Thrombocytopenia (ITP), and Thrombotic Thrombocytopenic Purpura (TTP)

Revised: Aug 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Maj Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator); Lt Col Paul Vu (AFMRA Medical Standards Policy Chief)

Significant Changes: Waiver guide restructured, updated to reflect the most recent MSD and clinical nomenclature.

I. Waiver Consideration

Any disorder of platelet function and/or thrombocytopenia with platelet counts < 100,000/mm^3 are disqualifying for all flying class, ATC, GBO, OSF, and SWA duties as well as for retention. These disorders of platelet function include, but are not limited to, immune thrombocytopenia (ITP, formerly known as "idiopathic thrombocytopenia") and immune thrombotic thrombocytopenic purpura (TTP, formerly known as "idiopathic thrombocytopenic purpura").

The use of any medication used to treat such disorders that is not included on the applicable career field medication list is also disqualifying for ongoing aviation or operational duty and would necessitate a waiver. Please cross-reference the Medical Standards Directory, Air Force Waiver Guide, and appropriate career field medication list for all potentially disqualifying conditions and treatments. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of thrombocytopenia in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Waiver may be considered for trained personnel with a history of a single episode of resolved ITP or thrombocytosis after at least six months of demonstrated asymptomatic stability, off of any medication used to treat the thrombocytopenia, with sustained platelet counts above 100,000/mm^3. For untrained FC II, FC III, ATC, GBO, OSF, and SWA applicants with a history of a single episode of resolved ITP or thrombocytosis who meet the aforementioned criteria, a waiver may also be considered. Additionally, a waiver may be considered for FC I/IA applicants with a history of thrombocytopenia or ITP occurring in childhood and resolving before the age of 18. However, a waiver is unlikely for FC I/IA applicants with any history of ITP, TTP, or thrombocytopenia with platelet counts below 100,000/mm^3 occurring after age 18.

Both trained and untrained FC II, III, ATC, GBO, OSF, and SWA personnel may request a waiver for a history of recurrent ITP or for thrombocytosis with platelet counts maintained between 50,000-100,000/mm^3. Again, it is expected that individuals will be asymptomatic, off of all medications used to treat thrombocytopenia, with stable platelet counts for at least 6 months prior to waiver submission. Waiver eligibility for these individuals will be assessed on a case-by-case basis. Waivers are unlikely when platelets are consistently below 50,000/mm^3.

The aeromedical risks associated with even a single episode of TTP are significantly higher than the risks associate with ITP or thrombocytopenia of other etiologies. As such, two years of disease-free stability should be demonstrated before a waiver consideration for both trained and untrained FC II, III, ATC, GBO, OSF, and SWA personnel, and platelet counts must be maintained above 100,000/mm^3. Generally, any individual with a history of recurrent TTP is unlikely to be granted a waiver.

Table 1: Waiver potential for Thrombocytopenia, Immune Thrombocytopenia (ITP), and Thrombotic Thrombocytopenic Purpura (TTP)

Flying Class	Condition	Waiver Potential Waiver Authority	ACS Review or Evaluation
IFC I/IA	Thrombocytopenia or ITP occurring in childhood and resolving before age 18 years	Yes AFRS/CMO	No
	History of ITP or TTP occurring after age 18 years or any sustained platelet count below 100,000/mm^3 on repeat testing	Unlikely AFRS/CMO	No
FC II/III/ATC/ GBO/OSF/SWA	History of a single episode of ITP, resolved, with sustained platelets above 100,000/mm^3, off all medication with stable platelets for at least 6 months	Yes[1] MAJCOM[2]	No
	History of recurrent ITP, or ongoing ITP that is not resolved with platelets maintained between 50,000-100,000/mm^3, off all medication with stable platelets for at least 6 months	Yes[1] MAJCOM[2]	Yes[3]
	History of recurrent ITP, or ongoing ITP that is not resolved with platelets below 50,000/mm^3	No MAJCOM[2]	No
	History of a single episode of TTP, resolved, with sustained platelets above 100,000/mm^3, with 2 years of disease-free stability	Yes[1] MAJCOM[2]	No[3]
	History of recurrent TTP	Unlikely MAJCOM[2]	No

1. No indefinite waivers.
2. Certification authority for untrained assets is AFRS/CMO.
3. ACS review is recommended for FC II, III, OSF, and SWA personnel. ACS review for other personnel may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Summary of diagnostic evaluation and treatment history, including list of any/all procedures with dates.
    c. List current medications with dosages.
2. Consultation report from the treating hematologist and all subsequent consultation notes.
3. Laboratory studies required:
    a. Current CBC with differential.
    b. All past CBC results with dates.
    c. Peripheral blood smear.
    d. Bone marrow aspiration (required if age greater than 60 years or if clinically indicated).
    e. If treated with glucocorticoid therapy for more than three consecutive weeks in the previous 12 months, then demonstration of an intact hypothalamic-pituitary-adrenal (HPA) axis is required (refer to the *Systemic Glucocorticoid (Steroid) Waiver Guide*).
        i. Serum morning cortisol level is required.
        ii. If morning cortisol is < 18 mcg/dL, then an adrenocorticotropic hormone (ACTH) stimulation test is required.
4. Results of any other testing performed in the course of diagnosis, evaluation, and management of thrombocytopenia, including other laboratory studies, all imaging reports, biopsies/pathology results (if performed), and any other ancillary studies.
5. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Summarize any interval evaluation and/or treatment.
    c. List current medications with dosages.
2. All interval consultation reports from the treating hematologist, if applicable. A new hematology consultation is required if there was any interval fluctuation in platelet counts since the previous waiver or if platelet counts are below 100,000/mm^3.
3. Laboratory studies required:
    a. Current CBC with differential

b. All interval CBCs obtained at least every 3 months (not required after 6 or more years of sustained stable remission)

4. Results of any other testing performed in the course of diagnosis, evaluation, and management of thrombocytopenia, including other laboratory studies, all imaging reports, biopsies/pathology results (if performed), and any other ancillary studies.
5. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

In general, thrombocytopenia is defined as a platelet count below 150,000/mm^3. Platelet counts in cases of mild thrombocytopenia range between 100,000-150,000/mm^3. The risk of bleeding with trauma or surgery is typically not increased until platelets fall below 75,000/mm^3. Spontaneous bleeding is unlikely at platelet counts above 30,000/mm^3, whereas individuals with platelets between 5,000-10,000/mm^3 are at risk for spontaneous, life-threatening hemorrhage.

True thrombocytopenia may be caused by under-production of platelets or by increased platelet destruction. The severity of the clinical sequelae associated with thrombocytopenia vary dramatically depending upon the underlying cause of the low platelet count. For example, transient, mild hypothermia may result in a relatively benign thrombocytopenia due to splenic sequestration. In this example, rewarming leads to a return of normal platelet count and function, the aeromedical and operational risk associated with the thrombocytopenia is minimal after the cause of the hypothermia is addressed.

Hypersplenism resulting in increased platelet destruction is of greater clinical, aeromedical, and operational concern. More than 200 separate disease processes are associated with the development of congestive splenomegaly and hypersplenism. Generally, platelet counts in the setting of hypersplenism are maintained above 50,000/mm^3. While spontaneous bleeding is not common at these counts, there may be an increased risk of bleeding with mild trauma such as might be encountered in an aviation or operational environment. It is important to note that splenomegaly and splenectomy (which is not always curative of associated thrombocytosis or anemia) may both be disqualifying for continued duty performance or retention. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for all potentially disqualifying conditions.

Immune thrombocytopenia (ITP) and immune thrombocytopenic purpura (TTP) are more serious and potentially life-threatening causes of low platelet counts, especially in an adult population. Patients with ITP often present relatively acutely with petechiae, purpura, gingival bleeding, or recurrent ecchymosis. They may provide a slightly longer history of easy bruising. The long-term prognosis is excellent for ITP that occurs during childhood (before age 18 years) and that resolves completely. Regardless of treatment necessary to achieve remission, these individuals often sustain remission without recurrence or long-term sequelae. In contrast, adult-onset ITP (occurring at age 18 years or later) tends to follow a more persistent and indolent course, frequently characterized by recurrent exacerbations of disease over a period of many years. The

estimated lifetime risk of fatal hemorrhage for a person with ITP is approximately 5%, while the risk of a nonfatal major hemorrhage is 3% per year for patients younger than 40 years of age. No conclusive data exist regarding the ability of clinical or laboratory parameters at time of diagnosis to predict the risk of major bleeding.

TTP is one of the thrombotic microangiopathy (TMA) syndromes. Primary TMA syndromes also include Shiga toxin-mediated hemolytic uremic syndrome (ST-HUS), complement-mediated TMA, and drug-induced TMA, which may be immune or non-immune mediated. TTP is an acute, fulminant disorder characterized by thrombocytopenia, microangiopathic hemolytic anemia, fever, variable neurological symptoms, and other end-organ damage. Affected organ systems include the CNS, heart, pancreas, thyroid gland, adrenal glands, and intestinal mucosa. In TTP, lung and kidney function are typically spared, though microthrombi are observed in the kidneys upon autopsy. Other TMA syndromes tend to be characterized by significant kidney damage and renal failure. Even among those fortunate individuals who recover from acute TTP, many experience demonstrable cognitive impairments to new learning and memory formation that persist for years.

The onset of TTP may be sudden, and the disease course may quickly progress to become life-threatening, even with definitive medical care. Plasma exchange is the only therapy with data indicating survival benefit. Without plasma exchange, the acute mortality is approximately 90%. Some individuals may require treatment with glucocorticoids or other more intensive immunosuppressive agents such as rituximab, cyclophosphamide, vincristine, or cyclosporine to obtain a remission. Relapse is common, occurring in 20% of individuals with idiopathic TTP within the first year. The risk of relapse is highest in those with the most severe deficiencies of the protease ADAMTS13.

Treatment for ITP and TTP is often not compatible with sustained aviation or operational duties. For example, active use of corticosteroids or intravenous immunoglobulin infusions are not amenable to waiver. Splenectomy is independently disqualifying and requires a waiver. Please cross-reference the Medical Standards Directory, Air Force Waiver Guide, and appropriate career field medication list for all potentially disqualifying conditions.

Review of the AIMWTS database from Aug 2019 through Aug 2022 revealed 23 cases with a diagnosis of a thrombocytopenic disorder. The breakdown of the number of waivers and number of total cases are tabulated below. The two FC I/IA disqualifications were for reasons associated with the diagnosis of thrombocytopenia.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)				
		IFC I/IA	FC II	FC III	GBO	SWA
D69.3	Immune thrombocytopenic purpura	3/5	10/11	4/4	2/2	1/1
D69.6	Thrombocytopenia, unspecified					
M31.1	Thrombotic microangiopathy					

IV. Suggested Readings

1. Neunert C, Terrell DR, Arnold DM, et al. American Society of Hematology 2019 guidelines for immune thrombocytopenia. Blood Adv 2019;3:3829-3866. Erratum in: Blood Adv 2020;4:252. Available at https://ashpublications.org/bloodadvances/article/3/23/3829/429213/American-Society-of-Hematology-2019-guidelines-for. Accessed 18 Aug 2022.
2. Provan D, Arnold DM, Bussel JB, et al. Updated international consensus report on the investigation and management of primary immune thrombocytopenia. Blood Adv 2019;3:3780-3817. Available at https://ashpublications.org/bloodadvances/article/3/22/3780/428877/Updated-international-consensus-report-on-the?searchresult=1. Accessed 18 Aug 2022.
3. Zheng XL, Vesely SK, Cataland SR, et al. Good practice statements (GPS) for the clinical care of patients with thrombotic thrombocytopenic purpura. J Thromb Haemost 2020;18:2503-2512. Available at https://onlinelibrary.wiley.com/doi/epdf/10.1111/jth.15009. Accessed 18 Aug 2022.
4. Zheng XL, Vesely SK, Cataland SR, et al. ISTH guidelines for the diagnosis of thrombotic thrombocytopenic purpura. J Thromb Haemost 2020;18:2486-2495. Erratum in: J Thromb Haemost 2021;19:1381. Available at https://onlinelibrary.wiley.com/doi/epdf/10.1111/jth.15006. Accessed 18 Aug 2022.
5. Zheng XL, Vesely SK, Cataland SR, et al. ISTH guidelines for treatment of thrombotic thrombocytopenic purpura. J Thromb Haemost 2020 Oct;18:2496-2502. Available at https://onlinelibrary.wiley.com/doi/epdf/10.1111/jth.15010. Accessed 18 Aug 2022.

Thrombocytosis

Revised: Aug 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Maj Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator); Lt Col Paul Vu (AFRMA Medical Standards Policy Chief)

Significant Changes: Waiver guide restructured, updated to reflect the most recent MSD and clinical nomenclature.

I. Waiver Consideration

Any persistent elevation of platelets above 400,000/mm^3 is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties as well as for retention. Any myeloproliferative disorder, including but not limited to essential thrombocytosis, is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties as well as for retention, regardless of platelet count. Any disorder of platelet function that predisposes to bleeding or coagulopathy is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties as well as for retention. Disorders of platelet function are covered in the Waiver Guide chapter *Thrombocytopenia, Immune Thrombocytopenia (ITP), and Thrombotic Thrombocytopenic Purpura (TTP)*. Isolated thrombocytosis that is confirmed by appropriate diagnostic evaluation to be due to an acute, self-limited, and otherwise benign reactive process (e.g., surgery or infection) is not disqualifying, provided that platelet counts return to normal.

The use of any medication used to treat such disorders that is not included on the applicable career field medication list is also disqualifying for ongoing aviation or operational duty and would necessitate a waiver. Please cross-reference the Medical Standards Directory, Air Force Waiver Guide, and appropriate career field medication list for all potentially disqualifying conditions and treatments. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of thrombocytosis in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

When a reactive thrombocytosis is sustained or chronic due to splenectomy, a waiver may be considered for both trained and untrained personnel after at least six months of asymptomatic stability without need for aeromedically unapproved medication. IFC I/IA candidates with thrombocytosis due to any cause other than splenectomy are generally not considered eligible for a waiver. Other untrained flying class and operational duty personnel with sustained thrombocytosis of any cause other than splenectomy are also unlikely to be considered for waiver, although certain low-risk individuals with sustained reactive thrombocytosis may be considered for waiver on a case by case basis.

Most causes of primary or autonomous thrombocytosis will not be considered compatible with continued aviation or operational duties. Rarely, a trained individual without any high-risk features or indication for cytoreductive therapy may be deemed eligible for a waiver after a

scrupulous and personalized risk assessment. Factors taken into consideration include, but are not limited to, absence of symptoms, stable platelet counts below 1,000,000/mm^3, no history of thrombosis or hemorrhage, no JAK2 mutation, no concomitant tobacco use, and no comorbid cardiovascular risk factors such as diabetes or hypertension. Use of low-dose aspirin (e.g., 81 mg/day) to prevent or control vasomotor symptoms of thrombocytosis may be acceptable for waiver depending upon overall individualized risk.

Individuals with essential thrombocytosis and a clinical indication for cytoreductive therapy are typically not considered eligible for a waiver. Polycythemia vera with associated thrombocytosis, primary myelofibrotic thrombocytosis, and other myelodysplastic disorders resulting in thrombocytosis are also not generally thought to be compatible with waiver.

Table 1: Waiver potential for Thrombocytosis

Flying Class	Condition	Waiver Potential Waiver Authority	ACS Review or Evaluation
IFC I/IA	Sustained reactive thrombocytosis due to splenectomy[1]	Yes[2] AFRS/CMO	No
	All other cases of sustained thrombocytosis	Unlikely AFRS/CMO	No
FC II/III/ATC/ GBO/OSF/SWA	Sustained reactive thrombocytosis due to splenectomy[1]	Yes[2] MAJCOM[3]	No
	Sustained reactive thrombocytosis due to cause other than splenectomy	Yes[2,4] MAJCOM[3]	Yes
	Essential thrombocytosis, not requiring cytoreductive therapy	Yes[2,4,5] MAJCOM[3]	Yes
	Essential thrombocytosis, requiring treatment with cytoreductive therapy	Unlikely MAJCOM[3]	No
	All other causes of thrombocytosis	Unlikely MAJCOM[3]	No

1. History of splenectomy is independently disqualifying. Please refer to the Aerospace Medicine Waiver Guide chapter on *Congenital and Acquired Asplenia*.
2. No indefinite waivers.
3. Certification authority for untrained assets is AFRS/CMO.
4. Untrained applicants are generally not considered eligible for waiver.
5. Waiver may be considered for certain low-risk personnel on a case-by-case basis. Generally, waiver eligibility will depend upon the individual being asymptomatic and demonstrating stable platelet counts below 1,000,000/mm^3, without need for treatment, without history of thrombosis or hemorrhage, and without JAK2 mutation or other high-risk features (e.g., concomitant tobacco use or comorbid hypertension, diabetes). Use of low-dose aspirin (e.g., 81 mg/day) to prevent/control vasomotor symptoms of thrombocytosis may be acceptable for waiver depending upon overall individualized risk.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative). Include a thorough examination of the skin, abdomen, and neurologic system.
    b. Specify any history of thrombosis or bleeding episodes.
    c. List cardiovascular risk factors.
    d. Summary of diagnostic evaluation and treatment history, including list of any/all procedures with dates.
    e. List current medications with dosages.
2. Consultation report from the treating hematologist and all subsequent consultation notes.
3. Laboratory studies required:
    a. Current CBC with differential.
    b. All past CBC results with dates.
    c. Peripheral blood smear.
    d. Serum ferritin.
    e. Erythrocyte sedimentation rate (ESR).
    f. C-reactive protein (CRP) level.
    g. Janus kinase 2 (JAK2) gene mutation test result.
    h. Bone marrow aspiration result.
4. Results of any other testing performed in the course of diagnosis, evaluation, and management of thrombocytosis, including other laboratory studies, all imaging reports, biopsies/pathology results (if performed), and any other ancillary studies.
5. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Summarize any interval evaluation and/or treatment.
    c. List current medications with dosages.
2. All interval consultation reports from the treating hematologist.
3. Laboratory studies required:
    a. Current CBC with differential
    b. All interval CBCs obtained at least every 6 months (if history of essential thrombocytosis) or 12 months (for other causes of thrombocytosis), or more often if clinically indicated

4. Results of any other testing performed in the course of diagnosis, evaluation, and management of thrombocytosis, including other laboratory studies, all imaging reports, biopsies/pathology results (if performed), and any other ancillary studies.
5. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

In general, thrombocytosis (also referred to as thrombocythemia) is a platelet count above a laboratory-defined upper limit of normal. In most cases, this upper limit is between 350,000-450,000/mm^3. The World Health Organization (WHO) defines thrombocytosis as any platelet count above 450,000/mm^3. A small percentage of healthy individuals will meet this definition of thrombocytosis. However, the overwhelming majority of platelet counts above 450,000/mm^3 are due to either a primary clonal (i.e., autonomous) disorder or a reactive process.

Primary clonal (or autonomous) thrombocytosis due to a myeloproliferative disorder (e.g., polycythemia vera, chronic myeloid leukemia, primary myelofibrosis, essential thrombocytosis), myelodysplastic disorders, or hereditary condition is associated with an increased risk of both thrombosis and hemorrhage. Autonomous thrombocytosis is also associated with vasomotor symptoms that include headache, lightheadedness, visual changes, chest pain, erythromelalgia, and acral dysesthesia. The particular likelihood of any of these complications varies depending on the underlying etiology of the thrombocytosis (e.g., essential thrombocytosis, myelodysplastic disorder, hereditary thrombocytosis, etc.). Some causes of autonomous thrombocytosis are also associated with other cell line dyscrasias, such as anemia. At a minimum, vasomotor symptoms would be distracting in an aviation or operational environment. A more severe complication such as erythromelalgia or intense chest pain could be debilitating enough to prevent safe performance of aviation or operational duties, while a catastrophic thrombotic or hemorrhagic event could occur without warning and be incapacitating or fatal.

Certain individuals with autonomous thrombocytosis may be candidates for low-dose aspirin therapy to reduce the risk of vasomotor symptoms. However, it is important to note that myelodysplastic disorders, especially essential thrombocytosis, are associated with the development of acquired von Willebrand disease. Use of aspirin in this setting does increase the risk of hemorrhage.

Clinically, cytoreductive agents are often used to lower platelet counts and complication rates in essential thrombocytosis and related disorders. Two of the most common cytoreductive agents are hydroxyurea and anagrelide. Due to their adverse effect profiles and the seriousness of the underlying conditions, neither the drugs nor the disease processes are considered compatible with continued aviation or operational duties. Even when platelets return to a normal range through cytoreduction, they are still qualitatively and functionally abnormal, and complications exceed acceptable risk thresholds.

Reactive thrombocytosis is most often a normal physiologic response to an underlying inflammatory condition. It may be transient, as occurs with an acute infection or surgery. It may also be sustained, as might occur following a splenectomy or in the setting of a chronic infectious process or autoimmune condition. Reactive thrombocytosis does not result in the vasomotor symptoms that are common with autonomous thrombocytosis. In general, reactive thrombocytosis is not associated with significant increase in risk of thrombotic or hemorrhagic complication beyond the risk due to the underlying disease state or inflammatory process. However, in extreme reactive thrombocytosis (platelet counts in excess of 1,000,000/mm^3), the rates of thrombosis and hemorrhage are approximately 1% and 3%, respectively.

Sustained reactive thrombocytosis should prompt an evaluation for an undiagnosed or inadequately controlled infection, autoimmune process, malignancy, or other inflammatory disorders. Even if the thrombocytosis is stable and the patient is asymptomatic, the underlying condition may be disqualifying (e.g., splenectomy, chronic infection, autoimmune disease). Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for all potentially disqualifying conditions and treatments.

Review of the AIMWTS database from Aug 2019 through Aug 2022 revealed 12 cases with diagnosis of a disorder that was associated with thrombocytosis. The breakdown of the number of waivers and number of total cases are tabulated below. Myeloproliferative and myelodysplastic disorders NOT presenting with thrombocytosis are not represented in the table.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)		
		IFC I/IA	FC II	FC III
D47.3	Essential thrombocythemia		3/4	2/2
D45	Polycythemia vera			
D47.1	Primary myelofibrosis		0/1	
C92.1	Chronic myeloid leukemia			
D46.9	Myelodysplastic syndrome, unspecified			
D75.838	Reactive or Secondary thrombocytosis	1/1		3/3
D75.839	Thrombocytosis unspecified	0/1		

IV. Suggested Readings

1. Barbui T, Thiele J, Gisslinger H, et al. The 2016 WHO classification and diagnostic criteria for myeloproliferative neoplasms: document summary and in-depth discussion. Blood Cancer J 2018;8:15. Available at https://www.nature.com/articles/s41408-018-0054-y.pdf. Accessed 8 March 2022.
2. Tefferi A and Barbui T. Polycythemia vera and essential thrombocythemia: 2021 update on diagnosis, risk-stratification and management. Am J Hematol 2020;95:1599-1613. Available at https://onlinelibrary.wiley.com/doi/epdf/10.1002/ajh.26008. Accessed 8 March 2022.

Aerospace Medicine Waiver Guide

Venous Thromboembolism (VTE)

Reviewed: May 2023

Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Updated to reflect current MSD.

I. Waiver Consideration

Venous thromboembolism (VTE) is a term used to describe an episode of pulmonary embolism (PE) or deep vein thrombosis (DVT). Any history of PE is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. Additionally, any history of DVT is disqualifying for all flying class and SWA duties. The terminology "any history" of PE or DVT applies to any occurrence, including single, isolated, or provoked events. Two or more episodes of DVT is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. The anticipated use of extended anticoagulation beyond 12 months is also independently disqualifying for retention. Similarly, symptomatic post-thrombotic syndrome requiring anticoagulation is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention.

An operationally restricted waiver for VTE may be considered after completion of at least one month of anticoagulation with resolution of prior symptoms and there is an established plan with regards to the intended treatment duration that is in accordance with accepted professional guidelines. The waiver package should include evidence to support whether the VTE was provoked or unprovoked. Provoked VTE is defined by the presence of one or more underlying risk factors. These risk factors may be transient or persistent and are categorized as major or minor. Examples of major transient risk factors include recent surgery, hospitalization with length of stay of three days or longer, Caesarean section, traumatic fracture, use of estrogen therapy, or pregnancy. Minor transient risk factors include surgical procedures less than 30 minutes in duration, shorter hospitalizations, other circumstances of reduced mobility, lower extremity injury without fracture resulting in reduced mobility for at least three days, or a long-haul flight. Examples of more persistent risk factors include obesity, active malignancy, active inflammatory or autoimmune disease, ongoing hormonal therapy, nephrotic syndrome, or recurrent long-haul flights.

Service members with a history of a single unprovoked VTE or any recurrent VTE require a complete hypercoagulable evaluation and age-appropriate cancer screening. Results of all testing must be submitted with the waiver request. After a single episode of either provoked or unprovoked VTE, continuation of anticoagulation for a minimum of three months must be planned, with ultimate duration of treatment determined based on accepted professional guidelines. Aviators will be operationally restricted to non-high performance, non-ejection seat aircraft while on anticoagulation. Similarly, SWA personnel will be restricted from jump duties while on anticoagulation.

Individuals treated with DOACs will be considered for waiver on a case-by-case basis as no anticoagulant medication is officially approved for operational use.

Table 1: Waiver potential for Venous Thromboembolism (VTE), including DVT and PE

Flying Class	Condition	Waiver Potential Waiver Authority[1]	ACS Review or Evaluation
FC I/IA	Provoked VTE, single episode, no longer requiring anticoagulation	Yes AFRS/CMO	Yes
	Recurrent VTE or single episode of unprovoked VTE	Unlikely AFRS/CMO	No
FC II/III/SWA	Provoked VTE, single episode[2,3]	Yes MAJCOM	Yes
	Recurrent VTE or single episode of unprovoked VTE[2,3]	Yes MAJCOM	Yes
ATC/GBO/OSF	Single PE episode or recurrent episodes of DVT (provoked or unprovoked)[2,3]	Yes MAJCOM	Yes
	Single DVT episode, no longer requiring anticoagulation	N/A	N/A

1. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use (e.g., warfarin, apixaban, rivaroxaban, etc.) is AFMRA.
2. The active use of anticoagulation is independently disqualifying as these medications are not officially approved for operational use. However, waivers can be considered on a case-by-case basis. Aviators will be operationally restricted to non-high performance, non-ejection seat aircraft while on anticoagulation. SWA personnel will be operational restricted from jump duties while on anticoagulation.
3. Operationally restricted waivers may be considered after completion of <u>at least one month</u> of anticoagulation with resolution of prior symptoms and there is an established plan with regards to the intended treatment duration that is in accordance with accepted professional guidelines.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. <u>Initial Waiver Request</u>:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Summary of diagnostic evaluation, including list of any/all procedures with dates.
    c. List any risk factors for VTE.
    d. Summary of all treatments/interventions.
    e. List current medications with dosages.

2. Consultation report from all treating specialists (e.g., hematologist, pulmonologist) and all subsequent consultation notes. These notes should include the following:
    a. Documentation of whether the VTE was provoked or unprovoked.
    b. Recommendation for or against extended anticoagulation; if anticoagulation is recommended, then a monitoring and treatment plan must be included.
    c. Documentation of any associated complications such as post-thrombotic syndrome or chronic thromboembolic pulmonary hypertension (CTEPH).
3. Results of any other testing performed during diagnosis, evaluation, and management of VTE, including laboratory studies and any other ancillary studies.
    a. For any history of a *single unprovoked VTE* or *any recurrence of VTE*, a hypercoagulable work-up and age-appropriate cancer screening are required.
    b. The hypercoagulable work-up must be performed off anticoagulation and include a minimum of the following:
        i. factor V Leiden mutation testing.
        ii. prothrombin gene mutation testing.
        iii. protein C and S activity levels.
        iv. antithrombin activity assessment.
        v. antiphospholipid antibody testing.
    c. If actively anticoagulated, include a recent CBC.
    d. If anticoagulated with warfarin, include current INR and all INR values from the preceding three months.
4. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. <u>Renewal Waiver Request</u>:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination.
    b. Specify any interval VTE or PE symptom recurrences.
    c. Complete list of current medications with dates of initiation, dosages, and all adverse effects. If continuing anticoagulation, specify the monitoring and treatment plan.
2. Any interval consultation reports from specialty providers (e.g., hematologist, pulmonologist), if applicable.
3. Results of all interval testing performed in the course of ongoing evaluation and management. The following must be included:
    a. Any interval imaging related to VTE, if applicable.
    b. If on anticoagulation, current CBC.
    c. If anticoagulated with warfarin, include current INR and all INR values from the preceding three months.
4. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

In the aeromedical or operational environment, an acute venous thromboembolism (VTE), whether a deep vein thrombosis (DVT) or pulmonary embolism (PE), could lead to distracting symptoms or sudden incapacitation. At its most benign, an acute DVT might present with swelling and distracting pain. Rarely, significant swelling may lead to neurovascular compromise of the affected limb. Perhaps the most serious complication of an acute VTE is a submassive or massive PE, which may result in sudden cardiovascular collapse and death without prodromal warning. Subsegmental PE may result in dyspnea, chest pain, and hypoxia, with symptoms ranging from distraction to substantial cardiovascular impairment in the aviation or operational environment. Sequelae of DVT include post-thrombotic syndrome, which might include distracting chronic pain or recurrent swelling. Of greater aeromedical and operational consequence is the development of chronic thromboembolic pulmonary hypertension (CTEPH) which can affect up to 5% of patients following PE. CTEPH development would be predicted to increase the risk of hypoxia at altitude, right-sided heart failure, and cardiac arrhythmias. Any persistent or progressive dyspnea, particularly during the first three months to two years of a PE diagnosis, should prompt the local flight surgeon to investigate for the development of CTEPH.

Recurrence of VTE after an initial event is of great aeromedical and operational concern. Although individuals with unprovoked VTE are at highest risk, all individuals are at increased risk of a subsequent event, whether the index episode was provoked or unprovoked. The risk of recurrence is highest within the first year. VTE provoked by surgery is associated with an approximately 3% risk of recurrence at 5 years. VTE provoked by a nonsurgical major transient risk factor carries a 15% risk of recurrence at 5 years, while unprovoked VTE carries a 30% risk of recurrence at 5 years. Thus, individuals with unprovoked VTE should undergo a hypercoagulable workup and age-appropriate cancer screening to evaluate for any underlying condition that predisposes to recurrent events.

In clinical practice, selected high-risk individuals may be considered for the use of extended or indefinite anticoagulation to reduce the likelihood of recurrent VTE events. Several options for extended duration anticoagulation now exist, including warfarin (Coumadin®) and various medications belonging to the class of direct oral anticoagulants (DOACs). The ongoing use of anticoagulation is disqualifying for all aviation and operational duties. There are no anticoagulants included on any career field medication list. However, there is precedence for case-by-case waiver consideration for warfarin and DOACs. In current clinical practice, DOACs are quickly supplanting warfarin as preferred agents both clinically and in aeromedical and operational use. Theoretical advantages to warfarin include the ability to monitor adherence and the wide availability of a reversal agent. However, the laboratory monitoring required for the safe management of warfarin therapy may be operationally burdensome. DOACs such as apixaban (Eliquis ®), rivaroxaban (Xarelto®), dabigatran (Pradaxa®), and edoxaban (Savaysa®) do not require monitoring or dose adjustments. Non-inferiority studies demonstrate these short-acting medications to be at least as effective and as safe as warfarin. More recent data indicate that some DOACs, especially apixaban, have lower rates of both major and minor bleeding complications compared to warfarin. Additionally, reversal agents are now available for apixaban, rivaroxaban, and dabigatran.

The predominant aeromedical and operational concern related to anticoagulant use is for the development of a serious spontaneous bleed (e.g., gastrointestinal, intracranial) or uncontrollable hemorrhaging in the event of trauma. The risk of spontaneous bleeding is low in young individuals without any significant comorbidities. Several validated tools estimate the risk of spontaneous bleeding (e.g., HAS-BLED). Although the HAS-BLED prediction tool is intended to assess bleeding risk in individuals with atrial fibrillation treated with anticoagulation to prevent embolic strokes, extrapolation may help to aid in weighing the benefit of extended anticoagulation against the risk of bleeding. The possibility of uncontrollable traumatic hemorrhage is of significant concern in aviation and operational environments. The duty requirements of some career fields (e.g., high-performance aviation, special warfare, parachute duties, etc.) may not be compatible with the active use of anticoagulation.

Review of the AIMWTS database from May 2020 through May 2023 revealed 126 waiver packages with a diagnosis of venous thromboembolism. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		FC I/IA	FC II	FC III	GBO	ATC	SWA
Z86.718	Personal history of venous thrombosis or embolism	4/6	65/66	36/37	7/10	2/2	5/5

IV. Suggested Readings

1. Ortel TL, Neumann I, Ageno W, et al. American Society of Hematology 2020 guidelines for management of venous thromboembolism: treatment of deep vein thrombosis and pulmonary embolism. Blood Adv 2020; 4:4693-4738. Available at https://ashpublications.org/bloodadvances/article/4/19/4693/463998/American-Society-of-Hematology-2020-guidelines-for. Accessed 18 May 2023.
2. Stevens SM, Woller SC, Kreuziger LB, et al. Antithrombotic therapy for VTE disease: second update of the CHEST Guideline and Expert Panel Report. Chest 2021; 160:e545-e608. Available at https://journal.chestnet.org/article/S0012-3692(21)01506-3/fulltext. Accessed 18 May 2023.
3. Stevens SM, Woller SC, Kreuziger LB, et al. Executive Summary: Antithrombotic therapy for VTE disease: second update of the CHEST Guideline and Expert Panel Report. Chest 2021; 160:2247-2259. Available at https://journal.chestnet.org/article/S0012-3692(21)01507-5/fulltext. Accessed 18 May 2023.
4. Witt DM, Nieuwlaat R, Clark NP, et al. American Society of Hematology 2018 guidelines for management of venous thromboembolism: optimal management of anticoagulation therapy. Blood Adv 2018; 2:3257-3291. Available at https://ashpublications.org/bloodadvances/article/2/22/3257/16107/American-Society-of-Hematology-2018-guidelines-for. Accessed 18 May 2023.

Aerospace Medicine Waiver Guide

Ankylosing Spondylitis

Reviewed: May 2023
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Stacey Aycock (Aerospace Medicine Specialist); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Updated to reflect current MSD.

I. Waiver Consideration

Ankylosing spondylitis (AS) and other inflammatory spondyloarthropathies are disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention if the condition results in duty restriction, *or* frequent absences from duty, *or* ongoing specialist follow-up more frequently than annually. Any inflammatory spondyloarthropathy (including AS) that is treated with an immunomodulator, biologic agent, or disease-modifying antirheumatic drug (DMARD) is also disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. The chronic use of a career field-approved non-selective non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen and naproxen require a waiver for all flying class and ATC duties, but not for GBO duties. Only specific NSAIDs are approved for chronic use.

The use of any medication not included on the career field-approved medication list is independently disqualifying. Use of non-approved medications may be considered on a case-by-case basis in trained personnel under unique circumstances and in otherwise low-risk individuals functioning in low-risk operational environments. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of spondyloarthropathy in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Factors weighed when assessing suitability for waiver include the severity of disease at diagnosis, evidence of sustained stabile disease remission, tolerance of a maintenance therapeutic regimen, adherence to treatment recommendations and whether treatment and monitoring are appropriate in the context of nationally or internationally recognized guidelines, the risk associated with treatment, and the cumulative risk of all comorbidities, complications, and/or extra-articular manifestations. A waiver may be considered once an individual is in disease remission on a stable, career field-approved medication regimen, without adverse effects. Due to concerns regarding potential cervical spine instability, aviators who are otherwise eligible for waiver will likely be restricted to non-high performance, non-ejection seat, non-rotary wing aircraft. Special warfare personnel may be restricted from jump duties. If an unrestricted waiver is desired, a thorough evaluation at the Aeromedical Consultation Service and a careful, individualized risk assessment is required. Refer to the below section “Aeromedical Considerations” for further discussion.

Table 1: Waiver potential for Ankylosing Spondylitis (AS)

Flying Class	Condition[1]	Waiver Potential[2] Waiver Authority[3]	ACS Review or Evaluation
FC I/IA	AS or other inflammatory spondyloarthropathy	Unlikely AFRS/CMO	No
FC II/III/SWA	AS or other inflammatory spondyloarthropathy, in remission and stable on career field-approved maintenance medications, without complication	Yes[2,4] MAJCOM	Yes
ATC/GBO/OSF	AS or other inflammatory spondyloarthropathy, in remission and stable on career field-approved maintenance medications, without complication	Yes[2] MAJCOM	No[5]

1. The use of any non-approved medication is independently disqualifying.
2. Untrained personnel of any class are unlikely to receive a waiver.
3. Certification authority for untrained assets is AFRS/CMO. Waiver authority for aeromedically unapproved medication use is AFMRA.
4. Aviators who are otherwise eligible for waiver will likely receive a waiver, restricted to non-high performance, non-ejection seat, non-rotary wing aircraft. Special warfare personnel may be restricted from jump duties. If an unrestricted waiver is desired, a thorough evaluation at the Aeromedical Consultation Service and a careful, individualized risk assessment is required.
5. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
        i. Include frequency of flares and date of last flare.
        ii. Include thorough spine and musculoskeletal examination.
    b. Specify presence or absence of ongoing symptoms (e.g., back pain or stiffness, buttock pain, hip pain, shoulder pain, other joint pain, joint swelling or inflammation, neck pain, etc.).
    c. Specify presence or absence of complications (e.g., fragility fracture, bone mineral density loss, neurologic compromise, etc.).
    d. Specify presence or absence of extra-articular manifestations (e.g., eye involvement, skin involvement, inflammatory bowel disease, cardiac involvement, pulmonary involvement, renal disease, etc.).
    e. Summary of diagnostic evaluation and treatment history, including list of any/all procedures with dates.
    f. List current medications with dosages.
2. Consultation report from the treating rheumatologist and all subsequent consultation notes. These notes must include the following:
    a. Subjective symptoms and objective physical exam findings to include thorough spine and joint exam.
    b. Discussion of current treatment, including dose, frequency, formulation, and all appropriate monitoring with schedule for follow-up (e.g., biologic agents require laboratory studies with a metabolic panel and CBC every 3-6 months and annual tuberculosis testing).
    c. Documentation of the presence or absence of complications (see above examples).
    d. Documentation of the presence or absence of extra-articular manifestations (see above examples).
    e. Detailed plan of ongoing treatment and monitoring.
3. Laboratory studies required:
    a. HLA-B27 gene testing
    b. Recent CBC, CMP, erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP)
4. Imaging studies required (radiology report is sufficient):
    a. Current plain radiographs of the lumbar spine and sacroiliac joints (standard anteroposterior view or Ferguson view)
    b. If any known cervical involvement, neck pain, or occipital pain, then plain radiographs of the cervical spine are required.
    c. If a murmur is auscultated, an echocardiogram is required.
5. Results of any other testing performed in the course of diagnosis, evaluation, and management of ankylosing spondylitis/inflammatory spondyloarthropathy, including laboratory studies and any other ancillary studies.
6. FL4 with return to duty and ALC status if member did not meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms, objective findings, or interval flares.
    b. Specify presence or absence of complications (e.g., fragility fracture, bone mineral density loss, neurologic compromise, etc.).
    c. Specify presence or absence of extra-articular manifestations (e.g., eye involvement, skin involvement, inflammatory bowel disease, cardiac involvement, pulmonary involvement, renal disease, etc.).
    d. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
2. All relevant interval consultation reports from the treating rheumatologist.
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, and any other ancillary tests. The following must be included:
    a. Recent CBC, CMP, erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP)
4. Current plain radiograph of the lumbar spine and sacroiliac joints (standard anteroposterior view or Ferguson view)
5. FL4 with return to duty and ALC status if member did not meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Ankylosing spondylitis (AS) is a chronic inflammatory arthritis of the spine that often involves extra-axial arthropathy and manifestations of extra-articular inflammation. The most common presentation is chronic inflammatory low back pain. Inflammatory back pain is characteristically associated with morning stiffness, pain that improves with activity and worsens (or is not improved) with rest, and nocturnal pain. Even in the absence of other accompanying symptoms, the pain of AS alone may result in significant occupational and functional limitations in an aviation or operational environment. Long duration flights in cramped positions may potentiate this impairment.

The chronic inflammation of AS and related inflammatory spondylarthritis may lead to progressive damage to the axial skeleton and its supporting structures, as well as to any peripheral joints affected with extra-axial arthritis. Sequelae of inflammatory spondyloarthritis include spinal fusion, sacral erosions and erosive arthropathy, loss of bone density, fragility fractures, neurologic compromise, and cervical instability, including atlantoaxial subluxation. Vertebral fragility fractures may occur in the setting of little or no traumatic force. This increased fracture risk is driven by a combination of factors, including reduced vertebral flexibility secondary to ankylosis, decreased bone mineral density, and damage to the supporting structures of the spine from chronic inflammation. Spinal cord injury is more than 10 times greater in individuals with AS than in the general population. The cervical spine is the most common level of involvement of both fracture and spinal cord injury. Atlantoaxial instability similar to that

observed in rheumatoid arthritis also affects individuals with AS. Reported rate of atlantoaxial instability in the AS literature vary widely, with estimates ranging between 2-20% of individuals with AS affected.

The consequences of a complication related to a fragility fracture or cervical involvement are potentially catastrophic and include the possibility of sudden death in the event of a spinal cord injury. Furthermore, fractures and subluxation are possible in individuals with AS in the absence of significant impact or trauma, especially if there is hyperextension or hyperflexion of the cervical spine. As such, service members with AS are generally not considered for an unrestricted waiver. Aviators who are otherwise eligible for waiver will likely receive a waiver restricted to non-high performance, non-ejection seat, non-rotary wing aircraft. Restriction from rotary wing aircraft is motivated by concern that vibration may increase the rate and/or risk of disease progression and will be dependent upon the underlying disease severity. Special warfare personnel may be restricted from jump duties. If an unrestricted waiver is desired, a thorough evaluation at the Aeromedical Consultation Service and a careful, individualized risk assessment are required.

In addition to arthritis, inflammatory spondyloarthropathies are associated with multiple extra-articular conditions, especially anterior uveitis, psoriasis, and inflammatory bowel disease. Other extra-articular manifestations include an increased risk of cardiovascular disease (e.g., atherosclerotic cardiovascular disease including acute coronary syndrome and cerebrovascular accident, conduction abnormalities, hypertension, aortic valve disease, disease of the aortic root, etc.) and pulmonary fibrosis. Any of these extra-articular manifestations conveys unique risks in the aviation or operational environment and may be independently disqualifying. Please cross-reference the Medical Standards Directory for all potentially disqualifying conditions

The primary goals of treatment for inflammatory spondyloarthropathy are to minimize symptoms, preserve function, and prevent complications, including sequelae of extra-articular inflammation. With these ends in mind, first line therapy is generally a combination of physical therapy and maintenance use of non-steroidal anti-inflammatory drugs (NSAIDs), such as diclofenac, indomethacin, ibuprofen, meloxicam, or celecoxib. There is no strong evidence indicating one NSAID is more effective than another at preventing disease progression or the development of AS complications, although certain NSAIDs may be associated with a higher risk of adverse effects, such as myocardial infarction. The non-selective NSAIDs ibuprofen and naproxen are approved for chronic use with a waiver in aircrew and ATC personnel. Celecoxib and meloxicam may be used chronically without a waiver. Other NSAIDs are not approved for chronic use in aircrew or ATC personnel. The chronic use of NSAIDs, with the exception of ketorolac, does not require a waiver for GBO personnel.

Individuals with AS who require treatment beyond NSAIDs may be candidates for biologic agents such as those targeting tumor necrosis factor alpha (TNF-alpha inhibitors) or for disease-modifying antirheumatic drugs (DMARDs). Several medications are approved for use with an appropriate waiver, including the TNF-alpha inhibitors adalimumab, etanercept, and infliximab. Other medications often used in the treatment of inflammatory spondyloarthropathy such as alternative TNF-alpha inhibitors, the anti-interleukin 17 antibodies, or Janus kinase (JAK) inhibitors are not formally approved for use. The use of any medication not included on the

applicable career field-approved medication list is disqualifying. However, the use of a non-approved biologic agent may be considered on a case-by-case basis in an otherwise low-risk trained servicemember in a low-risk operational environment. Please note that recourse to non-approved interventions may be indicative of the severity of the underlying condition, which might not be amenable to waiver. The aeromedical and operational risk of the medication will also be carefully weighed.

Active treatment with systemic glucocorticoids is not amenable to any form of waiver. The previous use of systemic glucocorticoids for more than three consecutive weeks in any 12-month period is independently disqualifying and requires demonstration of an intact hypothalamic-pituitary-adrenal (HPA) axis prior to waiver consideration. Please refer to the Aerospace Medicine Waiver Guide Chapter *Systemic Glucocorticoid (Steroid) Therapy.*

There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of AS and inflammatory spondyloarthropathy in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

It should be noted that service members who elect to under-treat their AS with the aim of avoiding non-approved medications will not be considered for an aviation or operational waiver. Under-treatment of AS may result in mild chronic active inflammation or frequent recurrent active inflammation and substantially increases the likelihood of both symptomatic acute flares and disease complications.

Review of the AIMWTS database from May 2020 through May 2023 revealed 22 cases with a diagnosis of ankylosing spondylitis. The breakdown of the number of waivers and number of total cases are tabulated below. Of the 5 DQs, all were specific to ankylosing spondylitis with ongoing uncontrolled symptoms.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
M45.9	Ankylosing spondylitis, unspecified site		13/15	2/4	1/1	0/1	1/1

IV. Suggested Readings

1. Smolen JS, Schöls M, Braun J, et al. Treating axial spondyloarthritis and peripheral spondyloarthritis, especially psoriatic arthritis, to target: 2017 update of recommendations by an international task force. Ann Rheum Dis 2018; 77:3-17. Available at https://ard.bmj.com/content/77/1/3. Accessed 12 May 2023.
2. Ward MM, Deodhar A, Gensler LS, et al. 2019 Update of the American College of Rheumatology/Spondylitis Association of America/Spondyloarthritis Research and Treatment Network Recommendations for the Treatment of Ankylosing Spondylitis and Nonradiographic Axial Spondyloarthritis. Arthritis Care Res 2019; 71:1285-1299. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6764857/. Accessed 12 May 2023.

Aerospace Medicine Waiver Guide

Diabetes Mellitus

Reviewed: May 2023
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Stacey Aycock (ACS Aerospace Medicine Specialist); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver Considerations and Aeromedical Concerns updated.

I. Waiver Consideration

Any type of diabetes mellitus is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties. It is also disqualifying for retention. Impaired fasting glucose, impaired glucose tolerance, or pre-diabetes mellitus are not considered disqualifying. However, treatment of such conditions with metformin would require a waiver. Waiver requirements for diabetes mellitus generally follow the recommendations established in the most recent version of the "Standards of Care in Diabetes," which is updated annually by the American Diabetes Association. Individuals who are not treated or monitored to recognized national or international guidelines will not be considered eligible for a waiver. Factors that are considered when assessing suitability for waiver include whether the treatment and monitoring are appropriate in the context of established standards of care, the degree and stability of glucose control, the medication regimen and adherence to treatment, the cumulative risk of all co-morbid conditions, and whether other metabolic or cardiovascular risk factors are present. These factors are also considered in determining whether a restricted or unrestricted waiver is appropriate.

In general, the use of insulin to control blood glucose is considered incompatible with military aviation and enhanced operational duties due to the high incidence and frequency of hypoglycemic adverse effects. Thus, any person needing to meet any enhanced medical standards with a diagnosis of type 1 diabetes mellitus and anyone with latent autoimmune diabetes in adults (LADA) or type 2 diabetes mellitus treated with insulin are unlikely to be considered for waiver. In rare and exceptional circumstances, a service member required to maintain career field status but not expected to perform the full scope of functions of that career field (e.g., an individual in an inactive flying or command billet) might be considered for a tightly restricted waiver after careful scrutinization of all the contributing factors of their unique case.

All waivers for LADA and diabetes mellitus type 2 are considered on an individualized basis. Due to the high risk for complications of aeromedical significance, FC I/IA waivers are unlikely to be granted for applicants with any history of diabetes mellitus. Waivers may be considered in low-risk individuals who are treated with operationally compatible non-insulin anti-hyperglycemic agents or for untrained FC II, FC III, ATC, GBO, OSF, and SWA candidates.

In addition to insulin, many of the medications used to treat diabetes mellitus convey side effects that are incompatible with aviation or enhanced operational duties. The only medications officially approved for use in USAF aviators, ground-based operators, or other special duty operators are metformin and sitagliptin. These medications were approved after careful reviews

demonstrated that with appropriate restrictions, the risk of adverse effects of aeromedical consequence were acceptable, including the risk of both symptomatic and subclinical hypoglycemia. Although other anti-hyperglycemic agents such as the glucagon-like peptide-1 (GLP-1) receptor agonists and the sodium-glucose co-transporter 2 (SGLT2) inhibitors are not officially approved for use, these medications may be considered for waiver on a case-by-case basis in otherwise low-risk individuals operating in lower-risk environments. Such waivers would necessarily weigh the combined risk of all co-morbid conditions, particularly any that might be independently disqualifying, such as concomitant renal impairment or heart disease.

There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of diabetes mellitus in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

A waiver request may be considered once a service member demonstrates at least 30 days of stability on an appropriate medication regimen without adverse effects. Blood glucose must be adequately controlled according to accepted national and international guidelines, which is most often defined as a hemoglobin A1c (HbA1c) of 7% or lower without episodic hypoglycemia. Please refer to the complete list of requirements for waiver consideration in Section II: Information Required for Waiver Submission.

Table 1: Waiver potential for Diabetes Mellitus

Flying Class	Condition	Waiver Potential Waiver Authority[1]	ACS Review or Evaluation
FC I/IA	Any history of diabetes mellitus type 1 or type 2, regardless of treatment (except for uncomplicated gestational diabetes that resolves after delivery)	Unlikely AFRS/CMO	No
FC II/III/ATC GBO/OSF/SWA	Diabetes mellitus type 2 controlled through therapeutic lifestyle with/without approved medication (i.e., metformin and/or sitagliptin)[2]	Yes MAJCOM	Yes
	Any type of diabetes mellitus treated with insulin	Unlikely MAJCOM	No[3]

1. Certification authority for untrained assets is AFRS/CMO. Waiver authority for aeromedically unapproved medication use is AFMRA.
2. Use of any medication not included on the career field-specific approved medication list is independently disqualifying. Waivers for the use of non-approved non-insulin medications (e.g., GLP-1 receptor agonists or SGLT2 inhibitors) may be considered on a case-by-case basis in certain low-risk individuals after ACS review.
3. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. List all risk factors for metabolic syndrome and atherosclerotic cardiovascular disease (ASCVD).
        i. Non-modifiable risk factors (age, gender, race/ethnicity, family history).
        ii. Modifiable risk factors (tobacco use, current blood pressure, current lipid panel, personal history of treatment for hypertension or hyperlipidemia).
    c. Summary of all treatments trialed, their effectiveness, and any adverse effects.
    d. List current medications with doses, demonstrating at least 30 days of medication stability.
    e. List all co-morbid conditions and describe degree of control.
    f. Document completion of a formal multi-disciplinary diabetes education program.
2. Laboratory studies required:
    a. Baseline blood glucose measurement and HbA1c level before starting treatment.
    b. Current fasting blood glucose measurement and HbA1c level.
    c. Baseline and current fasting CMP.
    d. Current fasting lipid panel.
    e. Current quantitative spot urine albumin-to-creatinine measurement
    f. If treatment includes metformin, include a current CBC or vitamin B12 levels.
3. Current physical examination findings.
    a. Include current blood pressure, weight, height.
    b. Report current diabetic foot exam (include visual inspection, vibration sensation assessed with a 128-Hz tuning fork, and either temperature or monofilament sensation).
4. Report of a dilated funduscopic examination obtained within the preceding 12 months.
5. Current ECG.
6. Results of any other testing performed during diagnosis, evaluation, and management of diabetes mellitus, including laboratory studies, imaging, and any other ancillary studies.
7. Form FL4 with return to duty and ALC status if service member did not meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Any changes in ASCVD risk factors.
    b. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
2. Updated laboratory studies
    a. Current fasting blood glucose measurement and HbA1c level.
    b. Current fasting CMP.
    c. Current fasting lipid panel.
    d. Current quantitative spot urine albumin-to-creatinine measurement.
    e. If treatment includes metformin, include a current CBC or vitamin B12 levels.
3. Report of a dilated funduscopic examination obtained within the preceding 12-24 months.
4. All pertinent interval clinical encounter notes related to the diagnosis and treatment of diabetes mellitus, including a recent note outlining degree of control/compliance and ongoing treatment plan.
5. Form FL4 with return to duty and ALC status if service member did not meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

The immediate and long-term aeromedical concerns are significant and numerous since diabetes mellitus is a multi-system disease that also results in microvascular and macrovascular complications. A primary concern is the risk for hypoglycemia in individuals who require medication to control their blood glucose. Hypoglycemia is a frequent side effect of many anti-hyperglycemic agents, and risk varies with medication class. Symptoms of hypoglycemia include excess perspiration, tremulousness, nervousness or anxiety, dizziness and/or lightheadedness, central nervous system depression, confusion, difficulty speaking, and weakness. These symptoms are likely with moderate to severe hypoglycemia and are incompatible with unrestricted flying and operational duties. Subclinical hypoglycemia may result in subtle cognitive and performance decrements. The highest risk for serious consequences of hypoglycemia, including death, occurs in individuals with hypoglycemia unawareness. These individuals may not develop noticeable symptoms despite dangerously low blood glucose levels, and therefore they may not seek timely treatment. Certain medications or combinations of medications convey a higher risk of hypoglycemia and hypoglycemia unawareness, with the greatest risk in individuals treated with insulin, sulfonylureas, or beta-blockers and/or who have a longstanding history of diabetes.

Untreated or uncontrolled diabetes is associated with periods of hyperglycemia. Symptoms of hyperglycemia include polyuria, dehydration, nausea, fatigue, and changes in visual acuity. Life-threatening hyperglycemic crises such as diabetic ketoacidosis or hyperosmolar hyperglycemic state (HHS), also known as hyperosmotic hyperglycemic nonketotic state (HHNK) may be precipitated by acute physiologic stressors such as a major illness, by certain medications (e.g., glucocorticoids, SGLT2 inhibitors), or by anti-hyperglycemic treatment interruption or non-adherence, especially involving the misadministration of insulin.

In addition to hypoglycemia and hyperglycemia, diabetes mellitus conveys an increased risk for atherosclerotic cardiovascular disease, including myocardial infarction and stroke. It is also associated with the development of microvascular and macrovascular disease, including retinopathy, nephropathy, and neuropathy, which carry further aeromedical and operational risk.

Review of the AIMWTS database from May 2020 through May 2023 revealed 76 cases with a diagnosis of diabetes mellitus. The breakdown of the number of waivers and number of total cases are tabulated below. Please note that the type 1 diabetes mellitus cases tabulated below include the diagnosis of latent autoimmune diabetes in adults in whom there was no active insulin requirement.

Please use *only* these ICD-10 codes for AIMWTS coding purposes		(# of waivers / total # of cases)						
		FC I/IA	FC II	FC III	GBO	ATC	OSF	SWA
E10.8	Type 1 diabetes mellitus with unspecified complications		2/3	0/1				
E10.9	Type 1 diabetes mellitus without complications		7/10	3/5	1/1			0/1
E11.8	Type 2 diabetes mellitus with unspecified complications		2/3	3/3	2/2			
E11.9	Type 2 diabetes mellitus without complications		13/15	17/17	7/7	3/6	2/2	

IV. Suggested Readings

1. American Diabetes Association. *Standards of Care in Diabetes – 2023.* Diabetes Care 2023; 46(Suppl. 1): S1-S292. Available at https://diabetesjournals.org/care/issue/46/Supplement_1. Accessed 18 May 2023.
2. American Diabetes Association. *Standards of Care in Diabetes – 2023 Abridged for Primary Care Providers*. Clin Diabetes 2023; 41:4-31. Available at https://diabetesjournals.org/clinical/article/41/1/4/148029/Standards-of-Care-in-Diabetes-2023-Abridged-for. Accessed 18 May 2023.
3. American Diabetes Association. *Summary of Revisions: Standards of Care in Diabetes – 2023*. Diabetes Care 2023; 46(Suppl 1.):S5-S9. Available at https://diabetesjournals.org/care/article/46/Supplement_1/S5/148048/Summary-of-Revisions-Standards-of-Care-in-Diabetes. Accessed 18 May 2023.
4. Trojian T, Colberg S, Harris G, et al. American Medical Society for Sports Medicine position statement on the care of the athlete and athletic person with diabetes. Clin J Sport Med 2022; 32:8-20. Available at https://journals.lww.com/cjsportsmed/Fulltext/2022/01000/American_Medical_Society_for_Sports_Medicine.4.aspx. Accessed 18 May 2023.
5. American College of Cardiology ASCVD Risk Estimator Plus. Available at https://tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/estimate/. Accessed 18 May 2023.

Gout

Reviewed: May 2023
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver Guide restructured. Updated to reflect current MSD.

I. Waiver Consideration

Any history of gout is disqualifying for all flying class and SWA duties. Gout becomes disqualifying for GBO, ATC, and OSF duties, as well as for retention when it is associated with frequent exacerbations, *or* if there is resultant chronic bone or joint damage (e.g., tophaceous gout, bone erosions, joint deformity, etc.), *or* if there is associated renal disease, *or* if symptoms impair the performance of required duties. Asymptomatic hyperuricemia is not disqualifying (i.e., no history of monosodium urate crystal deposition manifesting as gout flares, tophaceous gout, hyperuricemic nephropathy, or uric acid nephrolithiasis).

The medications used to treat gout (and asymptomatic hyperuricemia) may require a waiver. The use of any medication not included on the career field-approved medication list is independently disqualifying. Use of non-approved medications may be considered on a case-by-case basis under unique circumstances and in otherwise low-risk individuals functioning in low-risk operational environments. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of gout in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Factors weighed when assessing suitability for waiver include the severity of disease and degree of disease control, tolerance of a maintenance therapeutic regimen, adherence to treatment recommendations and whether treatment and monitoring are appropriate in the context of nationally or internationally recognized guidelines, the risk associated with treatment, and the cumulative risk of any comorbid conditions or complications. A waiver may be considered once an individual is well-controlled (i.e., not experiencing recurrent gout flares, with a uric acid at goal) on a career field-approved medication regimen, without adverse effects. Untrained personnel with documented clinical manifestations of gout (i.e., recurrent flares of inflammatory arthritis, a chronic arthropathy, tophaceous deposits, uric acid nephrolithiasis, or chronic nephropathy) are unlikely to receive a waiver.

Table 1: Waiver potential for Gout

Flying Class	Condition	Waiver Potential[1] Waiver Authority[2]	ACS Review or Evaluation
FC I/IA	Any history of gout	Unlikely AFRS/CMO	No
FC II/III/SWA	Gout, in remission and stable, with uric acid level at goal, on career field-approved maintenance therapy, without complication	Yes[1] MAJCOM	No
ATC/GBO/OSF	Gout, in remission and stable, with uric acid level at goal, on career field-approved maintenance therapy, without complication[3]	Yes[1] MAJCOM	No

1. Untrained personnel with documented clinical manifestations of gout are unlikely to receive a waiver.
2. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMRA.
3. Gout is only disqualifying for ATC, GBO, and OSF duties if the service member also does not meet retention standards. However, medications used in the treatment of gout may necessitate a need for waiver consideration. Please reference the applicable career field-approved medication list.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
        i. Include frequency of flares and date of last flare.
        ii. Include thorough joint examination of the hands and feet.
    b. List all risk factors for gout:
        i. Non-modifiable risk factors (e.g., age, gender, race/ethnicity, family history).
        ii. Modifiable risk factors (e.g., body habitus, hypertension, hyperlipidemia, metabolic syndrome, diabetes mellitus, chronic kidney disease, dietary factors, alcohol consumption, medications).
    c. Summary of all treatments trialed, their effectiveness, and any adverse effects.
    d. List current medications with dosages.
    e. List all co-morbid conditions and describe degree of control (e.g., hypertension, hyperlipidemia, diabetes mellitus, chronic kidney disease, etc.).

2. Consultation report from a treating rheumatologist or general internist and all subsequent consultation notes.
3. Laboratory studies required:
    a. Result of diagnostic joint aspiration.
    b. Current uric acid level.
    c. Current CMP.
    d. If treated with probenecid, then a 24-hour urine uric acid level is required.
4. Imaging studies required (radiology reports are sufficient):
    a. Current plain radiographs of the hands and feet.
    b. Current plain radiographs of any other affected joints.
5. Results of any other testing performed during diagnosis, evaluation, and management of gout, including laboratory studies and any other ancillary studies.
6. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms, objective findings, or interval flares.
    b. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
2. All relevant interval consultation reports from the treating rheumatologist or general internist, if applicable.
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, and any other ancillary tests. The following must be included:
    a. Current uric acid level.
    b. Current CMP.
    c. Current plain radiographs of the hands and feet.
    d. Current plain radiographs of any other affected joints.
4. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Gout is a recurrent, acute, inflammatory arthritis resulting from the deposition of monosodium urate crystals within joint spaces and in adjacent cartilage and tendons. It is often monoarticular, classically affecting the first metatarsal phalangeal (MTP) joint unilaterally, but it may occur bilaterally, and any joint may be affected. It is related to hyperuricemia, although urate over-saturation in the plasma alone is insufficient to result in clinical gout. Other manifestations of hyperuricemia that are frequently comorbid with gout include uric acid nephrolithiasis and chronic kidney disease.

Aeromedical and operational concerns related to gout include the impact of a symptomatic acute flare on duty performance, the sequelae of chronic gout, and complications and side effects related to treatment. The arthritis of acute gout is characterized by sudden onset of severe pain, swelling, warmth, and erythema, usually limited to a single joint, and most commonly affecting the foot. Other typically involved joints include knees, ankles, wrists, elbows, and fingers. Symptom development is usually rapid, escalating to maximum severity within 12-24 hours. The pain and swelling are frequently severe and disabling. Individuals with classic first MTP involvement are often unable to stand or ambulate. At a minimum, these symptoms would be distracting in an aviation or operational environment. More likely, they would prohibit the safe performance of duties.

The complications of gout include joint destruction and deformity from longstanding or chronically recurrent inflammation or from tophi deposition in joints and soft tissues. Common comorbid conditions include nephrolithiasis and renal disease. Any of these complications or comorbid conditions conveys unique risks in the aviation or operational environment and may be independently disqualifying. Please cross-reference the Medical Standards Directory for all potentially disqualifying conditions.

Gout management typically involves both the treatment of acute flares and the chronic management of hyperuricemia to prevent recurrence and reduce the risk of other complications. Medications used to reduce pain and inflammation and/or hasten resolution of acute gout attacks include non-steroidal anti-inflammatory drugs (NSAIDs), colchicine, and systemic glucocorticoids. Limited, acute use of NSAIDs is not disqualifying for aviation or operational duties, though the underlying condition, such as gout, remains disqualifying.

Chronic treatment with NSAIDs is disqualifying for all flying class and ATC duties. The non-selective NSAIDs ibuprofen and naproxen are approved for chronic use with a waiver in aircrew and ATC personnel. Celecoxib and meloxicam may be used chronically without a waiver. Other NSAIDs are not approved for chronic use in aircrew or ATC personnel. The chronic use of NSAIDs (except for ketorolac) does not require a waiver for GBO personnel. However, the need to utilize chronic NSAIDs to mitigate gout symptoms is an indicator of disease severity, and the underlying gout may not be amenable to waiver. Colchicine is not included on any career field-approved medication list. However, the acute use of colchicine to treat a gout flare or a several-month course of colchicine to prevent acute gout during initiation of urate-lowering therapy may be waiverable. However, if colchicine is needed for the management of chronic gout, it may be an indicator of more severe disease and may not be amenable to waiver.

Active treatment with systemic glucocorticoids is not amenable to any form of waiver. The previous use of systemic glucocorticoids for more than three consecutive weeks in any 12-month period is independently disqualifying and requires demonstration of an intact hypothalamic-pituitary-adrenal (HPA) axis prior to waiver consideration. Please refer to the Aerospace Medicine *Systemic Glucocorticoid (Steroid) Therapy* Waiver Guide for additional information.

Proper management of gout depends upon the correction of hyperuricemia (target goal < 6.0 mg/dL or, in the case of individuals with tophaceous gout, < 5.0 mg/dL) to reduce the risk of future acute gout recurrences and other associated complications and comorbidities (i.e., tophi

deposition, joint damage, kidney stones, and chronic kidney disease). The urate-lowering medications allopurinol and probenecid are approved for use in all flying class and ATC personnel with an appropriate waiver. The use of allopurinol and probenecid does not require a waiver for GBO personnel. Other urate-lowering therapies are not officially approved for use but may be considered on a case-by-case basis. Generally, recourse to non-approved interventions is indicative of the severity of the underlying condition, which might not be amenable to waiver. The aeromedical and operational risk of the medication will also be carefully weighed.

Review of the AIMWTS database from May 2020 through May 2023 revealed 56 waiver packages with a diagnosis of gout. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		FC I/IA	FC II	FC III	GBO	ATC	SWA
M10.9	Gout, unspecified	0/0	38/38	14/16	1/2	0/0	0/0

IV. Suggested Readings

1. FitzGerald JD, Dalbeth N, Mikuls T, et al. 2020 American College of Rheumatology Guideline for the Management of Gout. Arthritis Care Res 2020; 76:744-760. Available at https://onlinelibrary.wiley.com/doi/10.1002/acr.24180. Accessed 26 May 2023.
2. Qaseem A, Harris RP, Forciea MA, et al. Management of Acute and Recurrent Gout: A Clinical Practice Guideline from the American College of Physicians. Ann Intern Med 2017; 166:58-68. Available at https://www.acpjournals.org/doi/10.7326/M16-0570. Accessed 26 May 2023.
3. Qaseem A, McLean RM, Starkey M, et al. Diagnosis of Acute Gout: A Clinical Practice Guideline from the American College of Physicians. Ann Intern Med 2017; 166:52-57. Available at https://www.acpjournals.org/doi/10.7326/M16-0569. Accessed 26 May 2023.

Human Immunodeficiency Virus (HIV) Infection (May 2021)

Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner (ACS Internal Medicine); Lt Col Kevin Heacock (ACS Neuropsychiatry); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver consideration section updated.

I. Waiver Consideration

All flying classes, ATC, GBO, and SWA personnel diagnosed with human immunodeficiency virus (HIV) infection are disqualified from their specific operational duties and for retention. Trained personnel may be considered for waiver on a case-by-case basis. Waiver will generally be contingent on tolerability of medical therapy, demonstration of stability, and adherence to the guidelines established for HIV treatment. The member must have a current CD4 cell count above the threshold for opportunistic infection risk and must not have previously met the case definition for acquired immunodeficiency syndrome (AIDS). Appropriate viral suppression on a stable combination antiretroviral therapy (ART) regimen should be demonstrated with no symptomatic adverse drug effect or reaction. The goal for viral suppression will typically occur 8 to 24 weeks after ART initiation. Any current guideline recommended treatment combination will be considered for aeromedical waiver on a case-by-case basis.

Active duty Air Force members and Air Reserve Component (ARC) members on extended active duty will be referred to San Antonio Military Medical Center (SAMMC) for medical evaluation IAW AFI 44-178, Human Immunodeficiency Virus Program. ARC members not on extended active duty must obtain a medical evaluation from their civilian healthcare provider that meets the requirements of Attachment 8 in AFI 44-178.

Table 1: Waiver potential for HIV Infection

Flying Class (FC)	Waiver Potential[1]	Waiver Authority	ACS Review or Evaluation
FC I/IA	No	AETC	No
FC II/III	Yes[2,3]	AFMRA	Yes[4]
ATC/GBO/SWA	Yes[2,3]	AFMRA	Yes[4]

1. Waiver will be considered on a case-by-case basis for trained personnel only.
2. Waiver will not be considered if individual ever met criteria for AIDS (i.e, a CD4 cell count <200 cells/microL or a history of any AIDS-defining condition).
3. Must demonstrate appropriate viral suppression on a stable guideline recommended antiretroviral therapy regimen with CD4 cell counts >500 cells/microL. CD4 counts >300 cells/microL may be acceptable early in treatment course before maximal CD4 cell recovery has been achieved.
4. ACS review and evaluation will involve screening for potential cognitive and psychiatric disorders associated with HIV infection.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after the clinical disposition is complete and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

14. Information to include in history:
    a. Clearly delineate the disease presentation and course.
    b. Complete list of current medications with dates of initiation and doses.
15. Consultation reports from all treating providers, which should include:
    a. Subjective symptoms and objective physical exam findings.
    b. Current treatment plan, to include tolerance of maintenance medications and all appropriate monitoring labs for those medications, as applicable.
    c. If seen by Mental Health, please ensure consultation reports include a recent evaluation following the template in the Mental Health Waiver Guide Checklist (available on the Kx→Waiver Guide→Psychiatry section). This evaluation should be completed by a doctoral level mental health provider with preference for a Psychiatrist if the aviator is on psychotropic medication. Also include any completed psychological testing with RAW DATA and interpretation.
16. Laboratory studies required:
    a. CD4 counts at diagnosis and on therapy.
    b. Viral loads (viral RNA levels) at diagnosis and on therapy.
    c. Complete metabolic panel and CBC at baseline and on therapy.
    d. Lipid panel and fasting glucose on therapy.
    e. All other laboratory studies ordered by consulting specialist(s)
17. Current physical examination findings which must include a thorough neurological review of systems and neurological exam.
18. FL4 with RTD and ALC status.
19. Any other pertinent information.
20. If the local base cannot provide any of the above listed information, they should document why, explaining the reason to the waiver authority.

B. Renewal Waiver Request:

12. Updated AMS with interval history, including:
    a. Documentation of member's compliance with required clinical follow-up and all required laboratory monitoring
    b. Complete list of current medications with dates of initiation, doses, and all adverse effects.
    c. Documentation of medication adherence.
    d. Report of any new subjective symptoms.
13. All interval consultation reports from all treating providers.
14. Laboratory studies required:
    a. All interval CD4 counts.
    b. All interval viral loads (viral RNA levels).

c. Updated complete metabolic panel and CBC at baseline and on therapy.
d. Updated Lipid panel and fasting glucose or HbA1C on therapy.
e. All other laboratory studies ordered by consulting specialist(s)

15. An updated objective physical exam which must include thorough neurological review of systems and neurological exam.
16. FL4 with RTD and ALC status.
17. Any other pertinent information.
18. If the local base cannot provide any of the above listed information, they should document why, explaining the reason to the waiver authority.

III. Aeromedical Concerns

The primary aeromedical concern regarding individuals with HIV infection appropriately treated with standard of care antiretroviral medications and normal CD4 counts is neurocognitive impairment. Aviators and other special duty operators require a high degree of cognitive capability in an occupation with significant inherent risk. Clearly any condition that impairs cognitive capability is incompatible with aviation and other military duties. Importantly, measurable neurocognitive abnormalities, even if not severe enough to impair routine daily activities, can be of significance in the operational environment. HIV infection also carries increased risks of depression and suicide during the adjustment reaction phase of the infection. Additionally, the military member's emotional reaction to the diagnosis of HIV, the side effects of treatment regimens, and the need for close medical follow-up are all of potential aeromedical concern.

Acute HIV can be associated with an aseptic meningitis syndrome that may indicate early central nervous system infection or the propensity of HIV-related inflammation to disrupt the blood-brain barrier. Mild, even asymptomatic, cognitive decrements have historically been described in all stages of infection, including among those treated with antiretroviral medications. Current clinical guidelines support the initiation of combination antiviral treatment as soon as HIV infection is diagnosed, regardless of clinical stage or CD4 T-cell level. As a result, a growing body of literature suggests that earlier treatment initiation reduces this T-cell activation and inflammation, reduces the probability of clinical progression, and limits the reservoir of HIV-infected tissue during long-term therapy. Importantly, rates of neurocognitive impairment have been shown to improve with antiretroviral therapy at all stages of disease. Contemporary research demonstrates a low prevalence of neurocognitive impairment in HIV-positive individuals, and may suggest a normal distribution of neurocognitive dysfunction apart from HIV serostatus.

Using current definitions, risk factors for HIV-associated neurocognitive dysfunction (HAND) have been shown to include older age, lower education, lower nadir CD4 count, and AIDS-defining illnesses. "Nowadays, the most severe manifestations of HAND do almost only affect either untreated or insufficiently treated subjects" (Eggers, et al 2017). Given that the HIV-prevalent population is aging, research among patient groups non-normative to USAF aircrew must be interpreted with some degree of caution. Compared with the national average, HIV-positive USAF personnel tend to be younger, better educated, are healthier at baseline, and score

higher on cognitive test assessments. Additionally, USAF personnel are diagnosed and initiate treatment earlier in the course of the disease (often within a year of seroconversion), resulting in both preservation of a high CD4 and rapid achievement of sustained viral suppression. Regardless, screening for potential cognitive and psychiatric disorders associated with HIV infection remains prudent prior to making any return to duty status determination. As all HIV cases require an in-person ACS evaluation, there is no need to do any neuropsychologic testing locally beyond what may have already been done for clinical purposes. The ACS Neuropsychiatry Branch will complete necessary testing during the in-person evaluation.

While most first-line agents for HIV management are relatively well-tolerated in comparison to older regimens, risk of toxicity and the occupational burden of intense of monitoring for medication side effects must be considered on a case-by-case basis. Fortunately, current first-line ART regimens do not include the non-nucleoside reverse transcriptase inhibitors that were historically associated with neuropsychiatric adverse effects. Acute idiosyncratic drug effects occur uncommonly with combination ART. Long-term toxicities of ART are also generally very slow to progress, can be monitored with routine testing modalities, and are not exacerbated by the aviation environment.

Flight surgeons should be aware that transient viremia, or "blips", during therapy can occur and do not necessarily represent treatment failure. The technical definition of a "blip" is a measurable viral load of <200 copies/mL that is followed by a return to a viral load below the limit of detection or quantification (e.g., <20 copies/mL). In clinical practice, repeating the viral load measurement at the next regularly scheduled lab draw is an option assuming there are no issues with adherence to prescribed therapies. However, the ACS recommends that repeat viral load measurements be repeated as soon as possible for all aviators and special duty operators. The goal is to ensure that a detectable viral load is not due to the development of medication resistance or loss of viral suppression that would increase the risk for developing long-term complications (e.g., HAND). There is no need to remove an individual from duty status while obtaining repeat testing for viral blips. However, if viral loads are found to be >200 copies/mL on initial or repeat testing, then grounding management actions are warranted pending repeat testing and follow-up with infectious disease. The ACS also recommends that individuals with persistent viral load measurements of 20 to 199 copies/mL on repeat testing follow-up with infectious disease as soon as possible, but temporary removal from duty status would not be required.

Review of AIMWTS data from Jan 2010 through May 2020 revealed a total of 32 waiver packages involving the use of HIV infection. Of that total, 1 was FC I/IA (1 disqualified), 9 were FC II (8 disqualified), 13 were FC III (12 disqualified), 8 were ATC/GBC (7 disqualified), and 1 was SWA (1 disqualified). The first USAF aeromedical waiver for HIV infection was granted in Dec 2019 following ACS review and evaluation.

Please use *only* these ICD-10 codes for AIMWTS coding purposes	
B20	Human Immunodeficiency Virus Infection

IV. Suggested Readings

1. Center for Disease Control and Prevention HIV Informational Website. Available at https://www.cdc.gov/hiv/default.html. Accessed 4 May 2021.

2. U.S. Department of Health and Human Services HIV Informational Website. Available at https://hivinfo.nih.gov/. Accessed 4 May 2021

3. Federally approved medical practice guidelines for HIV/AIDS. Available at https://clinicalinfo.hiv.gov/en/guidelines. Accessed 4 May 2021

4. Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents Living with HIV. Available at https://clinicalinfo.hiv.gov/en/guidelines/adult-and-adolescent-arv/whats-new-guidelines. Accessed 4 May 2021

5. Crum-Cianflone NF, Moore DJ, Letendre S, et al. Low prevalence of neurocognitive impairment in early diagnosed and managed HIV-infected persons. Neurol 2013;80:371-379.

6. McDonnell J, Haddow L, Daskalopoulou M, et al. Minimal cognitive impairment in UK HIV-positive men who have sex with men: effect of case definitions and comparison with the general population and HIV-negative men. J Acquir Immune Defic Syndr 2014;67:120-127.

7. Evering TH, Applebaum A, La Mar M, et al. Rates of non-confounded HIV associated neurocognitive disorders in men initiating cART during primary infection. AIDS 2016;30:203-210.

8. Kore I, Ananworanich J, Valcour V, et al. Neuropsychological impairment in acute HIV and the effect of immediate antiretroviral therapy. J Acquir Immune Defic Syndr 2015;70:393-399.

9. Eggers C, Arendt G, Hahn K, et al. HIV-1 associated neurocognitive disorder: epidemiology, pathogenesis, diagnosis, and treatment. J Neurol 2017;264:1715-1727.

10. Jain V, Hartogensis W, Bacchetti P, et al. Antiretroviral therapy initiated within 6 months of HIV infection is associated with lower T-cell activation and smaller HIV reservoir size. J Infect Dis 2013;208:1202-1211.

11. Herout S, Mandorfer M, Breitenecker R, et al. Impact of early initiation of antiretroviral therapy in patients with acute HIV infection in Vienna, Austria. PLOS One 2016;11:1-11.

12. Okulicz JF, Le TD, Agan BK, et al. Influence of the timing of antiretroviral therapy on the potential for normalization of immune status in human immunodeficiency virus 1-infected individuals. JAMA Intern Med 2015;175:88-99.

13. Danel C, Moh R, Gabillard D, et al. A trial of early antiretrovirals and isoniazid preventive therapy in Africa. N Engl J Med 2015;373:808-822.

14. Lundgren JD, Babiker AG, Gordin F, et al. Initiation of antiretroviral therapy in early asymptomatic HIV infection. N Engl J Med 2015;373:795-807.

15. Spudich S, Robertson KR, Bosch RJ, Gandhi RT, et al. Persistent HIV-infected cells in cerebrospinal fluid are associated with poorer neurocognitive performance. J Clin Invest. 2019 Aug; 129(8): 3339-3346

16. Chan P, Hellmuth J, Spudich S, Valcour V. Cogntive impairment and persistent CNS injury in treated HIV. Curr HIV/AIDS Rep. 2016 Aug; 13(4): 209-217

17. Singer EJ, Thames AD. Neurobehavioral manifestations of human immunodeficiency virus/AIDS: Diagnosis and treatment. Neurol Clin. 2016;34(1):33-53.

Hypercholesterolemia and Hyperlipidemia

Revised: Jan 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick and Maj Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver guide updated to ensure consistency with published career field medication lists.

I. Waiver Consideration

Hypercholesterolemia and hyperlipidemia that is successfully treated with monotherapy using one of the aeromedically-approved lipid-lowering statin or bile acid-binding resin agents, is not disqualifying for any flying class, ATC, GBO, OSF, or SWA duties. The use of more than one lipid-lowering medication or the use of any aeromedically-unapproved aircrew medication is independently disqualifying for flying class I/IA, II, III, and ATC personnel. Certain aeromedically-approved non-statin and non-bile acid-binding resin lipid-lowering medications (i.e., ezetimibe, fenofibrate, and gemfibrozil) are also independently disqualifying for flying class I/IA, II, III, and ATC personnel and require waiver. Please note that ezetimibe, fenofibrate, and gemfibrozil are not disqualifying for GBO duties when utilized as monotherapy or in combination with a non-statin derivative medication. Use of any aeromedically-unapproved medication is also independently disqualifying for GBO personnel. For OSF and SWA personnel, lipid-lowering therapies are not disqualifying as no official approved medication list exists. However, the use of any new medication provided to these individuals must be carefully evaluated for potential side effects and impact on mission. It is strongly recommended that the MSD and the appropriate career field medication lists be cross-referenced for any and all treatments for hypercholesterolemia and hyperlipidemia.

Factors that are considered when assessing suitability for waiver of hypercholesterolemia and hyperlipidemia include whether the treatment and monitoring are appropriate in the context of nationally or internationally recognized guidelines, the risks associated with the specific medication(s), the individual service member's tolerance of the medication(s), adherence to therapy, and the cumulative risk of all co-morbid conditions (e.g., diabetes mellitus, heart disease, etc.). Waiver requirements also follow the recommendations established in the "2018 AHA/ACC Guideline on the Management of Blood Cholesterol: A Report of the American College of Cardiology / American Heart Association Task Force on Clinical Practice Guidelines." FC I/IA individuals who meet criteria for cholesterol treatment but are not on an appropriate treatment regimen will not be considered waiver-eligible.

Table 1: Waiver potential for Hypercholesterolemia and Hyperlipidemia

Flying Class (FC)	Condition	Waiver Potential Waiver Authority[1]	ACS Review or Evaluation
I/IA	Hypercholesterolemia and Hyperlipidemia treated with medication other than a single aeromedically-approved statin or resin binding agent[2,3]	Yes AFRS/CMO	No
	Repeat fasting LDL > 190 mg/dL, with or without risk factors; or > 160 mg/dL with at least 2 cardiac risk factors	Yes[4] AFRS/CMO	No
II/III/ATC/GBO	Hypercholesterolemia and Hyperlipidemia treated with medication other than a single aeromedically-approved statin or resin binding agent[2,3,5]	Yes MAJCOM[6]	No
OSF/SWA	Not Disqualifying[7]	N/A	N/A

1. Certification authority for untrained assets is AFRS/CMO.
2. Use of any medication that is not included on the applicable career field approved medication list is independently disqualifying.
3. Use of ezetimibe, fenofibrate, and gemfibrozil is independently disqualifying for all flying class and ATC duties. These medications are not disqualifying for GBO duties when utilized as monotherapy or in combination with a non-statin derivative medication.
4. In general, FC I/IA applicants who meet criteria for cholesterol treatment but are not on an appropriate treatment regimen will NOT be considered waiver-eligible.
5. FC II personnel being treated with gemfibrozil or fenofibrate in combination with statin therapy will typically be limited to non-high performance aviation duties.
6. Waivers for the use of non-approved career field medications will be considered on a case-by-case basis, and the waiver authority is AFMRA.
7. For OSF and SWA personnel, no official approved medication list exists. All new medications provided to OSF and SWA personnel should be carefully evaluated for potential side effects and impact on mission.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Summary of presentation, course, and treatment.
    a. List all risk factors for atherosclerotic cardiovascular disease
        i. Non-modifiable risk factors (age, gender, race/ethnicity, family history)
        ii. Modifiable risk factors (tobacco use, current blood pressure, personal history of diabetes, personal history of treatment for hypertension)
    b. List all treatments trialed, their effectiveness, and any adverse effects
    c. List current medications, doses, and adverse effects

    d. List all co-morbid conditions and describe degree of control
2. Laboratory studies required:
    a. Baseline fasting lipid panel before starting treatment
    b. Baseline fasting comprehensive metabolic panel (CMP)
3. Current physical examination findings.
4. Any other pertinent information.
5. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Any changes in atherosclerotic cardiovascular disease risk factors
    b. Current medications, doses, and adverse effects
    c. Updated fasting lipid panel
    d. Updated fasting CMP
2. Current physical examination findings.
3. Any other pertinent information.
4. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

III. Aeromedical Concerns

While hypercholesterolemia is typically asymptomatic, it is a common and treatable risk factor in the development of atherosclerotic cardiovascular disease (ASCVD). The manifestations of ASCVD, which include coronary heart disease (myocardial infarction, angina, heart failure, and sudden cardiac death), cerebrovascular accident (stroke and transient ischemic attack), aortic atherosclerotic disease and aneurysm, and peripheral artery disease, can be potentially catastrophic, resulting in sudden incapacitation in the aviation environment. Additionally, these diseases are individually disqualifying for continued aviation duties and may not be eligible for waiver, depending upon crew position, disease severity, required therapies, and a variety of other factors. Furthermore, very high triglyceride levels may result in acute pancreatitis, which can be suddenly incapacitating (additional information available in the *Pancreatitis* Air Force Waiver Guide). Due to the risks associated with these outcomes, it is of critical importance to intervene early to reduce the possibility of an event that could result in devastating consequences for both the health of the affected service member and the success of the aviation mission.

Review of the AIMWTS database from Jan 2019 through Jan 2022 revealed 37 cases with a disqualifying diagnosis of hypercholesterolemia and/or hyperlipidemia. A breakdown of the cases was as follows: 1 FC I/IA cases (0 disqualified), 22 FC II cases (1 disqualified), 12 FC III cases (1 disqualified), 0 ATC cases, 2 GBO cases (0 disqualified), and 0 SWA cases. Review of the cases revealed that disqualifications resulted from other active co-morbid conditions.

Please use *only* this ICD-10 code for AIMWTS coding purposes	
E78.0	Pure hypercholesterolemia
E78.1	Pure hyperglyceridemia
E78.2	Mixed hyperlipidemia

IV. Suggested Readings

1. Grundy SM, Stone NJ, Bailey AL, et al. AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA Guideline on the Management of Blood Cholesterol: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. J Am Coll Cardiolgy 2019;73:e285-350. Available at http://www.onlinejacc.org/guidelines/cholesterol. Accessed 18 January 2022.
2. American College of Cardiology ASCVD Risk Estimator Plus. Available at https://tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/estimate/. Accessed 18 January 2022.

Hyperthyroidism

Reviewed: May 2023
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver Considerations and Aeromedical Concerns updated.

I. Waiver Consideration

Subclinical hyperthyroidism is disqualifying for flying class I/IA/II/III and SWA duties, even if asymptomatic and requiring no treatment. Hyperthyroidism of any etiology that requires treatment to maintain a biochemical euthyroid state or to ameliorate symptoms is disqualifying for flying class, I/IA/II/III, ATC, and SWA duties. Treatments that require a waiver include chronic maintenance medication as well as definitive therapy such as radioactive iodine ablation or thyroidectomy. Hyperthyroidism becomes disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention when symptoms are severe and persist despite appropriate treatment *or* when there is a need for specialty follow-up more often than annually.

It is important to note that hyperthyroidism may be caused by a variety of mechanisms, and that the underlying etiology may be independently disqualifying for continued aviation or operational duties or for military retention. Likewise, complications or side effects of treatment may be disqualifying. Please cross-reference the Medical Standards Directory, Air Force Waiver Guide, and appropriate career field medication list for all potentially disqualifying conditions.

The use of any medication not included on the career field-approved medication list is independently disqualifying. Use of non-approved thionamide medications (e.g., propylthiouracil or methimazole) may be considered on a case-by-case basis in *trained* personnel under unique circumstances and in otherwise low-risk individuals functioning in low-risk operational environments. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplements, the use of a prescription medication or supplement for the treatment of hyperthyroidism in OSF and SWA personnel must be carefully evaluated for potential side-effects that might impact individual health or mission safety.

If a service member completes definitive treatment for hyperthyroidism with radioactive iodine ablation or thyroidectomy, then regular monitoring for hypothyroidism is required. The development of clinical or biochemical hypothyroidism or the use of thyroid replacement to maintain a euthyroid state is potentially disqualifying. Please cross-reference the Medical Standards Directory and refer to the Aerospace Medicine Waiver Guide for *Hypothyroidism*.

Table 1: Waiver potential for Hyperthyroidism

Flying Class	Condition	Waiver Potential[1] Waiver Authority[2]	ACS Review or Evaluation
FC I/IA	Subclinical hyperthyroidism	Yes AFRS/CMO	Yes
	Hyperthyroidism of any etiology that requires treatment to maintain a biochemical euthyroid state or to ameliorate symptoms[3,4]	Yes AFRS/CMO	Yes
FC II/III/SWA	Subclinical hyperthyroidism	Yes MAJCOM	Yes
	Hyperthyroidism of any etiology that requires treatment to maintain a biochemical euthyroid state or to ameliorate symptoms[3,4]	Yes MAJCOM	Yes
ATC	Hyperthyroidism of any etiology that requires treatment to maintain a biochemical euthyroid state or to ameliorate symptoms[3,4]	Yes MAJCOM	Yes
GBO/OSF	Hyperthyroidism, with severe symptoms that do not resolve with treatment, or when requiring specialty follow-up more than annually[3,4]	Yes MAJCOM	Yes

1. Factors influencing waiver consideration include the underlying etiology of the hyperthyroidism and demonstration of a clinical and biochemical euthyroid state.
2. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMRA.
3. Treatments that necessitate waiver consideration include chronic maintenance medication as well as definitive therapies such as radioactive iodine ablation or thyroidectomy.
4. The ongoing use of thionamide drugs (e.g., propylthiouracil or methimazole) to maintain a euthyroid state may be considered on a case-by-case basis for *trained* personnel only.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative). Include any previous or current cardiac, visual/ophthalmologic, and psychiatric symptoms or findings.
    b. Include findings of complete examination of the head and neck, especially thyroid gland and lymph nodes.
    c. Specify presence or absence of ongoing symptoms.
    d. Specify the underlying cause of the hyperthyroidism.
    e. Summary of diagnostic evaluation and treatment history, including list of any/all procedures with dates.
    f. List current medications with dosages.
2. Consultation report from the treating endocrinologist and all subsequent consultation notes. These notes must include the following:
    a. Documentation of the presence or absence of orbitopathy.
    b. Assessment of medication tolerance and statement regarding adherence.
    c. Plan for ongoing clinical, laboratory, and (if applicable) radiographic monitoring. Must include timeline for repeating TSH measurements to assess stability and after medication dose adjustments.
3. Consultation report from the treating ophthalmologist and all subsequent consultation notes, if applicable. Evaluation by an ophthalmologist is required for any signs or symptoms of optic neuropathy or orbitopathy.
4. Laboratory studies required:
    a. Current TSH, free thyroxine (free T4), and total T3.
    b. All past thyroid function test results (e.g., TSH, free T4, total T3, etc.), with dates.
    c. Thyroid antibody test results (must include thyroid-stimulating immunoglobulins, with or without thyrotropin receptor antibodies).
    d. If any history of thionamide treatment, include a current CBC and CMP.
5. Results of all testing performed during diagnosis, evaluation, and management of hyperthyroidism, including laboratory studies, imaging, and any other ancillary studies.
    a. Examples of additional studies that are often obtained in the evaluation of hyperthyroidism include, but are not limited to, the following: thyroid imaging (e.g., thyroid ultrasound, radioactive iodine uptake and scan); fine needle aspiration; thyroid peroxidase (TPO) antibodies.
6. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Updated examination of the head and neck, especially thyroid gland and lymph nodes.
    a. Summarize any interval evaluation and/or treatment.
    b. List current medications with dosages.
    c. Plan for ongoing clinical, laboratory, and (if applicable) radiographic monitoring. Must include timeline for repeating TSH measurements to assess stability and after medication dose adjustments.
2. All interval consultation reports from the treating endocrinologist and ophthalmologist, if applicable.
3. Laboratory studies required:
    a. Current TSH, free T4, and total T3.
    b. All interval thyroid function test results (e.g., TSH, free T4, total T3, etc.), with dates.
4. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, interval procedure reports, and any other ancillary tests.
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Subclinical and overt hyperthyroidism may affect multiple organ systems, and the aeromedical and operational concerns are broad. Chief among these concerns are the potential cardiopulmonary, neurological, and psychiatric consequences of the hyperthyroid state, as well as the risk of treatment side-effects. Cardiac manifestations of hyperthyroidism (e.g., tachycardia, dysrhythmias) may result in sudden incapacitation. Neurocognitive alterations (e.g., impaired attention and memory) and psychiatric symptoms (e.g., subtle irritability, restlessness, emotional lability, and anxiety) may result in subtle performance decrements. Patients with thyroid orbitopathy may have difficulty with eye movements. Additionally, corneal injury or optic neuropathy can occur. Other symptoms of untreated hyperthyroidism of operational importance include heat intolerance, fatigue, weakness, and tremor. All of these could pose safety hazards and detract from duty performance. Post-treatment, the major aeromedical and operational concerns include recurrence of hyperthyroidism (mainly after discontinuation of thionamide therapy) and the insidious onset of hypothyroidism, which can lead to apathy, slowed mentation, hypersomnolence, and performance degradation.

The use of thionamides for the treatment of hyperthyroidism is operationally challenging because they are typically utilized for 6-18 months before a trial of discontinuation. The rate of recurrence of hyperthyroidism after cessation of thionamides is high. Although long-term treatment with thionamides in select individuals to maintain a euthyroid state is a treatment strategy that may be pursued clinically, thionamides are not a definitive therapy for

hyperthyroidism and require persistent monitoring (every 3-6 months) of thyroid levels with frequent dose adjustment to ensure a biochemical euthyroid state, which may not be possible in an operational setting. Breakthrough thyrotoxicosis may develop while on treatment. Thyrotoxicosis occurring in an aviation or operational setting could be potentially catastrophic, especially during critical phases of flying or operational duties or in areas of limited medical resources/when access to definitive care is delayed. Consequently, the preferred aeromedical and operational management strategy is to pursue definitive treatment with either radioiodine ablation therapy or thyroidectomy. Additionally, thionamides may cause side-effects incompatible with aviation duties to include vertigo, drowsiness, liver dysfunction, or agranulocytosis. While on thionamide therapy, periodic CBC and liver function tests are required to detect agranulocytosis or hepatotoxicity.

There are no specific aeromedical concerns following radioiodine ablation treatment or thyroidectomy provided the recovery is uncomplicated, long-term thyroid hormone supplementation is maintained, and ongoing follow-up to ensure a clinical and biochemical euthyroid state is monitored.

Review of the AIMWTS database from May 2020 through May 2023 revealed 13 waiver packages with a diagnosis of hyperthyroidism. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		FC I/IA	FC II	FC III	GBO	ATC	SWA
E05.9	Thyrotoxicosis, unspecified	1/1	8/8	3/3	1/1	0/0	0/0

IV. Suggested Readings

1. Biondi B, Bartalena L, Cooper DS, et al. The 2015 European Thyroid Association guidelines on the diagnosis and treatment of endogenous subclinical hyperthyroidism. Eur Thyroid J 2015; 4:149-163. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4637513/. Accessed 26 May 2023.
2. National Guideline Centre (UK). Thyroid disease: assessment and management. London: National Institute for Health and Care Excellence (NICE); 2019 Nov. Available at https://www.nice.org.uk/guidance/ng145. Accessed 26 May 2023.
3. Ross DS, Burch HB, Cooper DS, et al. 2016 American Thyroid Association guidelines for the diagnosis and management of hyperthyroidism and other causes of thyrotoxicosis. Thyroid 2016; 26:1343-1421. Available at https://www.liebertpub.com/doi/10.1089/thy.2016.0229. Accessed 26 May 2023.

Aerospace Medicine Waiver Guide

Hypogonadism

Reviewed: May 2023
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver Considerations and Aeromedical Concerns updated.

I. Waiver Consideration

Hypogonadism by itself is not disqualifying for aviation or special operational duties. However, any need for chronic (greater than 6 months) exogenous hormone therapy is disqualifying for all flying class, ATC, OSF, and SWA duties. The use of any *topical* exogenous *androgen* replacement or supplementation is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties. The use of a topical androgen preparation is not disqualifying for retention. The use of any *injectable* hormone replacement is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. Finally, a history of gonadectomy becomes disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention if there are persistent post-operative symptoms of sufficient severity that they result in physical or mental incapacitation.

Waiver requirements for hypogonadism treated with testosterone replacement generally follow the recommendations established by professional guidelines. Factors considered when assessing suitability for waiver include whether a thorough diagnostic evaluation was completed and whether the treatment and monitoring are congruent with the standards of care outlined by national and international specialty organizations. The use of any medication not included on the applicable career field-approved medication list is independently disqualifying. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of hypogonadism in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

An individual may be eligible for a waiver after demonstrating stability and tolerance on testosterone replacement with resolution of all initial presenting symptoms and with achievement of goal serum testosterone levels. Favorable waiver consideration will depend upon a complete diagnostic evaluation and evidence of appropriate post-treatment laboratory monitoring. A diagnosis of hypogonadism is established by obtaining two separate morning testosterone levels that are low in symptomatic individuals. In most cases, low testosterone is defined as less than 300 ng/mL. Low testosterone levels in the absence of hypogonadal symptoms are not necessarily diagnostic of hypogonadism. Likewise, a single low testosterone level or inappropriately timed testosterone measurement is not diagnostic of hypogonadism. Inappropriately normal or low levels of FSH and LH warrant further evaluation for secondary causes of hypogonadism. Secondary causes of hypogonadism should be excluded as many of these diseases are independently disqualifying and carry additional aeromedical risk. Individuals who do not meet diagnostic criteria for hypogonadism on testosterone replacement are unlikely to receive a waiver.

Table 1: Waiver potential for Hypogonadism

Flying Class	Condition	Waiver Potential[1] Waiver Authority[2]	ACS Review or Evaluation
I/IA	Hypogonadism treated with exogenous hormone therapy	Yes AFRS/CMO	Yes
FC II/III/ATC GBO/OSF/SWA	Hypogonadism treated with exogenous hormone therapy	Yes MAJCOM	No[3]

1. Favorable waiver consideration will depend upon demonstration of stability and tolerance on maintenance hormone replacement, resolution of symptoms, and completion of an evaluation for secondary hypogonadism, if indicated (i.e., in the setting of inappropriately normal or low FSH or LH).
2. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMRA.
3. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Specify presence or absence of ongoing symptoms.
    c. Summary of diagnostic evaluation and treatment history.
    d. List current medications with dosages.
2. Consultation reports from all treating specialists (e.g., urologist, endocrinologist) and all subsequent consultation notes. These notes must include the following:
    a. Documentation of presenting symptoms and signs consistent with hypogonadism.
    b. Current treatment plan, to include formulation and current dose of testosterone replacement, tolerance of prescribed therapies, and all appropriate laboratory monitoring.
3. Laboratory studies required:
    a. Two or more pre-treatment, morning 0800 hrs (or equivalent for shift workers) testosterone levels below 300 ng/mL.
    b. Pre-treatment free testosterone, sex hormone binding globulin (SHBG), and estrogen levels if indicated or obtained by treating provider.
    c. Pre-treatment FSH and LH levels.
        i. If FSH and LH normal or low, then also obtain prolactin, TSH, ferritin, and iron saturation.
    d. Pre-treatment CBC.
    e. If 50 years of age or older, or if 40 years of age or older and at elevated risk for prostate cancer, pre-treatment PSA and PSA within the last year.
    f. Current total testosterone.
    g. Current CBC.

4. Results of all testing performed during diagnosis, evaluation, and management of hypogonadism, including laboratory studies, imaging, and any other ancillary studies.
    a. MRI of the pituitary gland or sella turcica is required when any of the following conditions are met:
        i. Total testosterone levels are <150 ng/dL, *or*,
        ii. Neurologic symptoms are present, *or*,
        iii. In the setting of secondary hypogonadism based on low testosterone and normal or low FSH or LH.
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    a. List current medications with dosages.
2. Any relevant interval consultation reports from specialty providers (e.g., urologist, endocrinologist).
3. Laboratory studies required:
    a. Current testosterone level and all interval testosterone levels.
    b. Current CBC.
    c. If 50 years of age or older, or if 40 years of age or older and at elevated risk for prostate cancer, PSA within the last year.
4. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, interval procedure reports, and any other ancillary tests.
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Male hypogonadism is a condition characterized by a deficiency of testosterone hormone due to pathology at one or more levels of the hypothalamic-pituitary-testicular axis, accompanied by symptoms or signs of low testosterone. When the onset of hypogonadism occurs after puberty, signs and symptoms may include loss of libido, erectile dysfunction, infertility, loss of axillary or pubic hair, and menopausal-type hot flashes. Non-specific symptoms include decreased energy, decreased motivation, depressed mood, sleep disturbances, decreased muscle mass or strength, and weight gain. Up to one third of men treated for hypogonadism or labeled as hypogonadal do not actually meet diagnostic criteria for hypogonadism. The use of exogenous testosterone is associated with potential serious adverse effects, particularly when utilized inappropriately. Side effects of testosterone range from mild to severe and may include an elevated risk of cardiovascular or thromboembolic events. Thus, it is important to perform a complete diagnostic

evaluation and risk stratification in any male suspected of hypogonadism prior to the initiation of testosterone replacement or supplementation.

The diagnosis of male hypogonadism is made in symptomatic individuals after measurement of two low morning total testosterone levels. Due to the diurnal fluctuation of testosterone concentrations, timing of blood draws should be around 0800 hrs, or the equivalent for shift workers. Generally, a low testosterone level is considered to be less than 300 ng/dL on two separated measurements. It is appropriate to measure the LH and FSH concentrations with the second testosterone measurement because if the second testosterone measurement confirms hypogonadism, the LH and FSH measurements are subsequently utilized to aid in distinguishing primary from secondary testicular failure. In the setting of low testosterone and an intact hypothalamic-pituitary-testicular axis, the LH and FSH should be elevated. An inappropriately low or normal LH or FSH level suggests that the primary deficiency is at the level of the hypothalamus or the pituitary gland. Identifying the cause of secondary hypogonadism is not only clinically important but is of significant aeromedical and operational relevance, because many of the disease processes that result in secondary hypogonadism are independently disqualifying and carry unique aeromedical and operational risk.

The risks associated with the use of exogenous testosterone are myriad. In men with underlying benign prostatic hyperplasia, lower urinary tract symptoms may be potentiated. Testosterone may accelerate the progression of undiagnosed or low-grade prostate cancer. Prior to starting testosterone, it is prudent to check a PSA level. While screening recommendations for prostate cancer vary, it is recommended to repeat a PSA level at three months and at one year after beginning exogenous testosterone. For men who are aged 50 years or older or who are 40 years or older and at increased risk of prostate cancer, annual PSA screening is advised.

Worsening of hypertension and obstructive sleep apnea are not uncommon with testosterone therapy. Erythrocytosis resulting in polycythemia is a frequent occurrence. Hemoglobin and hematocrit should be measured at baseline and then repeated at three months and six months after initiation of treatment. Subsequently, annual monitoring for polycythemia is required.

Data regarding the risks of venous thromboembolic events (VTE) and cardiovascular events in men using exogenous testosterone are somewhat conflicting. However, there is evidence suggesting that these risks are increased. Given the potential catastrophic consequences of an acute VTE or cardiovascular event during an aviation or operational mission, it is important that all servicemembers be diagnosed and treated appropriately and in accordance with established clinical guidelines and that exogenous testosterone not be used in the absence of clear evidence of both clinical and biochemical hypogonadism. Furthermore, it is critical that individuals diagnosed with and treated for hypogonadism be adequately screened for cardiovascular risk factors and that all modifiable risk factors be optimized.

Multiple testosterone formulations are available. The use of implantable testosterone pellets are not approved for use in USAF personnel, but transdermal and injectable preparations are often considered for waiver. Transdermal patches, gels, and foams are preferred due to ease of dosing and the consistency of serum testosterone levels maintained with these preparations. However, topical preparations may cause skin irritation at the site of application. Intramuscular (IM)

injectable formulations are reasonable alternatives to topical preparations. Downsides to IM testosterone include the possibility of injection site reactions and greater fluctuation in serum testosterone levels between doses (supraphysiologic peaks after injection followed by troughs prior to next injection, either of which may be associated with symptoms). Additionally, injectable formulations may pose mobility and readiness challenges in the deployed setting.

Review of the AIMWTS database from May 2020 through May 2023 revealed 72 waiver packages with a diagnosis of hypogonadism. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
E29.1	Testicular hypofunction	2/2	33/35	17/20	3/3	1/3	9/9

IV. Suggested Readings

1. Bhasin S, Brito JP, Cunningham GR, et al. Testosterone therapy in men with hypogonadism: An Endocrine Society clinical practice guideline. J Clin Endocrinol Metab 2018; 103:1715-1744. Available at https://academic.oup.com/jcem/article/103/5/1715/4939465. Accessed 26 May 2023.
2. Mulhall JP, Trost LW, Brannigan RE, et al. Evaluation and Management of testosterone deficiency: AUA Guideline. J Urol 2018; 200:423-432. Available at https://www.auajournals.org/doi/10.1016/j.juro.2018.03.115. Accessed 26 May 2023.

Aerospace Medicine Waiver Guide

Hypothyroidism

Reviewed: Nov 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Suggested readings (Section IV) updated.

I. Waiver Consideration

Hypothyroidism is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention when there is objective evidence of the hypothyroidism (e.g., laboratory confirmation) and when either of the following criteria are met: severe symptoms are present and do not resolve with treatment, or specialist follow-up is required more frequently than annually. Additionally, hypothyroidism is disqualifying for all flying class, ATC, and SWA duties if appropriate treatment necessitates maintenance medication, thyroid ablation, or surgery. In other words, any history of thyroidectomy (whether sub-total or total), thyroid ablation, or the use of medication to maintain stable thyroid hormone levels is disqualifying for all flying class, ATC, and SWA duties.

In isolation, the use of thyroid hormone replacement with an approved medication (e.g., levothyroxine and liothyronine) is not disqualifying for GBO duties and does not require a waiver. However, a period of DNIC/DNIA is required at the initiation of treatment to ensure safe tolerance of the medication without idiosyncratic reactions. Likewise, GBO personnel with symptoms of hyper- or hypothyroidism are required to be placed on DNIC/DNIA status until symptoms resolve. Please refer to the Official Air Force Aerospace Medicine Approved Medications list for the GBO career field for further information.

Medications to maintain appropriate thyroid hormone levels are not independently disqualifying for OSF or SWA personnel as a career field medication list for OSF or SWA personnel does not exist. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of hypothyroidism in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

It is important to note that hypothyroidism may be caused by a variety of mechanisms, and that the underlying etiology may be independently disqualifying for continued aviation or operational duties or for military retention. Likewise, complications or side effects of treatment may be disqualifying. Please cross-reference the Medical Standards Directory, Air Force Waiver Guide, and appropriate career field medication list for all potentially disqualifying conditions.

Individuals requiring a waiver for hypothyroidism may submit a request once they are asymptomatic and clinically stable (i.e., no signs or symptoms to suggest hyper- or hypothyroidism). If a service member is treated with an approved formulation of thyroid hormone replacement and is tolerating the medication well without adverse effects, with appropriate planned surveillance and follow-up for dose titration, it is not necessary to wait for

the achievement of a biochemically euthyroid state prior to submitting a waiver request. In other words, provided that the individual is asymptomatic and is being followed appropriately, a waiver request may be submitted before normalization of the thyroid stimulating hormone (TSH) levels. However, a period of DNIF/DNIC/DNIA may be necessary in the event that an individual treated with exogenous thyroid hormone develops new symptoms of over- or under-replacement (i.e., hyper- or hypothyroidism). Return to operational status may be granted locally after re-establishment of a clinically euthyroid state (i.e., resolution of symptoms).

Waiver renewal requires verification that the service member continues to remain clinically euthyroid (i.e., asymptomatic). Demonstration of a biochemically euthyroid state with a recent normal TSH is desirable at the time of waiver renewal requests. In the absence of other clinical changes, it is not necessary to request an early waiver renewal if a service member who was previously maintained on a stable dose of thyroid hormone replacement requires a dose titration for the purpose of maintaining a biochemically euthyroid state. As above, it is up to the local flight surgeon to temporarily place a service member on DNIF/DNIC/DNIA status if the individual is symptomatic or there are overt clinical signs that thyroid hormone is over- or under-replaced. Return to duty status may be granted when symptoms resolve.

Generally, exogenous thyroid hormone preparations that are not included on the applicable career field approved medication list are not considered favorably for waiver. Again, while there is no career field medication list for OSF or SWA personnel, diligence in assessing for potential risks to individual health and mission safety is required with the use of any medication or supplement (see above).

Table 1: Waiver potential for Hypothyroidism[1]

Flying Class	Condition	Waiver Potential Waiver Authority	ACS Review or Evaluation
FC I/IA	Hypothyroidism, with severe symptoms not resolved with treatment or requiring specialist follow-up more often than annually	Yes AFRS/CMO[2]	No[3]
	Hypothyroidism, requiring treatment with maintenance medication, thyroid ablation, or surgery[4]	Yes AFRS/CMO[2]	No[3]
FC II/III/ ATC/SWA	Hypothyroidism, with severe symptoms not resolved with treatment or requiring specialist follow-up more often than annually	Yes MAJCOM[2]	No[3]
	Hypothyroidism, requiring treatment with maintenance medication, thyroid ablation, or surgery[4]	Yes MAJCOM[2]	No[3]
GBO/OSF	Hypothyroidism, with severe symptoms not resolved with treatment or requiring specialist follow-up more often than annually[4]	Yes MAJCOM[2]	No[3]

1. Subclinical hypothyroidism (i.e., normal serum free thyroxine (T4) concentration in the presence of an elevated TSH concentration) without a clinical need for maintenance medication is not disqualifying.
2. Certification authority for untrained assets is AFRS/CMO. Waiver authority for aeromedically unapproved medication use is AFMRA.
3. ACS review may be requested at the discretion of the waiver authority.
4. Use of any medication not included on the career field-specific approved medication list is independently disqualifying and will be reviewed by on a case-by-case basis.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative). Include findings of complete examination of the head and neck, especially thyroid gland and lymph nodes.
    b. Specify presence or absence of ongoing symptoms.
    c. Specify if an underlying cause of the hypothyroidism was identified.

    d. Summary of diagnostic evaluation and treatment history, including list of any/all procedures with dates.
    e. List current medications with dosages.
2. Documentation from the treating medical providers and all applicable consultation notes. These notes must include the following:
    a. Documentation of the presence or absence of ongoing symptoms.
    b. Assessment of medication tolerance and statement regarding adherence.
    c. Plan for ongoing clinical, laboratory, and (if applicable) radiographic monitoring. Must include timeline for repeating TSH measurements to assess stability and after medication dose adjustments.
3. Laboratory studies required:
    a. Current TSH and free thyroxine (free T4).
    b. All past thyroid function test results (e.g., TSH, free T4, etc.), with dates.
4. Results of all testing performed in the course of diagnosis, evaluation, and management of hypothyroidism, including laboratory studies, imaging, and any other ancillary studies.
    a. Examples of additional studies that are often obtained in the evaluation of hypothyroidism include, but are not limited to, the following: thyroid imaging (e.g., thyroid ultrasound, radioactive iodine uptake and scan); fine needle aspiration; thyroid peroxidase (TPO) antibodies; triiodothyronine (T3). These studies are not required for waiver submission, but all relevant test results should be forwarded with the waiver package.
5. Form FL4 with return to duty and ALC status.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. <u>Renewal Waiver Request</u>:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Updated head and neck examination, especially thyroid gland and lymph nodes.
    a. Summarize any interval evaluation and/or treatment.
    b. List current medications with dosages.
    c. Plan for ongoing clinical, laboratory, and (if applicable) radiographic monitoring. Must include timeline for repeating TSH measurements to assess stability and after medication dose adjustments.
2. All interval documentation from the treating medical providers.
3. Laboratory studies required:
    a. Current TSH and free T4.
    b. All interval thyroid function test results (e.g., TSH, free T4, etc.), with dates.
4. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, interval procedure reports, and any other ancillary tests.
5. Form FL4 with return to duty and ALC status.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Hypothyroidism is a relatively common condition defined by a deficiency of thyroid hormone. Subclinical hypothyroidism is also quite common and is characterized by a high thyroid stimulating hormone (TSH) with normal thyroid hormone level (free thyroxine (T4)). The clinical presentation of hypothyroidism is highly variable and depends upon the severity of thyroid hormone deficiency and the speed at which the deficiency develops. Common symptoms include fatigue, cold intolerance, weight gain, constipation, dry skin, myalgia, loss of libido in both men and women, menstrual irregularities in women, and erectile dysfunction in men. Mental slowness, depression, apathy, headache, arthralgias, myalgias, dyspnea on exertion, hair thinning/hair loss, and hoarseness can also occur. Symptoms of hypothyroidism are less prominent clinically and better tolerated when there is a gradual loss of thyroid function (as in most cases of primary autoimmune hypothyroidism) compared to the rapid onset of hypothyroidism that occurs following surgical thyroidectomy or radioactive iodine ablation.

When hypothyroidism is suspected, an appropriate laboratory evaluation begins with measurement of TSH and free T4 levels. An elevated TSH indicates the presence of primary hypothyroidism, while a low free T4 confirms a biochemical hypothyroid state. In the case of subclinical hypothyroidism, TSH is elevated above the reference range, but the free T4 is normal. Secondary (central) hypothyroidism is diagnosed when the serum free T4 concentration is abnormally low and the serum TSH concentration is not appropriately elevated. Central hypothyroidism results from inadequate TSH secretion, which can be caused by either acquired or congenital disorders of the hypothalamus or pituitary gland.

The major aeromedical concern associated with hypothyroidism is the insidious nature of the disease, which may delay a diagnosis until symptoms become significant enough to pose a potential threat to flying/operational safety. For this reason, close monitoring of patients with any history of overt hypothyroidism or subclinical hypothyroidism is essential. Importantly, improvement in the clinical symptoms of hypothyroidism can occur relatively quickly after the initiation of thyroid replacement therapy, although complete biochemical recovery may take as long as several months. Generally, TSH does not reach steady-state for at least six weeks following initiation or dose adjustment of exogenous thyroid hormone. However, an aeromedical waiver request can be initiated once a clinically euthyroid state is documented by the treating physician (i.e., the individual is asymptomatic). Asymptomatic subclinical hypothyroidism is not disqualifying, but repeat TSH and free T4 should be obtained at least annually.

Review of the AIMWTS database from Nov 2019 through Nov 2022 revealed 571 cases with a diagnosis of hypothyroidism. The breakdown of the number of waivers and number of total cases are tabulated below. Of the 20 DQs, only 2 were specific to hypothyroidism and/or associated therapies. One involved an untrained applicant treated with non-aircrew approved medication and the other involved use of thyroid replacement medication without clinical indication.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
E03.9	Hypothyroidism, unspecified	28/29	253/259	209/216	28/29	21/24	12/14

IV. Suggested Readings

1. Jonklaas J, Bianco AC, Bauer AJ, et al. Guidelines for the treatment of hypothyroidism: Prepared by the American Thyroid Association Task Force on Thyroid Hormone Replacement. Thyroid 2014;24:1670-1751. Available at https://www.liebertpub.com/doi/pdf/10.1089/thy.2014.0028. Accessed 14 November 2022.
2. Jonklaas J, Bianco AC, Cappola AR, et al. Evidence-Based Use of Levothyroxine/Liothyronine Combinations in Treating Hypothyroidism: A Consensus Document. Thyroid 2021;31:156-182. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8035928/pdf/thy.2020.0720.pdf. Accessed 14 November 2022.
3. Lefevre ML, on behalf of the U.S. Preventive Services Task Force. Screening for thyroid dysfunction: U.S. Preventive Services Task Force recommendation statement. Ann Intern Med 2015;162:641-650. Available at https://www.uspreventiveservicestaskforce.org/uspstf/document/RecommendationStatementFinal/thyroid-dysfunction-screening. Accessed 14 November 2022.

Aerospace Medicine Waiver Guide

Chronic Kidney Disease

Reviewed: May 2023
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Stacey Aycock (Aerospace Medicine Specialist); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver guide restructured. Updated to reflect current MSD and most recent professional guidelines.

I. Waiver Consideration

Functional impairment of either or both kidneys is disqualifying for all flying class and SWA duties. As defined by the Kidney Disease: Improving Global Outcomes (KDIGO) guidelines and the Kidney Disease Outcomes Quality Initiative (KDOQI), chronic kidney disease (CKD) is NOT synonymous or interchangeable with functional kidney impairment, although functional impairment often accompanies kidney disease. CKD is a heterogeneous group of disorders that may differ in underlying etiology, severity of structural abnormality, and degree of functional impairment.

One measure of kidney function is the estimated glomerular filtration rate (eGFR). However, eGFR alone does not define kidney function. Rather, kidney function encompasses all the broad physiologic processes that occur at the level of the kidney. For aeromedical and operational purposes, functional kidney impairment is defined as *either* an eGFR of less than 60 mL/min/1.73 m^3 *or* the presence of some other marker of kidney damage (e.g., proteinuria) that persists for at least three months. Milder decreases in eGFR (i.e., categories G1 and G2, or eGFR above 60 mL/min/1.73 m^3) are generally not classified as CKD and are not disqualifying. However, these individuals are at potential increased risk for progression to more advanced kidney disease and dysfunction, and close clinical follow-up is advised.

CKD stage 3a or worse, defined as an eGFR of 59 mL/min/1.73 m^3 or less, is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Additionally, kidney disease that requires treatment with immunosuppressant agents is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention.

Functional impairment of the kidneys and/or CKD may result from a range of different etiologies. The underlying disease process(es) may be independently disqualifying (e.g., polycystic kidney disease, glomerulonephritis, chronic obstructive uropathy with hydronephrosis, hypertension, diabetes mellitus, etc.). Additionally, sequelae or complications of CKD may be independently disqualifying (e.g., anemia, proteinuria, etc.). Please cross-reference the Medical Standards Directory for all potentially disqualifying conditions.

The use of any medication not included on the career field-approved medication list in the treatment or management of CKD or functional kidney impairment is also independently disqualifying for all flying class, ATC, and GBO personnel. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military

members, the use of a prescription medication or supplement for the treatment of kidney disease in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Waivers for CKD or functional kidney impairment may be considered for certain low-risk trained individuals on a case-by-case basis after a careful assessment of individualized aeromedical and operational risk. Waivers are unlikely to be entertained for untrained personnel. Factors weighed when assessing suitability for waiver include the severity of the kidney disease, its underlying cause, the service member's stability, the risk of progression, any associated complications, the cumulative risk of all comorbid conditions, and risks associated with any required treatments. Advanced or rapidly progressive kidney disease, evidence of metabolic instability, or anticipated need for renal replacement therapy (i.e., dialysis) are generally not compatible with aeromedical or operational waivers.

Table 1: Waiver potential for Chronic Kidney Disease (CKD)

Flying Class	Condition	Waiver Potential[1] Waiver Authority[2]	ACS Review or Evaluation
FC I/IA	Functional impairment of one or both kidneys[3]	Unlikely AFRS/CMO	No
FC II/III/SWA	Functional impairment of one or both kidneys, stable and otherwise uncomplicated[3]	Yes MAJCOM	Yes
	CKD stage 3a or worse, defined by an eGFR of 59 mL/min/1.73 m^3 or lower, stable and otherwise uncomplicated	Yes[1] MAJCOM	Yes
	CKD requiring dialysis or immunosuppressive therapy	Unlikely MAJCOM	No
ATC/GBO/OSF	CKD stage 3a or worse, defined by an eGFR of 59 mL/min/1.73 m^3 or lower, stable and otherwise uncomplicated	Yes[1] MAJCOM	Yes
	CKD requiring dialysis or immunosuppressive therapy	Unlikely MAJCOM	No

1. Untrained personnel of any class are unlikely to receive a waiver.
2. Certification authority for untrained assets is AFRS/CMO. Waiver authority for aeromedically unapproved medication use is AFMRA.
3. For aeromedical purposes, functional kidney impairment is defined as either an eGFR ≤ 59 mL/min/1.73m3 or the presence of some other marker of kidney damage (e.g., proteinuria) that persists for at least three months.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative)
    b. Summary of diagnostic evaluation and specify the underlying cause(s) of kidney functional impairment and/or chronic kidney disease (CKD)
    c. Specify the presence or absence of complications related to kidney disease (e.g., anemia, hypertension, dyslipidemia, electrolyte abnormalities, acid-base abnormalities, hyperphosphatemia, bone disease, etc.)
    d. List all past and ongoing treatments for the underlying disease process or for its complications. Include the following: all procedures; all current and historic medications, dosages, dates of administration; any adverse effects or complications stemming from treatment
    e. List all co-morbid conditions
    f. List current medications with dosages
2. Consultation report from the treating nephrologist and all subsequent consultation notes.
3. Laboratory studies required:
    a. Random or spot urine protein/creatinine ratio *or* 24-hour urine collection with measurement of creatinine and protein
    b. Urinalysis and urine microscopy
    c. Current CBC
    d. Current BMP (use the CKD-EPI equation to calculate eGFR)
    e. Current phosphorus and magnesium
    f. Current total serum protein and albumin
    g. Current calcium, 25-OH vitamin D, and intact parathyroid hormone measured on the same blood draw
    h. Fasting lipid panel
4. Imaging studies required (radiology report is sufficient): Renal ultrasound
5. Results of any other testing performed during diagnosis, evaluation, and management of CKD or functional impairment, including laboratory studies and any other ancillary studies. If a kidney biopsy is performed, include pathology report.
6. Form FL4 with return to duty and ALC status if service member did not meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms, objective findings, or interval flares.
    b. Specify presence or absence of complications (e.g., anemia, hypertension, dyslipidemia, electrolyte abnormalities, acid-base abnormalities, hyperphosphatemia, bone disease, etc.)
    c. Complete list of current medications with dates of initiation, dosages, and all adverse effects
2. All relevant interval consultation reports from the treating nephrologist.
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, and any other ancillary tests. The following must be included:
    a. Random or spot urine protein/creatinine ratio *or* 24-hour urine collection with measurement of creatinine and protein
    b. Current CBC
    c. Current BMP (use the CKD-EPI equation to calculate eGFR)
    d. Current phosphorus and magnesium
    e. Current total serum protein and albumin
    f. Current calcium, 25-OH vitamin D, and intact parathyroid hormone measured on the same blood draw
    g. Fasting lipid panel
4. Form FL4 with return to duty and ALC status if service member did not meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Individuals with structural kidney abnormalities or with a history of kidney damage but with preserved estimated glomerular filtration rate and no other evidence of kidney dysfunction may be at increased risk of progression to more advanced kidney disease, but without immediate health implications. These persons are not considered to have chronic kidney disease, and their aeromedical and operational risk is low. When there is clear evidence of functional impairment or a decrease in eGFR $\leq$ 59 mL/min/1.73 m^3 that persists beyond three months, aeromedical and operational risk rises to the threshold of necessitating a waiver. Predominant among these risks are the potential for electrolyte and volume shifts, which may occur rapidly and be associated with symptoms that result in performance decrement or incapacitation in a military environment. For example, the first presenting sign of electrolyte abnormalities might range from mild muscle weakness to confusion to a fatal cardiac arrhythmia. Furthermore, there is a risk that the aviation or operational environment could potentiate or exacerbate electrolyte and fluid shifts (e.g., by predisposing to dehydration, difficulty following a renal diet due to lack of available food options, etc.).

At more advanced stages, CKD is associated with further complications that are potentially incompatible with sustained aviation and enhanced military operations. Examples of such

complications include anemia, bone disease, and cardiovascular disease. The natural course of progression and development of complications are often unpredictable, even with close clinical and laboratory monitoring.

Many different conditions that cause kidney injury can lead to CKD. Examples of disparate disease processes that converge on the common endpoint of CKD include medication toxicity (most commonly NSAIDs, but other nephrotoxins are also implicated), hypertensive nephrosclerosis, diabetic nephropathy, immunologic processes, chronic obstructive uropathy, and congenital kidney disease. The underlying disease state(s) that result in functional kidney impairment or CKD may be associated with additional symptoms or complications that convey increased aeromedical or operational risk. Therefore, it is essential that the etiology of the CKD be elucidated in order to perform an appropriate risk assessment. Many of these underlying conditions are independently disqualifying for continued duties and are associated with unique waiver considerations. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for additional information.

Active treatment with systemic glucocorticoids or immunosuppressive therapy is unlikely to be found amenable to waiver. The previous use of systemic glucocorticoids for more than three consecutive weeks in any 12-month period is independently disqualifying and requires demonstration of an intact hypothalamic-pituitary-adrenal (HPA) axis prior to waiver consideration. Please refer to the Aerospace Medicine Waiver Guide Chapter *Systemic Glucocorticoid (Steroid) Therapy.*

Review of the AIMWTS database from May 2020 through May 2023 revealed just 6 cases coded with a diagnosis of isolated chronic kidney disease without mention of other underlying disease process(es). Only one of the 6 cases had an eGFR ≤ 59 mL/min/1.73m3. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
N18.9	Chronic Kidney Disease, unspecified	0/0	10/10	12/13	5/5	1/1	2/2

IV. Suggested Readings

1. Inker LA, Astor BC, Fox CH, et al. KDOQI US commentary on the 2012 KDIGO clinical practice guideline for the evaluation and management of CKD. Am J Kidney Dis 2014; 63:713-735. Available at https://www.ajkd.org/article/S0272-6386(14)00491-0/fulltext. Accessed 12 May 2023.
2. National Kidney Foundation. KDOQI clinical practice guidelines for chronic kidney disease: evaluation, classification, and stratification. Am J Kidney Dis 2002; 39:S1-266. Available at http://kidneyfoundation.cachefly.net/professionals/KDOQI/guidelines_ckd/index.htm. Accessed 12 May 2023.
3. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO clinical practice guideline for the evaluation and management of chronic kidney disease. Kidney Int Suppl 2013; 3:v-150. Available at https://kdigo.org/wp-content/uploads/2017/02/KDIGO_2012_CKD_GL.pdf. Accessed 12 May 2023.
4. Vassalotti JA, Centor R, Turner BJ, et al. Practical approach to detection and management of chronic kidney disease for the primary care clinician. Am J Med 2016; 129:153-162. Available at http://www.amjmed.com/article/S0002-9343(15)00855-4/pdf. Accessed 12 May 2023.

Aerospace Medicine Waiver Guide

Lyme Disease

Reviewed: May 2023
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator); Lt Col Paul Vu (AFRMA Medical Standards Policy Chief)

Significant Changes: Waiver guide restructured. Updated to reflect the most recent MSD.

I. Waiver Consideration

The diagnosis of Lyme disease alone is not disqualifying for any aviation or operational duty. Symptomatic Lyme disease may require duties not including flying, controlling, or alert (DNIF/DNIC/DNIA) until completion of an appropriate course of treatment and resolution of any symptoms that might impair a service member's ability to function at full capacity in the aviation or operational environment. As with other symptomatic conditions that are not explicitly disqualifying, the DNIF/DNIC/DNIA decision and timing of return to flight or operational status is at the discretion of the flight surgeon.

Complications of Lyme disease may be disqualifying. Examples of potentially disqualifying complications include, but are not limited to, neurologic involvement such as meningitis, cardiac arrhythmias, atrioventricular block, myopericarditis, or chronic arthritis. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for all potentially disqualifying complications of Lyme disease.

The antibiotic doxycycline is first line treatment for Lyme disease. In the absence of a previous ground trial, this medication requires a DNIF/DNIC/DNIA period until the potential for idiosyncratic reaction is rule out. See the appropriate career field medication list for additional details. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of any medication for the treatment of Lyme disease in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

II. Information Required for Waiver Submission

Not applicable. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for all potentially disqualifying complications of Lyme disease and applicable waiver submission requirements.

III. Aeromedical Concerns

The symptoms of uncomplicated Lyme disease may include arthralgias, fatigue, headache, neck pain, and fever. Active infection is not conducive to the safe performance of aviation or operational duties. A period of DNIF/DNIC/DNIA is appropriate during the symptomatic period, with return to status at the discretion of the flight surgeon after completion of appropriate treatment and full recovery. As with all infectious diseases, when Lyme disease is recognized and treated early and when symptoms fully resolve without complication, it is appropriate to return the recovered service member to full status without need for waiver. Unfortunately, Lyme disease may result in complications that convey significant risk to the safety of the individual service member and the aviation or operational mission. Such complications are independently disqualifying. When complications arise or symptoms persist beyond the completion of initial therapy, then further medical evaluation is indicated, specialist referral is typically necessary, and waiver for the complication or chronic symptom becomes necessary prior to return to aviation or operational duties.

Cardiac manifestations of Lyme disease include conduction disturbances and inflammation of cardiac muscle, the pericardium, or both. Among the conduction disturbances associated with Lyme disease are the new onset of atrioventricular (AV) blocks, particularly Mobitz II second degree and third degree (complete) blocks, which can lead to sudden death, syncope, bradycardia, or heart failure. Ongoing Lyme carditis causing even mild myocardial dysfunction is incompatible with military aviation duties due to the risk for sudden incapacitation. Please refer to the appropriate cardiovascular Aerospace Medicine Waiver Guide chapters. Examples of potentially applicable Waiver Guide chapters include, but are not limited to, the following: *Cardiac Conduction Delay*; *Pericardial and Myocardial Disorders, Including Pericarditis, Myopericarditis, and Myocarditis*; and *Cardiomyopathy*. Several arrhythmias are also independently addressed in the Aerospace Medicine Waiver Guide. Lack of a specific Waiver Guide chapter should not be inferred to indicate that a persistent symptom or complication is not disqualifying. Please cross-reference the Medical Standards Directory.

Neurologic manifestations of Lyme disease are also of paramount aeromedical and operational concern. The neurologic involvement of Lyme disease may present in myriad ways, with consequences ranging from cognitive impairment or decreased level of consciousness (meningoencephalitis) to focal neurologic deficits (neuritis, radiculoneuropathy, myelitis), seizures, headaches, or visual sequelae (diplopia, abnormal eyelid function). Bell's palsy (unilateral or bilateral impairment of facial nerve) may lead to the inability to close one or both eyelids, leading to eye irritation and vision decrement. Facial muscle weakness may result in impaired swallowing and the pooling of food and liquids, including saliva. Speech may also be affected. The fit of the aviator mask may be adversely impacted by facial weakness. Please refer to the appropriate cardiovascular Aerospace Medicine Waiver Guide chapters. Examples of potentially applicable Waiver Guide chapters include, but are not limited to, the following: *Headache*; *Seizures, Epilepsy, and Abnormal EEG*; *Meningitis and Encephalitis*; and *Bell's Palsy*. Again, lack of a specific Waiver Guide chapter should not be inferred to indicate that a persistent symptom or complication is not disqualifying. Please cross-reference the Medical Standards Directory.

Ocular involvement in Lyme disease includes conjunctivitis, uveitis, and keratitis. Please cross-reference the Medical Standards Directory for any ophthalmologic complications that develop. Chronic fatigue, pain, arthralgias, and/or subjective mood or cognitive changes that persist beyond definitive treatment of the Lyme infection should be evaluated by a specialist, and alternative explanations for symptoms must be carefully excluded. Ongoing symptoms of sufficient severity to impact safe and effective execution of aviation or operational duties likely necessitates DNIF/DNIC/DNIA at the discretion of the flight surgeon, and a waiver for the symptoms may be required. Again, please cross-reference the Medical Standards Directory and Aerospace Medicine Waiver Guide for any complication of treated Lyme disease and for all ongoing symptoms or sequelae following definitive therapy for Lyme infection.

Please use *only* this ICD-10 code for AIMWTS coding purposes	
A69.20	Lyme disease, unspecified

IV. Suggested Readings

1. Association of Public Health Laboratories. Suggested Reporting Language, Interpretation and Guidance Regarding Lyme Disease Serologic Test Results. May 2021. Available at https://www.aphl.org/aboutAPHL/publications/Documents/ID-2021-Lyme-Disease-Serologic-Testing-Reporting.pdf. Accessed 26 May 2023.
2. Branda JA and Steere AC. Laboratory testing of Lyme Borreliosis. Clin Microbiol Rev 2021; 34:e00018-19. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7849240/. Accessed 26 May 2023.
3. Centers for Disease Control and Prevention. Lyme Disease. Last reviewed: 19 September 2022. Available at https://www.cdc.gov/lyme/healthcare/index.html. Accessed 26 May 2023.
4. Lantos PM, Rumbaugh J, Bockenstedt LK, et al. Clinical Practice Guidelines by the Infectious Diseases Society of America (IDSA), American Academy of Neurology (AAN), and American College of Rheumatology (ACR): 2020 Guidelines for the Prevention, Diagnosis and Treatment of Lyme Disease. Clin Infect Dis 2021; 72:1-8. Available at https://www.idsociety.org/practice-guideline/lyme-disease/. Accessed 26 May 2023.

Malaria and Antimalarial Medications

Revised: February 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Maj Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Suggested readings updated.

I. Waiver Consideration

Any aircrew or special duty operator who contracts malaria requires DNIF, DNIC, or DNIA until successfully treated and fully recovered. With respect to malarial prophylaxis, there are several antimalarial medications which are approved for aeromedical and operational use without need for a waiver. These medications can be found in the "Official Air Force Aerospace Medicine Approved Medications" and "Official Air Force Ground Based Operator (GBO) Approved Medications" lists. The approved medications currently are chloroquine (Aralen®), doxycycline (Vibramycin®), primaquine (PQ), and atovaquone/proguanil (Malarone®). Ground testing requirements to exclude idiosyncratic reactions for all of these medications are identical, but the prescribing parameters differ between medications. Mefloquine (Larium®) IS NOT APPROVED for aeromedical and operational use. If mefloquine is mistakenly administered, a DNIF/DNIC/DNIA period of four weeks is required to observe for the development of neuropsychological side effects.

There are a variety of factors that will influence decision-making regarding malarial prophylaxis. Choice of an appropriate antimalarial depends on the distribution of *Plasmodium* spp. in the area(s) that will be traveled through, local drug resistance patterns, and length of anticipated exposure. Timing will also influence antimalarial choice. Some of the approved prophylaxis agents require initiation up to a week before travel, and the length of terminal prophylaxis after return from the endemic area also varies. For travel or deployment with short notice, one of the medications that does not require preloading would be preferred. Other factors that will influence aeromedical decision-making include the availability of established medical infrastructure at the destination and individual tolerability, side effects, or contraindications of the particular medications. Currently, there is no unified policy regarding malaria prophylaxis in USAF personnel. Different MAJCOMs or theater commanders may implement specific policies with consideration for the unique nature of their mission.

II. Information Required for Waiver Submission

Not Applicable. Please cross-reference the appropriate career field medication list.

III. Aeromedical Concerns

The prescribing of antimalarial medications by Flight Medicine providers for use in USAF aircrew and special duty operators is common due to the frequency of deployments to malaria endemic areas. To prevent malaria and to maintain the health and operational readiness of aircrew and special duty operators, a proper understanding of this disease and the use of

antimalarial chemoprophylaxis is essential. Malaria comprises at least five protozoan species transmitted by female *Anopheles* mosquitoes that bite primarily in the dark hours from dusk to dawn. *Plasmodium falciparum* may be rapidly fatal in nonimmune visitors to endemic areas; the other species (most commonly *P. vivax*, *P. ovale*) much less commonly cause severe disease, but infected individuals may relapse many weeks to months after exposure due to latent infection harbored in the liver. Both primary and relapsing malaria represent infection of erythrocytes—with multiple attendant complications—resulting at least in an uncomfortable, febrile syndrome that is incompatible with the aviation or operational environment.

Prevention is the first and best line of defense against malaria, including personal protective measures combined with strategies to avoid mosquito bites. Appropriate antimalarial chemoprophylaxis taken correctly should prevent clinical malaria disease during travel, but malaria infection can occur if the above protective measures fail and/or doses of chemoprophylaxis are missed. Malaria that is acquired while taking chemoprophylaxis may be atypical in presentation, delayed in onset, and more difficult to diagnose and differentiate from other illnesses. Relapsing forms of malaria (non-*falciparum* species) are prevented and cleared of their latent hepatic forms only by primaquine, its use variably termed "terminal prophylaxis," "presumptive anti-relapse therapy," or "radical cure."

Among the available chemoprophylactic agents, mefloquine (Larium®) is NOT APPROVED FOR USE due to potential neuropsychiatric side effects. Given its long half-life, members taking mefloquine by mistake must remain DNIF/DNIC/DNIA for four weeks and observed for adverse effects. Mefloquine is medically contraindicated for anyone with significant psychiatric history or cardiac conduction abnormality. Chemoprophylaxis approved for use by aircrew or special duty operators includes chloroquine (Aralen®), doxycycline (Vibramycin®), atovaquone/proguanil (Malarone®), and primaquine (PQ).

Chloroquine has a long half-life, making it appropriate for weekly dosing. Ground trial is required due to potential side effects such as nausea, abdominal discomfort, palpitations, agranulocytosis (or multiple cytopenias), headache, lightheadedness, ataxia, vertigo, tinnitus, sensorineural hearing loss, diarrhea, pruritus, fatigue, and visual symptoms (accommodation disturbance, blurred vision, scotoma, color vision changes, and visual field defects). Chloroquine may suppress the cell-mediated immune response, contributing to complications such as reactivation of the herpes viruses (e.g. zoster). Personnel experiencing significant neurological side effects must remain DNIF/DNIC/DNIA for four weeks while observed for side effect resolution. Members taking chloroquine for longer than several months should be examined periodically for visual adverse effects, including acuity and color discrimination. Although FDA indicated for malaria chemoprophylaxis, hydroxychloroquine currently is not approved for use in aircrew or special duty operators for the purpose of malaria prevention. Its use for this indication would require a waiver. Hydroxychloroquine has an adverse effect profile that is similar to chloroquine; both may prolong the QTc interval. In areas with chloroquine-sensitive *P. falciparum*, both chloroquine and hydroxychloroquine in adults is administered once weekly beginning one to two weeks prior to exposure, during exposure, and for four weeks following exposure.

Doxycycline is a daily chemoprophylaxis agent with a half-life so short that it needs to be taken reliably every 24 hours (regardless of number of time zones crossed). Ground trial is required to detect idiosyncratic reactions and demonstrate tolerability. Common adverse effects include gastrointestinal upset (ameliorated by taking with food), headache, tinnitus, photosensitivity, and vulvovaginal candidiasis. Pill esophagitis is a rare complication which can be avoided by taking with plenty of fluids and avoiding recumbence immediately after a dose. Doxycycline in adults is administered once daily beginning one to two days prior to exposure, during exposure, and for four weeks following exposure.

Atovaquone/proguanil (Malarone®) is a daily chemoprophylaxis agent that has a low rate of discontinuation due to side effects. Single-dose ground trial is required. Adverse effects may include nausea, abdominal discomfort, and headache; but photosensitivity and neuropsychiatric manifestations are not characteristic. Atovaquone/proguanil represents a more expensive malaria prophylaxis option, but it may be required preferentially for some regions (e.g., USAFRICOM AOR). Atovaquone/proguanil in adults is administered once daily beginning one to two days prior to exposure, during exposure, and for one week following exposure.

Primaquine (PQ) generally is reserved for terminal prophylaxis after travel to areas in which there is significant risk for exposure to non-*falciparum* malaria (relapsing species). PQ use per policy (e.g., for Force Health Protection purposes) must be in accordance with FDA indications, i.e. 15 mg daily for two weeks. However, the clinical (non-policy) off-label dosing of 30 mg daily for two weeks is more commonly used and widely accepted among travel medicine practitioners. PQ has also been used (similarly off-label) as a 30 mg daily primary chemoprophylaxis agent in areas without reported *P. falciparum*. Specifically, for short duration travel to areas with principally *P. vivax*, PQ is administered once daily beginning one to two days prior to exposure, during exposure, and for one week following exposure. G6PD activity must be assessed prior to any PQ use, and PQ is not recommended for pregnant or breastfeeding women due to the unknown G6PD status of the infant. Single-dose ground trial is required prior to aircrew or operational use. Adverse effects may include abdominal discomfort, nausea, rash, headache, pruritus, interference with accommodation, cytopenias (even in G6PD-normal individuals), and methemoglobinemia.

IV. Suggested Readings

Resources available to the flight medicine providers caring for individuals travel to or deploy to at-risk locations:

Centers for Disease Control and Prevention
https://www.cdc.gov/malaria/about/distribution.html (geographic distribution)
https://www.cdc.gov/malaria/travelers/country_table/a.html (drug resistance by country)
Yellow Book: Health Information for International Travel (CDC publication)
https://wwwnc.cdc.gov/travel
Travax, US DoD website for operational travel medicine (CAC required)
https://www.travax.com/account/login/dod
Armed Forces Pest Management Board
https://www.acq.osd.mil/eie/afpmb/
Malaria Field Guide (US Army Public Health Command publication)
https://phc.amedd.army.mil/PHC%20Resource%20Library/ento-malaria-field-guide-tg336.pdf
World Health Organization. Guidelines for the treatment of malaria. Updated 13 July 2021.
https://www.who.int/teams/global-malaria-programme/guidelines-for-malaria

Aerospace Medicine Waiver Guide

Osteoarthritis

Reviewed: May 2023
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver Guide restructured. Updated to reflect current MSD.

I. Waiver Consideration

Arthritis of any type that interferes with the ability to follow a physically active lifestyle or that may be reasonably expected to preclude the satisfactory performance of aviation or operational duties is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. Additionally, primary osteoarthritis (OA) is specifically disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention if symptoms are severe enough to require follow-up with a specialist more frequently than annually. Furthermore, OA that results in any chronic impairment of duty performance, impacts deployability, or that is treated with recurrent use of scheduled II-IV medications is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention.

An aeromedical or operational waiver is considered appropriate if the OA does not result in functional limitation, pain is controlled with acetaminophen or career field-approved non-steroidal anti-inflammatory drugs (NSAIDs), and chronic use of these medications is tolerated by the individual without adverse effect. Flyers with OA of the spine that is of sufficient severity to necessitate medication to manage pain (includes over-the-counter medication and injections) or that results in clinical follow-up for the indication of the OA more than annually and who are otherwise eligible for an aeromedical waiver may be restricted to FC IIB, non-ejection seat aircraft.

Uncontrolled pain, functional impairment, or occupational limitation necessitates duties not including flying, controlling, or alerts (DNIF/DNIC/DNIA) until treatment is optimized. The use of any medication not included on the career field-approved medication list is independently disqualifying. Use of a non-approved medication often signals more severe disease, which may not be amenable to waiver. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of OA in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

If symptoms or limitations persist despite optimized conservative measures, then disqualification may be considered. If joint replacement is recommended by the treating specialist, please cross-reference the Medical Standards Directory and Air Force Waiver Guide *Retained Orthopedic Device and Joint Replacement* chapter to inform aeromedical and operational judgment. Waiver considerations should not take precedence over best clinical decision-making.

Table 1: Waiver potential for Osteoarthritis (OA)

Flying Class	Condition	Waiver Potential Waiver Authority[1]	ACS Review or Evaluation
FC I/IA	Primary OA, not requiring medication to control pain, without functional or occupational limitation	Yes AFRS/CMO	No
	Primary OA, requiring medication to control pain[2]	Unlikely[3] AFRS/CMO	No
	Primary OA, with ongoing chronic pain or with functional/occupational limitation	Unlikely AFRS/CMO	No
FC II/III/ATC GBO/OSF/SWA	Primary OA, symptoms controlled with conservative measures and not requiring use of aeromedically unapproved medications, without persistent functional/occupational limitation	Yes[3] MAJCOM	No
	Primary OA, treated with aeromedically unapproved medications, or with ongoing chronic pain, or with functional/occupational limitation	Unlikely[4] MAJCOM	No

1. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMRA.
2. For aeromedical and operational purposes, "medications" includes over-the-counter systemic medications (e.g., acetaminophen, career field-approved NSAIDs) and injections.
3. Any recurrent use of medication to treat pain symptoms of OA is generally felt incompatible with waiver for FC I/IA duties and is also considered unfavorably for other untrained applicants, especially those applying for more physically demanding career fields.
4. If symptoms or limitations persist despite optimized conservative measures, then disqualification may be considered. If joint replacement is recommended by the treating specialist, please cross-reference the Medical Standards Directory and Air Force Waiver Guide *Retained Orthopedic Device and Joint Replacement* chapter to inform aeromedical and operational judgment.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
        i. Include history of previous orthopedic injuries and/or trauma
        ii. Include description of past and present physical activity level
        iii. Document a thorough joint/musculoskeletal examination, including range of motion and strength testing of all affected joints; comment on presence or absence of muscle atrophy, muscle or joint tenderness, edema, effusion, synovitis, joint deformities, and any abnormalities of skin or nails.
    b. Specify presence or absence of any lifestyle or occupational limitations due to symptoms or sequelae of osteoarthritis (OA).
    c. Summary of all treatments trialed, their effectiveness, and any adverse effects.
    d. List current medications with dosages (include all over-the-counter medications and supplements).
    e. List all co-morbid conditions.
2. Consultation report from any treating specialists (e.g., orthopaedics, sports medicine, rheumatology, physical therapy) and all subsequent consultation notes, if applicable.
3. Results of any testing performed during diagnosis, evaluation, and management of osteoarthritis, including laboratory studies, imaging results (radiology reports are sufficient) and any other ancillary studies.
    a. Testing is guided based on clinical indication.
    b. Examples of studies that may be obtained in the evaluation of OA include, but are not limited to, rheumatoid factor, anti-cyclic citrullinated peptide, erythrocyte sedimentation rate, C-reactive protein level, plain radiographs, magnetic resonance imaging, etc.
    c. Include all relevant imaging results (radiology reports are sufficient).
4. FL4 with return to duty and ALC status if servicemember didn't meet retention standards

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms, objective findings, or interval exacerbations.
    b. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
2. All relevant interval consultation reports from any treating specialists (e.g., orthopaedics, sports medicine, rheumatology, physical therapy), if applicable.
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, and any other ancillary tests.
4. FL4 with return to duty and ALC status if servicemember didn't meet retention standards

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Osteoarthritis (OA) is the most common cause of arthritis in both general and military populations. Presentation and the rate of progression vary considerably, but joint pain and functional limitation are eventual characteristic features of OA in most affected individuals. As opposed to the pain of inflammatory arthritis, the joint pain of OA tends to worsen with activity or use and improve with rest. The pain of mild OA may be episodic and predictably provoked with specific activities. Over time, OA pain often progresses to become more constant, with less predictable paroxysms of severe pain against a background of almost continual dull pain. At this stage, OA usually manifests as functional impairments. The pain itself may lead to a sense of exhaustion or may interfere with sleep, resulting in chronic fatigue. Other associated symptoms include joint stiffness, swelling, progressive joint deformity, restricted range of joint mobility, and/or joint instability.

In a flying or operational environment, these symptoms may be distracting or lead to a decrement in duty performance. At worst, pain or loss of joint mobility and function may result in an inability to perform essential duties, may interfere with wear of aviation or military equipment, and may inhibit safe egress in the event of an emergency.

The primary treatment goals for individuals with OA are to control symptoms and minimize functional limitations. Management is often multimodal, incorporating both pharmacologic and non-pharmacologic (e.g., physical therapy, psychosocial support, sleep hygiene, addressing comorbid mood disorders and medical conditions, smoking cessation, etc.) interventions. First-line medications to control pain are often either acetaminophen or an NSAID. There is no strong evidence indicating one NSAID is more effective than another in the management of OA, although certain NSAIDs may be associated with a higher risk of adverse effects, such as myocardial infarction. The non-selective NSAIDs ibuprofen and naproxen are approved for chronic use with a waiver in aircrew and ATC personnel. Celecoxib and meloxicam may be used chronically without a waiver. Other NSAIDs are not formally approved for chronic use in aircrew or ATC personnel. The chronic use of NSAIDs (except for ketorolac) does not require a waiver for GBO personnel.

The use of any medication not included on the applicable career field-approved medication list is disqualifying. Rarely, the use of a non-approved agent may be considered on a case-by-case basis in an otherwise low-risk trained service member in a low-risk operational environment. However, recourse to non-approved interventions is indicative of the severity of the underlying condition, which may not be amenable to waiver. The aeromedical and operational risk of the medication will also be carefully weighed.

Review of the AIMWTS database from May 2020 through May 2023 revealed 24 waiver packages with a diagnosis of osteoarthritis. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
M19.9	Osteoarthritis, unspecified site		14/14	5/6	2/2		1/2

IV. Suggested Readings

1. Bannuru RR, Osani MC, Vaysbrot EE, et al. OARSI guidelines for the non-surgical management of knee, hip, and polyarticular osteoarthritis. Osteoarthritis Cartilage 2019; 27:1578-1589. Available at https://linkinghub.elsevier.com/retrieve/pii/S1063-4584(19)31116-1. Accessed 26 May 2023.
2. Department of Veterans Affairs (VA)/Department of Defense (DoD): Clinical practice guideline for the non-surgical management of hip & knee osteoarthritis, version 2.0. Available at https://www.healthquality.va.gov/guidelines/cd/oa/index.asp. Accessed 26 May 2023.
3. Kolasinski SL, Neogi T, Hochberg MC, et al. 2019 American College of Rheumatology/Arthritis Foundation Guideline for the Management of Osteoarthritis of the Hand, Hip, and Knee. Arthritis Care Res 2020; 72:149-162. Available at https://onlinelibrary.wiley.com/doi/10.1002/acr.24131. Accessed 26 May 2023.
4. Martel-Pelletier J, Maheu E, Pelletier JP, et al. A new decision tree for diagnosis of osteoarthritis in primary care: international consensus of experts. Aging Clin Exp Res 2019; 31:19-30. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6514162/. Accessed 26 May 2023.

Aerospace Medicine Waiver Guide

Osteoporosis and Osteopenia

Revised: Aug 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick and Maj Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver guide restructured, suggested readings updated.

I. Waiver Consideration

Any history of osteopenia or osteoporosis is disqualifying for all flying class and SWA duties. Uncomplicated, asymptomatic osteopenia or osteoporosis is not disqualifying for GBO, ATC, or OSF duties. However, osteopenia or osteoporosis that requires specialist follow-up more frequently than annually or that results in sequelae (e.g., pain, weakness, deformity) that interfere with the wear of required occupational/deployment equipment is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention.

An individual with a secondary cause of bone mineral density loss may be disqualified due to the primary condition. The use of any medication not included on the applicable career field medication list is disqualifying for ongoing aviation or operational duty and would necessitate a waiver. Please cross-reference the Medical Standards Directory, Air Force Waiver Guide, and appropriate career field medication list for all potentially disqualifying conditions and treatments. Although a career field medication list for OSF or SWA personnel does not exist, the use of a prescription medication or supplement for the treatment of low bone density in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Osteopenia and osteoporosis are diagnosed based on low bone mineral density, measured by dual energy X-ray absorptiometry (DEXA or DXA), and assessed as the number of standard deviations (SD) from a population mean. The number of SDs from the mean bone density at a given site of measurement is expressed as either a Z-score or T-score. The Z-score, rather than the T-score, should be used to assess bone loss in premenopausal women and men younger than 50 years of age. The Z-score compares an individual's bone mineral density with an age-matched reference population. Any Z-score worse than -2.0 SD below the mean represents abnormally low bone density and necessitates further evaluation. *Low bone density that does not meet the diagnostic definition of osteopenia or osteoporosis is not disqualifying in the absence of other disqualifying factors*.

The reference mean used to calculate the T-score is based upon the bone density of a young premenopausal, healthy, female population. The International Society for Clinical Densitometry (ISCD) recommends using the World Health Organization (WHO) diagnostic criteria for osteoporosis in post-menopausal women and men aged 50 years or older. By WHO criteria, T-scores between -1.0 and -2.5 are categorized as osteopenia; while T-scores of -2.5 or worse are categorized as osteoporosis. A T-score below 0 but not as low as -1.0 may represent low bone density relative to the healthy mean, but it does not fit the diagnostic definition of osteopenia based on WHO criteria and ISCD recommendations. Low bone density that does not meet the definition of osteopenia or osteoporosis is not disqualifying in the absence of other disqualifying

factors. Any history of a fragility fracture is diagnostic of osteoporosis, regardless of the T-score. Any history of a fragility fracture is diagnostic of osteoporosis, regardless of the Z-score or T-score.

In the absence of any indication for pharmacologic therapy, individuals who are disqualified due to osteopenia and are otherwise asymptomatic may submit for a waiver after completion of all necessary endocrinologic and metabolic evaluation to exclude secondary causes of bone mineral loss. All other service members with complications related to osteoporosis/osteopenia may submit a waiver once an appropriate endocrinologic and metabolic evaluation is complete and the individual is stable and tolerating clinically-appropriate therapy without adverse effects. It is expected that individuals requesting a waiver will be recovered from any fractures or other complications without residual pain or sequelae that could interfere with aviation or operational duties, including the wearing of aviation or deployment equipment. The use of an aeromedically unapproved medications for the treatment of osteopenia or osteoporosis will not be considered favorably for waiver. Generally, aviators with any history of fragility fracture will only be considered for a restricted waiver, limited to non-high performance and non-ejection seat aircraft. Due to the risk of future fracture, certain high-velocity or high-impact activities are contraindicated in the setting of severe osteoporosis, osteopenia with a high estimated risk of fracture (e.g., based on the Fracture Risk Assessment Tool (FRAX®)), or a history of previous fragility fracture. In these cases, a waiver restriction prohibiting certain duties may be considered (e.g., no parachute or jump duty).

Table 1: Waiver potential for Osteoporosis and Osteopenia

Flying Class	Condition[1]	Waiver Potential Waiver Authority[2]	ACS Review or Evaluation
FC I/IA	Any history of osteopenia or osteoporosis	Yes AFRS/CMO	No[3]
FC II/III/ SWA	Any history of osteopenia or osteoporosis	Yes MAJCOM	No[3]
ATC/GBO/OSF	Osteopenia or osteoporosis that requires specialist follow-up more frequently than annually or with sequelae that interfere with the wear of required deployment/survival equipment	Yes MAJCOM	No[3]

1. The underlying etiology of secondary osteoporosis may be independently disqualifying. The use of any aeromedically unapproved medication is independently disqualifying. Please cross-reference the Medical Standards Directory, Air Force Waiver Guide, and appropriate career field medication list for all potentially disqualifying conditions.
2. Certification authority for untrained assets is AFRS/CMO. Certification authority for non-approved medication use is AFMRA.
3. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Summary of diagnostic evaluation and treatment history, including list of any/all procedures with dates.
    c. Specify presence or absence of any secondary cause of bone density loss.
    d. List current medications with dosages.
2. Consultation report from the treating endocrinologist and all subsequent consultation notes, if applicable.
3. Laboratory studies required:
    a. Current CMP.
    b. Current phosphorus.
    c. Current 25-OH vitamin D level.
    d. 24-hour urine calcium.
    e. Intact parathyroid hormone level and serum calcium (drawn simultaneously).
    f. Thyroid stimulating hormone (TSH) level.
4. Imaging studies required (radiology report is sufficient):
    a. Initial dual energy X-ray absorptiometry (DEXA or DXA) study and all subsequent follow-up studies
    b. X-rays of any fragility fractures
5. Results of all testing performed during diagnosis, evaluation, and management of osteopenia or osteoporosis, including laboratory studies, imaging, and any other ancillary studies.
6. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Summarize any interval evaluation and/or treatment.
    c. List current medications with dosages.
2. All interval consultation reports from the treating endocrinologist, if applicable.
3. Laboratory studies required:
    a. Current CMP.
    b. Current phosphorus.
    c. Current 25-OH vitamin D level.

    d. Intact parathyroid hormone level and serum calcium (drawn simultaneously).
    e. Thyroid stimulating hormone (TSH) level.
4. Imaging studies required (radiology report is sufficient):
    a. All interval dual energy X-ray absorptiometry (DEXA or DXA) studies.
    b. X-rays of any interval fragility fractures.
5. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, interval procedure reports, and any other ancillary tests.
6. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Osteoporosis and osteopenia are characterized by loss of bone mass and disruption of the bone microarchitecture. Both factors result in diminished bone strength, predisposing the affected individual to fractures. The major aeromedical and operational concerns associated with osteopenia and osteoporosis involve the risk to the health and welfare of the individual service member and the potential detrimental impact on mission completion and safety.

Individuals with osteopenia or osteoporosis are at heightened risk for fragility fractures, which are defined as fractures resulting from low or minimal force. Examples of mechanisms that might lead to fragility fractures include falling from a standing height or jumping from several feet of elevation, such as would be expected during emergency aircraft egress. Some activities performed regularly in the course of routine duties in certain career fields involve mechanical forces that could result in fracture in the setting of weakened bones from osteopenia or osteoporosis (e.g., axial-loading, high-G maneuvers, rapid accelerations and decelerations, heavy lifting, jumping, twisting, bending, etc.). In other career fields, such forces would only be encountered during emergency procedures such as rapid egress or aircraft ejection. Whether in the performance of routine duties or during emergency procedures, an acute fragility fracture would pose a risk to the individual service member's health and jeopardize the welfare of other members of the aircrew or operational unit and may place the mission at risk.

Common locations of fragility fractures include the spine, hips, wrists, upper arms, ribs, and pelvis. Depending on the location and severity of the fracture, immediate consequences could range from distracting pain to immobility and incapacitation (e.g., vertebral or femoral neck fracture). Long term consequences include chronic pain, deformity (e.g., kyphosis), musculoskeletal weakness, and loss of physical function (e.g., joint range of motion).

The individualized likelihood of a major osteoporotic fracture or hip fracture over a period of ten years can be calculated using the Fracture Risk Assessment Tool (FRAX®). This calculation is a validated clinical decision making tool for assessing treatment options using antiresorptive agents to reduce fracture risk. The FRAX® calculator takes into consideration an individual's ethnicity, gender, age, height, weight, smoking history, previous fracture history, family history of fracture, and risk factors for secondary osteoporosis.

In general, pharmacotherapy is recommended for anyone with a 10-year risk of major osteoporotic fracture of 20% or greater or a 10-year risk of hip fracture of 3% or greater. These individuals are at high risk for fragility fracture, even if their T-scores are not within the range of osteoporosis. Thus, these individuals have the highest risk for complications that would interfere with safe performance of aviation and operational duties.

By definition, individuals with low bone density who do not have a history of fragility fracture and low 10-year FRAX® score out of range for antiresorptive medication are at low risk for fracture over the time course of a limited-duration waiver. While their aeromedical and operational risk remain elevated above their non osteopenic/osteoperotic peers, the risk is anticipated to be low.

Bisphosphonate therapy is first-line treatment for fracture risk reduction in individuals with osteopenia or osteoporosis. Among the bisphosphonate class, alendronate is approved for use in aircrew and GBO personnel. It is effective at reducing the incidence of fragility fractures among those with diminished bone density and abnormal bone microarchitecture, and it is well-tolerated when administered properly. It is important that alendronate be taken on an empty stomach, with water only, without other food or beverage, one hour prior to the consumption of any further medication, food, or beverage. The oral bisphosphonates are all associated with a risk of pill esophagitis. For this reason, they should be taken with a full glass of water (8 ounces), and an upright posture should be maintained for at least one hour after medication ingestion. The risk of esophagitis can be minimized by consuming a meal or snack one hour after tablet ingestion.

In high-performance aircraft, bisphosphonate therapy has a theoretical concern for regurgitation of gastric contents that could result from the combined factors of G-suit abdominal compression, negative G_z forces, and recumbent positioning. In order to minimize this risk, it is recommended that high-performance aviators dose alendronate on a day when no flying is planned. Such dosing may be possible because alendronate is only administered once weekly. If conflict with the flying schedule is unavoidable, the aviator should medicate at least 60 minutes prior to flying and should eat a snack just before the mission to assist with neutralizing any active drug remaining in the stomach.

Review of the AIMWTS database from Aug 2019 through Aug 2022 revealed 29 cases with a diagnosis of osteoporosis or osteopenia. The breakdown of the number of waivers and number of total cases are tabulated below. Four FC II cases received operational restrictions from high-performance and/or ejection seat aircraft.

ICD-10 Codes		(# of waivers / total # of cases)			
		IFC I/IA	FC II	FC III	GBO
M80.8	Other osteoporosis with current pathological fracture, unspecified site	1/1	20/20	7/7	1/1
M81.8	Other osteoporosis without current pathologic fracture				
M85.9	Disorder of bone density and structure, unspecified				

IV. Suggested Readings

1. 2019 ISCD Official Positions: Adult. International Society for Clinical Densitometry. Available at https://iscd.org/wp-content/uploads/2021/09/2019-Official-Positions-Adult-1.pdf. Accessed 16 Aug 2022.
2. Qaseem A, Forciea MA, McLean RM, Denberg TD; Clinical Guidelines Committee of the American College of Physicians. Treatment of Low Bone Density or Osteoporosis to Prevent Fractures in Men and Women: A Clinical Practice Guideline Update From the American College of Physicians. Ann Intern Med 2017;166:818-839. Available at https://www.acpjournals.org/doi/10.7326/M15-1361. Accessed 16 Aug 2022.
3. US Preventive Services Task Force, Curry SJ, Krist AH, Owens DK, et al. Screening for Osteoporosis to Prevent Fractures: US Preventive Services Task Force Recommendation Statement. JAMA 2018; 319:2521-2531. Available at https://www.uspreventiveservicestaskforce.org/uspstf/document/RecommendationStatementFinal/osteoporosis-screening. Accessed 16 August 2022.
4. Watts NB, Adler RA, Bilezikian JP, et al. Osteoporosis in Men: An Endocrine Society Clinical Practice Guideline. J Clin Endocrinol Metab 2012;97:1802-1822. Available at https://academic.oup.com/jcem/article/97/6/1802/2536476?login=false. Accessed 16 August 2022.

Proteinuria and IgA Nephropathy

Reviewed: Sep 2024
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Maj Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (Aerospace Medicine Branch Chief)

Significant Changes: Waiver guide restructured. Updated to reflect current MSD and most recent professional guidelines.

I. Waiver Consideration

Proteinuria is disqualifying for all flying class and SWA duties when it meets a threshold of 200 mg or greater in a 24-hour urine collection or 200 mg/g on a random urine sample protein-to-creatinine ratio. Any chronic glomerulonephritis or nephrotic syndrome, including IgA nephropathy, is disqualifying for all flying class and SWA duties, as well as for retention. It is not disqualifying for ATC, GBO, or OSF duties. However, a diagnosis of nephrosis or proteinuria of 500 mg or more in 24 hours is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Similarly, chronic nephritis with functional renal impairment or chronic nephritis that requires specialist follow-up more frequently than annually is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention.

Urine samples should be collected at least 48 hours after the last strenuous exercise to exclude the possibility of exercise-induced proteinuria. Although there may be an underlying benign etiology of the proteinuria, any finding of proteinuria could indicate serious kidney disease until proven otherwise and should prompt a thorough diagnostic evaluation. Many of the underlying conditions resulting in proteinuria are independently disqualifying. Waiver eligibility depends on the aeromedical and operational risks associated with the primary condition and its treatments. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for all potentially disqualifying conditions. The diagnosis of IgA nephropathy will be addressed in detail in this Waiver Guide chapter, while other causes of proteinuria are addressed in separate Waiver Guide chapters (examples include, but are not limited to, *Diabetes Mellitus*, *Hypertension*, and *Chronic Kidney Disease*).

A waiver request for proteinuria and/or IgA nephropathy may be submitted once a service member is in disease remission or sustained stable condition on an appropriate career field-approved medication regimen, without adverse effects. Please refer to the Waiver Guide chapter on *Chronic Kidney Disease* for further information.

Waiver consideration for proteinuria or IgA nephropathy is highly individualized due to the heterogeneity of these conditions. Aeromedical and operational risk is assessed on a case-by-case basis. Waivers are generally not entertained for untrained personnel. Factors weighed when assessing suitability for waiver include the severity of the underlying cause of the proteinuria, the service member's stability, the risk of progression, any associated complications, the cumulative risk of all comorbid conditions, and risks associated with any required treatments. Benign forms of proteinuria are routinely waived for all flying and operational classes after an appropriate specialist evaluation. Advanced or rapidly progressive kidney disease, evidence of metabolic

instability, or anticipated need for renal replacement therapy (i.e., dialysis) are generally not compatible with an aeromedical or operational waiver. Likewise, certain medications may not be amenable to waiver (e.g., immunosuppressant agents or corticosteroids used to treat some glomerular diseases).

The use of any medication not included on the career field-approved medication list in the treatment or management of proteinuria or IgA nephropathy is independently disqualifying. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of the underlying cause of proteinuria in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Table 1: Waiver potential for Proteinuria and IgA Nephropathy

Flying Class	Condition[1]	Waiver Potential[2] Waiver Authority[3]	ACS Review or Evaluation
FC I/IA	Proteinuria ≥ 200 mg/24 hr or spot protein/creatinine ratio ≥ 200 mg/g, without other underlying disease[4]	Yes AFRS/CMO	No[5]
	Proteinuria ≥ 200 mg/24 hr or spot protein/creatinine ratio ≥ 200 mg/g, with underlying kidney disease or IgA nephropathy	Unlikely AFRS/CMO	No
FC II/III/SWA	Proteinuria ≥ 200 mg/24 hr or spot protein/creatinine ratio ≥ 200 mg/g, without other underlying disease	Yes[4] MAJCOM	No
	Proteinuria ≥ 200 mg/24 hr or spot protein/creatinine ratio ≥ 200 mg/g, with underlying kidney disease or IgA nephropathy	Yes[4] MAJCOM	Yes
ATC/GBO/OSF	Nephrosis or proteinuria ≥ 500 mg/24 hr	Yes[4] MAJCOM	Yes

1. A clinically appropriate, thorough diagnostic evaluation to determine the causative etiology of the proteinuria is essential to exclude serious kidney disease and other disqualifying conditions.
2. Waiver potential is dependent upon underlying causative etiology of the proteinuria. Waivers are considered on a case-by-case basis. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for all potentially disqualifying conditions, including the Waiver Guide chapter on *Chronic Kidney Disease*.
3. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMED.

4. Untrained personnel of any class are unlikely to receive a waiver except when the underlying cause of the proteinuria is determined to be benign without risk of progression after appropriate specialist evaluation.
5. FC I/IA with otherwise benign proteinuria but with underlying isolated hypertension will be considered for a waiver on a case-by-case basis. ACS review is required.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Summary of diagnostic evaluation and specify the underlying cause(s) of proteinuria.
    c. Specify the presence or absence of chronic kidney disease.
    d. List all past and ongoing treatments for the underlying disease process or for its complications, if applicable. Include the following: all procedures; all current and historic medications, dosages, dates of administration; any adverse effects or complications stemming from treatment.
    e. List all co-morbid conditions.
    f. List current medications with dosages.
2. Consultation report from the treating nephrologist and all subsequent consultation notes.
3. Laboratory studies required:
    a. 24-hour urine collection with measurement of creatinine and protein
    b. Urinalysis and urine microscopy
    c. Current CBC
    d. Current BMP (use the CKD-EPI equation to calculate eGFR)
4. Results of any other testing performed during diagnosis, evaluation, and management of proteinuria or IgA nephropathy, including laboratory studies and any other ancillary studies. If a kidney biopsy is performed, include pathology report.
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms, objective findings, or interval flares.
    b. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
2. All relevant interval consultation reports from the treating nephrologist.
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, and any other ancillary tests. The following must be included:

a. Random or spot urine protein/creatinine ratio *or* 24-hour urine collection with measurement of creatinine and protein
b. Current BMP (use the CKD-EPI equation to calculate eGFR)

4. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Proteinuria is often an early and sensitive marker of chronic kidney disease (CKD). Because urinalysis is often performed as a matter of routine, proteinuria is frequently an incidental finding or is discovered during other surveillance (e.g., medication monitoring, diabetes mellitus disease management, etc.). When detected and confirmed on repeated testing, proteinuria always warrants further evaluation to identify a treatable cause of CKD. Early diagnosis and intervention may slow disease progression, preserving kidney function and avoiding future complications of clinical, aeromedical, and operational significance. When identified, CKD is independently disqualifying for aviation and operational duties. Please refer to the Waiver Guide chapter on *Chronic Kidney Disease* for further information. Many other causes of proteinuria may be independently disqualifying (e.g., diabetes mellitus). Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for all potentially disqualifying conditions.

Healthy adult urinary protein excretion is less than 150 mg in 24 hours. More than 150 mg of protein on a 24-hour urine collection is sufficient cause for further diagnostic evaluation. The first step in an evaluation for proteinuria is always confirmatory testing, which should be performed at least 48 hours after last physical exertion or fever to exclude transient proteinuria due to these benign factors.

Many different conditions can cause glomerular injury and result in proteinuria, and these etiologies range from benign to serious with high risk of progression and complication. The more benign etiologies include isolated proteinuria, orthostatic proteinuria, and exercise-induced proteinuria. Of more pressing aeromedical and operational concern are conditions such as many of the primary glomerulopathies, myeloma, monoclonal gammopathies, CKD arising from other chronic medical conditions that may or may not be previously diagnosed (e.g., hypertension, diabetes, obstructive uropathy), and CKD as an effect of exposure to renal toxins.

The specific aeromedical and operational risks associated with proteinuria will depend upon the nature of the proteinuria and any underlying disease process, associated complications, and medical therapies. As such, a thorough diagnostic evaluation is paramount not only to optimizing individual health and preventing disease progression, if underlying disease is identified, but also for accurately determining aeromedical and operational impact.

IgA nephropathy is the most common of the primary glomerulopathies of adulthood. It is an immune complex-mediated process that generally presents with episodic hematuria. The onset frequently follows an acute upper respiratory tract infection. Up to 50% of affected individuals may progress to CKD. Risk factors for progressive kidney failure include serum creatinine above 2.5 mg/dL at the time of diagnosis, hypertension, and persistent proteinuria above 0.5-1 g/24 hr.

Interventions to slow the rate of progression of proteinuric kidney disease in IgA nephropathy and other forms of CKD include optimization of blood pressure and blood glucose control and the use of renal protective medications. Firstline medications for renal protection in kidney disease with proteinuria are the angiotensin converting enzyme (ACE) inhibitors and angiotensin II receptor blockers (ARBs). More recent data show benefit from the use of sodium-glucose cotransporter 2 (SGLT2) inhibitors, even in individuals without concomitant diabetes mellitus. Depending on the particular medication and the prescribing context, these therapeutics may or may not be approved for aeromedical or operational use. The use of any medication not included on the career field-approved medication list is independently disqualifying.

Systemic glucocorticoids are used in advanced cases of IgA nephropathy and to treat certain other causes of CKD that may be resulting in proteinuria. Active treatment with systemic glucocorticoids or immunosuppressive therapy is not amenable to any form of waiver. The previous use of systemic glucocorticoids for more than three consecutive weeks in any 12-month period is independently disqualifying and requires demonstration of an intact hypothalamic-pituitary-adrenal (HPA) axis prior to waiver consideration. Please refer to the Waiver Guide chapter *Systemic Glucocorticoid (Steroid) Therapy.*

Review of the AIMWTS database from Aug 2021 through Aug 2024 revealed 28 waiver packages with a diagnosis of proteinuria and IgA Nephropathy that required an aeromedical waiver. The breakdown of the number of approved waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
R80.9	Proteinuria, unspecified	1/1	9/9	6/6	0/0	1/1	0/0
N02.B	IgA Nephropathy	0/0	6/6	5/5	0/0	0/0	0/0

IV. Suggested Readings

1. Inker LA, Astor BC, Fox CH, et al. KDOQI US commentary on the 2012 KDIGO clinical practice guideline for the evaluation and management of CKD. Am J Kidney Dis 2014; 63:713-735. Available at https://www.ajkd.org/article/S0272-6386(14)00491-0/fulltext. Accessed 11 September 2024.
2. National Kidney Foundation. KDOQI clinical practice guidelines for chronic kidney disease: evaluation, classification, and stratification. Am J Kidney Dis 2002; 39:S1-266. Available at http://kidneyfoundation.cachefly.net/professionals/KDOQI/guidelines_ckd/index.htm. Accessed 11 September 2024.
3. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO clinical practice guideline for the evaluation and management of chronic kidney disease. Kidney Int Suppl 2013; 3:v-150. Available at https://kdigo.org/wp-content/uploads/2017/02/KDIGO_2012_CKD_GL.pdf. Accessed 11 September 2024.
4. Vassalotti JA, Centor R, Turner BJ, et al. Practical approach to detection and management of chronic kidney disease for the primary care clinician. Am J Med 2016; 129:153-162. Available at http://www.amjmed.com/article/S0002-9343(15)00855-4/pdf. Accessed 11 September 2024.

Raynaud's Phenomenon

Reviewed: May 2023
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver Guide restructured. Updated to reflect current MSD.

I. Waiver Consideration

Any history of Raynaud's phenomenon (RP) or peripheral vasospastic disease is disqualifying for all flying class and SWA duties. RP is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention if occurrences of vasospasm are frequent or severe, *or* if the RP is associated with a systemic disease (secondary RP), *or* if the condition would otherwise limit worldwide assignability.

For aeromedical waiver purposes, "frequent or severe" symptoms are defined as symptoms necessitating medication therapy. If identified, service members who elect to forego recommended treatment with the aim of avoiding disqualification will not be considered for an aviation or operational waiver. Waiver potential depends upon the severity of symptoms, any associated complications, and whether RP is primary or secondary. Prior to waiver submission, completion of a screening evaluation to differentiate primary from secondary RP is required. The cumulative risk of all disqualifying conditions and any medications/treatments are considered when assessing suitability for waiver. Secondary RP is considered for waiver in conjunction with the primary disqualifying condition and may not be amenable to waiver if the underlying systemic process exceeds waiver standards. Please cross-reference the Medical Standards Directory for all potentially disqualifying conditions. This waiver guide principally addresses primary RP, occurring in the absence of a comorbid systemic disorder. However, the aeromedical considerations apply to both primary and secondary RP.

Table 1: Waiver potential for primary Raynaud's phenomenon (RP)

Flying Class	Condition	Waiver Potential Waiver Authority[1]	ACS Review or Evaluation
FC I/IA	History of primary RP, with infrequent/mild symptoms and 2 years demonstrated stability, never requiring medication for disease control	Yes AFRS/CMO	No
	Any history of primary RP treated with medication	Unlikely[2] AFRS/CMO	No
FC II/III/SWA	Primary RP, with infrequent/mild symptoms, never requiring medication for disease control	Yes MAJCOM	No
	Any history of primary RP treated with medication	Yes[2] MAJCOM	No[3]
ATC/GBO/OSF	Any history of primary RP treated with medication[4,5]	Yes MAJCOM	No[3]

1. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMRA.
2. Long-acting dihydropyridine calcium channel blockers (e.g., amlodipine and nifedipine) are often the preferred first-line pharmacologic agents. Aviators utilizing this medication class will be restricted to duties in non-high performance aircraft.
3. ACS review may be requested at the discretion of the waiver authority.
4. RP is only disqualifying for ATC, GBO, and OSF duties if the servicemember also does not meet retention standards. However, medications used in the treatment of RP often necessitate a need for waiver consideration. Please reference the applicable career field approved medication list.
5. There is no career field medication list for SWA and OSF personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of RP in SWA and OSF personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
        i. Include age of onset
        ii. Include frequency of episodes and date of last episode
        iii. Include thorough joint examination of the hands and feet
        iv. Address the following questions (yes/no):
            1. Are the fingers unusually sensitive to cold?
            2. Do the fingers change color when exposed to cold temperatures?
            3. If the fingers change color with cold exposure, do they turn white, blue/purple, or both?
    b. List all risk factors for primary vs. secondary RP:
        i. Non-modifiable risk factors (e.g., age at onset, gender, race/ethnicity, family history of RP, family history of connective tissue disorders, etc.)
        ii. Modifiable risk factors (e.g., smoking history, body habitus, etc.)
    c. Summary of all treatments trialed, their effectiveness, and any adverse effects.
    d. List current medications with dosages.
    e. List all co-morbid conditions.
2. Report the results of nailfold capillary microscopy. If this examination cannot be performed in the flight medicine or primary care clinic, then a referral to a rheumatologist or dermatologist is required in order to better distinguish primary vs secondary RP.
3. Consultation report from the treating specialist (e.g., rheumatologist or dermatologist) and all subsequent consultation notes, as applicable. Any abnormal screening laboratory tests or examination results that could indicate systemic disease/secondary RP requires a rheumatology referral.
4. Laboratory studies required:
    a. CBC, CMP, Thyroid stimulating hormone (TSH), Erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP) level
    b. Anti-nuclear antibody (ANA) titer with indirect immunofluorescence testing
    c. Urinalysis with urine sediment
5. Results of any other testing performed during diagnosis, evaluation, and management of RP, including laboratory studies and any other ancillary studies.
    a. Additional testing is guided based on suspicion for an underlying systemic condition, under the direction of a specialist, such as a rheumatologist.
    b. Examples of additional studies that are often obtained in the evaluation of RP include, but are not limited to, anti-topoisomerase antibody (anti-Scl-70), complement C3 and C4 levels, anti-RNA polymerase III, anti-Jo-1 antibody, creatinine kinase, and/or serum protein electrophoresis (SPEP).
6. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms, objective findings, or interval exacerbations.
    b. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
2. All relevant interval consultation reports from the treating rheumatologist or dermatologist, if applicable.
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, and any other ancillary tests.
4. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Raynaud's phenomenon (RP) is characterized by vasospasm of the capillaries and cutaneous arterioles of the phalanges as an exaggerated response to cold temperature exposure or emotional stress. Classically, affected individuals describe distinct color changes of the fingers and toes in response to provoking stimuli (i.e., cold or emotional extremes), with sharp boundaries between affected and unaffected tissue. RP may occur independent of other chronic conditions (primary RP) or may be associated with a systemic disorder, often an autoimmune process (secondary RP). Aeromedical and operational concerns related to isolated RP will be discussed in this section.

When RP occurs in the setting of another primary systemic condition, the aeromedical and operational implications of the primary disorder and any concomitant complications must also be considered. Examples of conditions associated with secondary RP include systemic lupus erythematosus (SLE), systemic scleroderma, mixed connective tissue disease, vasculitis, and cryoglobulinemia. Certain medications are also associated with secondary RP. Please cross-reference the Medical Standards Directory for all potentially disqualifying conditions.

The major aeromedical and operational concerns associated with RP are bi-directional as the symptoms may degrade duty performance and the potential for the military environment to provoke or exacerbate symptoms. The symptoms of an RP episode may include pain, decreased sensation of the affected digits, and clumsiness of the hand. The impact in the aviation or operational environment could range from distraction resulting in subtle performance decrement to more pronounced limitation, such as acute loss of fine motor coordination and inability to skillfully manipulate flight controls or operate other essential equipment. More severe attacks can lead to prolonged tissue ischemia and complications such as digital ulceration. Additionally, repeated episodes of vasospasm may result in sequelae of cumulative tissue damage over time.

The frequency and severity of RP attacks may be potentiated by exposures in the aviation and operational environments. Generally, risk can be effectively mitigated with the use of protective clothing and equipment and cold weather countermeasures without the need for systemic medication. The need for a maintenance medication to reduce vasospasm recurrence may indicate a more severe manifestation of RP. First line pharmacotherapy often relies upon the use of long-acting dihydropyridine calcium channel blockers (CCBs) to relax and dilate vascular smooth muscle and prevent distal vasoconstriction. The CCBs amlodipine and nifedipine are approved for use in aircrew and ATC personnel with an appropriate waiver. Due to the negative effects of these medications on G-tolerance, waivers for aviators utilizing CCBs are restricted to non-high performance aircraft.

Individuals who have contraindications to or do not tolerate CCBs, monotherapy with a low-dose phosphodiesterase (PDE) type 5 inhibitors, topical nitrates, angiotensin receptor blockers, or serotonin reuptake inhibitors have been used as alternative clinical options. The use of any of the above medications that are not included on the applicable career field approved medication list would also be disqualifying and considered for waiver on a case-by-case basis.

Review of the AIMWTS database from May 2020 through May 2023 revealed 8 waiver packages with a diagnosis of Raynaud's phenomenon. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		FC I/IA	FC II	FC III	GBO	ATC	SWA
I73.0	Raynaud's syndrome	0/0	2/2	5/6	0/0	0/0	0/0

IV. Suggested Readings

1. Belch J, Carlizza A, Carpentier PH, et al. ESVM guidelines - the diagnosis and management of Raynaud's phenomenon. Vasa 2017; 46:413-423. Available at https://econtent.hogrefe.com/doi/epdf/10.1024/0301-1526/a000661. Accessed 26 May 2023.
2. Garner R, Kumari R, Lanyon P, et al. Prevalence, risk factors and associations of primary Raynaud's phenomenon: systematic review and meta-analysis of observational studies. BMJ Open 2015; 15:e006389. Available at https://bmjopen.bmj.com/content/5/3/e006389.long. Accessed 26 May 2023.
3. Maverakis E, Patel F, Kronenberg DG, et al. International consensus criteria for the diagnosis of Raynaud's phenomenon. J Autoimmun 2014; 48-49:60-65. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4018202/. Accessed 26 May 2023.
4. Pacini G, Pogna A, Pendolino M, et al., Understanding the value of non-specific abnormal capillary dilations in presence of Raynaud's phenomenon: a detailed capillaroscopic analysis. RMD Open 2022; 8:e002449. Available at https://rmdopen.bmj.com/content/8/2/e002449.long. Accessed 26 May 2023.

Rheumatoid Arthritis

Reviewed: May 2023
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Stacey Aycock (ACS Aerospace Medicine Specialist); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Updated to reflect current MSD.

I. Waiver Consideration

Any history of rheumatoid arthritis (RA) is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. Untrained personnel are unlikely to receive an aeromedical or operational waiver. Trained personnel may be considered for a waiver after achieving disease remission on a stable career field-approved medication regimen, without adverse effects or complications. Factors weighed when assessing suitability for waiver include the severity of disease at diagnosis, evidence of sustained stable disease remission, tolerance of a maintenance therapeutic regimen, adherence to treatment recommendations and whether treatment and monitoring are appropriate in the context of nationally or internationally recognized guidelines, the risk associated with treatment, and the cumulative risk of all comorbidities, complications, and/or extra-articular manifestations.

The use of any medication not included on the career field-approved medication list is independently disqualifying. Use of non-approved medications may be considered on a case-by-case basis under unique circumstances and in otherwise low-risk individuals functioning in low-risk operational environments. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of RA in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual or mission safety.

Table 1: Waiver potential for Rheumatoid Arthritis (RA)

Flying Class	Condition	Waiver Potential Waiver Authority[1]	ACS Review or Evaluation
FC I/IA	Any history of RA	Unlikely AFRS/CMO	No
FC II/III/SWA	RA, in remission and stable on career field-approved maintenance medications, without complication	Yes[2,3] MAJCOM	Yes
ATC/GBO/OSF	RA, in remission and stable on career field-approved maintenance medications, without complication	Yes[2] MAJCOM	No

1. Certification authority for untrained assets is AFRS/CMO. Waiver authority for aeromedically unapproved medication use is AFMRA. The use of any non-approved medication is independently disqualifying.
2. Untrained personnel of any class are unlikely to receive a waiver.
3. Flyers otherwise eligible for waiver will be restricted from ejection seat aircraft. SWA personnel will be restricted from jump duties.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
        i. Include frequency of flares and date of last flare.
        ii. Include thorough joint examination.
    b. Specify presence or absence of ongoing symptoms (e.g., joint pain, stiffness, swelling, synovitis, etc.).
    c. Specify presence or absence of complications (e.g., erosive joint disease, bone mineral density loss, etc.).
    d. Specify presence or absence of extra-articular manifestations (e.g., eye involvement, skin involvement, cardiac involvement, pulmonary involvement, renal disease, etc.).
    e. Summary of diagnostic evaluation and treatment history, including a list of any/all procedures with dates.
    f. List current medications with dosages.
2. Consultation report from the treating rheumatologist and all subsequent consultation notes. These notes must include the following:
    a. Subjective symptoms and objective physical exam findings to include joint exam.
    b. Discussion of current treatment, including dose, frequency, formulation, and all appropriate monitoring with schedule for follow-up (e.g., biologic agents require laboratory studies with CMP and CBC every 3-6 months and annual TB testing).
    c. Documentation of the presence or absence of complications (see 1c above).
    d. Documentation of the presence or absence of extra-articular manifestations (see 1d above).
    e. Detailed plan of ongoing treatment and monitoring.
3. Laboratory studies required:
    a. Rheumatoid factor (RF), anti-cyclic citrullinated peptide (anti-CCP), current CBC, current CMP, current erythrocyte sedimentation rate (ESR), and current C-reactive protein (CRP) levels.
4. Imaging studies required (radiology report is sufficient):
    a. Current plain radiographs of the hands and feet
    b. Current plain radiographs of the cervical spine in the following views: anteroposterior, lateral, open-mouthed, and flexion/extension
5. Results of any other testing performed during diagnosis, evaluation, and management of rheumatoid arthritis, including laboratory studies and any other ancillary studies.
6. Dilated funduscopic examination results are required if treated with hydroxychloroquine.
7. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms, objective findings, or interval flares.
    b. Specify presence or absence of complications (e.g., erosive joint disease, bone mineral density loss, etc.).
    c. Specify presence or absence of extra-articular manifestations (e.g., eye involvement, skin involvement, cardiac involvement, pulmonary involvement, renal disease, etc.).
    d. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
2. All relevant interval consultation reports from the treating rheumatologist.
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, and any other ancillary tests. The following must be included:
    a. Current CBC, current CMP, current ESR, and current CRP level
    b. Current plain radiographs of the hands and feet
    c. Current plain radiographs of the cervical spine in the following views: anteroposterior, lateral, open-mouthed, and flexion/extension
4. Dilated funduscopic examination results are required if treated with hydroxychloroquine.
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Rheumatoid arthritis (RA) is a chronic, systemic, inflammatory condition that results in both articular and extra-articular symptoms of aeromedical and operational concern. It predominantly affects synovial joints, and the most common presentation is symmetric inflammatory polyarthropathy. The small joints of the hands, wrists, and feet are most often impacted. Other frequently involved joints include elbows, shoulders, ankles, and knees. Symptoms associated with inflammatory arthritis include prolonged morning stiffness, joint swelling, and erythema. Function may be impaired due to pain, stiffness, and over time, active RA may lead to irreversible joint damage and deformity. In a flying or operational environment, these symptoms may be distracting or lead to a decrement in duty performance. At worst, pain or loss of joint mobility and function may result in an inability to perform essential duties, may interfere with wear of aviation or military equipment, and may inhibit safe egress in the event of an emergency.

A complication of RA of serious aeromedical and operational significance is cervical spine involvement, which is relatively common and may present early in the disease course. Cervical spine involvement related to chronic inflammation of the joints of the cervical spine, inflammation of the supporting structures of the neck, and loss of bone mineral density is common and may lead to sequelae such as atlantoaxial instability, atlantoaxial subluxation, or cranial settling. Such injuries may occur in the setting of little or no traumatic force, especially if there is hyperextension or hyperflexion of the cervical spine. Even among individuals with early disease (within 12 months or less of onset), approximately 24% demonstrate some degree of

cervical involvement on MRI. The rate of cervical involvement may be even higher among those with more prolonged duration of disease, positive anti-CCP or RF, higher disease activity scores, higher ESR or CRP levels, erosions on peripheral joint imaging, and among females. Given the frequency with which individuals with RA manifest some type of cervical spine involvement and the potential catastrophic consequences of an acute cervical injury in the flying and operational environment, service members with RA are generally not considered for an unrestricted waiver. Flyers who are otherwise eligible for waiver will be restricted from ejection seat aircraft. Similarly, special warfare personnel will be restricted from jump duties.

The primary method of screening for cervical involvement in RA is plain radiography of the cervical spine in the following views: anteroposterior, lateral, open-mouth, and flexion/extension. MRI is more sensitive for inflammation and closely predicts neurologic compromise, but it may under-estimate the degree of subluxation when compared to true flexion and extension plain films. The consequences of a complication related to cervical instability are potentially catastrophic and include the possibility of sudden death in the event of a spinal cord injury.

In addition to inflammatory arthritis, RA is associated with multiple extra-articular conditions, including vasculitis, skin ulcers, other cutaneous involvement, Sjögren's syndrome, uveitis, iritis, pulmonary disease (e.g., interstitial fibrosis, pleuritis, etc.), cardiovascular disease (e.g., coronary artery disease, peripheral vascular disease, heart failure, myocarditis, pericarditis, etc.), and renal disease. Neurologic, hematologic, and psychiatric maladies are also frequently concurrent. Any of these extra-articular manifestations conveys unique risks in the aviation or operational environment and may be independently disqualifying. Please cross-reference the Medical Standards Directory for all potentially disqualifying conditions.

The primary treatment goals for individuals with RA are to control symptoms, to prevent progressive joint damage, and to reduce the risk of other complications of systemic inflammation. With these goals in mind, first line therapy generally depends upon the early initiation of disease-modifying antirheumatic drugs (DMARDs). Several medications are approved for the treatment of RA with an appropriate waiver, including sulfasalazine, hydroxychloroquine, and the tumor necrosis factor-alpha (TNF-alpha) inhibitors adalimumab, etanercept, and infliximab. Other medications often used in the treatment of RA such as alternative TNF-alpha inhibitors, the interleukin-6 (IL-6) receptor antagonists, or Janus Kinase (JAK) inhibitors are not officially approved for use but can be considered on a case-by-case basis for aeromedical waiver. Recourse to non-approved interventions may be an indication of disease severity, which may not be amenable to waiver. Additionally, many medications used in the treatment of RA pose mobility and readiness challenges due to the route of administration (i.e., injection) and need for medication refrigeration.

Some medications used to treat RA convey side effects that may not be compatible with flying or operational duties. One such first-line agent used in the management of RA is methotrexate. Due to the potential for toxicity to multiple organ systems of aeromedical and operational concern, the use of methotrexate is often considered incompatible with a waiver. With respect to the potential toxic effects of methotrexate, the risk to the pulmonary system is considered of greatest aeromedical and operational concern. It is possible for an individual taking methotrexate to

develop pulmonary toxicity rapidly, and the onset may develop at any point during treatment, even after prolonged stability on the medication.

Active treatment with systemic glucocorticoids is also unlikely for aeromedical waiver. The previous use of systemic glucocorticoids for more than three consecutive weeks in any 12-month period is independently disqualifying and requires demonstration of an intact hypothalamic-pituitary-adrenal (HPA) axis prior to waiver consideration. Please refer to the Aerospace Medicine Waiver Guide *Systemic Glucocorticoid (Steroid) Therapy* chapter.

It should be noted that service members who elect to under-treat their RA with the aim of avoiding aeromedically unapproved medications will not be considered for a flying or operational waiver as under-treatment of RA may substantially increase the likelihood of both symptomatic acute flares and disease complications.

Review of the AIMWTS database from May 2020 through May 2023 revealed 26 waiver packages with a diagnosis of rheumatoid arthritis. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)						
		FC I/IA	FC II	FC III	GBO	ATC	OSF	SWA
M06.9	Rheumatoid arthritis, unspecified	0/0	6/8	7/10	1/1	2/2	1/2	1/3

IV. Suggested Readings

1. Fraenkel L, Bathon JM, England BR, et al. 2021 American College of Rheumatology Guideline for theTreatment of Rheumatoid Arthritis. Arthritis Care Res 2021; 73:924-939. Available at https://www.rheumatology.org/Portals/0/Files/2021-ACR-Guideline-for-Treatment-Rheumatoid-Arthritis-Early-View.pdf. Accessed 26 May 2023.
2. Smolen JS, Breedveld FC, Burmester GR, et al. Treating rheumatoid arthritis to target: 2014 update of the recommendations of an international task force. Ann Rheum Dis 2016; 75:3-15. Available at https://ard.bmj.com/content/75/1/3.long. Accessed 26 May 2023.

HIV Pre-Exposure Prophylaxis (PrEP)

Revised: Apr 2024
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (ACS Aerospace Medicine Branch Chief)

Significant Changes: Waiver guide restructured. Updated to reflect current MSD and most recent professional guidelines.

I. Waiver Consideration

Confirmed seropositivity to human immunodeficiency virus (HIV) is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Pre-exposure prophylaxis (PrEP) to prevent infection with HIV not disqualifying and does not require a waiver when it is prescribed appropriately and managed in accordance with Centers for Disease Control and Prevention (CDC) guidelines.

The medications that are approved for PrEP in aircrew, ATC, and GBO personnel are Truvada® (tenofovir disoproxil fumarate-emtricitabine, abbreviated TDF/FTC) and Descovy® (tenofovir alafenamide-emtricitabine, abbreviated TAF/FTC). These medications can be found in the "Official Air Force Aerospace Medicine Approved Medications" and "Official Air Force Ground Based Operator (GBO) Approved Medications" lists. At initiation of PrEP with Truvada® or Descovy®, temporary DNIF/DNIC/DNIA of at least 14 days to complete a ground testing trial and exclude idiosyncratic reactions is required for both medications.

The use of other antiretroviral therapies other than Truvada® or Descovy® for PrEP are not officially approved. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the prevention of HIV in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

The aeromedical use of approved PrEP presumes tolerance of the medication without side effects that might impact duty performance. It also presumes strict adherence to the medication regimen and all recommended follow-up monitoring. It is expected that follow-up and monitoring will comply with the most current CDC guidelines on Preexposure Prophylaxis for the Prevention of HIV Infection, which are accessible on the CDC website. In general, the CDC specifies intervals for clinical surveillance, behavioral risk reduction counseling including education and reinforcement of safe sex practices, HIV and other STI testing, and other laboratory and ancillary monitoring. Discontinuation of HIV PrEP with appropriate counseling about stopping/restarting PrEP is required should the member be TDY/deployed to a location that cannot support continued strict compliance with the CDC guidelines.

II. Information Required for Waiver Submission

Not Applicable. Please cross-reference the appropriate career field medication list.

III. Aeromedical Concerns

Truvada® (tenofovir disoproxil fumarate-emtricitabine, abbreviated TDF/FTC) and Descovy® (tenofovir alafenamide-emtricitabine, abbreviated TAF/FTC) are both FDA-approved for HIV pre-exposure prophylaxis (PrEP) in high-risk individuals to mitigate the risk of HIV-transmission. Individuals considered at high-risk of new HIV infection include those with HIV-positive sexual partners; injection drug users who share injection equipment or were in treatment for injection drug use within the preceding six months; and both heterosexual and homosexual individuals engaging in high-risk sexual behaviors as described in CDC practice guidelines for PrEP. TDF, TAF and FTC are nucleoside/nucleotide reverse transcriptase inhibitors (NRTIs) that inhibit HIV replication and can prevent seroconversion in HIV-negative individuals who are exposed to the virus. The efficacy of TDF/FTC and TAF/FTC at reducing the risk of HIV-seroconversion has been demonstrated in multiple studies of high-risk HIV-negative individuals.

TDF/FTC is a well-tolerated medication, and the rate of aeromedically-relevant adverse effects is considered acceptable provided consistent adherence to proper clinical and laboratory monitoring. TAF/FTC is also well-tolerated and is likely the preferred agent for individuals with bone or renal contraindications to TDF/FTC. The most commonly reported adverse effects include gastrointestinal symptoms such as nausea, vomiting, and diarrhea in about 5-10% of patients and neurologic symptoms such as headache (2-6%), insomnia (0-8%), and fatigue (2-9%). The majority of these symptoms appear to resolve within a month of medication initiation ("start-up syndrome"). There are no reported neurocognitive or neuropsychiatric side effects from TDF/FTC or TAF/FTC use.

The CDC recommends regular laboratory monitoring to assess for HIV-seroconversion, acquirement of other sexually transmitted infections (STIs), and the development of kidney toxicity while on FTC/TDF. Refer to the CDC guidelines on Preexposure Prophylaxis for the Prevention of HIV Infection for the most current clinical and laboratory monitoring parameters. The clinical follow-up and laboratory monitoring required while taking these medications may impose operational and mobility limitations when the frequent monitoring and behavioral counseling are not available. Discontinuation of PrEP by the treatment team for the purpose of extended TDY/deployment may be required.

IV. Suggested Readings

1. Centers for Disease Control and Prevention. US Public Health Service: Preexposure prophylaxis for the prevention of HIV infection in the United States – 2021 Update: a clinical practice guideline. Available at https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2021.pdf. Accessed 15 March 2024.
2. Centers for Disease Control and Prevention. US Public Health Service: Preexposure prophylaxis for the prevention of HIV infection in the Unites States – 2021 Update: clinical providers' supplement. Available at https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-provider-supplement-2021.pdf. Accessed 15 March 2024.

Aerospace Medicine Waiver Guide

Systemic Glucocorticoid (Steroid) Therapy

Revised: Aug 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick and Maj Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Flying class consideration for chronic therapy

I. Waiver Consideration

Active treatment with systemic glucocorticoids (GCs) are disqualifying for all flying class, ATC, GBO, OSF, and SWA duties. Flying class I, II, III, and ATC personnel who are actively being treated with systemic GCs are ineligible for waiver due to the risk of developing aeromedically and operationally significant adverse physiologic effects/complications. Treatment with chronic systemic GCs is also disqualifying for GBO duties as these therapies are not specifically listed on the applicable career field medication list; however, these members may be considered for waiver if the underlying condition is controlled and the individual is stable on therapy, without idiosyncratic reactions. Although no approved medication list exists for OSF and SWA personnel, the active treatment with systemic GCs is felt to have the potential to adversely impact mission accomplishment in these members. Therefore, OSF and SWA personnel should also be placed in DNIF/DNIC status while actively being treated with systemic GCs. Lastly, the diagnosis of adrenal insufficiency (Addison's disease) is also disqualifying for all flying class, ATC, GBO, OSF, and SWA duties. A waiver for primary adrenal insufficiency is unlikely due to the elevated risk of adrenal crisis.

History of systemic GCs use is not disqualifying for any flying class, ATC, GBO, OSF, or SWA duties provided that the hypothalamic-pituitary-adrenal (HPA) axis is intact and the underlying condition for which systemic GCs were prescribed is resolved and/or is not disqualifying. As chronic suppression of the HPA axis with systemic GC use can result in adrenal insufficiency and increase the risk of acute adrenal crisis, documentation of an intact HPA axis should be accomplished prior to returning any military member to flying or special operational duty if systemic GC use was greater than three consecutive weeks within the last twelve months. If an aeromedical waiver is required for the underlying condition, submission of the waiver package should occur after completion of systemic GC treatment and resolution or stabilization of the condition. In this instance, the aeromedical waiver package should include a recent measurement of the member's basal serum cortisol and if indicated results of an adrenocorticotropic hormone (ACTH) stimulation test (Table 1).

The initial test to determine an intact HPA axis should be a fasting morning serum basal cortisol. If serum basal cortisol levels are ≥ 18 mcg/dL, the risk of relative adrenal insufficiency or development of adrenal crisis is aeromedically acceptable. No further testing would be clinically or aeromedically indicated. If the serum basal cortisol level is < 18 mcg/dL, an ACTH stimulation test is used to further assess the HPA axis due to increased risk of underlying adrenal insufficiency. Recombinant ACTH (Cosyntropin®) 250 mcg is injected IV or IM after a baseline cortisol level is drawn. Stimulated cortisol levels are then drawn at 30 and 60 minutes. A stimulated cortisol level of ≥18 mcg/dL is considered normal. ACTH stimulation testing can

be performed at any point after GC discontinuation, but it is typically performed one month after discontinuing therapy. If abnormal, stimulation testing can be repeated at monthly intervals until cortisol levels normalize.

Table 1: Workup Required AFTER Systemic Glucocorticoid Therapy Discontinuation

Flying Class[1,2,3]	Duration of Systemic Glucocorticoid (GC) Therapy	Required Testing
All	≤ 3 weeks of systemic GC therapy, or completion of systemic GC therapy more than 12 months ago	N/A
All	> 3 weeks of systemic GC therapy during the preceding 12 months	Serum morning basal cortisol level ≥18 mcg/dL: no further testing needed <18 mcg/dL: ACTH stim test required
All	> 3 weeks of systemic GC therapy during the preceding 12 months **and** morning cortisol level is <18mcg/dL	Cortisol level post-ACTH stimulation: ≥18 mcg/dL: no further testing needed <18 mcg/dL: Repeat monthly until HPA axis normalizes

1. Aeromedical waiver is NOT required if systemic glucocorticoid treatments have been discontinued, the HPA axis is intact, and there is no underlying disqualifying condition.
2. Generally, only GBO personnel requiring chronic systemic glucocorticoid use will be considered favorably for aeromedical waiver once idiosyncratic reactions have been ruled out and the underlying condition is controlled.
3. Underlying conditions that are disqualifying per the MSD require waiver submission even if no longer being treated with systemic glucocorticoids. Consult the applicable waiver guide if the underlying condition requires waiver.

II. Information Required for Waiver Submission

Not Applicable. Please cross-reference the Medical Standards Directory and the appropriate career field medication list. Refer to the Air Force Waiver Guide for condition-specific waiver submission requirements (if applicable).

III. Aeromedical Concerns

HPA axis suppression after the completion of systemic GC therapy is a significant aeromedical concern. Individuals with any use of systemic GC therapy are at risk for adrenal insufficiency due to HPA axis suppression; however, this is less likely to occur with a short course of therapy (i.e., less than three weeks duration). The greatest risk of HPA axis suppression occurs when supraphysiologic doses of GCs are administered, duration of therapy is greater than three weeks, split and nighttime doses are administered, or with Cushingoid features. Tapering GC therapy slowly is required to restore the HPA axis while minimizing the risk of precipitating adrenal insufficiency or crisis. Adrenal insufficiency presents insidiously with symptoms of fatigue, weight loss, postural dizziness, anorexia, and vague abdominal discomfort. Adrenal crisis presents acutely with symptoms of severe weakness, abdominal pain, nausea, electrolyte derangements, syncope, confusion, and potentially shock leading to progressive circulatory collapse and death. High emotional or physiologic stress, such as encountered in the aviation and special operation environments, increases the risk of precipitating symptoms of relative adrenal

insufficiency and also acute adrenal crisis. Risk is highest when there is association with surgical procedures, infection, or abrupt systemic GC withdrawal. Even without these additional risk factors for developing adrenal crisis, all aircrew and special duty operators should undergo testing of the HPA axis after discontinuation of systemic GCs when the course of treatment exceeds three weeks duration within the preceding twelve months. An aeromedical waiver is not required in individuals demonstrating intact HPA function; however, the underlying condition that required prolonged systemic GC use may be disqualifying. Refer to the appropriate waiver guides if there are underlying conditions the necessitated GC use.

IV. Suggested Readings

1. Bornstein SR, Allolio B, Arlt W, Barthel A, Don-Wauchope A, Hammer GD, Husebye ES, Merke DP, Murad MH, Stratakis CA, Torpy DJ. Diagnosis and Treatment of Primary Adrenal Insufficiency: An Endocrine Society Clinical Practice Guideline. J Clin Endocrinol Metab. 2016 Feb;101(2):364-89. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4880116/. Accessed 16 August 2022.
2. Broersen LH, Pereira AM, Jørgensen JO, Dekkers OM. Adrenal Insufficiency in Corticosteroids Use: Systematic Review and Meta-Analysis. J Clin Endocrinol Metab. 2015 Jun;100(6):2171-80. Available at https://academic.oup.com/jcem/article/100/6/2171/2829580. Accessed 16 August 2022.
3. Joseph RM, Hunter AL, Ray DW, Dixon WG. Systemic glucocorticoid therapy and adrenal insufficiency in adults: A systematic review. Semin Arthritis Rheum. 2016 Aug;46(1):133-41. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4987145/. Accessed 16 August 2022.
4. Liu D, Ahmet A, Ward L, Krishnamoorthy P, Mandelcorn ED, Leigh R, Brown JP, Cohen A, Kim H. A practical guide to the monitoring and management of the complications of systemic corticosteroid therapy. Allergy Asthma Clin Immunol. 2013 Aug 15;9(1):30. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3765115/. Accessed 16 August 2022.
5. Struja T, Briner, L, et al. Diagnostic accuracy of basal cortisol level to predict adrenal insufficiency in cosyntropin testing: results from an observational cohort study with 804 patients. Endocr Pract. 2017 Aug;23(8):949-961. Available at https://www.endocrinepractice.org/article/S1530-891X(20)35851-1/fulltext. Accessed 16 August 2022.

Aerospace Medicine Waiver Guide

Urticaria, Angioedema, and Anaphylaxis

Reviewed: Nov 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: AIMWTS waiver table and suggested readings updated.

I. Waiver Consideration

Chronic urticaria or angioedema (i.e., urticaria and angioedema that is present most days of the week for a period of six weeks or more) is disqualifying for all flying class and SWA duties. Any history of solar urticaria is specifically disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention. If chronic urticaria, including cold urticaria, or angioedema is severe and refractory to treatment, it also becomes disqualifying for GBO, ATC, and OSF duties, as well as for retention. Isolated episodes of self-limited (i.e., acute) urticaria or angioedema that resolves without complication is not disqualifying. However, aviators must remain DNIF and other personnel must remain DNIC/DNIA until all symptoms completely remit.

A single episode of *severe allergic reaction* to any common foods, spices, or food additives, or a single episode of *severe allergic reaction* to insect venom inoculation (e.g., a sting or a bite) is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties. It is not disqualifying for retention, but any requirement to carry an epinephrine auto-injector does require a deployment waiver. Any history of food-induced *anaphylaxis* is disqualifying for all flying class and SWA duties. Any history of recurrent *anaphylaxis*, with or without an identifiable trigger, is disqualifying for all flying class, GBO, ATC, OSF, and SWA duties, as well as for retention.

Due to the unpredictability of angioedema or anaphylaxis and the high risk to individual safety (and thereby mission and team/crew safety) in the event of a severe recurrent episode, waivers for chronic urticaria, angioedema, or anaphylaxis are carefully considered on a case-by-case basis. It is expected that all cases will undergo an ACS review. A variety of factors that are weighed when assessing waiver suitability, including, but not limited to, the historical severity of symptoms, the treatments required to resolve or control symptoms, and the frequency of episodes.

To be eligible for waiver, the service member must undergo a thorough allergy evaluation to identify any potential inciting triggers. If aeromedical and operational risk can be effectively mitigated through avoidance or elimination of a causative factor, then waiver will often be considered favorably. Idiopathic urticaria, angioedema, or anaphylaxis may be amenable to waiver if the individual is able to demonstrate a period of asymptomatic remission with use of a prophylactic medication regimen that is approved for use in the applicable career field (e.g., with daily use of a prophylactic dose of an approved second-generation, non-sedating antihistamine). There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of urticaria, angioedema, or anaphylaxis in OSF and SWA

personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

The use of any medication not included on the career field-approved medication list is independently disqualifying. The use of the biologic agent omalizumab (Xolair®) may be considered for waiver on a case-by-case basis, particularly in lower risk career fields. However, other immunosuppressive agents (e.g., cyclosporin, systemic glucocorticoids, etc.) used to treat refractory disease are unlikely to receive an aeromedical waiver. A clinical requirement to carry an epinephrine auto-injector may not be compatible with unrestricted flying duties and could result in a IIC restriction for pilots (multi-place aircraft with another qualified pilot), particularly in cases involving unknown or unavoidable provocative stimuli.

The use of allergen immunotherapy (AIT) is disqualifying for all flying class and SWA duties. A four-hour period of DNIF/DNIC/DNIA is necessary for all aviators, including ATC and SWA personnel, after each AIT injection. An aeromedical or operational waiver can be considered for use of AIT to treat environmental and aeroallergens after the service member demonstrates tolerability of treatment during an appropriate lead-in phase. In the past, it was necessary to achieve maintenance dosing for AIT targeted against environmental and aeroallergens. However, service members may now be considered for an earlier waiver if clinically stable with appropriate follow-up, provided the dosing regimen is deemed compatible with the continued operational tempo.

It is critical to note that aeromedical and operational risk associated with the use of AIT to address symptoms of chronic rhinosinusitus, conjunctivitis, or urticaria is not equivocal to the use of desensitization AIT when there is a history of anaphylaxis to insect venom. Whereas AIT for environmental and aeroallergen treatment may often safely be discontinued or interrupted without adverse health consequences to the individual if necessitated by operational needs, the same is not true for desensitization therapy to insect venom. Therefore, interruption of venom desensitization is not endorsed for operational needs, and waivers for this indication will be scrutinized more carefully.

Table 1: Waiver potential for Urticaria, Angioedema, and Anaphylaxis

Flying Class	Condition	Waiver Potential[1] Waiver Authority	ACS Review or Evaluation
FC I/IA	Chronic urticaria or angioedema	Yes AFRS/CMO[2]	Yes
	Urticaria or angioedema that is chronic, severe, and not controlled with approved medications	Unlikely AFRS/CMO[2]	No
	History of anaphylaxis	Yes AFRS/CMO[2]	Yes
FC II/III/SWA	Chronic urticaria or angioedema	Yes MAJCOM[2]	Yes
	Urticaria or angioedema that is chronic, severe, and not controlled with approved medications	Unlikely MAJCOM[2]	No[3]
	History of anaphylaxis	Yes MAJCOM[2]	Yes
ATC/GBO/OSF	Urticaria or angioedema that is chronic, severe, and not controlled with approved medications	Unlikely MAJCOM[2]	No[3]
	History of anaphylaxis	Yes MAJCOM[2]	No[3]

1. No indefinite waivers.
2. Certification authority for untrained assets is AFRS/CMO. Waiver authority for aeromedically unapproved medication use is AFMRA.
3. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative). Include symptoms associated with episodes, duration of episodes, and frequency of recurrences.
    b. Summary of diagnostic evaluation, including list of any/all procedures with dates.
    c. List exacerbating/triggering factors (if known).
    d. Summary of all treatments and their effectiveness.
    e. Document all comorbidities (e.g., food allergies, asthma, eczema, etc.).
    f. List current medications with dosages.

2. Consultation report from the treating allergist and all subsequent consultation notes. These notes must include the following:
    a. Summarization of presentation, evaluation, and treatment course.
    b. Date of last recurrence.
    c. Current treatment or prophylaxis recommendations.
    d. If on allergy immunotherapy, an outline of the anticipated course of ongoing treatment must be included.
3. Results of any other testing performed in the course of diagnosis, evaluation, and management of urticaria, angioedema, or anaphylaxis, including laboratory studies, imaging, and any other ancillary studies.
4. Form FL4 with return to duty and ALC status.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination.
    b. Specify any interval recurrences.
    c. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
2. All interval consultation reports from the treating allergist. If on allergy immunotherapy, an outline of the anticipated course of ongoing treatment must be included.
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging, interval colonoscopy/endoscopy reports and biopsy results, and any other ancillary tests.
4. Form FL4 with return to duty and ALC status.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

The primary aeromedical and operational concerns for aviators and other service members with a history of chronic or recurrent urticaria, angioedema, or anaphylaxis relate to the risk that a subsequent event could result in sudden incapacitation or symptoms of sufficient severity to adversely affect performance, mission, or safety. In most cases, the risk of sudden incapacitation and death is presumed to be highest for those individuals with a history of anaphylaxis. When untreated, anaphylaxis can result in airway compromise and/or cardiovascular collapse in less than five minutes. The severity of a recurrence cannot be reliably predicted based on the extent/severity of symptoms during previous episodes. Likewise, the course of an episode may be unpredictable, and previous patterns of symptom progression do not necessarily foretell how future episodes will evolve. Symptoms may return after an initial improvement or may persist for hours or days, requiring further medical intervention to prevent systemic collapse.

Angioedema is a common component of anaphylaxis and may co-occur with urticaria; however, angioedema may occur independently. The risks and approaches to management differ with the

underlying etiology. While an avoidable/allergic trigger can be identified in some cases, the cause of chronic angioedema or urticaria is often idiopathic. Recurrences can be unpredictable. In some cases, symptoms are provoked by physical or emotional stressors, such as those encountered in aviation and operational environments. Edema of the tissues of the tongue, palate, and pharynx may lead to respiratory compromise and sudden incapacitation. In the absence of anaphylaxis (i.e., a history of multisystem involvement), the risk of sudden incapacitation is considered less. When swelling is limited to the face and cheeks, there remains a potential for progression without medical intervention. Even mild symptoms pose a risk for distraction and performance decrement, particularly during critical phases of flight. Facial swelling could interfere with the wearing of the aviator mask or other life support equipment, and periorbital swelling could obstruct the field of vision.

Chronic urticaria without angioedema is usually considered non-life threatening, but extensive involvement can result in distraction and performance decrement, particularly during critical phases of flight. If left untreated, symptoms can progress, and the possibility for the development of angioedema exists. Like angioedema, urticarial symptoms can be provoked by stress in some individuals. Of aeromedical and operational significance, many of the medications used to treat or control chronic urticaria are sedating. Fortunately, there are two second-generation antihistamines that are approved for use in USAF aircrew (fexofenadine and loratadine), which are often effective at maintaining remission when used daily. A third antihistamine, cetirizine, is approved for use in GBO personnel. However, none of these medications are approved for the treatment or prophylaxis of urticaria and/or angioedema, and use for this indication requires a waiver. The use of montelukast for the treatment and prophylaxis of urticaria is approved for all aircrew and GBO personnel, with an appropriate waiver for the underlying condition.

When an allergen is identified as a triggering factor causing recurrent urticaria, angioedema, or anaphylaxis reactions, an individual may be a candidate for immunotherapy to reduce the risk of future recurrence. AIT is associated with an ongoing risk for systemic reaction including anaphylaxis. Due to the greater likelihood of such reactions during the build-up phase, waivers are generally not considered until an individual demonstrates stability. In the past, service members were required to achieve maintenance dosing prior to waiver request submission. An earlier waiver request may be considered on a case-by-case basis, dependent on a variety of factors. Individualized assessments of risk will depend upon the severity of symptoms or previous reactions prior to the initiation of AIT, symptoms since initiation of AIT, and tolerance of treatment without adverse reactions. The clinical impact of operationally-necessitated interruptions in AIT will also be weighed. AIT desensitization in the setting of a previous anaphylactic reaction to insect venom is considered to be higher risk than AIT for refractory allergic rhinitis, conjunctivitis, sinusitis, or urticaria. Thus, interruptions in AIT for insect venom desensitization will not be considered favorably for waiver. However, the severity of the underlying condition prior to initiation of AIT will be taken into consideration in all cases.

Occasionally, non-approved biologic agents such as omalizumab (Xolair®) may be used for recurrent urticaria that does not respond to less potent agents. Recourse to these agents is indicative of the severity of the underlying condition, which might not be waiverable. The biologic agents themselves are also associated with significant aeromedical and operational risks, including delayed anaphylaxis. Therefore, biologic agents may be considered on a case-by-case

basis in select subset of individuals who are otherwise determined to be low-risk for serious health effects in a low-risk operational setting.

Review of the AIMWTS database from Nov 2019 through Nov 2022 revealed 305 cases with a diagnosis of urticaria, angioedema, or anaphylaxis. The breakdown of the number of waivers and number of total cases are tabulated below. Of the 21 DQs, 8 were specific to urticaria, angioedema, anaphylaxis, and/or associated therapies.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
L50.9	Urticaria, unspecified	7/7	54/57	36/40	5/6	4/4	3/4
T78.2	Anaphylaxis, unspecified	9/12	34/35	44/47	25/26	4/4	11/11
T78.3	Angioneurotic edema	1/1	34/35	10/11	2/3	0/0	1/2

IV. Suggested Readings

1. Kolkhir P, Pogorelov D, Darlenski R, et al.; WAO Junior Members Group. Management of chronic spontaneous urticaria: a worldwide perspective. World Allergy Organ J 2018;11:14. Available at https://waojournal.biomedcentral.com/track/pdf/10.1186/s40413-018-0193-4.pdf. Accessed 22 November 2022.
2. Lieberman P, Nicklas RA, Randolph C, et al. Anaphylaxis- a practice parameter update 2015. Ann Allergy Asthma Immunol 2015;115:341-384. Available at https://www.aaaai.org/Aaaai/media/Media-Library-PDFs/Allergist%20Resources/Statements%20and%20Practice%20Parameters/2015-Anaphylaxis-PP-Update.pdf. 22 November 2022.
3. Zuberbier T, Aberer W, Asero R, et al. The EAACI/GA²LEN/EDF/WAO guideline for the definition, classification, diagnosis and management of urticaria. Allergy 2018;73:1393-1414. Available at https://onlinelibrary.wiley.com/doi/epdf/10.1111/all.13397. Accessed 22 November 2022.

Bladder Cancer

Revised: Sep 2024
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Maj Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (Aerospace Medicine Branch Chief)

Significant Changes: Waiver guide reformatted. Updated to reflect the most recent MSD and standards of medical care.

I. Waiver Consideration

Any history of a malignant neoplasm, including bladder cancer, is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Complications of the malignancy, treatment for the malignancy, or sequelae of treatment may be independently disqualifying. For example, any sequelae that result in an anatomic urinary disorder or symptoms of sufficient severity that they distract from duty performance, necessitate frequent intervention, or interfere with normal functioning is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. A cystectomy ureterostomy is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. A ureterostomy is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention; while a cystostomy is disqualifying for all flying class, ATC, and SWA duties. Other potential complications of bladder cancer and its treatment may be independently disqualifying. It is recommended that the MSD and the appropriate career field medication list be cross-referenced for all treatments, complications, or residual symptoms.

The use of any non-approved medication is independently disqualifying. Waiver may be considered in certain low-risk, trained individuals on a case-by-case basis. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of bladder cancer in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Typically, an aeromedical or operational waiver for bladder cancer is considered after completion of all planned treatment and the establishment of disease-free asymptomatic clinical stability. It is expected that the service member will be in remission and be following a routine schedule of post-treatment surveillance, in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines). Any adverse outcomes of the primary malignancy or its treatment should be addressed before requesting a waiver, with clear establishment of clinical, biochemical, and radiographic stability, as applicable. Generally, a period of at least six months of stable post-treatment surveillance is required prior to consideration of a waiver for a trained asset; whereas five years of surveillance is required prior to consideration of a waiver for an untrained individual. Case-by-case consideration may be given to an earlier waiver in select low-risk cases.

Table 1: Waiver potential for Bladder Cancer

Flying Class	Condition	Waiver Potential[1] Waiver Authority[2]	ACS Review or Evaluation
FC I/IA	Bladder cancer, stages 0-I[3]	Yes AFRS/CMO	Yes
	Bladder cancer, stage II-IV	Unlikely AFRS/CMO	No
FC II/III/ ATC/GBO/ OSF/SWA	Bladder cancer, stages 0-IIIA[3,4]	Yes AFMED	Yes
	Bladder cancer, stage IIIB-IV	Unlikely AFMED	No

1. No indefinite waivers.
2. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMRA.
3. Waiver for untrained assets may be considered after five years of stable, asymptomatic, disease-free surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.
4. Waiver for trained assets may be considered after six months of stable, asymptomatic, disease-free surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Fully describe the course of treatment, including dates of each intervention and any side effects, adverse outcomes, or complications.
    c. Specify presence or absence of any residual symptoms or sequelae following completion of treatment.
    d. List any current medications, dosages, dates of dose adjustments, and any medication adverse effects.
    e. Specify current surveillance regimen, including schedule of specialist clinical re-evaluation, laboratory testing, and any applicable imaging. Explain any discrepancies in surveillance plan from established post-treatment guidelines.
2. Consultation report from all treating specialists, as applicable (e.g., urologist, medical oncologist, radiation oncologist, surgeon) and all subsequent consultation notes. These notes must include the following:
    a. Summarization of presentation, evaluation, and staging.
    b. Summarization of complete treatment course, including any modifications to initial planned treatments with explanation.

    c. Recent post-treatment follow-up note addressing clinical stability and commenting on presence or absence of residual disease, symptoms, or sequelae of the bladder cancer or its treatment.
    d. Detailed plan of ongoing surveillance for recurrence, including interval of follow-up and specific monitoring tests planned.
3. Results of all testing performed during diagnosis, evaluation, and management of bladder cancer, and post-treatment surveillance, including laboratory studies, imaging reports, pathology results, and any other ancillary studies. The below-listed studies must be included:
    a. Current urinalysis
    b. Current urine cytology
    c. Current comprehensive metabolic panel (CMP)
    d. Any imaging reports for staging, restaging, and surveillance
    e. Cystoscopy reports
    f. All operative and procedure reports
    g. Pathology reports from all biopsy and surgical samples
4. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. <u>Renewal Waiver Request</u>:

1. Updated AMS with interval history, including:
    a. Any new subjective symptoms or objective findings.
    b. Complete list of current medications with dates of initiation, dosages, dates of dose adjustments, and all adverse effects.
    c. Summary of interval surveillance evaluations and studies.
    d. Updated plan of ongoing surveillance for recurrence.
2. All relevant interval consultation reports from specialty providers (e.g., urologist, medical oncologist, radiation oncologist, surgeon).
3. Laboratory studies required:
    a. Current urinalysis
    b. Current urine cytology
    c. Current BMP
    d. Current hepatic panel (liver function test)
4. Results of all interval testing performed in the course of ongoing management and surveillance, including all laboratory studies, imaging reports, and other ancillary tests.
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

There is no screening test for bladder cancer. Typically, the diagnosis is made after the development of symptoms prompts diagnostic testing. The most common presenting symptom is painless gross hematuria. Incidental microscopic hematuria, urinary frequency, urgency, and dysuria are also possible. Pain may result from mass effect, invasion into nearby structures, or metastasis (e.g., bone pain, abdominal pain from abdominal lymph node or liver involvement, headaches due to intracranial metastasis). Advanced metastatic disease may present with fatigue and unexplained weight loss. Unfortunately, lack of symptom specificity and the fact that symptoms are often intermittent may result in a delayed diagnosis and more advanced stage of disease when the diagnosis is ultimately established.

Bladder cancer often presents insidiously, and individuals with early-stage disease may remain asymptomatic under normal physiologic conditions (i.e., in the absence of hypoxia, altitude-exposure, dehydration, physical exertion, etc.). However, with changing pressures at altitude, hypoxic insult, or under the physiologic stresses of the aviation or occupational environment, individuals may become significantly symptomatic or impaired. Gradual onset of anemia from slow blood loss may result in fatigue, reduced exertional tolerance, or reduced ability to tolerate hypoxia. Pain from local, regional, or distant spread of disease may be distracting from duties or potentially incapacitating, if severe. Acute bladder outlet obstruction or ureteral obstruction is a medical emergency.

The diagnosis of bladder cancer comprises urothelial, or transitional cell, carcinoma, which accounts for 90% of all bladder cancers in the United States, as well as non-urothelial carcinomas. Urothelial carcinoma can originate from the renal pelvis, ureter, or urethra, although these primary sites are much less common than the bladder. At time of diagnosis, bladder cancer is staged based on depth of invasion into the bladder wall and whether there is locoregional or distant spread. Treatment and prognosis vary greatly depending on these factors. As such, it is difficult to generalize aeromedical and operational risk. Each intervention is associated with unique adverse effects and complications, which must be weighed in the context of the individual service member, the primary disease, any associated complications, risks of recurrence, potential for late sequelae of therapy, and the unique occupational considerations.

At time of diagnosis, about half of bladder cancers are non-invasive, meaning there is no extension to the deeper layers of the bladder wall. About a third of newly diagnosed bladder cancers are termed muscle-invasive, indicated deeper penetration. Most of the remaining newly diagnosed cases will show evidence of locoregional extension to nearby tissue and lymph nodes, while only about 5% demonstrate distant metastasis. Unfortunately, the prognosis for metastatic disease is poor. The most common sites of bladder cancer metastasis are the lungs, bone, and liver. The aeromedical and operational risk of metastatic disease depends on total cancer burden and the specific organ systems involved. Metastatic spread to any organ system may result in complications of aeromedical and operational significance, such as respiratory impairment or bone fracture. Brain metastasis is of unique concern, because of the poor sensitivity of screening to detect early disease. As a result, the first indication of brain involvement may be the development of symptoms, some of which convey serious risk in an aviation or operational environment (e.g., cognitive changes, hemorrhage, or seizure).

Recurrence following completion of treatment for bladder cancer is common, and many individuals experience multiple recurrences. Therefore, post-treatment surveillance is paramount to maximizing clinical outcomes and mitigating aeromedical and operational risk. Post-treatment surveillance is not universally defined and depends on the treatments that were implemented to achieve remission. Generally, this surveillance will include periodic clinical re-evaluation in conjunction with serial urinalysis, urine cytology, and often an of liver function, renal function, and electrolytes. Interval imaging may also be performed. Urine biomarkers of bladder cancer are an area of active investigation and will likely play a larger clinical role both diagnostically and as a method of surveillance for recurrence in the future. When surveillance is conducted in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines), it is expected that recurrent disease would be detected prior to development of symptoms or complications of significant aeromedical or operational impact.

Review of the AIMWTS database from Aug 2021 through Aug 2024 revealed 8 waiver packages with a diagnosis of bladder cancer that required an aeromedical waiver. The breakdown of the number of approved waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
C67.9	Malignant neoplasm of bladder, unspecified	0/0	5/5	2/3	0/0	0/0	0/0
D09.0	Carcinoma in situ of bladder	0/0	0/0	0/0	0/0	0/0	0/0

IV. Suggested Readings

1. Bladder Cancer: a joint SIU-ICUD international consultation. Ed. Black P, Gontero P. Lisbon, Portugal: Société International d'Urologie. 2017. Available at https://www.siu-urology.org/themes/web/assets/files/society/pdf/siu-icud_bladder_cancerv2_pdf.pdf. Accessed 11 Sep 2024.
2. Chang SS, Bochner BH, Chou R, et al. Treatment of non-metastatic muscle-invasive bladder cancer: AUA/ASCO/ASTRO/SUO guideline. J Urol 2017;198:552-559. Available at https://www.auanet.org/guidelines-and-quality/guidelines/bladder-cancer-non-metastatic-muscle-invasive-guideline. Accessed 11 Sep 2024.
3. Holzbeierlein J, Bixler BR, Buckley DI, et al. Diagnosis and treatment of non-muscle invasive bladder cancer: AUA/SUO guideline: 2024 amendment. J Urol 2024;211:533-538. Available at https://www.auanet.org/guidelines-and-quality/guidelines/bladder-cancer-non-muscle-invasive-guideline. Accessed 11 Sep 2024.
4. National Comprehensive Cancer Network. Bladder Cancer (Version 2.2024). 27 March 2024. Available at https://www.nccn.org/professionals/physician_gls/pdf/bladder.pdf. Accessed 11 Sep 2024. (Note: A free account must be created to access this guideline).
5. PDQ Adult Treatment Editorial Board. Bladder Cancer Treatment (PDQ®): Health Professional Version. 2023 January 18. In: PDQ Cancer Information Summaries [Internet]. Bethesda, MD: National Cancer Institute (US), 2002. Available at https://www.ncbi.nlm.nih.gov/books/NBK65962/. Accessed 11 Sep 2024.

Breast Cancer

Reviewed: Sep 2024
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Maj Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (Aerospace Medicine Branch Chief)

Significant Changes: Updated to reflect the most recent MSD and standards of medical care.

I. Waiver Consideration

Any history of a malignant neoplasm, including breast cancer, is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Complications of the malignancy, treatment for the malignancy, or sequelae of treatment may be independently disqualifying. For example, chronic breast pain that interferes with the wear of military equipment is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention.

Primary or secondary chemoprophylaxis with tamoxifen or raloxifene is acceptable for FC II, III, ATC, and GBO duties with a waiver. Although tamoxifen is not included in the most recent addition of the GBO medication list, use for primary or secondary chemoprophylaxis is considered compatible with a waiver. The use of any medication not included on the career field approved medication list is independently disqualifying. Unapproved medications include the aromatase inhibitors and all other adjuvant endocrine therapies and immunotherapies to reduce the risk of late recurrence, a new primary breast cancer, and to improve overall survival. Unapproved medications may be considered for waiver on a case-by-case basis. The presence of complications or adverse effects stemming from endocrine therapy (e.g., muscle pain that is distracting or interferes with duty performance, osteoporosis, etc.) make a waiver less likely. It is recommended that the MSD and the appropriate career field medication list be cross-referenced for all treatments, complications, or residual symptoms.

There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of breast cancer in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Typically, an aeromedical or operational waiver for breast cancer is considered after completion of all planned treatment and the establishment of disease-free asymptomatic clinical stability. It is expected that the service member will be in remission and be following a routine schedule of post-treatment surveillance, in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines). Any adverse outcomes of the primary malignancy or its treatment should be addressed before requesting a waiver, with clear establishment of clinical, biochemical, and radiographic stability, as applicable. Generally, a period of at least six months of stable post-treatment surveillance is required prior to consideration of a waiver for most trained assets; whereas five years of surveillance is required prior to consideration of a waiver for most untrained individuals. Case-by-case consideration may be given to an earlier waiver in select low-risk cases.

Table 1: Waiver potential for Breast Cancer

Flying Class	Condition	Waiver Potential[1] Waiver Authority[2]	ACS Review or Evaluation
FC I/IA	Breast cancer, stages 0-IIB[3]	Yes AFRS/CMO	Yes
	Breast cancer, stage IIIA-IV	Unlikely AFRS/CMO	No
FC II/III	Breast cancer, stages 0-IIB[3,4]	Yes AFMED	Yes
	Breast cancer, stages IIIA-IIIC[3,4]	Yes AFMED	Yes
	Breast cancer, stage IV	Unlikely AFMED	No
ATC/GBO/ OSF/SWA	Breast cancer, stages 0-IIB[3,4]	Yes AFMED	No[5]
	Breast cancer, stages IIIA-IIIC[3,4]	Yes AFMED	No[5]
	Breast cancer, stage IV	Unlikely AFMED	No

1. No indefinite waivers.
2. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMED.
3. Waiver for untrained assets may be considered after five years of stable, asymptomatic, disease-free surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.
4. Waiver for trained assets may be considered after six months of stable, asymptomatic, disease-free surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.
5. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Fully describe the course of treatment, including dates of each intervention and any side effects, adverse outcomes, or complications.
    c. Specify presence or absence of any residual symptoms or sequelae following completion of treatment.
    d. List any current medications, dosages, dates of dose adjustments, and any medication adverse effects.

    e. Specify current surveillance regimen, including schedule of specialist clinical re-evaluation, laboratory testing, and any applicable imaging. Explain any discrepancies in surveillance plan from established post-treatment guidelines.
2. Consultation report from all treating specialists, as applicable (e.g., medical oncologist, radiation oncologist, surgeon) and all subsequent consultation notes. These notes must include the following:
    a. Summarization of presentation, evaluation, and staging.
    b. Summarization of complete treatment course, including any modifications to initial planned treatments with explanation.
    c. Recent post-treatment follow-up note addressing clinical stability and commenting on presence or absence of residual disease, symptoms, or sequelae of the breast cancer or its treatment.
    d. Detailed plan of ongoing surveillance for recurrence, including interval of follow-up and specific monitoring tests planned.
3. Results of all testing performed during diagnosis, evaluation, and management of breast cancer, and post-treatment surveillance, including laboratory studies, imaging reports, pathology results, and any other ancillary studies. The below-listed studies must be included:
    a. Current CBC with differential
    b. Current comprehensive metabolic panel (CMP)
    c. Any imaging reports for staging, restaging, and surveillance
    d. All operative and procedure reports, including reconstructive surgeries
    e. Pathology report from all biopsy and surgical samples, including results of hormone receptor and HER2 receptor testing
    f. If treatment included anthracycline chemotherapy, then a post-treatment echocardiogram or multigated acquisition scan (MUGA) is required to assess left ventricular function
4. Current physical examination findings, including:
    a. Bilateral clinical breast examination of any conserved breast tissue
    b. Chest wall/surgical site
    c. Lymph nodes
    d. Bilateral upper extremities with particular attention to range of motion and presence or absence of lymphedema
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. <u>Renewal Waiver Request</u>:

1. Updated AMS with interval history, including:
    a. Any new subjective symptoms or objective findings.
    b. Complete list of current medications with dates of initiation, dosages, dates of dose adjustments, and all adverse effects.
    c. Summary of interval surveillance evaluations and studies.
    d. Updated plan of ongoing surveillance for recurrence.
2. Current physical examination findings, including:
    a. Bilateral clinical breast examination of any conserved breast tissue

    b. Chest wall/surgical site
    c. Lymph nodes
    d. Bilateral upper extremities with particular attention to range of motion and presence or absence of lymphedema
3. All relevant interval consultation reports from specialty providers (e.g., medical oncologist, radiation oncologist, surgeon).
4. Results of all interval testing performed in the course of ongoing management and surveillance, including all laboratory studies, imaging reports, and other ancillary tests.
5. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.
6. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

III. Aeromedical Concerns

In locales with well-established breast cancer screening programs, the majority of breast cancers are diagnosed before the development of any signs or symptoms of clinical, aeromedical, or operational significance. Among women who undergo diagnostic evaluation due to concerning symptoms, the most common presenting feature is a breast mass or lump. Axillary adenopathy or changes in the skin of the breast are signs of more locally advanced disease. Other signs and symptoms include nipple changes (e.g., new inversion, spontaneous discharge) and breast pain. Even when these symptoms are present, the impact on aviation or operational duties is generally negligible, although pain and discomfort may interfere with the wearing of equipment, and anxiety or worry about symptoms could distract from duty performance.

At time of diagnosis, most breast cancers are either confined to the breast or have not spread to more than three regional lymph nodes (i.e., stage I or II). Distant metastases are present at first diagnosis in only 6% of women. Unfortunately, the risk of later metastasis in women who are initially diagnosed with early-stage disease is relatively high at 30%. The most common sites of breast cancer metastasis are liver, brain, bone, and lung. The aeromedical and operational risk of metastatic disease depends on total cancer burden and the specific organ systems involved. Metastatic spread to any organ system may result in complications of aeromedical and operational significance, such as respiratory impairment or bone fracture. Brain metastasis is of unique concern, because of the poor sensitivity of screening to detect early disease. As a result, the first indication of brain involvement may be the development of symptoms, some of which convey serious risk in an aviation or operational environment (e.g., cognitive changes, hemorrhage, or seizure).

As is true for many malignancies, treatment for breast cancer is highly individualized. As such, it is difficult to generalize aeromedical and operational risk. Each intervention is associated with unique adverse effects and complications, which must be weighed in the context of the individual service member, the primary disease, any associated complications, risks of recurrence, potential for late sequelae of therapy, risks and side effects associated with any prolonged chemoprophylaxis, and the unique occupational considerations.

Rates of breast cancer recurrence vary depending on the stage and other characteristics (e.g., hormone receptor status) of the primary malignancy. Recurrent disease may present locally, in regional lymph nodes, or at distant sites. Locoregional recurrence is most likely, although it is estimated that about a third of patients with locoregional disease have concurrent metastatic disease at the time their recurrence is detected. Bone is the most common site of metastatic recurrent disease. Local recurrent disease must be distinguished from a second primary malignancy in individuals who were treated with breast conserving therapy. Although late recurrence is possible, most recurrences will occur within five years of definitive treatment. Median time to recurrence differs by treatment modality; two to three years following mastectomy, three to four years following breast conserving therapy, and five to seven years following adjuvant systemic chemotherapy. However, the absolute risk of recurrence after achievement of clinical remission is low. For example, the lifetime incidence of local recurrence after breast conserving therapy is estimated between 2.5-5.5%. Similarly, between 2.3-3.6% of individuals who undergo mastectomy for operable breast cancer will eventually develop recurrence in the chest wall or regional lymph nodes. When surveillance is conducted in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines), it is expected that recurrent disease would be detected prior to development of symptoms or complications of significant aeromedical or operational impact.

Review of the AIMWTS database from Aug 2021 through Aug 2024 revealed 21 waiver packages with a diagnosis of breast cancer that required an aeromedical waiver. The breakdown of the number of approved waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
C50.9	Malignant neoplasm of breast of unspecified site	0/0	12/12	8/8	0/0	0/0	0/0
D05.9	Unspecified type of carcinoma in situ of breast	0/0	0/0	1/1	0/0	0/0	0/0

IV. Suggested Readings

1. Curigliano G, Burstein HJ, Gnant M, et al. Understanding breast cancer complexity to improve patient outcomes: The St Galen International Consensus Conference for the Primary Therapy of Individuals with Early Breast Cancer 2023. Ann Oncol 2023;34:970-986. Available at https://www.sciencedirect.com/science/article/pii/S0923753423008359. Accessed 11 September 2024.
2. National Comprehensive Cancer Network. Breast Cancer (Version 2.2024). 11 March 2024. Available at https://www.nccn.org/professionals/physician_gls/pdf/breast.pdf. Accessed 11 September 2024. (Note: A free account must be created to access this guideline).
3. PDQ Adult Treatment Editorial Board. Breast Cancer Treatment (PDQ®): Health Professional Version. 2024 Jan 19. In: PDQ Cancer Information Summaries [Internet]. Bethesda, MD: National Cancer Institute (US), 2002. Available at https://www.ncbi.nlm.nih.gov/books/NBK65744/. Accessed 11 September 2024.
4. Visvanthan K, Fabian CJ, Bantug E, et al. Use of Endocrine Therapy for Breast Cancer Risk Reduction: ASCO Clinical Practice Guideline Update. J Clin Oncol 2019;37:3152-3165. Available at https://ascopubs.org/doi/10.1200/JCO.19.01472. Accessed 11 September 2024.
5. Zoberi K and Tucker J. Primary care of breast cancer survivors. Am Fam Physician 2019;99:370-375. Available at https://www.aafp.org/pubs/afp/issues/2019/0315/p370.html. Accessed 11 September 2024.

Aerospace Medicine Waiver Guide

Cancers (Misc.)

Revised: Sep 2024
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Maj Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (Aerospace Medicine Branch Chief)

Significant Changes: Waiver guide reformatted.

I. Waiver Consideration

Any history of a malignant neoplasm is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Complications of the malignancy, treatment for the malignancy, or sequelae of treatment may be independently disqualifying. It is recommended that the MSD and the appropriate career field medication list be cross-referenced for all treatments, complications, or residual symptoms.

The use of any non-approved medication is independently disqualifying. Waiver may be considered in certain low-risk, trained individuals on a case-by-case basis. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of malignancy in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Typically, an aeromedical or operational waiver for malignancy is considered after completion of all planned treatment and the establishment of disease-free asymptomatic clinical stability. It is expected that the service member will be in remission and be following a routine schedule of post-treatment surveillance, in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines). Any adverse outcomes of the primary malignancy or its treatment should be addressed before requesting a waiver, with clear establishment of clinical, biochemical, and radiographic stability, as applicable. Generally, a period of at least six months of stable post-treatment surveillance is required prior to consideration of a waiver for a trained asset; whereas five years of surveillance is required prior to consideration of a waiver for an untrained individual. Case-by-case consideration may be given to an earlier waiver in select low-risk cases. ACS review is generally required. Indefinite waivers are typically not recommended.

Please refer to the below waiver guide chapters for more information on specific malignancies:

Bladder Cancer
Breast cancer
Cervical Cancer
Colorectal Cancer
Hodgkin Lymphoma
Leukemia
Malignant Melanoma
Non-Hodgkin Lymphoma

Pituitary Tumors
Prostate Cancer
Testicular Cancer
Thyroid Cancer

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Fully describe the course of treatment, including dates of each intervention and any side effects, adverse outcomes, or complications.
    c. Specify presence or absence of any residual symptoms or sequelae following completion of treatment.
    d. List any current medications, dosages, dates of dose adjustments, and any medication adverse effects.
    e. Specify current surveillance regimen, including schedule of specialist clinical re-evaluation, laboratory testing, and any applicable imaging. Explain any discrepancies in surveillance plan from established post-treatment guidelines.
2. Consultation report from all treating specialists, as applicable (e.g., medical oncologist, radiation oncologist, surgeon, other specialists) and all subsequent consultation notes. These notes must include the following:
    a. Summarization of presentation, evaluation, and staging.
    b. Summarization of complete treatment course, including any modifications to initial planned treatments with explanation.
    c. Recent post-treatment follow-up note addressing clinical stability and commenting on presence or absence of residual disease, symptoms, or sequelae of the malignancy or its treatment.
    d. Detailed plan of ongoing surveillance for recurrence, including interval of follow-up and specific monitoring tests planned.
3. Results of all testing performed during diagnosis, evaluation, and management of the malignancy, and post-treatment surveillance, including laboratory studies, imaging reports, pathology results, and any other ancillary studies. The below-listed studies must be included:
    a. Diagnostic, staging, and surveillance laboratory results
    b. Any imaging reports for staging, restaging, and surveillance
    c. All operative and procedure reports
    d. Pathology reports from all biopsy and surgical samples
4. Current physical examination findings.
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Any new subjective symptoms or objective findings.
    b. Complete list of current medications with dates of initiation, dosages, dates of dose adjustments, and all adverse effects.
    c. Summary of interval surveillance evaluations and studies.
    d. Updated plan of ongoing surveillance for recurrence.
2. All relevant interval consultation reports from specialty providers (e.g., medical oncologist, radiation oncologist, surgeon, other specialists).
3. Current physical examination findings.
4. Results of all interval testing performed in the course of ongoing management and surveillance, including all laboratory studies, imaging reports, and other ancillary tests.
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Aeromedical and operational risks related to malignancy depend upon the underlying primary cancer, stage of disease, treatment modalities utilized, risks of recurrence, risks of late complications of therapy, and other unique factors. As such, it is impossible to generalize aeromedical and operational risk. Individuals are considered on a case-by-case basis. Relevant concerns include sequelae of systemic chemotherapy, immunotherapy, or targeted radiation therapy. Additionally, the likelihood of recurrence is weighed against how readily detectable the recurrent disease would be prior to onset of symptoms or complications of aeromedical or operational impact.

Generally, post-treatment surveillance is paramount to maximizing clinical outcomes and mitigating aeromedical and operational risk. This surveillance often includes periodic clinical re-evaluation, interval laboratory studies, and interval imaging, depending on the primary malignancy and its stage. When surveillance is conducted in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines) and when service members are diligent about presenting any concerning signs or symptoms to flight/operational medicine for evaluation, it is expected that any malignancy of sufficiently low risk to be amenable to waiver, were it to recur, would be detected prior to development of symptoms or complications of significant aeromedical or operational impact.

IV. Suggested Readings

1. National Comprehensive Cancer Network. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®): Treatment by Cancer Type. Available at https://www.nccn.org/guidelines/category_1. Accessed 11 September 2024. (Note: A free account must be created to access this guideline).

Cervical Cancer

Revised: Aug 2022

Reviewed: Dr. Max Lee (ACS Waiver Guide coordinator), Lt Col Amy Brown (AF/SG OB/GYN consultant), and Lt Col Paul Vu (AFMRA Physical Standards Development Chief)

Significant Changes:

Updates reflective of changes in DoDI 6130.03 V1, updated suggested readings

In trained aviators, abnormal PAP tests are not disqualifying and do not require DNIF unless the flyer has physical or emotional symptoms that warrant grounding until resolved, as determined by their flight surgeon. IAW DoDI 6130.03 V1, new accessions with abnormal cervical cytology within the preceding 3 years (excluding atypical squamous cells of undetermined significance [ASCUS] with human papilloma virus [HPV] and confirmed low-grade squamous intraepithelial lesions [LSIL]) are disqualified for service entry, as is any history of malignancy. All malignant neoplasms (i.e. cancers) require I-RILO processing and are disqualifying for aviation duties. Cervical carcinomas-in-situ without sequelae, after adequate excision as evidenced by pathology report, are exempt from this requirement.

In general, aeromedical waivers are granted for cervical cancers, after meeting clinical and adequate observational timelines. The one exception is Stage IVB disease (distant metastasis), which remains highly unlikely for waiver.

Table 1: Waiver potential for Cervical Cancer

Flying Class (FC)	Disease/Condition	Waiver Authority Waiver Potential	ACS Review/ Evaluation
FC I/IA[1]	Stages IA1 – IIA	AFRS/CMO Yes [2, 4]	Yes
	Stages IIB – IVB	AFRS/CMO Unlikely	No
FC II/III and ATC/GBO/SWA[1]	Stages IA1 – IVA	MAJCOM Yes [2, 3, 4]	Yes
	Stage IVB	MAJCOM Unlikely	No

1. Certification authority for all untrained servicemember is AFRS/CMO.
2. For untrained servicemembers, aeromedical waiver may be considered after five years of remission and asymptomatic.
3. For trained personnel waiver may be considered after six months of completed treatment and are in remission and asymptomatic. For stage IA – IB1 cervical cancers treated with surgical only, without radiation or chemotherapy, and pathology report for low recurrence risk, submit for waiver consideration after appropriate surgical recovery.
4. No indefinite waivers.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. Summary of presentation, course, and treatment.
    a. Include: symptoms; pathology; stage; treatment: including date of last treatment, surveillance plan and activity level.
2. Current physical exam findings, including but not limited to genital and rectovaginal exam, lymph nodes, and abdomen.
3. All consultation reports, including follow-up notes with examination findings after disease resolution.
    a. Gynecology and Oncology consult reports to include the six-month follow-up visit in accordance with the National Comprehensive Cancer Network (NCCN) guidelines.
    b. Include tumor board report (military or civilian) if applicable.
4. Reports of any pertinent laboratory studies, imaging studies, copies of images (as indicated).
    a. Include all follow-up PAP results, frequency per NCCN guidelines.
    b. Any initial and follow-up labs (minimum of CBC and BUN/Creatinine levels).
5. Any specific diagnostic tests performed, before and after treatment (as indicated).
6. Documentation of return to full physical activity, including specific comments regarding any activity limitations.
7. Medical evaluation board results (FL4 with RTD and ALC status).
8. All operative and/or procedural notes related to cervical cancer.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Interim history since last waiver submission.
2. Current physical exam findings, including but is not limited to genital and rectovaginal exam, lymph nodes, and abdomen.
3. All consultation reports, including follow-up notes with examination findings after disease resolution.
    a. Gynecology and Oncology consult reports to include the six-month follow-up visit in accordance with the NCCN guidelines.
    b. Include tumor board report (military or civilian) if applicable.
4. Reports of any pertinent laboratory studies, imaging studies, copies of images since last waiver.
    a. Include all follow-up PAP results (frequency per NCCN guidelines).
    b. Any follow-up labs.

5. Discuss the status of any previously identified treatment complications. Include a discussion of any new complications that developed since the previous waiver, information on the functional impact of these complications, and the management plan.
6. Any other pertinent information.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Cervical cancer is the most common cancer caused by a known preventative pathogen in the United States, and is associated with an infection of the human papilloma virus (HPV), with serotypes 16, 18, 31, 33, 45, and 56 responsible for more than 80% of invasive cervical cancers. Symptoms depend on location and extent of spread of the cancer, but can minimally include invasion of the cervical tissue (causing irregular vaginal bleeding) or can include extension into the surrounding tissue/organs of the vagina, bladder, and GI tract. Risk factors for cervical cancer include early age at first intercourse (age 13 years or younger), multiple sexual partners, multiparity, lower socioeconomic standing, cigarette smoking, history of sexually transmitted diseases, and immunosuppression (e.g. HIV positive, organ transplant patients, and long-term corticosteroid use). Treatment for cervical cancer depends on the stage of the disease, but can include surgical excision, chemotherapy, and/or radiation therapy. The 5-year survival rate for all stages of cervical cancer is close to 68%, but if caught in the early non-metastatic stages, the 5-year survival exceeds 90%. Complications from treatment for cervical cancer vary depending on the type of treatment and their potential for side-effects such as radiation induced proctitis, ulcerations, and strictures, which must be considered when assessing whether an operator is ready to return to duties.

Patients in the U.S. have seen a declining trend over the past 10 years in the number of new cervical cancer cases diagnosed, which has been attributed to the widespread use of primary prevention strategies (sexual abstinence, condom usage, and HPV vaccination) and secondary prevention strategies (improvements in evidence-based screening involving PAP test, cervical cytology, and HPV screening). Cervical cancer is highly preventable utilizing primary prevention recommendations and early detection through cervical cancer screening, treatments have a high rate of success, and the likelihood of returning to flying and operational duties is high. Success of treatment declines as the stage that the cancer is diagnosed increases. It is important to remember that cancer diagnoses of any type may lead to emotional distress. Thus, the member's mental health and emotional wellness should be assessed and managed prior to return to flying or operational duty determination.

Following treatment, the aeromedical concerns primarily surround the sequelae of treatment, the logistics of surveillance, and the potential for local or metastatic disease recurrence. The level of concern increases with advancing stages of disease, and each operator with a diagnosis of cervical cancer needs to be evaluated on a case-by-case basis.

Review of AIMWTS data through July 2022 revealed 7 cases of cervical cancer requiring aeromedical waivers. The breakdown of the number of waivers and number of total cases are tabulated below. The 2 initial FC III disqualifications were related to other medical or administrative conditions.

Please use only this Cervical Cancer ICD-10 codes for AIMWTS coding purposes		(# of waivers / total # of cases)			
		IFC I/IA	FC II	FC III	ATC
C53.0	Malignant neoplasm of the endocervix	0	2/2	2/4	1/1
C53.1	Malignant neoplasm of the exocervix				
C53.8	Malignant neoplasm of overlapping site of cervix uteri				
C53.9	Malignant neoplasm of the cervix uteri, unspecified				

IV. Suggested Readings

1. Cervical Cancer. National Comprehensive Cancer Network Clinical Practice Guidelines in Oncology; V.4.2019. https://www.nccn.org/professionals/physician_gls/pdf/cervical.pdf (Free access after sign-up)

2. Straughn JM and Yashar C. Management of early-stage cervical cancer. UpToDate. Feb 11, 2022. Accessed Jul 26, 2022. https://www.uptodate.com/contents/management-of-early-stage-cervical-cancer

3. Frumovitz, M. Invasive cervical cancer: Epidemiology, risk factors, clinic manifestations, and diagnosis. UpToDate. Apr 19, 2022. Accessed Jul 26, 2022. https://www.uptodate.com/contents/invasive-cervical-cancer-epidemiology-risk-factors-clinical-manifestations-and-diagnosis

4. U.S. Preventive Service Task Force. Cervical Cancer: Screening. Aug 21, 2018. Accessed Jul 26, 2022. https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/cervical-cancer-screening

Colorectal Cancer

Revised: Sep 2024
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Maj Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (Aerospace Medicine Branch Chief)

Significant Changes: Waiver guide reformatted. Updated to reflect the most recent MSD and standards of medical care.

I. Waiver Consideration

Any history of a malignant neoplasm, including colorectal cancer, is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Complications of the malignancy, treatment for the malignancy, or sequelae of treatment may be independently disqualifying. For example, any history of abdominal surgery is disqualifying for SWA duties. With the exception of appendectomy, any history of resection of any portion of the small or large intestine is disqualifying for all flying class and SWA duties. If colectomy results in post-operative hyper-defecation, it also becomes disqualifying for ATC, GBO, and OSF duties, as well as for retention. A permanent ostomy is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Other potential complications of colorectal cancer and its treatment may be independently disqualifying. It is recommended that the MSD and the appropriate career field medication list be cross-referenced for all treatments, complications, or residual symptoms.

The use of any non-approved medication is independently disqualifying. Waiver may be considered in certain low-risk, trained individuals on a case-by-case basis. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of colorectal cancer in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Typically, an aeromedical or operational waiver for colorectal cancer is considered after completion of all planned treatment and the establishment of disease-free asymptomatic clinical stability. It is expected that the service member will be in remission and be following a routine schedule of post-treatment surveillance, in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines). Any adverse outcomes of the primary malignancy or its treatment should be addressed before requesting a waiver, with clear establishment of clinical, biochemical, and radiographic stability, as applicable. Generally, a period of at least six months of stable post-treatment surveillance is required prior to consideration of a waiver for a trained asset; whereas five years of surveillance is required prior to consideration of a waiver for an untrained individual. Case-by-case consideration may be given to an earlier waiver in select low-risk cases.

Table 1: Waiver potential for Colorectal Cancer

Flying Class	Condition	Waiver Potential[1] Waiver Authority[2]	ACS Review or Evaluation
FC I/IA	Colorectal cancer, stages 0-II[3]	Yes AFRS/CMO	Yes
	Colorectal cancer, stage III-IV	Unlikely AFRS/CMO	No
FC II/III/ ATC/GBO/ OSF/SWA	Colorectal cancer, stages 0-III[3,4]	Yes AFMED	Yes
	Colorectal cancer, stage IV	Unlikely AFMED	No

1. No indefinite waivers.
2. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMED.
3. Waiver for untrained assets may be considered after five years of stable, asymptomatic, disease-free surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.
4. Waiver for trained assets may be considered after six months of stable, asymptomatic, disease-free surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Fully describe the course of treatment, including dates of each intervention and any side effects, adverse outcomes, or complications.
    c. Specify presence or absence of any residual symptoms or sequelae following completion of treatment.
    d. List any current medications, dosages, dates of dose adjustments, and any medication adverse effects.
    e. Specify current surveillance regimen, including schedule of specialist clinical re-evaluation, laboratory testing, and any applicable imaging. Explain any discrepancies in surveillance plan from established post-treatment guidelines.
2. Consultation report from all treating specialists, as applicable (e.g., medical oncologist, radiation oncologist, surgeon) and all subsequent consultation notes. These notes must include the following:
    a. Summarization of presentation, evaluation, and staging.
    b. Summarization of complete treatment course, including any modifications to initial planned treatments with explanation.

    c. Recent post-treatment follow-up note addressing clinical stability and commenting on presence or absence of residual disease, symptoms, or sequelae of the colorectal cancer or its treatment.
    d. Detailed plan of ongoing surveillance for recurrence, including interval of follow-up and specific monitoring tests planned.
3. Results of all testing performed during diagnosis, evaluation, and management of colorectal cancer, and post-treatment surveillance, including laboratory studies, imaging reports, pathology results, and any other ancillary studies. The below-listed studies must be included:
    a. Current CBC with differential
    b. Current comprehensive metabolic panel (CMP)
    c. Current carcinoembryonic antigen (CEA) level
    d. All past CEA levels with dates
    e. Any imaging reports for staging, restaging, and surveillance
    f. Colonoscopy reports
    g. All operative and procedure reports
    h. Pathology report from all biopsy and surgical samples
4. Current physical examination findings, including:
    a. Abdominal examination
    b. Rectal examination
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Any new subjective symptoms or objective findings.
    b. Complete list of current medications with dates of initiation, dosages, dates of dose adjustments, and all adverse effects.
    c. Summary of interval surveillance evaluations and studies.
    d. Updated plan of ongoing surveillance for recurrence.
2. Current physical examination findings, including:
    a. Abdominal examination
    b. Rectal examination
3. All relevant interval consultation reports from specialty providers (e.g., medical oncologist, radiation oncologist, surgeon).
4. Laboratory studies required:
    a. Current CBC with differential
    b. Current CEA level
    c. All interval CEA levels with dates
5. Results of all interval testing performed in the course of ongoing management and surveillance, including all laboratory studies, imaging reports, and other ancillary tests.
6. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

In areas with high rates of colorectal cancer screening, the incidence of colorectal cancer is gradually declining, and much disease is preventable through the identification and removal of precancerous polyps. Early-stage disease is often detected on screening evaluation prior to the development of any signs or symptoms of clinical, aeromedical, or operational significance. However, even in the modern era of improved screening, most colorectal cancer (70-90%) is advanced and symptomatic at the time of diagnosis. Colorectal cancer growth is insidious, and symptoms may be non-specific, such as fatigue, anemia, altered bowel function, abdominal pain, and weight loss. Symptoms resulting from mass effect of the tumor or erosion into adjacent structures and may include intestinal obstruction and hematochezia or melena.

Any of the symptoms associated with colorectal cancer may result in significant impairment or even sudden incapacitation in the aviation or occupational environment. Complications such as anemia may develop gradually, and individuals may remain asymptomatic under normal physiologic conditions (i.e., in the absence of hypoxia, altitude-exposure, dehydration, physical exertion, etc.). However, with changing pressures at altitude, hypoxic insult, or under the physiologic stresses of the aviation or occupational environment, individuals may become significantly symptomatic or impaired. Acute colonic obstruction, perforation, or brisk gastrointestinal bleeding are medical emergencies that may be fatal without prompt access to definitive medical care.

About 20% of colorectal cancer is metastatic at time of diagnosis. The most common sites of colorectal cancer metastasis are regional lymph nodes, lung, liver, and peritoneum. The aeromedical and operational risk of metastatic disease depends on total cancer burden and the specific organ systems involved. Metastatic spread to any organ system may result in complications of aeromedical and operational significance, such as respiratory impairment or pain. Brain metastasis is of unique concern, because of the poor sensitivity of screening to detect early disease. However, brain metastasis from colorectal cancer is rare.

As is true for many malignancies, treatment for colorectal cancer is highly individualized. As such, it is difficult to generalize aeromedical and operational risk. Each intervention is associated with unique adverse effects and complications, which must be weighed in the context of the individual service member, the primary disease, any associated complications, risks of recurrence, potential for late sequelae of therapy, and the unique occupational considerations.

More than 40% of individuals with stage II or III disease at diagnosis will eventually develop recurrence. Recurrent disease may present locally or at distant sites, most commonly the lungs or liver. About 95% of recurrences occur within four years of definitive treatment. Post-treatment surveillance is paramount to maximizing clinical outcomes and mitigating aeromedical and operational risk. This surveillance generally includes a combination of periodic clinical re-evaluation in conjunction with tumor markers, other laboratory studies, serial imaging, and interval colonoscopy. Comparatively, individuals with lower risk disease (e.g., stage I) who undergo curative surgical resection may require only interval colonoscopy, because their risk of disease recurrence is relatively low. When surveillance is conducted in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines),

it is expected that recurrent disease would be detected prior to development of symptoms or complications of significant aeromedical or operational impact.

Review of the AIMWTS database from Aug 2021 through Aug 2024 revealed 7 waiver packages with a diagnosis of colon cancer that required an aeromedical waiver. The breakdown of the number of approved waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
C18.9	Malignant neoplasm of colon, unspecified	0/0	4/4	1/2	1/1	0/0	0/0

IV. Suggested Readings

1. El-Shami K, Oeffinger KC, Erb NL, et al. American Cancer Society colorectal cancer survivorship care guidelines. CA Cancer J Clin 2015;65:428-455. Available at https://acsjournals.onlinelibrary.wiley.com/doi/full/10.3322/caac.21286. Accessed 11 Sep 2024.
2. Hardiman KM, Felder SI, Friedman G, et al. The American Society of Colon and Rectal Surgeons clinical practice guidelines for the surveillance and survivorship care of patients after curative treatment of colon and rectal cancer. Dis Colon Rectum 2021;64:517-533. Available at https://journals.lww.com/dcrjournal/fulltext/2021/05000/the_american_society_of_colon_and_rectal_surgeons.6.aspx. Accessed 11 Sep 2024.
3. Langenfeld SJ, Davis BR, Vogel JD, et al. The American Society of Colon and Rectal Surgeons clinical practice guidelines for the management of rectal cancer 2023 supplement. Dis Colon Rectum 2024;67:18-31. Available at https://journals.lww.com/dcrjournal/fulltext/2024/01000/the_american_society_of_colon_and_rectal_surgeons.6.aspx. Accessed 11 Sep 2024.
4. National Comprehensive Cancer Network. Colon Cancer (Version 1.2024). 29 January 2024. Available at https://www.nccn.org/professionals/physician_gls/pdf/colon.pdf. Accessed 11 Sep 2024. (Note: A free account must be created to access this guideline).
5. National Comprehensive Cancer Network. Rectal Cancer (Version 1.2024). 29 January 2024. Available at https://www.nccn.org/professionals/physician_gls/pdf/rectal.pdf. Accessed 11 Sep 2024. (Note: A free account must be created to access this guideline).
6. PDQ Adult Treatment Editorial Board. Colon Cancer Treatment (PDQ®): Health Professional Version. 2024 January 23. In: PDQ Cancer Information Summaries [Internet]. Bethesda, MD: National Cancer Institute (US), 2002. Available at https://www.ncbi.nlm.nih.gov/books/NBK65858/. Accessed 11 Sep 2024.
7. Vogel JD, Felder SI, Bhama AR, et al. The American Society of Colon and Rectal Surgeons clinical practice guidelines for the management of colon cancer. Dis Colon Rectum 2022;65:148-177. Available at https://journals.lww.com/dcrjournal/fulltext/2022/02000/the_american_society_of_colon_and_rectal_surgeons.7.aspx. Accessed 11 Sep 2024.
8. You YN, Hardiman KM, Bafford A, et al. The American Society of Colon and Rectal Surgeons clinical practice guidelines for the management of rectal cancer. Dis Colon Rectum 2020;63:1191-1222. Available at https://journals.lww.com/dcrjournal/fulltext/2020/09000/the_american_society_of_colon_and_rectal_surgeons.6.aspx. Accessed 11 Sep 2024.

Hodgkin Lymphoma

Reviewed: Jun 2024
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Maj Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (Aerospace Medicine Branch Chief)

Significant Changes: Waiver guide reformatted. Updated to reflect MSD 6 Mar 2024 and the most recent standards of medical care.

I. Waiver Consideration

Any history of leukemia, lymphoma, or any neoplasm of blood or lymphoid-forming tissue, including Hodgkin lymphoma, is disqualifying for all flying classes, ATC, GBO, OSF, and SWA duties, as well as for retention. Complications of the malignancy, treatment for the malignancy, or sequelae of treatment may be independently disqualifying. It is recommended that the MSD and the appropriate career field medication list be cross-referenced for all treatments, complications, or residual symptoms.

The use of any non-approved medication is independently disqualifying. Waiver may be considered in certain low-risk, trained individuals on a case-by-case basis. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of Hodgkin lymphoma in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Typically, an aeromedical or operational waiver for Hodgkin lymphoma is considered after completion of all planned treatment and the establishment of disease-free asymptomatic clinical stability. It is expected that the service member will be in remission and be following a routine schedule of post-treatment surveillance, in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines). Any adverse outcomes of the primary malignancy or its treatment should be addressed before requesting a waiver, with clear establishment of clinical, biochemical, and radiographic stability, as applicable. Generally, a period of at least six months of stable post-treatment surveillance is required prior to consideration of a waiver for a trained asset, whereas five years of surveillance is required prior to consideration of a waiver for an untrained individual. Case-by-case consideration may be given to an earlier waiver in select low-risk cases.

Due to the risk for delayed pulmonary toxicity with bleomycin coupled with its potential for significant adverse flight safety impacts, individuals who undergo treatment with bleomycin require careful individualized consideration prior to issuance of an aeromedical waiver. All service members exposed to bleomycin during treatment must be asymptomatic from a respiratory standpoint and show post-treatment evidence of normal pulmonary function and diffusion capacity. In general, personnel attempting to return to high-performance aircraft or other aircrew positions that require routine (frequent) wear of an aviator mask must complete 12 months of post-treatment surveillance prior to waiver consideration due to the risk of delayed toxicity within the first year. Based on the increased risk for severe lung injury with later oxygen

exposure in individuals WITH a history of bleomycin-induced lung injury, service members with such a history who are otherwise eligible for a waiver will be restricted to airframes that do not require routine (frequent) use of 100% oxygen by aviator mask.

Table 1: Waiver potential for Hodgkin Lymphoma

Flying Class	Condition	Waiver Potential[1] Waiver Authority[2]	ACS Review or Evaluation
FC I/IA	Hodgkin lymphoma, any stage[3]	Yes AFRS/CMO	Yes
FC II/III	Hodgkin lymphoma, any stage[3,4,5]	Yes AFMED	Yes
ATC/GBO/ OSF/SWA	Hodgkin lymphoma, any stage[3,4]	Yes AFMED	No[6]

1. No indefinite waivers.
2. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMED.
3. Waiver for untrained assets may be considered after **five years** of stable, asymptomatic, disease-free surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.
4. Waiver for trained assets may be considered after **six months** of stable, asymptomatic, disease-free surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.
5. Consideration of a FC II waiver for duties that involve routine (frequent) wear of an aviator mask in individuals exposed to bleomycin chemotherapy requires demonstration of **12 months** of post-treatment stability and normal post-treatment pulmonary function testing including DLCO. Waivers for aircrew with history of bleomycin-induced lung injury are restricted to airframes that do not require routine (frequent) use of 100% oxygen by aviator mask.
6. ACS review may be requested at the discretion of the waiver authority. Any history of hematopoietic cell transplantation requires ACS review.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Fully describe the course of treatment, including dates of each intervention and any side effects, adverse outcomes, or complications.
    c. Specify presence or absence of any residual symptoms or sequelae following completion of treatment.
    d. List any current medications, dosages, dates of dose adjustments, and any medication adverse effects.
    e. Specify current surveillance regimen, including schedule of specialist clinical re-evaluation, laboratory testing, and any applicable imaging. Explain any discrepancies in surveillance plan from established post-treatment guidelines.

2. Consultation report from all treating specialists, as applicable (e.g., medical hematologist/oncologist, radiation oncologist, surgeon) and all subsequent consultation notes. These notes must include the following:
    a. Summarization of presentation, evaluation, and staging.
    b. Summarization of complete treatment course, including any modifications to initial planned treatments with explanation.
    c. Recent post-treatment follow-up note addressing clinical stability and commenting on presence or absence of residual disease, symptoms, or sequelae of the Hodgkin lymphoma or its treatment.
    d. Detailed plan of ongoing surveillance for recurrence, including interval of follow-up and specific monitoring tests planned.
3. Results of all testing performed during diagnosis, evaluation, and management of Hodgkin lymphoma, and post-treatment surveillance, including laboratory studies, imaging reports, pathology results, and any other ancillary studies. The below-listed studies must be included:
    a. Current CBC
    b. Current lipids
    c. Current fasting glucose or hemoglobin A1c
    d. Current comprehensive metabolic panel (CMP)
    e. Current lactate dehydrogenase (LDH)
    f. If treatment included neck irradiation, then current TSH is required.
    g. Any imaging reports for staging, restaging, and surveillance
    h. All operative and procedure reports
    i. Pathology reports from all biopsy and surgical samples
    j. If treatment included anthracycline chemotherapy, then a post-treatment echocardiogram or multigated acquisition scan (MUGA) is required to assess left ventricular function.
    k. If treatment included bleomycin chemotherapy, then post-treatment pulmonary function testing (PFT) is required, with spirometry, lung volumes, and diffusion capacity (DLCO) to assess for pulmonary dysfunction.
4. Current physical examination findings, including:
    a. Neck and thyroid gland
    b. Spleen and liver
    c. Chest and lungs
    d. Lymph nodes (i.e. head/neck, supraclavicular, axillary, inguinal)
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. <u>Renewal Waiver Request</u>:

1. Updated AMS with interval history, including:
    a. Any new subjective symptoms or objective findings.
    b. Complete list of current medications with dates of initiation, dosages, dates of dose adjustments, and all adverse effects.
    c. Summary of interval surveillance evaluations and studies.
    d. Updated plan of ongoing surveillance for recurrence.

2. All relevant interval consultation reports from specialty providers (e.g., medical hematologist/oncologist, radiation oncologist, surgeon).
3. Laboratory studies required:
    a. Current CBC
    b. Current lipids
    c. Current fasting glucose or hemoglobin A1c
    d. Current comprehensive metabolic panel (CMP)
    e. Current lactate dehydrogenase (LDH)
    f. If treatment included neck irradiation, then current TSH is required.
4. Current physical examination findings, including:
    a. Neck and thyroid gland
    b. Spleen and liver
    c. Chest and lungs
    d. Lymph nodes (i.e. head/neck, supraclavicular, axillary, inguinal)
5. Results of all interval testing performed in the course of ongoing management and surveillance, including all laboratory studies, imaging reports, and other ancillary tests.
6. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Hodgkin lymphoma is comprised of two major subgroups distinguished by the morphology and immunophenotype of the malignant cells. The two major groups are classic Hodgkin lymphoma (cHL), accounting for about 90% of cases, and nodular lymphocyte predominant Hodgkin lymphoma (NLPHL). The onset of symptoms is usually insidious. Often, slowly progressive symptoms over an antecedent period of weeks or months are recognized retrospectively following a definitive diagnosis. Early symptoms may include fatigue, pruritis, painless lymphadenopathy, fevers, night sweats, and gradual unintentional weight loss. Classic B-type symptoms (i.e., fever, night sweats, weight loss) are present in about 40% of individuals at time of diagnosis and are more common in advanced stage disease.

Mediastinal involvement is common, and the first indication of disease may be the finding of a mediastinal mass on chest imaging. Mediastinal disease may be asymptomatic or present with cough, dyspnea, or chest pain. Other presenting features are less common, but abdominal pain, nausea, loss of appetite, bone pain, nephrotic syndrome, neurologic symptoms, or skin rashes are possible, depending on the extent of lymphoma spread and the organ systems affected. The most common extranodal and extralymphatic sites affected by Hodgkin lymphoma are the bone marrow, liver, lungs, and bones. Hepatomegaly and splenomegaly are potential findings when the liver or spleen are involved. Laboratory abnormalities may include anemia, leukocytosis, eosinophilia, lymphopenia, thrombocytosis, hypoalbuminemia, hypercalcemia, and liver abnormalities.

Aeromedical and operational risks of Hodgkin lymphoma include the risk of performance impairment due to symptom burden and the degradation of physical and cognitive abilities resulting from the disease and its treatment, particularly during active therapy and initial

recovery. Treatment for Hodgkin lymphoma may involve radiotherapy, chemotherapy, or both. Chemotherapeutic regimens may include bleomycin or an anthracycline agent (e.g., doxorubicin). Refractory or relapsed disease is typically treated with hematopoietic cell transplantation (HCT). Increasingly, targeted immunotherapies are being utilized for refractory disease. Each intervention is associated with unique adverse effects and complications, which must be weighed in the context of the individual service member, the stage and severity of the primary disease, any associated complications, risks of recurrence, potential for late sequelae of therapy, and the unique occupational considerations.

Provided a servicemember achieves a good clinical outcome, no therapeutic intervention is an absolute hindrance to eventual waiver. However, certain interventions convey serious aeromedical and operational risks. For example, allogeneic HCT is a treatment that conveys a lifelong risk of late complications including graft-versus-host disease and organ system dysfunction. Individuals who have undergone HCT must be considered carefully and seriously prior to any wavier recommendation. Similarly, there is a relative dearth of long-term outcomes data for the newer interventions such as the novel immunotherapies, and waivers must be considered on a case-by-case basis.

Bleomycin is associated with a risk of pulmonary fibrosis following exposure to oxygen, and delayed toxicity is reported. In the past, treatment with bleomycin was permanently disqualifying for aviation duties. However, more recent data, including unpublished data from the Duke Hyperbaric Unit, permitted loosening of waiver policy several years ago. The pulmonary risks for individuals with a history of bleomycin therapy continue to warrant attentiveness and caution, particularly given the potential life-threatening nature of pulmonary pneumonitis when it occurs. As such, post-treatment pulmonary testing is required. Because the risk for delayed bleomycin lung toxicity appears to be highest during the first year following therapy, individuals attempting to return to high-performance aircraft where the aviator mask and 100% oxygen are routinely utilized are required to demonstrate 12 months of post-treatment stability prior to waiver consideration. Aviators with a history of bleomycin-induced lung injury will not be allowed to return to airframes that require routine use of 100% oxygen. Also, they should be exempted from the portions of the altitude chamber qualification that require 100% oxygen use. Use of 100% oxygen during emergencies such as fire or rapid decompression is acceptable and should not be discouraged.

The prognosis of Hodgkin lymphoma varies considerably. Histologic subtype and stage at diagnosis are the two most important factors impacting prognosis. Poor prognostic factors include large mediastinal mass, extensive tumor burden, and presence of B type symptoms. For early-stage favorable Hodgkin lymphoma, the relapse rate at five years approaches 10%, compared to 15% for early-stage unfavorable disease. About 30-47% of individuals with advanced-stage disease who achieve remission will eventually relapse, and most of these relapses will occur within five years of treatment completion. However, even long-term survivors demonstrate excess morbidity and earlier mortality compared to the general population. Late morbidity and mortality are most often the result of long-term treatment-related complications, including secondary malignancies and cardiovascular disease. Other delayed complications include pulmonary dysfunction, endocrinopathies (e.g., hypothyroidism in those

treated with neck irradiation), and neurologic and psychosocial sequelae including neurocognitive impairment.

For all survivors of Hodgkin lymphoma, careful follow-up, including long-term surveillance for recurrence and screening for secondary malignancies, is paramount to optimizing not only survival and individual health but also mitigating aeromedical and operational risk. It is also critical that the clinician have a high index of suspicion for late complications of Hodgkin lymphoma when a survivor presents with any new symptoms. When surveillance is conducted in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines) and when service members are diligent about presenting any concerning signs or symptoms to flight/operational medicine for evaluation, it is expected that recurrent disease, new malignancies, or late complications would be detected prior to development of symptoms or complications of significant aeromedical or operational impact.

Review of the AIMWTS database from May 2021 through May 2024 revealed 22 waiver packages with a diagnosis of Hodgkin lymphoma. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
C81.90	Hodgkin lymphoma, unspecified, unspecified site	1/1	12/12	2/2	6/6	0/0	1/1

IV. Suggested Readings

1. Lewis WD, Lilly S, Jones KL. Lymphoma: diagnosis and treatment. Am Fam Physician 2020;101:34-41. Available at https://www.aafp.org/pubs/afp/issues/2020/0101/p34.html. Accessed 25 May 2024.
2. National Comprehensive Cancer Network. Hodgkin Lymphoma (Version 3.2024). 18 March 2024. Available at https://www.nccn.org/professionals/physician_gls/pdf/hodgkins.pdf. Accessed 25 May 2024. (Note: A free account must be created to access this guideline).
3. National Comprehensive Cancer Network. Pediatric Hodgkin Lymphoma (Version 2.2023). 9 March 2023. Available at https://www.nccn.org/professionals/physician_gls/pdf/ped_hodgkin.pdf. Accessed 25 May 2024. (Note: A free account must be created to access this guideline).
4. Neelapu SS, Adkins S, Ansell SM, et al. Society for Immunotherapy of Cancer (SITC) clinical practice guideline on immunotherapy for the treatment of lymphoma. J Immunother Cancer 2020;8:e001235. Available at https://jitc.bmj.com/content/8/2/e001235. Accessed 25 May 2024.
5. PDQ Adult Treatment Editorial Board. Hodgkin Lymphoma Treatment (PDQ®): Health Professional Version. 2024 February 28. In: PDQ Cancer Information Summaries [Internet]. Bethesda, MD: National Cancer Institute (US), 2002. Available at https://www.ncbi.nlm.nih.gov/books/NBK66038/. Accessed 25 May 2024.
6. PDQ Pediatric Treatment Editorial Board. Childhood Hodgkin Lymphoma Treatment (PDQ®): Health Professional Version. 2023 December 18. In: PDQ Cancer Information Summaries [Internet]. Bethesda, MD: National Cancer Institute (US), 2002. Available at https://www.ncbi.nlm.nih.gov/books/NBK65726/. Accessed 25 May 2024.

Leukemia

Reviewed: Sep 2024
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Maj Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (Aerospace Medicine Branch Chief)

Significant Changes: Waiver guide reformatted. Updated to reflect the most recent MSD and standards of medical care.

I. Waiver Consideration

Any history of leukemia, lymphoma, or any neoplasm of blood or lymphoid-forming tissue, is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Complications of the malignancy, treatment for the malignancy, or sequelae of treatment may be independently disqualifying. It is recommended that the MSD and the appropriate career field medication list be cross-referenced for all treatments, complications, or residual symptoms.

The use of any non-approved medication is independently disqualifying. Waiver may be considered in certain low-risk, trained individuals on a case-by-case basis. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of leukemia in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Typically, an aeromedical or operational waiver for leukemia is considered after completion of all planned treatment and the establishment of disease-free asymptomatic clinical stability. It is expected that the service member will be in remission and be following a routine schedule of post-treatment surveillance, in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines). Any adverse outcomes of the primary malignancy or its treatment should be addressed before requesting a waiver, with clear establishment of clinical, biochemical, and radiographic stability, as applicable. Generally, a period of at least six months of stable post-treatment surveillance is required prior to consideration of a waiver for a trained asset; whereas five years of surveillance is required prior to consideration of a waiver for an untrained individual. Case-by-case consideration may be given to an earlier waiver in select low-risk cases.

Table 1: Waiver potential for Leukemia

Flying Class	Condition	Waiver Potential[1] Waiver Authority[2]	ACS Review or Evaluation
FC I/IA	All leukemias, any stage[3]	Yes AFRS/CMO	Yes
FC II/III/ ATC/GBO/ OSF/SWA	All leukemias, any stage[3,4]	Yes AFMED	Yes

1. No indefinite waivers.

2. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMED.
3. Waiver for untrained assets may be considered after five years of stable, asymptomatic, disease-free surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.
4. Waiver for trained assets may be considered after six months of stable, asymptomatic, disease-free surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Fully describe the course of treatment, including dates of each intervention and any side effects, adverse outcomes, or complications.
    c. Specify presence or absence of any residual symptoms or sequelae following completion of treatment.
    d. List any current medications, dosages, dates of dose adjustments, and any medication adverse effects.
    e. Specify current surveillance regimen, including schedule of specialist clinical re-evaluation, laboratory testing, and any applicable imaging. Explain any discrepancies in surveillance plan from established post-treatment guidelines.
2. Consultation report from all treating specialists, as applicable (e.g., medical hematologist/oncologist, radiation oncologist, surgeon) and all subsequent consultation notes. These notes must include the following:
    a. Summarization of presentation, evaluation, and staging.
    b. Summarization of complete treatment course, including any modifications to initial planned treatments with explanation.
    c. Recent post-treatment follow-up note addressing clinical stability and commenting on presence or absence of residual disease, symptoms, or sequelae of the leukemia or its treatment.
    d. Detailed plan of ongoing surveillance for recurrence, including interval of follow-up and specific monitoring tests planned.
3. Results of all testing performed during diagnosis, evaluation, and management of leukemia, and post-treatment surveillance, including laboratory studies, imaging reports, pathology results, and any other ancillary studies. The below-listed studies must be included:
    a. Current CBC
    b. Current comprehensive metabolic panel (CMP)
    c. Any imaging reports for staging, restaging, and surveillance
    d. All operative and procedure reports

e. Pathology reports from all biopsy and surgical samples, including bone marrow biopsy results
f. If treatment included anthracycline chemotherapy, then a post-treatment echocardiogram or multigated acquisition scan (MUGA) is required to assess left ventricular function

4. Current physical examination findings, including:
    a. Neurologic examination
    b. Chest and lungs
    c. Abdomen
    d. Skin
    e. Lymph nodes (i.e. head/neck, supraclavicular, axillary, inguinal)
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Any new subjective symptoms or objective findings.
    b. Complete list of current medications with dates of initiation, dosages, dates of dose adjustments, and all adverse effects.
    c. Summary of interval surveillance evaluations and studies.
    d. Updated plan of ongoing surveillance for recurrence.
2. All relevant interval consultation reports from specialty providers (e.g., medical hematologist/oncologist, radiation oncologist, surgeon).
3. Laboratory studies required:
    a. Current CBC
    b. Current comprehensive metabolic panel (CMP)
4. Current physical examination findings, including:
    a. Neurologic examination
    b. Chest and lungs
    c. Abdomen
    d. Skin
    e. Lymph nodes (i.e. head/neck, supraclavicular, axillary, inguinal)
5. Results of all interval testing performed in the course of ongoing management and surveillance, including all laboratory studies, imaging reports, and other ancillary tests.
6. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

The term "leukemia" is used to characterize a heterogeneous range of hematologic malignancies. There are multiple accepted classification schemes for hematologic malignancies that are continually reviewed and revised. Classification schemes include the International Consensus Classification (ICC) and the system published by World Health Organization (WHO), which is

currently in its 5th edition. As of the writing of this waiver guide, both the ICC and WHO were most recently revised in 2022. Previous classifications, including earlier editions of the WHO system and the French-American-British (FAB) system are now considered outmoded. The ICC and WHO differ in their categorizations of leukemias and occasionally use different nomenclature for the same disease. However, the principles of classification depend upon cell morphology (e.g., cytology, histology, architecture), clinical characteristics (e.g., acute, chronic), immunophenotype, and cytogenetic and genetic features.

Disease presentation and prognosis is highly variable, depending on subtype and whether the course is acute or chronic. Acute leukemias are characterized by blast cell infiltration of bone marrow or extramedullary sites resulting in one or more cytopenias. Pancytopenia is common. Individuals may be asymptomatic at time of diagnosis or may present with a range of non-specific complaints, including weakness, lethargy, fatigue, dyspnea, fever, weight loss, and easy bruising or bleeding (e.g., mucosal bleeding, petechia, fundal hemorrhages). Nodal involvement may result in lymphadenopathy. Hepatomegaly or splenomegaly may occur from blast cell infiltration of extranodal tissue. Bone marrow infiltration may lead to bone pain. Headaches or neurologic deficits are possible in the event of a central nervous system (CNS) hemorrhage. In some cases, symptom onset may be sudden, severe, and rapidly progressive.

The clinical presentation and course of chronic leukemias also varies broadly. Like the acute leukemias, the chronic leukemias are infiltrative clonal processes. As such, they may also cause organomegaly, lymphadenopathy, and the bone pain that accompanies bone marrow involvement. Presentation with B symptoms (i.e., fever, weight loss, night sweats) or an acute blast crisis is possible. The same clinical consequences of cytopenias that are observed in acute leukemias may develop in patients with chronic leukemias. One quarter to one half of individuals may be asymptomatic, with abnormal laboratory findings the only initial indication of a disease process (e.g., cytopenias, hypogammaglobulinemia).

Aeromedical and operational risks of leukemia include the risk of performance impairment due to symptom burden and the degradation of physical and cognitive abilities resulting from the disease and its treatment, particularly during active therapy and initial recovery. Treatment for leukemia is dependent upon its subtype and features, including immunophenotype, genetics, and cytogenetics. Treatment may involve a combination of chemotherapy, radiation, hematopoietic cell transplantation (HCT), or glucocorticoids. When there is evidence of CNS involvement or a high risk for CNS spread, intrathecal chemotherapy is often standard of care. Cranial irradiation may be utilized. Each intervention is associated with unique adverse effects and complications, which must be weighed in the context of the individual service member, the stage and severity of the primary disease, any associated complications, risks of recurrence, potential for late sequelae of therapy, and the unique occupational considerations.

Provided a servicemember achieves a good clinical outcome, no therapeutic intervention is an absolute hindrance to eventual waiver. However, certain interventions convey serious aeromedical and operational risks. For example, allogeneic HCT is a treatment that conveys a lifelong risk of late complications including graft-versus-host disease and organ system dysfunction. Individuals who have undergone HCT must be considered carefully and seriously prior to any wavier recommendation. Similarly, certain chemotherapeutic agents convey

significant risks of toxicity of aeromedical and operational relevance, onset of which may be delayed. Treatment with intrathecal chemotherapy or CNS irradiation is associated with lifelong risks of neurocognitive impairments.

The prognosis of leukemia varies considerably depending on subtype and other features of the disease at the time of diagnosis. Relapse is common, particularly among certain subtypes. Among those who achieve a favorable treatment outcome, long-term symptoms and complications are common, including persistent fatigue and cytopenias. Delayed complications of treatment are possible, including secondary malignancies and later organ dysfunction. Risks vary depending upon underlying disease and treatment course.

For all survivors of leukemia, careful follow-up, including long-term surveillance for recurrence and screening for secondary malignancies, is paramount to optimizing not only survival and individual health but also mitigating aeromedical and operational risk. It is also critical that the clinician have a high index of suspicion for late complications of leukemia when a survivor presents with any new symptoms. When surveillance is conducted in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines) and when service members are diligent about presenting any concerning signs or symptoms to flight/operational medicine for evaluation, it is expected that recurrent disease, new malignancies, or late complications would be detected prior to development of symptoms or complications of significant aeromedical or operational impact.

Review of the AIMWTS database from Aug 2021 through Aug 2024 revealed 12 waiver packages with a diagnosis of leukemia that required an aeromedical waiver. The breakdown of the number of approved waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
C95.9	Leukemia, unspecified	1/1	6/6	3/3	2/2	0/0	1/1

IV. Suggested Readings

1. Arber DA, Borowitz MJ, Cessna M, et al. Initial diagnostic workup of acute leukemia: guideline from the College of American Pathologists and the American Society of Hematology. Arch Pathol Lab Med 2017;141:1342-1393. Available at https://www.cap.org/protocols-and-guidelines/cap-guidelines/current-cap-guidelines/initial-diagnostic-workup-of-acute-leukemia. Accessed 11 September 2024.
2. Boyiadzis MM, Aksentijevich I, Arber DA, et al. The Society for Immunotherapy of Cancer (SITC) clinical practice guideline on immunotherapy for the treatment of acute leukemia. J Immunother Cancer 2020;8: e000810. Available at https://dx.doi.org/10.1136/jitc-2020-000810. Accessed 11 September 2024.
3. National Comprehensive Cancer Network. Acute Lymphoblastic Leukemia (Version 2.2024). 5 February 2024. Available at https://www.nccn.org/professionals/physician_gls/pdf/all.pdf. Accessed 11 September 2024. (Note: A free account must be created to access this guideline).
4. National Comprehensive Cancer Network. Acute Myeloid Leukemia (Version 4.2023). 22 March 2024. Available at https://www.nccn.org/professionals/physician_gls/pdf/aml.pdf. Accessed 11 September 2024. (Note: A free account must be created to access this guideline).
5. National Comprehensive Cancer Network. Chronic Lymphocytic Leukemia/Small Lymphocytic Lymphoma (Version 3.2024). 26 March 2024. Available at https://www.nccn.org/professionals/physician_gls/pdf/cll.pdf. Accessed 11 September 2024. (Note: A free account must be created to access this guideline).

6. National Comprehensive Cancer Network. Chronic Myeloid Leukemia (Version 2.2024). 5 December 2023. Available at https://www.nccn.org/professionals/physician_gls/pdf/cml.pdf. Accessed 11 September 2024. (Note: A free account must be created to access this guideline).
7. National Comprehensive Cancer Network. Hairy Cell Leukemia (Version 1.2024). 3 November 2023. Available at https://www.nccn.org/professionals/physician_gls/pdf/hairy_cell.pdf. Accessed 11 September 2024. (Note: A free account must be created to access this guideline).
8. National Comprehensive Cancer Network. Pediatric Acute Lymphoblastic Leukemia (Version 5.2024). 3 April 2024. Available at https://www.nccn.org/professionals/physician_gls/pdf/ped_all.pdf. Accessed 11 September 2024. (Note: A free account must be created to access this guideline)

Malignant Melanoma

Revised: Sep 2024
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Maj Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (Aerospace Medicine Branch Chief)

Significant Changes: Waiver guide reformatted. Updated to reflect the most recent MSD and standards of medical care.

I. Waiver Consideration

Any history of a malignant neoplasm, including malignant melanoma, is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Complications of the malignancy, treatment for the malignancy, or sequelae of treatment may be independently disqualifying. For example, any scars that interfere with the wear of military equipment are disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Other potential complications of malignant melanoma and its treatment may be independently disqualifying. It is recommended that the MSD and the appropriate career field medication list be cross-referenced for all treatments, complications, or residual symptoms.

The use of any non-approved medication is independently disqualifying. Waiver may be considered in certain low-risk, trained individuals on a case-by-case basis. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of malignant melanoma in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

In general, malignant melanoma is associated with a high risk of recurrence and metastatic spread, including late recurrence. Based on the unique risks of this disease, consideration of an aeromedical or operational waiver is individualized, and a longer period of disease-free stability may be required prior to waiver issuance. It is expected that the service member will be in remission and be following a routine schedule of post-treatment surveillance, in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines). Any adverse outcomes of the primary malignancy or its treatment should be addressed before requesting a waiver, with clear establishment of clinical, biochemical, and radiographic stability, as applicable.

Both trained personnel and untrained applicants with stage 0 malignant melanoma may be considered for waiver in the absence of any high-risk features such as a history of multiple atypical nevi, familial atypical mole melanoma (FAMM) syndrome, or a family history of melanoma following definitive treatment. A waiting period of three years after completion of treatment is necessary in most instances of untrained applicants with higher stage malignant melanoma. FC I/IA applicants with stage I or higher malignant melanoma are generally not viewed favorably for waiver. Waiver eligibility for trained personnel may be considered at six months post-treatment. Case-by-case consideration may be given to an earlier waiver in select low-risk cases.

Table 1: Waiver potential for Malignant Melanoma

Flying Class	Condition	Waiver Potential[1] Waiver Authority[2]	ACS Review or Evaluation
FC I/IA	Malignant melanoma, stage 0[3]	Yes AFRS/CMO	No
	Malignant melanoma, stages I-IV	Unlikely AFRS/CMO	No
FC II/III/ ATC/GBO/ OSF/SWA	Malignant melanoma, stages 0-III[3,4,5]	Yes AFMED	Yes
	Malignant melanoma, stage IV	Unlikely AFMED	No

1. An indefinite waiver may be considered for stage 0 disease. Otherwise, no indefinite waivers.
2. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMED.
3. Waiver for both trained personnel and untrained applicants with stage 0 malignant melanoma and no high-risk features may be considered following completion of definitive treatment. High-risk features include a history of multiple atypical nevi, familial atypical mole melanoma (FAMM) syndrome, or a family history of melanoma.
4. Waiver for untrained assets (other than FC I/IA) with higher stage malignant melanoma and no high-risk features may be considered after three years of stable, asymptomatic, disease-free surveillance following completion of definitive treatment.
5. Waiver for trained assets may be considered 6-months following completion of definitive treatments. Case-by-case consideration may be given to an earlier waiver in select low-risk cases.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Fully describe the course of treatment, including dates of each intervention and any side effects, adverse outcomes, or complications.
    c. Specify presence or absence of any residual symptoms or sequelae following completion of treatment.
    d. List any current medications, dosages, dates of dose adjustments, and any medication adverse effects.
    e. Specify current surveillance regimen, including schedule of specialist clinical re-evaluation, laboratory testing, and any applicable imaging. Explain any discrepancies in surveillance plan from established post-treatment guidelines.
2. Consultation report from all treating specialists, as applicable (e.g., dermatologist, medical oncologist) and all subsequent consultation notes. These notes must include the following:
    a. Summarization of presentation, evaluation, and staging.

    b. Summarization of complete treatment course, including any modifications to initial planned treatments with explanation.
    c. Recent post-treatment follow-up note addressing clinical stability and commenting on presence or absence of residual disease, symptoms, or sequelae of the malignant melanoma or its treatment.
    d. Detailed plan of ongoing surveillance for recurrence, including interval of follow-up and specific monitoring tests planned.
3. Results of all testing performed during diagnosis, evaluation, and management of malignant melanoma, and post-treatment surveillance, including laboratory studies, imaging reports, pathology results, and any other ancillary studies. The below-listed studies must be included:
    a. Any imaging reports for staging, restaging, and surveillance
    b. All operative and procedure reports
    c. Pathology reports from all biopsy and surgical samples
4. Current physical examination findings, including:
    a. Conjunctiva
    b. Dilated funduscopic examination performed by an optometrist or ophthalmologist
    c. Full body skin examination performed by a dermatologist
    d. Lymph nodes (i.e. head/neck, supraclavicular, axillary, inguinal)
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Any new subjective symptoms or objective findings.
    b. Complete list of current medications with dates of initiation, dosages, dates of dose adjustments, and all adverse effects.
    c. Summary of interval surveillance evaluations and studies.
    d. Updated plan of ongoing surveillance for recurrence.
2. All relevant interval consultation reports from specialty providers (e.g., dermatologist, medical oncologist).
3. Current physical examination findings, including:
    a. Conjunctiva
    b. Dilated funduscopic examination performed by an optometrist or ophthalmologist
    c. Full body skin examination performed by a dermatologist
    d. Lymph nodes (i.e. head/neck, supraclavicular, axillary, inguinal)
4. Results of all interval testing performed in the course of ongoing management and surveillance, including all laboratory studies, imaging reports, and other ancillary tests.
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Typically, the diagnosis of malignant melanoma is made after an individual presents to medical attention with a new or changing pigmented skin lesion. Most often, individuals are otherwise asymptomatic. When superficial melanoma is detected early, it is often highly treatable, with a favorable prognosis. The longer a melanoma persists undiagnosed, the greater the possibility of deeper malignant spread and the higher the risk of eventual recurrent disease or distant metastasis. Risk is reduced by the practice of sun/UV protection and avoidance. Earlier detection is promoted by educating individuals at higher risk of melanoma in monthly self-screening techniques (e.g., the ABCDE criteria) and through regular clinical screening. It is reasonable to refer high-risk individuals to a dermatologist for formal full body skin examinations on a routine basis. Risk factors for melanoma may include fair complexion, red or blond hair, light eye color, the presence of multiple (more than 50) melanocytic nevi, the presence of any number of atypical or large nevi, a lifetime history of sun or UV exposure to include tanning bed use, or a family history of melanoma.

After melanoma is histologically confirmed, pathologic staging determines prognosis and treatment. The most powerful negative predictors of survival are greater thickness of the lesion, presence of ulceration, and high mitotic index. Other important factors include microsatellite instability, in-transit metastasis, lymph node involvement, and distant metastasis. Additional factors that are generally associated with a worse prognosis but are of less certain significance include anatomic site (trunk location worse than extremities), male gender, histologic subtype, presence of lymphovascular invasion or perineural invasion, and regression of the primary tumor. The presence of tumor-infiltrating lymphocytes is associated with better survival outcomes. Prognosis varies greatly depending on these factors. As such, it is difficult to generalize aeromedical and operational risk.

The primary treatment for all melanomas is wide local excision. Sentinel lymph node biopsy is recommended in any melanoma with high-risk features for improved prognostic staging and to guide additional therapy. Systemic adjuvant therapy remains a treatment option for metastatic disease. Systemic therapy may involve cytotoxic chemotherapy, immunotherapy, or the combination of both. However, some of these drugs convey significant risk of toxicity with unclear survival benefit. Each intervention is associated with unique adverse effects and complications, which must be weighed in the context of the individual service member, the primary disease, any associated complications, risks of recurrence, potential for late sequelae of therapy, and the unique occupational considerations.

Most melanoma presents as localized disease. However, a subset of individuals presents with metastatic disease, and later metastasis after definitive treatment is not uncommon. The aeromedical and operational risk of metastatic disease depends on total cancer burden and the specific organ systems involved. Metastatic spread to any organ system may result in complications of aeromedical and operational significance. Brain metastasis is of unique concern. Melanoma is the third leading cause of brain metastasis after lung and breast cancer. Characteristics of the primary lesion that are more likely to be associated with CNS metastasis are location of the primary lesion in the mucosal, head, neck or trunk area, acral lentiginous or nodular histologic subtypes, presence of lymph node involvement, or metastatic spread to the

viscera. Because of the poor sensitivity of screening to detect early disease, the first indication of brain involvement may be the development of symptoms, some of which convey serious risk in an aviation or operational environment (e.g., cognitive changes, hemorrhage, or seizure). In fact, the first indication of cancer recurrence may be the acute onset of a seizure, focal neurologic deficit, or sudden marked behavior change.

Recurrence following completion of treatment for malignant melanoma is possible, particularly for individuals with higher stage disease or risk factors. Additionally, individuals with a history of melanoma are at an increased risk of additional primary skin malignancies. Therefore, post-treatment surveillance is paramount to maximizing clinical outcomes and mitigating aeromedical and operational risk. Generally, this surveillance will include periodic clinical re-evaluation with a dermatologist conducting a thorough full-body skin examination. Interval imaging may also be performed, depending on initial disease stage. When surveillance is conducted in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines) and when service members are diligent about presenting any concerning signs or symptoms to flight/operational medicine for evaluation, it is expected that recurrent disease would be detected prior to development of symptoms or complications of significant aeromedical or operational impact.

Review of the AIMWTS database from Aug 2021 through Aug 2024 revealed 198 waiver packages with a diagnosis of malignant melanoma that required an aeromedical waiver. The breakdown of the number of approved waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
C43.9	Malignant melanoma of the skin, unspecified	2/2	66/68	33/33	13/13	3/3	6/6
D03.9	Melanoma in situ	0/0	49/51	13/13	7/7	2/2	0/0

IV. Suggested Readings

1. National Comprehensive Cancer Network. Melanoma: Cutaneous (Version 2.2024). 3 April 2024. Available at https://www.nccn.org/professionals/physician_gls/pdf/cutaneous_melanoma.pdf. Accessed 11 Sep 2024. (Note: A free account must be created to access this guideline).
2. National Comprehensive Cancer Network. Melanoma: Uveal (Version 1.2023). 4 May 2023. Available at https://www.nccn.org/professionals/physician_gls/pdf/uveal.pdf. Accessed 11 Sep 2024. (Note: A free account must be created to access this guideline).
3. Pavlik AC, Ariyan CE, Buchbinder EI, et al. The Society for Immunotherapy of Cancer (SITC) clinical practice guideline on immunotherapy for the treatment of melanoma, version 3.0. J Immunother Cancer 2023;11:e006947. Available at https://doi.org/10.1136/jitc-2023-006947. Accessed 11 Sep 2024.
4. PDQ Adult Treatment Editorial Board. Melanoma Treatment (PDQ®): Health Professional Version. 2023 January 31. In: PDQ Cancer Information Summaries [Internet]. Bethesda, MD: National Cancer Institute (US), 2002. Available at https://www.ncbi.nlm.nih.gov/books/NBK66034/. Accessed 11 Sep 2024.
5. Swetter SM, Tsao H, Bichakjian CK, et al. Guidelines of care for the management of primary cutaneous melanoma. J Am Acad Dermatol 2019;80:208-250. Available at https://www.jaad.org/article/S0190-9622(18)32588-X/fulltext. Accessed 11 Sep 2024.

Non-Hodgkin Lymphoma

Reviewed: Jun 2024
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Maj Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (Aerospace Medicine Branch Chief)

Significant Changes: Waiver guide reformatted. Updated to reflect MSD 6 Mar 2024 and the most recent standards of medical care.

I. Waiver Consideration

Any history of leukemia, lymphoma, or any neoplasm of blood or lymphoid-forming tissue, including non-Hodgkin lymphoma, is disqualifying for all flying classes, ATC, GBO, OSF, and SWA duties, as well as for retention. Complications of the malignancy, treatment for the malignancy, or sequelae of treatment may be independently disqualifying. It is recommended that the MSD and the appropriate career field medication list be cross-referenced for all treatments, complications, or residual symptoms.

The use of any non-approved medication is independently disqualifying. Waiver may be considered in certain low-risk, trained individuals on a case-by-case basis. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of non-Hodgkin lymphoma in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

Typically, an aeromedical or operational waiver for non-Hodgkin lymphoma is considered after completion of all planned treatment and the establishment of disease-free asymptomatic clinical stability. It is expected that the service member will be in remission and be following a routine schedule of post-treatment surveillance, in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines). Any adverse outcomes of the primary malignancy or its treatment should be addressed before requesting a waiver, with clear establishment of clinical, biochemical, and radiographic stability, as applicable. Generally, a period of at least six months of stable post-treatment surveillance is required prior to consideration of a waiver for a trained asset, whereas five years of surveillance is required prior to consideration of a waiver for an untrained individual. Case-by-case consideration may be given to an earlier waiver in select low-risk cases.

Due to the risk for delayed pulmonary toxicity with bleomycin coupled with its potential for significant adverse flight safety impacts, individuals who undergo treatment with bleomycin require careful individualized consideration prior to issuance of an aeromedical waiver. All service members exposed to bleomycin during treatment must be asymptomatic from a respiratory standpoint and show post-treatment evidence of normal pulmonary function and diffusion capacity. In general, personnel attempting to return to high-performance aircraft or other aircrew positions that require routine (frequent) wear of an aviator mask must complete 12 months of post-treatment surveillance prior to waiver consideration due to the risk of delayed toxicity within the first year. Based on the increased risk for severe lung injury with later oxygen

exposure in individuals WITH a history of bleomycin-induced lung injury, service members with such a history who are otherwise eligible for a waiver will be restricted to airframes that do not require routine (frequent) use of 100% oxygen by aviator mask.

Table 1: Waiver potential for Non-Hodgkin Lymphoma

Flying Class	Condition	Waiver Potential[1] Waiver Authority[2]	ACS Review or
FC I/IA	Non-Hodgkin lymphoma, any stage[3]	Yes AFRS/CMO	Yes
FC II/III	Non-Hodgkin lymphoma, any stage[3,4,5]	Yes AFMED	Yes
ATC/GBO/ OSF/SWA	Non-Hodgkin lymphoma, any stage[3,4]	Yes AFMED	No[6]

1. No indefinite waivers.
2. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMED.
3. Waiver for untrained assets may be considered after **five years** of stable, asymptomatic, disease-free surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.
4. Waiver for trained assets may be considered after **six months** of stable, asymptomatic, disease-free surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.
5. Consideration of a FC II waiver for duties that involve (frequent) wear of an aviator mask in individuals exposed to bleomycin chemotherapy requires demonstration of **12 months** of post-treatment stability and normal post-treatment pulmonary function testing including DLCO. Waivers for aircrew with history of bleomycin-induced lung injury are restricted to airframes that do not require routine (frequent) use of 100% oxygen by aviator mask.
6. ACS review may be requested at the discretion of the waiver authority. Any history of hematopoietic cell transplantation requires ACS review.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Fully describe the course of treatment, including dates of each intervention and any side effects, adverse outcomes, or complications.
    c. Specify presence or absence of any residual symptoms or sequelae following completion of treatment.
    d. List any current medications, dosages, dates of dose adjustments, and any medication adverse effects.
    e. Specify current surveillance regimen, including schedule of specialist clinical re-evaluation, laboratory testing, and any applicable imaging. Explain any discrepancies in surveillance plan from established post-treatment guidelines.

2. Consultation report from all treating specialists, as applicable (e.g., medical hematologist/oncologist, radiation oncologist, surgeon) and all subsequent consultation notes. These notes must include the following:
    a. Summarization of presentation, evaluation, and staging.
    b. Summarization of complete treatment course, including any modifications to initial planned treatments with explanation.
    c. Recent post-treatment follow-up note addressing clinical stability and commenting on presence or absence of residual disease, symptoms, or sequelae of the non-Hodgkin lymphoma or its treatment.
    d. Detailed plan of ongoing surveillance for recurrence, including interval of follow-up and specific monitoring tests planned.
3. Results of all testing performed during diagnosis, evaluation, and management of non-Hodgkin lymphoma, and post-treatment surveillance, including laboratory studies, imaging reports, pathology results, and any other ancillary studies. The below-listed studies must be included:
    a. Current CBC
    b. Current lipids
    c. Current fasting glucose or hemoglobin A1c
    d. Current comprehensive metabolic panel (CMP)
    e. Beta-2-microglobulin level, if applicable
    f. Serum protein electrophoresis (SPEP), if applicable
    g. If treatment included neck irradiation, then current TSH is required.
    h. Any imaging reports for staging, restaging, and surveillance
    i. All operative and procedure reports
    j. Pathology reports from all biopsy and surgical samples
    k. If treatment included anthracycline chemotherapy, then a post-treatment echocardiogram or multigated acquisition scan (MUGA) is required to assess left ventricular function.
    l. If treatment included bleomycin chemotherapy, then post-treatment pulmonary function testing (PFT) is required, with spirometry, lung volumes, and diffusion capacity (DLCO) to assess for pulmonary dysfunction.
4. Current physical examination findings, including:
    a. Neck and thyroid gland
    b. Spleen and liver
    c. Chest and lungs
    d. Lymph nodes (i.e. head/neck, supraclavicular, axillary, inguinal)
5. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. <u>Renewal Waiver Request</u>:

1. Updated AMS with interval history, including:
    a. Any new subjective symptoms or objective findings.
    b. Complete list of current medications with dates of initiation, dosages, dates of dose adjustments, and all adverse effects.
    c. Summary of interval surveillance evaluations and studies.

    d. Updated plan of ongoing surveillance for recurrence.
2. All relevant interval consultation reports from specialty providers (e.g., medical hematologist/oncologist, radiation oncologist, surgeon).
3. Laboratory studies required:
    a. Current CBC
    b. Current lipids
    c. Current fasting glucose or hemoglobin A1c
    d. Current comprehensive metabolic panel (CMP)
    e. Beta-2-microglobulin level, if applicable
    f. Serum protein electrophoresis (SPEP), if applicable
    g. If treatment included neck irradiation, then current TSH is required.
4. Current physical examination findings, including:
    a. Neck and thyroid gland
    b. Spleen and liver
    c. Chest and lungs
    d. Lymph nodes (i.e. head/neck, supraclavicular, axillary, inguinal)
5. Results of all interval testing performed in the course of ongoing management and surveillance, including all laboratory studies, imaging reports, and other ancillary tests.
6. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Non-Hodgkin lymphoma (NHL) is comprised of a heterogeneous group of hematologic malignancies arising from B cell progenitors, T cell progenitors, mature B cells, mature T cells. Infrequently, NHL may arise from natural killer cells. Disease presentation and prognosis is highly variable, depending on subtype, site of involvement, and extent of spread. Progression may range from indolent to aggressive. Some individuals may present with a history of painless lymphadenopathy present for years prior to formal diagnosis while others may rapidly progress to death in a matter of weeks from the initial onset of symptoms. Aggressive lymphomas (e.g., diffuse large B cell lymphoma, Burkitt lymphoma, precursor B and T lymphoblastic leukemia/lymphoma adult T cell leukemia/lymphoma, other peripheral T cell lymphomas) may present with sudden onset of B symptoms (i.e., fever, weight loss, night sweats), a rapidly growing mass, or tumor lysis syndrome. In contrast, the only indications of an indolent NHL (e.g., follicular lymphoma, chronic lymphocytic leukemia/small lymphocytic lymphoma, splenic marginal zone lymphoma) may be intermittent painless lymphadenopathy, hepatomegaly, splenomegaly, or unexplained cytopenias. These findings may be present for months or years with very little, if any, evidence of progression or other associated signs or symptoms.

At the time of diagnosis, only a minority of individuals with NHL will show evidence of extranodal disease. However, the most common sites of extranodal involvement include the gastrointestinal tract, central nervous system, and skin. Symptoms or complications may include early satiety or loss of appetite, vomiting, weight loss, gastrointestinal perforation, gastrointestinal bleeding, headache, lethargy, focal neurologic impairments, seizures, spinal cord

compression, meningitis, and cutaneious rashes. Symptoms of pruritis, fatigue, and malignant effusions (e.g.., pleural effusion, pericardial effusion, ascites) occur infrequently but are possible.

Aeromedical and operational risks of NHL include the risk of performance impairment due to symptom burden and the degradation of physical and cognitive abilities resulting from the disease and its treatment, particularly during active therapy and initial recovery. Treatment for NHL may involve radiotherapy, chemotherapy, immunotherapy, or a combination. Chemotherapeutic regimens may include bleomycin or an anthracycline agent (e.g., doxorubicin, daunorubicin). Hematopoietic cell transplantation (HCT) may be utilized in select cases. Novel immunotherapies are an area of active investigation. Each intervention is associated with unique adverse effects and complications, which must be weighed in the context of the individual service member, the stage and severity of the primary disease, any associated complications, risks of recurrence, potential for late sequelae of therapy, and the unique occupational considerations.

Provided a servicemember achieves a good clinical outcome, no therapeutic intervention is an absolute hindrance to eventual waiver. However, certain interventions convey serious aeromedical and operational risks. For example, allogeneic HCT is a treatment that conveys a lifelong risk of late complications including graft-versus-host disease and organ system dysfunction. Individuals who have undergone HCT must be considered carefully and seriously prior to any wavier recommendation. Similarly, there is a relative dearth of long-term outcomes data for the newer interventions such as the novel immunotherapies, and waivers must be considered on a case-by-case basis.

Bleomycin is associated with a risk of pulmonary fibrosis following exposure to oxygen, and delayed toxicity is reported. In the past, treatment with bleomycin was permanently disqualifying for aviation duties. However, more recent data, including unpublished data from the Duke Hyperbaric Unit, permitted loosening of waiver policy several years ago. The pulmonary risks for individuals with a history of bleomycin therapy continue to warrant attentiveness and caution, particularly given the potential life-threatening nature of pulmonary pneumonitis when it occurs. As such, post-treatment pulmonary testing is required. Because the risk for delayed bleomycin lung toxicity appears to be highest during the first year following therapy, individuals attempting to return to high-performance aircraft where the aviator mask and 100% oxygen are routinely utilized are required to demonstrate 12 months of post-treatment stability prior to waiver consideration. Aviators with a history of bleomycin-induced lung injury will not be allowed to return to airframes that require routine use of 100% oxygen. Also, they should be exempted from the portions of the altitude chamber qualification that require 100% oxygen use. Use of 100% oxygen during emergencies such as fire or rapid decompression is acceptable and should not be discouraged.

The prognosis of NHL varies considerably. Histologic subtype is the most important factor impacting prognosis. Stage at diagnosis is also of substantial import but is less significant. Other factors include age, the presence of extranodal disease, and performance status. Cytogenetics, immunophenotype, growth fraction, cytokine production, and tumor burden all play a role in both determining treatment and influencing prognosis. Among those who achieve a favorable treatment outcome, long-term morbidity exceeds the general population. Persistent fatigue is

common, affecting about two-thirds of patients. The majority of fatigue resolves within a year of therapy completion, but for some individuals, chronic fatigue may linger for years. Common causes of late morbidity and mortality include secondary malignancies and cardiovascular disease. Other delayed complications include pulmonary dysfunction, endocrinopathies (e.g., hypogonadism, insulin resistance, hypothyroidism in those treated with neck irradiation), and neurologic and psychosocial sequelae including neurocognitive impairment.

For all survivors of NHL, careful follow-up, including long-term surveillance for recurrence and screening for secondary malignancies, is paramount to optimizing not only survival and individual health but also mitigating aeromedical and operational risk. It is also critical that the clinician have a high index of suspicion for late complications of NHL when a survivor presents with any new symptoms. When surveillance is conducted in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines) and when service members are diligent about presenting any concerning signs or symptoms to flight/operational medicine for evaluation, it is expected that recurrent disease, new malignancies, or late complications would be detected prior to development of symptoms or complications of significant aeromedical or operational impact.

Review of the AIMWTS database from May 2021 through May 2024 revealed 27 waiver packages with a diagnosis of Non-Hodgkin lymphoma. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
C85.9	Non-Hodgkin lymphoma, unspecified	3/3	18/20	1/1	2/2	0/0	3/3

IV. Suggested Readings

1. Lewis WD, Lilly S, Jones KL. Lymphoma: diagnosis and treatment. Am Fam Physician 2020;101:34-41. Available at https://www.aafp.org/pubs/afp/issues/2020/0101/p34.html. Accessed 28 May 2024.
2. National Comprehensive Cancer Network. B-Cell Lymphomas (Version 1.2024). 18 January 2024. Available at https://www.nccn.org/professionals/physician_gls/pdf/b-cell.pdf. Accessed 28 May 2024. (Note: A free account must be created to access this guideline).
3. National Comprehensive Cancer Network. Chronic Lymphocytic Leukemia/Small Lymphocytic Lymphoma (Version 3.2024). 26 March 2024. Available at https://www.nccn.org/professionals/physician_gls/pdf/cll.pdf. Accessed 28 May 2024. (Note: A free account must be created to access this guideline).
4. National Comprehensive Cancer Network. Pediatric Aggressive Mature B-Cell Lymphomas (Version 1.2024). 8 April 2024. Available at https://www.nccn.org/professionals/physician_gls/pdf/ped_b-cell.pdf. Accessed 28 May 2024. (Note: A free account must be created to access this guideline).
5. National Comprehensive Cancer Network. Primary Cutaneous Lymphomas (Version 1.2024). 21 December 2023. Available at https://www.nccn.org/professionals/physician_gls/pdf/primary_cutaneous.pdf. Accessed 8 April 2024. (Note: A free account must be created to access this guideline).
6. National Comprehensive Cancer Network. T-Cell Lymphomas (Version 2.2024). 14 March 2024. Available at https://www.nccn.org/professionals/physician_gls/pdf/t-cell.pdf. Accessed 28 May 2024. (Note: A free account must be created to access this guideline).
7. National Comprehensive Cancer Network. Waldenström Macroglobulinemia/Lymphoplasmacytic Lymphoma (Version 2.2024). 5 December 2023. Available at

https://www.nccn.org/professionals/physician_gls/pdf/waldenstroms.pdf. Accessed 28 May 2024. (Note: A free account must be created to access this guideline).
8. Neelapu SS, Adkins S, Ansell SM, et al. Society for Immunotherapy of Cancer (SITC) clinical practice guideline on immunotherapy for the treatment of lymphoma. J Immunother Cancer 2020;8:e001235. Available at https://jitc.bmj.com/content/8/2/e001235. Accessed 8 April 2024.
9. PDQ Adult Treatment Editorial Board. B-Cell Non-Hodgkin Lymphoma Treatment (PDQ®): Health Professional Version. 2024 February 2. In: PDQ Cancer Information Summaries [Internet]. Bethesda, MD: National Cancer Institute (US), 2002. Available at https://www.ncbi.nlm.nih.gov/books/NBK592890/. Accessed 28 May 2024.
10. PDQ Adult Treatment Editorial Board. Non-Hodgkin Lymphoma Treatment (PDQ®): Health Professional Version. 2023 May 18. In: PDQ Cancer Information Summaries [Internet]. Bethesda, MD: National Cancer Institute (US), 2002. Available at https://www.ncbi.nlm.nih.gov/books/NBK66057/. Accessed 28 May 2024.
11. PDQ Adult Treatment Editorial Board. Peripheral T-Cell Non-Hodgkin Lymphoma Treatment (PDQ®): Health Professional Version. 2023 September 21. In: PDQ Cancer Information Summaries [Internet]. Bethesda, MD: National Cancer Institute (US), 2002. Available at https://www.ncbi.nlm.nih.gov/books/NBK592888/. Accessed 28 May 2024.
12. PDQ Pediatric Treatment Editorial Board. Childhood Non-Hodgkin Lymphoma Treatment (PDQ®): Health Professional Version. 2024 February 16. In: PDQ Cancer Information Summaries [Internet]. Bethesda, MD: National Cancer Institute (US), 2002. Available at https://www.ncbi.nlm.nih.gov/books/NBK65738/. Accessed 28 May 2024.

WAIVER GUIDE
Updated: Aug 2016
Supersedes Waiver Guide of Mar 2012
By: Lt Col Bryant Martin (RAM 2017) and Dr Dan Van Syoc
Reviewed by Lt Col Irene Folaron, AF/SG consultant for Endocrinology

CONDITION:
Pituitary Tumors (Aug 2016)

I. Waiver Consideration.

All pituitary tumors, whether benign or malignant, are disqualifying for all flying classes, ATC, GBO and SWA duties, as well as retention. The severity of the condition, the medications required to control the condition and/or complications/results of surgery impact the waiver decision-making process.

Table 1. Waiver potential for pituitary tumors.

Flying Class	Condition	Waiver Potential Waiver Authority	ACS review/evaluation
I/IA	Incidental microadenomas, non-functional, unchanged for 2 years	Yes AETC	Yes
	Nonfunctioning micro or macroadenomas treated with surgery and requiring no pharmacotherapy	Maybe AETC	Yes
	Secreting microadenoma or macroadenoma treated with or without pharmacotherapy or treated with surgery and requiring pharmacotherapy	No AETC	No
	Pituitary carcinoma	No AETC	No
II//III ATC GBO SWA	Microadenomas, non-functional	Yes MAJCOM	Yes
	Secreting prolactinoma, asymptomatic requiring no pharmacotherapy	Yes* AFMRA	Yes
	Micro or macroadenomas treated with surgery, in remission and requiring no pharmacotherapy	Maybe* AFMRA	Yes
	Micro or macroadenomas treated with or without surgery and requiring pharmacotherapy	No AFMRA	No†
	Pituitary carcinoma	No AFMRA	No

* Waiver for untrained FC II and III is unlikely.
† If pharmacotherapy is stopped after an interval (12-24 months) and remission is maintained for six months, waiver will be considered after ACS review.

AIMWTS search in Jun 2016 revealed a total of 58 individuals with a diagnosis of a pituitary tumor. There were a total of 11 disqualifications. Breakdown of the cases was as follows: 4 FC I/IA cases (4 disqualifications), 29 FC II cases (1 disqualification), 19 FC III cases (4 disqualifications), 4 ATC/GBC cases (2 disqualifications), and 2 MOD cases (0 disqualifications. All 11 disqualified cases were related to the pituitary diagnosis.

II. Information Required for Waiver Submission.

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines/recommendations.

The AMS for initial waiver should include the following:

A. List and fully discuss all clinical diagnoses requiring a waiver.
B. Thorough history and physical to identify possible endocrinologic, neurologic, or ophthalmologic clinical findings with directed evaluation based on findings.
C. MRI of pituitary or CT if unable to perform MRI.
D. Serum PRL level for all pituitary tumors.
E. Endocrinology consult to include need for further hormonal evaluation and management.
F. Neurosurgery consult for evaluation for surgery on any pituitary tumor other than prolactinoma or incidentaloma, or any pituitary tumor with suspected mass effect.
G. Baseline formal visual field testing (Humphrey visual field 30-2), acuity, and dilated funduscopic exam. If surgery is performed, then repeat testing afterwards.
H. Echocardiogram in GH secreting pituitary adenoma.
I. MEB results.

Note: If steroids are temporarily required after treatment of ACTH pituitary adenoma, see waiver guide on systemic glucocorticoid (steroid) treatment.

The AMS for waiver renewal for pituitary tumor should include the following:
A. History – brief summary of initial work-up, interval signs or symptoms including pertinent negatives.
B. Physical – complete with focus on previous findings.
C. MRI/CT of pituitary annually for first two years, then every two years if stable.
D. Endocrinology consult.
E. Formal visual field testing and acuity testing annually for macroadenomas (not needed if a macroprolactinoma and has responded to therapy), history of surgery/radiation therapy, or increase in tumor size, and more frequently as indicated for any visual complaints.

III. Overview.

Pituitary tumors represent 15% of all primary intracranial tumors and are derived from hormone-secreting adenohypophyseal cells.[1] Primary pituitary tumors are either adenomas or carcinomas. Fortunately, pituitary carcinomas are exceedingly rare with an incidence of less than 0.5% of symptomatic lesions.[2, 3] Pituitary adenomas are benign anterior pituitary lobe neoplasms that comprise over 90% of pituitary tumors. The annual incidence of pituitary adenoma traditionally has been reported as approximately 1 in 10,000.[4] However, the prevalence of pituitary adenomas was 16.7% on a recent meta-analysis of autopsy (14.4%) and radiological (22.5%) data.[5] A more recent study of a population in the UK showed a prevalence of 77.6 per 100,000.[6, 7]

Pituitary adenomas are the most common cause of sellar masses from the third decade on, accounting for up to 10 percent of all intracranial neoplasms.[8] They are classified by their size and

hormone secreted. Microadenomas are less than 10 mm and macroadenomas are 10 mm or greater.[9, 10] The five types based on hormone secretion are lactotroph (prolactin [PRL]), gonadotroph (nonfunctioning), somatotroph (growth hormone [GH]), corticotroph (adrenocorticotropic hormone [ACTH]), and thyrotroph (thyroid-stimulating hormone [TSH]). Some pituitary adenomas have multiple hormones released, such as PRL/GH and LH/FSH/TSH.[1] Approximate frequency of adenomas are PRL (35%), nonfunctioning (30%), GH (20%), PRL/GH (7%), ACTH (7%), and LH/FSH/TSH (1%), and TSH (<1%).[11, 12]

Prolactinoma (lactotroph adenoma), the most common category causes hyperprolactinemia. Common signs and symptoms are amenorrhea/oligomenorrhea with anovulation, galactorrhea, and infertility in females and impotence, infertility, and diminished libido in men.[13, 14, 15] Gonadotrophs, nonfunctioning adenomas, are the most common macroadenomas due to the late presentation of symptoms secondary to local mass effects.[16] Typical findings would include headache, visual field defects (classically bitemporal hemianopsia from optic chiasm compression), diplopia, hypopituitarism, and hypogonadism.[4] Although all types of adenomas can present with mass effect findings, primary secretory hormone types usually will present with their hormonal based symptoms earlier. Somatotroph produces hypersecretion of GH and the liver secretes insulin-like growth factor-1 (IGF-1) in response to the GH, which leads to acromegaly in adults. Physical findings include coarse facial features, acral enlargement, prognathism, hirsutism, and osteoarthritis.[17] Corticotrophs produce ACTH, which act on the adrenal gland and lead to hypercortisolemia, also known as Cushing's disease. Most are diagnosed as microadenomas secondary to relatively early clinical findings of truncal obesity, facial plethora, acne, hirsutism, striae, hypertension, osteopenia and muscle weakness.[4] Thyrotrophs produce TSH, which act on the thyroid gland and cause hyperthyroidism. The clinical findings are goiter, visual impairment, and thyrotoxicosis.[12]

The evaluation of pituitary adenomas involves endocrinological, neurological, ophthalmological, and radiological considerations. The evaluation is driven by clinical findings discussed previously and appropriate screening tests looking for hyposecretion or hypersecretion of related hormones to support clinical findings. These screening tests are summarized in Table 1.[1, 12]

Table 2. Screening tests for functional pituitary adenomas.[31]

Condition	Test	Comments
Acromegaly	IGF-I.	Interpret IGF-I relative to age- and gender-matched controls.
Prolactinoma	Serum PRL level	Exclude medications. Magnetic resonance imaging (MRI) of the sella should be ordered if PRL levels elevated.
Cushing's disease	24-hr urinary free cortisol.	Ensure urine collection is total and accurate.
	Dexamethasone (1 mg) at 11 pm and fasting plasma cortisol measured at 8 am.	Normal subjects suppress to <1.8 µg/dL (sensitivity of 95%). Other cut-offs such as < 3-5ug/dL are used at the expense of sensitivity.
	Late-night Salivary cortisol test.[18]	Normal subjects should be < 145 ng/dL or reference range
Hyperthyroidism	Serum TSH and free thyroxine (T4) levels.	Normal to elevated TSH and elevated free T4 levels.

For radiological evaluation of the pituitary, high resolution T-1 weighted MRI in coronal and sagittal planes with and without gadolinium is the gold standard.[1] However, the increasing resolution and availability of MRI and CT in brain imaging has spawned more incidental findings of pituitary tumors (incidentalomas) with these asymptomatic lesions present in 10% of the general population.[19, 20] The majority of these lesions are microadenoma; in two years of follow-up only two percent showed enlargement as compared to about a third of macroadenomas.[21] In asymptomatic patients, a single assay for PRL is usually sufficient for hormonal evaluation of an incidentally found microadenoma, although the Endocrine Society suggests an assessment for hypersecretion of prolactin, GH, and ACTH as part of the initial workup.[4] For microadenomas (less than 1 cm), a sella MRI should be repeated annually for up to 3 years, then less frequently thereafter if there has been no change in the lesion size.[21]

The primary goals of treatment are to normalize excess pituitary secretion, alleviate signs and symptoms, shrink or eliminate compression of vital structures, and preserve or restore normal pituitary function.[13] These goals are approached by medical therapy, surgery, irradiation, or a combination.

Prolactinomas, the most common of pituitary adenomas, are primarily treated with pharmacotherapy or observation. Observation is a viable option in asymptomatic microprolactinomas because 95% of tumors do not enlarge in four to six years of observation.[22] Dopamine agonists such as bromocriptine (Parlodel®) and cabergoline (Dostinex®) are the mainstay of therapy. Bromocriptine is taken two to three times daily compared with the longer acting cabergoline, which is taken twice weekly.[23, 24] Both drugs are effective in decreasing PRL levels and tumor size reduction in over 90% of patients, with cabergoline demonstrating slightly greater efficacy.[22] Withdrawal of dopamine agonists after 1-3 years have shown no recurrence of hyperprolactinemia in 25.8 – 69%; the ideal candidate is one with normal prolactin concentrations while on dopamine agonists and small or no visible tumor on MRI prior to discontinuation of the

dopamine agonist.[22] The principal side effects of dopamine agonists are nausea, vomiting, postural hypotension, mental fogginess, and infrequently nasal stuffiness, psychosis, depression, hallucinations, nightmares, insomnia, vertigo, and Raynaud's phenomenon.[13, 22] Many of the adverse symptoms can be managed clinically with reduction in dose.[13, 22, 25] Nonetheless, the adverse effects are highly significant from an aeromedical standpoint.

If pharmacotherapy does not control the symptoms of hyperprolactinemia, or shrink a prolactinoma that is exerting mass effect, then surgery is an option.[26] For all other pituitary tumors, surgery is the primary treatment modality.[1] Endoscopic pituitary surgery has emerged as the first-line surgical treatment of choice with the exception of prolactinomas.[27] Postoperative remission for pituitary adenomas range from 73-96% (lowest GH secreting, highest nonfunctional), recurrence over 10 years is 8-13%. In adenomas which have resulted in visual deficits, visual recovery rates range from 88-92%.[4] All individuals should have extensive neuro-ophthalmological examination to include visual fields and acuity as well as fundoscopic exam prior to and following surgery.

For nonprolactinomas, other pharmacologic agents may be used as adjuncts to surgery. Acromegaly is treated primarily with somatostatin analogs, such as octreotide (Sandostatin®) and lanreotide (Somatuline®). Somatostatin analogs have been shown to shrink GH-secreting adenomas by 19.4%.[28] Somatostatin analogs are limited by side effects to include gallstones and biliary sludging, nausea, cramps, and steatorrhea.[29, 31] Somatostatin analogs have shown good efficacy in TSH-secreting adenomas as well.[13] Ketoconazole, which inhibits steroid biosynthesis at the adrenal gland, is used as adjuvant therapy in Cushing's disease, both prior to surgery and afterwards if resection fails to result in complete control. Liver enzyme elevations, gynecomastia in men, gastrointestinal upset, and edema are common side effects and ketoconazole is notorious for a wide range of serious drug interactions.[13]

Pituitary radiation is indicated for surgical failure, residual mass effects, persistent hormone hypersecretion, or when surgery is contraindicated. Concerns with pituitary radiation are hypopituitarism (80% within 10 years), other primary brain tumors (< 5% gliomas/meningiomas), optic nerve damage (2%), and brain necrosis (potential cognitive dysfunction, especially memory loss).[1] The introduction of more precise techniques, such as gamma-knife and linear accelerator, should decrease the amount of radiation and collateral impact mentioned previously. Follow up after surgery or radiation should include serial clinical, endocrinologic, ophthalmologic, and radiologic studies. A postoperative MRI should be performed within three months of surgery or treatment and annual evaluations for tumor recurrence or residual.[4] A summary of the management and control of pituitary adenomas is summarized in Table 2.[13]

Table 3. Management and control of hormone hypersecretion in pituitary adenomas.

Approach	*Prolactin-Secreting Tumors*	*Growth Hormone-Secreting Tumors*	*ACTH-Secreting Tumors*	*TSH-Secreting Tumors*	*Nonfunctioning Tumors*
Primary Approach	**DA: microadenomas, 80% to 90% response; macroadenomas, 60% to 75% response**	**Surgery: microadenomas, 70% response; macroadenomas, 50% response**	**Surgery: microadenoma, 80% to 90% response; macroadenoma, 50% response**	**Surgery plus irradiation, 67% response**	**Surgery: improved vision, 70% response**
Secondary Approach	**Surgery: microadenomas, 55% response; macroadenomas, 20% response**	**Somatostatin analogues, 60% response; DA, 20% response; irradiation, 50% response (by 12 years)**	**Irradiation plus cortisol-decreasing drugs**	**Somatostatin analogues, 75% response**	**Irradiation**
Novel medical developments	**Depot long-acting DA, somatostatin receptor subtype-selective analogues**	**Long-acting somatostatins, somatostatin receptor subtype-selective analogues, growth hormone receptor or GHRH antagonist**		**Long-acting somatostatins**	**Gonadotropin-releasing hormone antagonists**

H – adrenocorticotropin hormone; DA – dopamine agonists; GHRH – growth hormone releasing hormone; TSH – thyroid-stimulating hormone; Response refers to normalization of hormone secretion or ion of tumor mass

Long-term monitoring of these conditions is variable, related to the condition and the response of the condition to the medical treatment. In general, normalization of abnormal hormone secretion and prevention of clinical signs and symptoms is the goal. The monitoring of serum markers will be more frequent (every 4-6 weeks) initially until stability is achieved. Pituitary MRI should show stability for 1-2 years before the interval is extended.[27]

IV. Aeromedical Concerns.

Pituitary apoplexy, a hemorrhage into the pituitary tumor, is likely to cause sudden incapacitation but is exceedingly rare.[32] The main concerns for the pituitary tumors are related to hormone hypersecretion, the medications used to treat them, and mass-effect. For prolactinomas the primary concern is the side effects of the centrally-acting dopamine agonists used to treat some of these tumors, such as bromocriptine and cabergoline. These agents commonly cause headache and dizziness, as well as hypotension, syncope, drowsiness, fatigue, and vertigo. Dopamine agonists are

frequently sedating, and reports of sleep attacks, which initially were described in Parkinson's patients, have now been described in other conditions with these agents.[34] (Whether these drugs are excitatory or sedating is dependent on dose, time, and individual variance.) Psychosis, predominantly mania, occurs at unpredictable intervals; in one study, the average delay was 13.5 months (range 4-52 months) after inception of therapy.[11] Given the role of dopamine antagonism in the mechanism of action of antipsychotic drugs, the occasional occurrence of psychosis with dopamine agonism is not surprising. In addition, therapy with bromocriptine and cabergoline has been clearly associated with impulse control disorders, such as pathologic gambling, hypersexuality, and other behaviors.[34, 35]

These medications are not compatible with flying. GH-secreting adenomas, which cause acromegaly, are primarily treated with surgery, but somatostatin analogs are used for tumor shrinkage and suppression of GH prior to surgery. Common somatostatin analogs are octreotide and lanreotide and may be used continuously if individual is not a surgical candidate. These agents have common side effects to include biliary dysfunction, hypo/hyperglycemia, hypothyroidism and arrhythmias. The drug preparation requires refrigeration for storage since it is stable for only two weeks at 25°C. These considerations are clearly not compatible with either the flying or the deployed environment. Cushing's disease usually presents with hypersecretion symptoms that are adverse for flying such as hypertension, truncal obesity, hyperglycemia, and bruising.[4] Surgery is the preferred method of treatment secondary to poor medical response to treatment. These patients typically have a fair response to surgery, but need steroid replacement for up to 12 months after surgery.[4] Persistent steroid use and high recurrence rates after 5 years make this condition incompatible with aviation. TSH-secreting adenomas are more aggressive and cause all the side effects of hyperthyroidism with visual impairment and goiter. Pituitary carcinomas are extremely aggressive and have very poor prognosis.[3, 30]

The mass-effect seen with macroadenomas is another concern. Common symptoms related to this include headache and panhypopituitarism. With only a 1 cm gap between the pituitary and the optic chiasm, visual complications are common, and a complete visual workup needs to be done to evaluate for visual defects from compression of the chiasm or diplopia from oculomotor nerve impingement. Neuro-ophthalmologic finding could clearly impact individual performance and mission accomplishment. Except for prolactinomas, surgery is indicated when mass effect is present. If the prolactinoma doesn't respond to therapy, surgery may be indicated if the mass effect is clinically significant (i.e. mass effect on the optic chiasm causing bitemporal hemianopsia). As above, surgery has good remission rates and 10-year recurrence rates around 1% per year. Potential complications of surgery include CSF leak, transient diabetes insipidus, and inappropriate ADH secretion.[1] Adjuvant radiotherapy or radiosurgery results in good control, but high rates of subsequent hypopituitarism. This may lead to issues with hormone replacement in the future.

ICD-9 codes for pituitary tumors	
194.3	Malignant neoplasm in pituitary gland
227.3	Benign neoplasm of pituitary gland craniopharyngeal duct (pouch)
242.8	Thyrotoxicosis (overproduction of TSH)
253.0	Acromegaly and gigantism (overproduction of growth hormone)
253.1	Other and unspecified anterior pituitary hyperfunction (except ACTH and TSH)
255.0	Cushing syndrome (overproduction of ACTH)

ICD-10 codes for pituitary tumors	
C75.1	Malignant neoplasm of pituitary gland
D35.2	Benign neoplasm of pituitary gland
E23.6	Other disorders of the pituitary gland
E22.0	Acromegaly and pituitary gigantism
E22.8	Other hyperfunction of pituitary gland
E24.0	Pituitary-dependent Cushing's syndrome

V. References.

1. Melmed S. Pituitary Tumors. Endocrinol Metab Clin N Am, 2015; 44: 1-9.

2. Davis AK, Farrell WE, and Clayton RN. Pituitary tumours. Reproduction, 2001; 121: 363-71.

3. Kaltsas GA, Nomikos P, Kontogeorgos G, et al. Clinical Review: Diagnosis and Management of Pituitary Carcinomas. J Clin Endocrinol Metab, 2005; 90: 3089-99.

4. Jagannathan J, Kanter AS, Sheehan JP, et al. Benign Brain Tumors: Sellar/Parasellar Tumors. Neurologic Clinics, 2007; 25: 1231-49.

5. Ezzat S, Asa SL, Couldwell WT, et al. The Prevalence of Pituitary Adenomas: A Systematic Review. Cancer, 2004; 101: 613-19.

6. Fernandez A, Karavitaki N, and Wass JA. Prevalence of pituitary adenomas: a community-based, cross-sectional study in Banbury (Oxfordshire, UK). Clin Endocrinol (Oxf), 2010; 72(3): 377-82.

7. Lake MG, Krook LS, and Cruz SV. Pituitary Adenomas: An Overview. Am Fam Physician, 2013; 88(5): 319-27.

8. Snyder PJ. Causes, presentation, and evaluation of sellar masses. UpToDate. Oct 15.

9. Syro LV, Rotondo F, Ramirez A, et al. Progress in the diagnosis and classification of pituitary adenomas. Front. Endocrinol. 2015; 6(97): 1-8.

10. Raverot G, Vasiljevic A, Jouanneau E, and Trouillas J. A Prognostic Clinicopathologic Classification of Pituitary Endocrine Tumors. Endocrinol Metab Clin N Am, 2015; 44: 11-18.

11. Turner TH, Cookson JC, Wass JAH, et al. Psychotic reactions during treatment of pituitary tumours with dopamine agonists. Br Med J (Clin Res Ed), 1984; 289: 1101-03.

12. Weiss RE and Refetoff S. TSH-secreting pituitary adenomas. UpToDate. Sep 2015.

13. Shimon I and Melmed S. Management of Pituitary Tumors. Ann Intern Med, 1998; 129: 472-83.

14. Klibanski A. Prolactinomas. N Eng J Med, 2010; 362: 1219-26.

15. Wong A, Eloy JA, Couldwell WT, and Liu JK. Updates on prolactinomas. Part 1: Clinical manifestations and diagnostic challenges. J Clin Neurosci, 2015; 22: 1562-67.

16. Snyder PJ. Treatment of gonadotroph and other clinically nonfunctioning adenomas. UpToDate. Nov 2015.

17. Chan MR, Ziebert M, Maas DL, and Chan PS. "My rings won't fit anymore." Ectopic growth hormone-secreting tumor. Am Fam Physician, 2005; 71: 1766-67.

18. Nieman LK, Biller BMK, Findling JW, et al. The Diagnosis of Cushing's Syndrome: An Endocrine Society Clinical Practice Guideline. J Clin Endocrinol Metab, 2008; 93(5): 1526-40.

19. King JT, Justice AC and Aron DC. Management of Incidental Pituitary Microadenomas: A Cost-Effectiveness Analysis. J Clin Endocrinol Metab, 1997; 82: 3625-32.

20. Mayson SE and Snyder PJ. Silent Pituitary Adenomas. Endocrinol Metab Clin N Am, 2015; 44: 79-87.

21. Snyder PJ. Incidentally discovered sellar masses (pituitary incidentalomas). UpToDate. May 2015.

22. Snyder PJ. Management of hyperprolactinemia. UpToDate. Oct 2015.

23. Bromocriptine: Drug information. *Lexi-Comp Select Drug Information*. Hudson, Ohio, Lexi-Comp, Inc., 2016.

24. Cabergoline: Drug information. *Lexi-Comp Select Drug Information*. Hudson, Ohio, Lexi-Comp, Inc., 2016.

25. Plowman BK, Boggie DT, Morreale AP, et al. Sleep attacks in patients receiving dopamine-receptor agonists. Am J Health-Syst Pharm, 2005; 62: 537-40.

26. Chandler WF and Barkan AL. Treatment of Pituitary Tumors: A Surgical Perspective. Endocrinol Metab Clin N Am, 2008; 37: 51-66.

27. Dhepnorrarat RC, Ang BT, and Sethi DS. Endoscopic Surgery of Pituitary Tumors. Otolaryngol Clin N Am, 2011; 44: 923-35.

28. Melmed S, Sternberg R, Cook D, et al. Clinical Review: A Critical Analysis of Pituitary Tumor Shrinkage during Primary Medical Therapy in Acromegaly. J Clin Endocrinol Metab, 2005; 90(7): 4405-10.

29. Carrasco CA, Gadelha M, Manavela M, and Bruno OD. Aggressive tumors and difficult choices in acromegaly. Pituitary, 2014; 17: S24-S29.

30. Chatzellis E, Alexandraki KI, Androulakis II, and Kaltsas G. Aggressive Pituitary Tumors. Neuroendocrinology, 2015; 101: 87-104.

31. Molitch ME. Anterior Pituitary. Ch. 231 in Goldman's Cecil Medicine, 24th ed, Saunders, 2011.

32. Glezer A and Bronstein MD. Pituitary apoplexy: pathophysiology, diagnosis and management. Arch Endocrinol Metab, 2015; 59/3: 259-64.

33. Bassetti C, Clavadetscher S, Gugger M, and Hess CW. Pergolide-associated 'sleep attacks' in a patient with restless legs syndrome. Sleep Med, 2002; 3: 275-77.

34. McKeon A, Josephs KA, Klos KJ, et al. Unusual compulsive behaviors primarily related to dopamine agonist therapy in Parkinson's disease and multiple system atrophy. Parkinsonism Relat Disord, 2007; 13: 516-19.

35. Singh A, Kandimala G, Dewey RB, and O'Suilleabhain P. Risk factors for pathologic gambling and other compulsions among Parkinson's disease patients taking dopamine agonists. J Clin Neurosci, 2007; 14: 1178-81.

Prostate Cancer

Revised: January 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Maj Laura Bridge, and Capt Cody Hedrick (ACS Internal Medicine); Col Christopher Allam (AF/SG Urology Consultant), Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver guide restructured.

I. Waiver Consideration

Any history of a malignant neoplasm, including prostate cancer, is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Treatment of any malignancy or the sequelae of either the malignancy or its treatment may be independently disqualifying. For example, post-treatment urinary incontinence may be disqualifying if it meets certain severity criteria, such as the need for follow-up with a specialist more than annually. Additionally, the use of certain phosphodiesterase-5 (PDE-5) inhibitors for post-treatment erectile dysfunction may require 24-hour DNIF after each dose. PDE-5 inhibitors are not approved for daily use, and tadalafil is not approved for use in aircrew. It is recommended that the MSD and the appropriate career field medication list be cross-referenced for any and all treatments, complications, or residual symptoms.

Typically, an aeromedical or operational waiver for prostate cancer is considered after completion of all planned treatment and the establishment of disease-free asymptomatic clinical stability. It is expected that the service member will be in remission and be following a routine schedule of post-treatment surveillance, in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines). Any adverse outcomes of the primary malignancy or its treatment should be addressed before requesting a waiver, with clear establishment of clinical, biochemical, and (if applicable) radiographic stability. Generally, a period of at least six months of stable post-treatment surveillance is required prior to consideration of a waiver for a trained asset; whereas five years of surveillance is required prior to consideration of a waiver for an untrained individual. Case-by-case consideration may be given to an earlier waiver in select low-risk cases.

Table 1: Waiver potential for Prostate Cancer

Flying Class	Condition	Waiver Potential[3] Waiver Authority	ACS Review or Evaluation
FC I/IA[1]	Prostate cancer, stages I-IIC	Yes AFRS/CMO	Yes
	Prostate cancer, stages IIIA-IVB	No AFRS/CMO	No
FC II/III[1,2]	Prostate cancer, stages I-IIIB	Yes AFMRA[4]	Yes
	Prostate cancer, stages IIIC-IVB	No AFMRA[4]	No
ATC/GBO/OSF/ SWA[1,2]	Prostate cancer, stages I-IIIB	Yes AFMRA[4]	No[5]
	Prostate cancer, stages IIIC-IVB	No AFMRA[4]	No

1. Waiver for untrained assets may be considered after five years of stable, asymptomatic surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.
2. Waiver for trained assets may be considered after six months of stable, asymptomatic surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.
3. No indefinite waivers.
4. Certification authority for untrained assets is AFRS/CMO.
5. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Fully describe the course of treatment, including dates of each intervention and any side effects, adverse outcomes, or complications.
    c. Specify presence or absence of any residual symptoms or sequelae following completion of treatment.
    d. List any current medications, dosages, dates of dose adjustments, and any medication adverse effects.
    e. Specify current surveillance regimen, including schedule of specialist clinical re-evaluation, laboratory testing, and any applicable imaging. Explain any discrepancies in surveillance plan from established post-treatment guidelines.
2. Consultation report from all treating specialists, as applicable (e.g., urologist, medical oncologist, radiation oncologist) and all subsequent consultation notes. These notes must include the following:

    a. Summarization of presentation, evaluation, and staging.
    b. Summarization of complete treatment course, including any modifications to initial planned treatments with explanation.
    c. Recent post-treatment follow-up note addressing clinical stability and commenting on presence or absence of residual disease, symptoms, or sequelae of the prostate cancer or its treatment.
    d. Detailed plan of ongoing surveillance for recurrence, including interval of follow-up and specific monitoring tests planned.
3. Results of all testing performed in the course of diagnosis, evaluation, and management of prostate cancer, including laboratory studies, imaging, pathology results, and any other ancillary studies. The below-listed studies must be included:
    a. All prostate specific antigen (PSA) levels with dates of measurement.
    b. Results of all diagnostic, staging, and surveillance imaging studies, as applicable in accordance with established guidelines (e.g., CT, MRI, PET-CT, bone scan).
4. Current physical examination, including digital rectal examination (DRE) and examination of external genitalia.
5. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.
6. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings and a current DRE and examination of external genitalia.
    b. Complete list of current medications with dates of initiation, dosages, dates of dose adjustments, and all adverse effects.
    c. Summary of interval surveillance evaluations and studies.
    d. Updated plan of ongoing surveillance for recurrence.
2. All relevant interval consultation reports from specialty providers (e.g., urologist, medical oncologist, radiation oncologist).
3. Results of all interval testing performed in the course of ongoing management and surveillance, including all PSA levels with dates of measurement and (as applicable) any other laboratory studies, imaging, and other ancillary tests.
4. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.
5. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

III. Aeromedical Concerns

Approximately 95% of prostate cancer is adenocarcinoma. Other histologic types of prostate cancer include small cell, transitional cell, and squamous cell carcinoma. Neuroendocrine tumors and sarcomas of the prostate are rare. Non-adenocarcinoma prostate cancer is beyond the scope of this waiver guide.

The American Cancer Society recommends screening with an annual digital rectal exam (DRE) beginning at age 50 for men at average risk and are expected to live at least 10 more years, and recommends earlier screening (age 45) for men at high risk for prostate cancer, which include African American race and first degree relatives diagnosed with prostate cancer before age 65. Men with multiple first degree relatives diagnosed with prostate cancer before age 65 should consider screening as early as age 40.

At the time of diagnosis, about 90% of prostate cancer is either localized to the prostate gland or its spread is confined to regional lymph nodes. Most prostate cancer is diagnosed prior to the onset of symptoms or complications that would impact aviation or operational duties. Recent literature indicates 15 year metastasis-free survival was near 95% in Grade Group 1 and 85% in Grade Group 2.[9] The aeromedical risk related to primary prostate cancer is low in cases of early stage disease. For these individuals, aeromedical and operational risk predominantly stems from the complications related to treatment, particularly long-term or late complications of chemotherapy or radiation therapy. Unfortunately, some prostate cancers are aggressive, and about 6% of men demonstrate metastatic disease at the time of initial prostate cancer diagnosis. The most common site of distant metastatic spread is the bone, and individuals with bony metastases may present with bone pain. Other sites of possible metastasis include the lymph nodes, lungs, and liver. Metastatic spread to the brain, adrenal glands, or other distant sites is rare. When metastatic spread occurs, aeromedical risk depends on metastatic burden and the particular organ systems involved.

Treatment for prostate cancer includes active surveillance, radical prostatectomy, external beam radiation, brachytherapy, cryotherapy, hormone therapy (i.e., medical castration), systemic chemotherapy, and systemic immunotherapy. Each intervention is associated with unique adverse effects and complications. Therefore, aeromedical and operational risks are quite individualized. The risk of sequelae of aeromedical or operational significance increases with underlying disease prognostic risk. Occupational risk is also higher for individuals who undergo systemic or combination therapy. Generally, systemic or combination interventions are only utilized in intermediate risk or high risk disease. Suitability for waiver will depend upon the type of treatment(s), outcome, extent and stability of any residual disease, any lasting symptoms or sequelae of the primary tumor or the treatment intervention, burden of surveillance testing, and whether long-term treatment is necessary for disease suppression/prevention of recurrence (e.g., medical castration).

Selection of treatment is guided by risk stratification that considers extent of disease (i.e., stage), histologic grade (i.e., Gleason score and grade group), molecular tumor characteristics (i.e., genomic profile), highest PSA level, comorbid conditions, and the overall health of the individual. Additional considerations when choosing a course of therapy include the potential complications associated with different treatments and patient preference. Numerous pre-treatment risk classification and prognostication tools exist to assist clinicians and patients in shared decision making around an individualized treatment plan. The nuances of these tools and treatment decisions are beyond the scope of this waiver guide, but validated prognostication tools may be utilized during the course of a waiver review to further define individualized aeromedical or operational risk.

Review of AIMWTS data from Dec 2018 through Dec 2021 revealed a total of 31 waiver packages involving prostate cancer. Of that total, 0 was FC I/IA, 23 were FC II (0 disqualified), 8 were FC III (2 disqualified), 0 were ATC/GBO, and 0 were SWA. Both FC III disqualifications were for reasons other than the member's treated prostate cancer.

Please use *only* these ICD-10 code for AIMWTS coding purposes	
C61	Malignant neoplasm of prostate
D07.5	Carcinoma in situ of prostate

IV. Suggested Readings

1. Bekelman JE, Rumble RB, Chen RC, et al. Clinically Localized Prostate Cancer: ASCO Clinical Practice Guideline Endorsement of an American Urological Association/American Society for Radiation Oncology/Society of Urologic Oncology Guideline. J Clin Oncol 2018;36:3251-3258. Available at https://ascopubs.org/doi/pdf/10.1200/JCO.18.00606. Accessed 13 December 2021.
2. Brawley S, Mohan R, and Nein CD. Localized prostate cancer: treatment options. Am Fam Physician 2018;97:798-805. Available at https://www.aafp.org/afp/2018/0615/p798.html. Accessed 13 December 2021.
3. Expert Panel on Urologic Imaging:, Coakley FV, Oto A, Alexander LF, et al. ACR Appropriateness Criteria® Prostate Cancer-Pretreatment Detection, Surveillance, and Staging. J Am Coll Radiol 2017;14:S245-S257. Available at https://www.jacr.org/action/showPdf?pii=S1546-1440%2817%2930206-5. Accessed 13 December 2021.
4. Gillessen S, Attard G, Beer TM, et al. Management of Patients with Advanced Prostate Cancer: Report of the Advanced Prostate Cancer Consensus Conference 2019. Eur Urol 2020;77:508-547. Available at https://www.sciencedirect.com/science/article/pii/S0302283820300488?via%3Dihub. Accessed 13 December 2021.
5. National Comprehensive Cancer Network. Prostate Cancer (Version 2.2022). 10 September 2021. Available at https://www.nccn.org/professionals/physician_gls/pdf/prostate.pdf. Accessed 13 December 2021. (Note: A free account must be created to access this guideline).
6. Wolf AMD, Wender RC, Etzioni RB, et al. American Cancer Society Guideline for the Early Detection of Prostate Cancer – Update 2010. CA Cancer J Clin, 2010; 60: 70-98. Website: American Cancer Society
7. U.S. Preventative Service Task Force: Final Recommendation Statement: Screening for Prostate Cancer (https://www.uspreventativesesrvicestaskforce/org/Announcements/News/Items/final-recommendation-statement-screening-for-prostate-cancer) January 5, 2022.
8. Musunuru HB, Yamamoto T, Klotz L, et al., Active Surveillance for Intermediate Risk Prostate Cancer: Survival Outcomes in the Sunnybrook Experience. J Urol 2016; 196(6): 1651-1658.
9. Mohler J, Armstrong, A, Bahnson RR, et al. Prostate Cancer. National Comprehensive Cancer Network Clinical Practice Guidelines in Oncology; V.1.2015.

Testicular Cancer

Revised: Jan 2022
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Significant Changes: Waiver guide restructured, minor edits.

I. Waiver Consideration

Any history of a malignant neoplasm, including testicular cancer, is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Treatment of any malignancy or the sequelae of either the malignancy or its treatment may be independently disqualifying. For example, post-treatment hypogonadism requiring use of exogenous hormone replacement is disqualifying for all flying class, ATC, GBO, and SWA duties. The use of injectable exogenous testosterone is disqualifying for retention. It is recommended that the MSD and the appropriate career field medication list be cross-referenced for any and all treatments, complications, or residual symptoms.

Typically, an aeromedical or operational waiver for testicular cancer is considered after completion of all planned treatment and the establishment of disease-free asymptomatic clinical stability. It is expected that the service member will be in remission and be following a routine schedule of post-treatment surveillance, in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines). Any adverse outcomes of the primary malignancy or its treatment should be addressed before requesting a waiver, with clear establishment of clinical and biochemical stability. Generally, a period of at least six months of stable post-treatment surveillance is required prior to consideration of a waiver for a trained asset; whereas two years of surveillance is required prior to consideration of a waiver for an untrained individual. Case-by-case consideration may be given to an earlier waiver in select low-risk individuals.

Table 1: Waiver potential for Testicular Cancer

Flying Class	Condition	Waiver Potential Waiver Authority	ACS Review or Evaluation
FC I/IA[1]	Seminoma and non-seminoma, all stages	Yes AFRS/CMO	Yes
FC II/III[1,2]	Seminoma and non-seminoma, all stages	Yes AFMRA[3]	Yes
ATC/GBO/OSF/ SWA[1,2]	Seminoma and non-seminoma, all stages	Yes AFMRA[3]	No[4]

1. Waiver for untrained assets may be considered after two years of stable, asymptomatic surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.
2. Waiver for trained assets may be considered after six months of stable, asymptomatic surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.
3. Certification authority for untrained assets is AFRS/CMO.
4. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Fully describe the course of treatment, including dates of each intervention and any side effects, adverse outcomes, or complications. If the treatment regimen included bleomycin, specify whether there were ever any respiratory symptoms or suspicion of possible lung injury/pulmonary toxicity.
    c. Specify presence or absence of any residual symptoms or sequelae following completion of treatment.
    d. List any current medications, dosages, dates of dose adjustments, and any medication adverse effects.
    e. Specify current surveillance regimen, including schedule of specialist clinical re-evaluation, laboratory testing, and any applicable imaging. Explain any discrepancies in surveillance plan from established post-treatment guidelines.
2. Consultation report from all treating specialists, as applicable (e.g., urologist, medical oncologist, radiation oncologist) and all subsequent consultation notes. These notes must include the following:
    a. Summarization of presentation, evaluation, and staging.
    b. Summarization of complete treatment course, including any modifications to initial planned treatments with explanation.

c. Recent post-treatment follow-up note addressing clinical stability and commenting on presence or absence of residual disease, symptoms, or sequelae of the testicular cancer or its treatment.
d. Detailed plan of ongoing surveillance for recurrence, including interval of follow-up and specific monitoring tests planned.

3. Results of all testing performed in the course of diagnosis, evaluation, and management of testicular cancer, including laboratory studies, imaging, pathology results, and any other ancillary studies. The below-listed studies must be included:
    a. α-fetoprotein (AFP) level measured before treatment and at most recent follow-up.
    b. β-human chorionic gonadotropin (β-hCG) measured before treatment and at most recent follow-up.
    c. Lactate dehydrogenase (LDH) measured before treatment and at most recent follow-up.
    d. If treatment included bleomycin or chest radiation, the following must be included: pre- and post-bronchodilator spirometry, full plethysmography, and DLCO.
    e. Results of all diagnostic, staging, and surveillance imaging studies, as applicable in accordance with established guidelines (e.g., testicular ultrasound, chest x-ray, CT of the abdomen/pelvis, PET-CT).
4. Current physical examination, including examination of external genitalia and lymph nodes.
5. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.
6. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings and a current examination of external genitalia and lymph nodes.
    b. Complete list of current medications with dates of initiation, dosages, dates of dose adjustments, and all adverse effects.
    c. Summary of interval surveillance evaluations and studies.
    d. Updated plan of ongoing surveillance for recurrence.
2. All relevant interval consultation reports from specialty providers (e.g., urologist, medical oncologist, radiation oncologist).
3. Results of all interval testing performed in the course of ongoing management and surveillance, including (as applicable) laboratory studies, imaging, and any other ancillary tests. Include results of current AFP, β-hCG, and LDH.
4. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.
5. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

III. Aeromedical Concerns

Testicular cancer is relatively uncommon, but represents the most common solid tumor in males 20-34 years old. Approximately 95% of testicular cancers present as stage I or II disease, prior to the development of any symptoms or complications of serious aeromedical or operational concern. The five year survival of all testicular cancer is >95%. Although the risk of relapse is high, recurrent disease is typically detected biochemically through regular careful surveillance before the onset of symptoms or physical findings. Therefore, aeromedical and operational risk predominantly stems from the complications related to treatment, particularly long-term or late complications of chemotherapy or radiation therapy. The burden of surveillance testing is also a factor in waiver consideration due to the potential impact of operational tempo on the ability of an individual to complete necessary testing and evaluations and the possibility that surveillance may interfere with a service member's readiness. Due to the high risk of recurrence associated with treated testicular cancer, frequent and timely surveillance in accordance with established evidence-based guidelines (e.g., National Comprehensive Cancer Network) is of critical importance, regardless of initial stage or primary treatment. Follow up schedules depend on the tumor type, staging and elected therapies following orchiectomy (i.e. surveillance, chemotherapy, surgery or radiation therapy). Patient follow schedules range from 2-6 months for several years based on NCCN guidelines.

Individuals with testicular cancer undergo initial surgical resection with orchiectomy which is then followed by either surveillance, chemotherapy, radiation, or retroperitoneal lymph node dissection depending upon the tumor type and stage. The most common chemotherapeutic regimens include bleomycin, etoposide, and cisplatin. Short- and long-term chemotherapy toxicity is a substantial concern in aviation and operational environments. While both etoposide and cisplatin are associated with adverse effects that would increase aeromedical and operational risk (e.g., neuropathy), the greatest aeromedical and operational concern arises from the use of bleomycin.

Historically, the use of bleomycin was permanently disqualifying for aviation duties due to the concern for pulmonary toxicity and the risk for irreversible pulmonary fibrosis after exposure to supplemental oxygen. Acute pulmonary injury occurs in up to 18% of individuals who receive bleomycin. Delayed toxicity is also described in the medical literature, mostly in case reports and small case series. Its true incidence is uncertain. Risk factors appear to include increased age, higher cumulative dose of bleomycin, and renal insufficiency. However, there are documented cases in young individuals previously treated with small cumulative doses of bleomycin following administration of modest levels of supplemental oxygen (33-42%) during the course of surgical operations lasting between 4 and 8 hours. The majority of reported cases occurred within the first year after completion of bleomycin chemotherapy. However, it is unknown if the actual risks decrease over time due to the potential for observation bias.

Several years ago, waiver policy with respect to bleomycin shifted as a result of new data from the Duke Hyperbaric Unit. In a small number of patients with a history of bleomycin treatment, repeated hyperbaric oxygen (HBO) treatments with 100% oxygen in a pressurized chamber did not result in permanent worsened pulmonary function. At least one individual experienced chest discomfort and a decrease in DLCO by 50%, which resolved and did not recur with subsequent

HBO treatments at a reduced frequency. A series of 15 patients previously exposed to bleomycin were successfully treated with HBO without the development of new respiratory symptoms or any significant change in arterial blood gas values, spirometry, or chest x-ray findings. Based on this limited but promising data, aviators in both high-performance and non-high performance aircraft were permitted to return to unrestricted flying duties after receiving bleomycin chemotherapy, provided that there was no evidence of current or previous pulmonary toxicity and there were no other impediments to waiver.

At present, short-duration waivers for individuals with a history bleomcyin pneumonitis requiring return to manned aviation are considered on a case-by-case basis after one year of post-treatment asymptomatic stability. In these instances, ACS evaluation includes thorough pulmonary testing (e.g., pre- and post-bronchodilator spirometry, full plethysmography, diffusion capacity, and high resolution chest CT). Typically, when there is any suspicion of possible pulmonary reaction related to bleomycin, if the individual is otherwise considered suitable for a waiver, the waiver will be restricted to non-high performance aircraft and no routine use of the aviator mask or 100% supplemental oxygen. Likewise, these service members are prohibited from participating in any portion of altitude chamber qualification that requires 100% oxygen use. These restrictions arise from the concern for life-threatening acute pneumonitis provoked by exposure to high oxygen concentrations, based on case reports of such reactions from the surgical literature. Use of 100% oxygen during emergencies such as fire or rapid decompression is acceptable and should not be discouraged. Generally, initial waivers and waiver renewals for individuals with suspicion of past bleomycin toxicity are restricted to one year duration, with repeat pulmonary testing at one and two years of follow-up (i.e., at two and three years after completion of definitive therapy).

Review of AIMWTS data from Dec 2018 through Dec 2021 revealed a total of 63 waiver packages involving testicular cancer. Of that total, 6 were FC I/IA (2 disqualified), 37 were FC II (1 disqualified), 11 were FC III (0 disqualified), 5 were ATC/GBO (1 disqualified), and 4 were SWA (0 disqualified). The two FC I/IA disqualifications were a result of being <1 year removed from treatment. The two disqualifications in trained airmen were also associated with other unrelated or indirectly related conditions and were not disqualifications directly due to the effects of the testicular cancer or treatment.

Please use *only* these ICD-10 code for AIMWTS coding purposes	
C62.90	Malignant neoplasm of unspecified testis, unspecified whether descended or undescended

IV. Suggested Readings

1. Baird DC, Meyers GJ, and Hu JS. Testicular cancer: diagnosis and treatment. Am Fam Physician. 2018;97:261-268. Available at https://www.aafp.org/afp/2018/0215/afp20180215p261.pdf. Accessed 13 December 2021.
2. Fung C, Dinh PC, Fossa SD, et al. Testicular cancer survivorship. Journal of the National Comprehensive Cancer Network J Natl Compr Canc Netw 2019;17:1557-1568. Available at https://jnccn.org/view/journals/jnccn/17/12/article-p1557.xml. Accessed 139 December 2021.

3. National Comprehensive Cancer Network. Testicular Cancer (Version 2.2021). 13 April 2021. Available at https://www.nccn.org/professionals/physician_gls/pdf/testicular.pdf. Accessed 13 December 2021. (Note: A free account must be created to access this guideline).
4. Stephenson A, Eggener SE, Bass EB, et al. Diagnosis and Treatment of Early Stage Testicular Cancer: AUA Guideline. J Urol 2019;202:272-281. Available at https://www.auajournals.org/doi/pdf/10.1097/JU.0000000000000318. Accessed 13 December 2021.
5. Stephenson AJ, Gilligan TD: Neoplasms of the Testis. Campbell Walsh Urology10th edition: 837-870; 2011

Thyroid Cancer

Revised: February 2022
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Maj Laura Bridge, and Capt Cody Hedrick (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver guide restructured.

I. Waiver Consideration

Any history of a malignant neoplasm, including thyroid cancer, is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. Treatment of any malignancy or the sequelae of either the malignancy or its treatment may be independently disqualifying. For example, injury to the parathyroid glands may result in transient or permanent parathyroid dysfunction, which is disqualifying for all flying class, ATC, and SWA duties. The use of thyroid hormone replacement or supplementation to correct post-treatment hypothyroidism or to induce thyroid suppression for the purpose of reducing the risk of recurrence is also independently disqualifying for all flying class, ATC, and SWA duties. It is recommended that the MSD and the appropriate career field medication list be cross-referenced for any and all treatments, complications, or residual symptoms.

Typically, an aeromedical or operational waiver for differentiated thyroid cancer is considered after completion of definitive treatment and the establishment of asymptomatic clinical stability. It is expected that the service member will have no or minimal residual disease and be following a routine schedule of post-treatment surveillance, in accordance with established professional guidelines (e.g., National Comprehensive Cancer Network Guidelines). Any adverse outcomes of the primary malignancy or its treatment should be addressed before requesting a waiver, with clear establishment of clinical and biochemical stability. Examples of common sequelae include post-operative hypothyroidism and/or hypoparathyroidism, hypocalcemia, or recurrent laryngeal nerve injury. Generally, a period of at least six months of stable post-treatment surveillance is required prior to consideration of a waiver for a trained asset; whereas two years of surveillance is required prior to consideration of a waiver for an untrained individual. Case-by-case consideration may be given to an earlier waiver in select low-risk cases.

Table 1: Waiver potential for thyroid cancer

Flying Class	Condition	Waiver Potential[3] Waiver Authority	ACS Review or Evaluation
FC I/IA[1]	Differentiated thyroid cancer, all stages	Yes AFRS/CMO	Yes
FC II/III[1,2]	Differentiated thyroid cancer, all stages	Yes AFMRA[4]	Yes
ATC/GBO/OSF/ SWA[1,2]	Differentiated thyroid cancer, all stages	Yes AFMRA[4]	No[5]

1. Waiver for untrained assets may be considered after two years of stable, asymptomatic surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.
2. Waiver for trained assets may be considered after six months of stable, asymptomatic surveillance following completion of definitive treatment. An early waiver may be considered on a case-by-case basis in low-risk individuals.
3. No indefinite waivers.
4. Certification authority for untrained assets is AFRS/CMO.
5. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent symptoms and physical findings (positive and negative).
    b. Fully describe the course of treatment, including dates of each intervention and any side effects, adverse outcomes, or complications.
    c. Specify presence or absence of any residual symptoms or sequelae following treatment completion.
    d. List all current medications, dosages, dates of dose adjustments, and any medication adverse effects. Specify thyroid stimulating hormone (TSH) target. Explain any discrepancies in TSH target from established post-treatment guidelines.
    e. Specify current surveillance regimen, including schedule of specialist clinical re-evaluation, laboratory testing, and any applicable imaging. Explain any discrepancies in surveillance plan from established post-treatment guidelines.
2. Consultation report from all treating specialists, as applicable (e.g., endocrinologist, surgeon, medical oncologist, radiation oncologist) and all subsequent consultation notes. These notes must include the following:
    a. Summarization of presentation, evaluation, and staging.
    b. Summarization of complete treatment course, including any modifications to initial planned treatments with explanation.

    c. Recent post-treatment follow-up note addressing clinical stability and commenting on presence or absence of residual disease, symptoms, or sequelae of the thyroid cancer or its treatment.
    d. Detailed plan of ongoing surveillance for recurrence, including interval of follow-up and specific monitoring tests planned.
3. Results of all testing performed in the course of diagnosis, evaluation, and management of thyroid cancer, including laboratory studies, imaging, biopsies/pathology results, and any other ancillary studies. For medullary thyroid cancer, the following must be included: results of screening for MEN syndromes.
4. Results of surveillance laboratory studies on a stable dose of thyroid replacement/suppression, including recent TSH, free thyroxine (free T4), thyroglobulin, and anti-thyroglobulin antibodies. For medullary thyroid cancer, the following must be included: Carcinoembryonic antigen (CEA) and calcitonin.
5. Results of surveillance imaging studies, as applicable in accordance with established surveillance guidelines (e.g., neck ultrasound, whole-body scan, MRI, CT, PET-CT).
6. Current physical examination, including neck exam.
7. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.
8. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings and a current neck exam.
    b. Complete list of current medications with dates of initiation, dosages, dates of dose adjustments, and all adverse effects.
    c. Summary of interval surveillance evaluations and studies.
    d. Updated plan of ongoing surveillance for recurrence.
2. All relevant interval consultation reports from specialty providers (e.g., endocrinologist, surgeon, medical oncologist, radiation oncologist).
3. Results of all interval testing performed in the course of ongoing management and surveillance, including (as applicable) laboratory studies, imaging, and any other ancillary tests. Include results of current TSH, free thyroxine (free T4), thyroglobulin, and anti-thyroglobulin antibodies. For medullary thyroid cancer, the following must be included: CEA and calcitonin.
4. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.
5. If any of the substantiating documentation listed above is not included in the waiver package, document and explain to the waiver authority the reason for omission.

III. Aeromedical Concerns

Differentiated thyroid cancer poses little aeromedical or operational risk in the absence of distant metastases. Fortunately, only 10% of individuals diagnosed with differentiated thyroid cancer will develop distant metastases over their lifetime. In the rare event that metastatic spread does

occur, the most frequent site of involvement is the lungs. Spread to the bone or CNS is observed infrequently. Most differentiated thyroid tumors are slow-growing. Even in the case of mild residual disease, the short-term risk to service member health is low when the malignancy is localized. Thus, primary differentiated thyroid cancer itself often poses minimal risk to aviation or operational safety or to mission completion. Rather, the majority of aeromedical and operational risk stems from the treatment of the malignancy and post-treatment sequelae.

The overwhelming majority of individuals with differentiated thyroid cancer undergo surgical resection with either total or sub-total thyroidectomy, with or without lymph node dissection. A subset of individuals will also require radioactive iodine ablation or adjuvant external beam radiation. The most common post-treatment complication is iatrogenic hypothyroidism. There is a small risk of injury to the recurrent laryngeal nerve and parathyroid glands, which may occur intraoperatively or as a result of local tumor invasion into these nearby structures. Following surgery, thyroid suppression is typically utilized to reduce the risk of recurrence. Whether due to post-operative hypothyroidism, a need for thyroid suppression, or both, almost all individuals will require treatment with exogenous thyroid hormone (e.g., levothyroxine). The use of levothyroxine requires careful monitoring and dose adjustments to maintain goal TSH. Over- or under-replacement may result in a hypo- or hyperthyroid state. At suppressive doses, exogenous thyroid hormone induces a mild thyrotoxicosis. There is a slightly increased risk of atrial fibrillation, but the risk of a significant impact on aviation or operational duties is considered minimal.

After hypothyroidism, the most common complications of thyroidectomy are hypoparathyroidism and injury to the recurrent laryngeal nerve. The more extensive the surgery (e.g., total vs sub-total thyroidectomy, thyroidectomy with lymph node dissection vs thyroidectomy alone), the greater the risk of complication. Up to 20% of all individuals who undergo surgical resection of thyroid cancer experience transient hypoparathyroidism. Of individuals who undergo total thyroidectomy, 0.8-3% will sustain a parathyroid injury resulting in a permanent hypoparathyroid state. Whether the hypoparathyroidism is transient or permanent, if it remains undiagnosed and uncorrected, it may cause hypocalcemia and tetany that can range from mild to severe. Mild manifestations of hypocalcemia include perioral tingling, paresthesia of the hands and feet, and muscle cramping. Severe manifestations can be life-threatening and include laryngospasm and seizures. However, when properly monitored and treated, hypoparathyroidism is amenable to aeromedical and operational waiver. Individuals are educated to recognize early signs and symptoms of hypocalcemia so that it can be corrected with calcium replacement or calcitriol before reaching a level of aeromedical or operational significance.

With regard to iatrogenic or locally invasive recurrent laryngeal nerve injury, waiver consideration depends on the severity of resulting impairment. Unilateral involvement may cause dysphonia and interfere with a service member's ability to communicate, particularly in an environment with a significant level of ambient noise. Waivers for unilateral recurrent laryngeal nerve injury may be considered on a case-by-case basis. Damage to the bilateral recurrent laryngeal nerves may result in aphonia, which is not considered to have waiver potential.

Medullary thyroid cancer is distinct from other forms of thyroid cancer. It is a neuroendocrine tumor that arises from the parafollicular cells, or C cells, of the thyroid gland. Curative treatment depends upon complete surgical resection. Thus, the post-operative considerations for medullary thyroid cancer are the same as those for other differentiated thyroid cancers. Because local invasion is the primary risk, aeromedical concerns center on intraoperative injury and the risk of future recurrence or invasion. Waiver considerations include the burden of residual disease and the risks associated with any sequelae of treatment, as discussed above.

Review of AIMWTS data from Dec 2018 through Dec 2021 revealed a total of 58 waiver packages involving thyroid cancer. Of that total, 1 was FC I/IA (0 disqualified), 40 were FC II (0 disqualified), 13 were FC III (0 disqualified), 2 were ATC/GBO (0 disqualified), and 2 were SWA (0 disqualified).

Please use *only* these ICD-10 code for AIMWTS coding purposes	
C73	Malignant neoplasm of thyroid gland

IV. Suggested Readings

1. Fagin JA, Wells SA. Biologic and clinical perspectives on thyroid cancer. N Eng J Med 2016;375:1054-67. Available at https://www.nejm.org/doi/full/10.1056/NEJMra1501993. Accessed 13 December 2021. (Note: Requires personal or institutional subscription to access. Available via the AFMS Virtual Library on the AF Knowledge Exchange at https://kx.health.mil/Pages/default.aspx).
2. Haugen BR, Alexander EK, Bible KC, et al. 2015 American Thyroid Association Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer: The American Thyroid Association Guidelines Task Force on Thyroid Nodules and Differentiated Thyroid Cancer. Thyroid 2016;26:1-133. Available at https://www.liebertpub.com/doi/pdfplus/10.1089/thy.2015.0020. Accessed 13 December 2021.
3. National Comprehensive Cancer Network. Thyroid Carcinoma (Version 2.2021). 1 September 2021. Available at https://www.nccn.org/professionals/physician_gls/pdf/thyroid.pdf. Accessed 13 December. (Note: A free account must be created to access this guideline).

Aerospace Medicine Waiver Guide

Bell's Palsy

Revised: Jun 2023

Reviewed: Maj Isaac Yourison (RAM '23), Lt Col Aven Ford (ACS Neurologist), Dr. Max Lee (Waiver Guide Coordinator)

Significant Changes: ICD-10 codes, waiverability table, and Suggested Readings updated

I. Waiver Consideration

An isolated episode or history of Bell's palsy with full recovery without clinical or functional residua is not aeromedically disqualifying and does not require waiver, but does require a DNIF period during treatment and recovery. An isolated episode of Bell's palsy with incomplete and functionally limiting clinical recovery or recurrent episodes of Bell's palsy is disqualifying for all flying classes and operational duties, and the servicemember will be considered for a waiver based on the outcome of treatment and level of post-treatment residual deficits. Affected individuals often have complete resolution of symptoms and are at a low risk of recurrence.

Table 1: Waiver potential for *Bell's Palsy with incomplete functional recovery or recurrent episodes.*

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
I/IA	Yes[1]	AFRS/CMO	Yes
II//III/SWA	Yes[1]	MAJCOM	Yes
ATC/GBO	Yes[1]	MAJCOM	No

1. Waiver consideration based on degree of residual symptoms and deficits. Indefinite waiver recommendation is possible with complete resolution (with complete resolution, a waiver is not required) or minimal residua.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed, all appropriate treatments have been initiated using best current clinical guidelines and recommendations, and the member is clinically stable.

A. Initial Waiver Request:

1. Complete history of event detailing all symptoms, treatment (all medications, dosages, and number of days treated) and level of symptom resolution.
2. Copies of relevant clinical notes, diagnostic studies, imaging reports and images, and operative reports (if applicable).
3. Current physical and neurologic examinations.
4. Refer to page 2 of the AF Aerospace Medicine Waiver Guide Compendium for image uploading instructions.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Interval history and level of symptom resolution.
2. Copies of any applicable interim specialty reports, labs, imaging reports and images.
3. Current physical and neurologic examination findings.
4. Refer to page 2 of the AF Aerospace Medicine Waiver Guide Compendium for image uploading instructions.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Aeromedical concerns for Bell's palsy include effects of any residual symptoms on operational safety and mission effectiveness, and future risk of symptom recurrence. The inability to close the eyelid on the affected side may lead to vision impairment secondary to corneal damage or dry eyes. Speech may be affected due to due to facial weakness and the wear of life support gear, particularly a tight-fitting aviator mask, can also be compromised. In addition, hyperacusis may be distracting and interfere with communication. These symptoms make flying inadvisable until resolution of the Bell's palsy. As most cases will be treated with steroids and antiviral agents, the aviator should be grounded during treatment as these medications are not aeromedically-approved and are unlikely to be recommended for waiver. In most cases of Bell's palsy, symptoms worsen over the first few days, stabilize after several weeks, and recover gradually over two to three months from onset. Significant worsening after the first several weeks and any symptoms outside of those that would be caused by injury to the facial nerve (CN VII) should prompt further evaluation and consideration of other diagnoses.

AIMWTS review in May 2023 showed 55 cases with the diagnosis of Bell's Palsy. Breakdown of the cases revealed that three of the DQ cases were for a significant nerve deficit and the other 3 for other related neurologic diagnoses. Among approved waivers: two pilots demonstrated very mild facial weakness, one FC I applicant showed a mild hemifacial spasm, one pilot showed mild facial asymmetry, and a flight surgeon had residual lagophthalmos.

Please use only *these* ICD-10 codes for Bell's Palsy for AIMWTS coding purposes		(# of waivers / total # of cases)					
		FC I/IA	FC II	FC III	ATC	GBO	SWA
G51.8	Facial Nerve Disorders						
G51.0	Bell's Palsy	5/5	16/16	23/27	1/1	3/3	
G51.9	Facial Nerve Disorder, Unspecified			0/1		1/1	0/1

IV. Suggested Readings

1. Gronseth GS, Paduga R. Evidence-based guideline update: Steroids and antivirals for Bell palsy: Report of the Guideline Development Subcommittee of the American Academy of Neurology. Neurology 2012; 79(22):2209-13

2. Holland NJ, Bernstein JM. Bell's palsy. BMJ Clinical Evidence [Internet]. 2014 Apr 9;2014. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3980711/

3. Ronthal M, Greenstein P. Bell's Palsy [Internet]. www.uptodate.com. 2023 [cited 2023 May 3]. Available from: https://www.uptodate.com/contents/bells-palsy-pathogenesis-clinical-features-and-diagnosis-in-adults?source=history_widget#references

4. Zandian A, Osiro S, Hudson R, et al. The neurologist's dilemma: A comprehensive clinical review of Bell's palsy, with emphasis on current management trends. Med Sci Monit 2014; 20:83-90.

5. Zhang W, Xu L, Luo T, Wu F, Zhao B, Li X. The etiology of Bell's palsy: a review. Journal of Neurology [Internet]. 2019 Mar 28; Available from: https://link.springer.com/article/10.1007%2Fs00415-019-09282-4#citeas

Aerospace Medicine Waiver Guide

Chronic Low Back Pain

Revised: Feb 2022

Reviewed: Lt Col Mark Dudley (RAM 22), Maj Caleb James, (RAM 22), Dr. Max Lee (ACS Waiver Guide Manager); Col Joseph Stuart (AF/SG Orthopaedics consultant)

Significant Changes: Reformatted with updated references

I. Waiver Consideration

Recurrent disabling back pain or back pain requiring external support is specifically disqualifying for all flying and operational duties. In addition, chronic back or neck pain, regardless of cause, which requires ongoing duty or deployment restrictions for over a year, or ongoing specialist follow-up more than annually, or frequent duty absences, or chronic/recurrent use of schedule II-IV controlled medications are disqualifying for all flying classes and may require consideration for MEB to meet retention standards.

Table 1: Waiver potential for chronic low back pain

Flying Class (FC)	Condition	Waiver Potential Waiver Authority	ACS Review/ Evaluation
Any Initial FC or Operational Duty	Chronic Pain[2]	Yes[1] AFRS/CMO	No, No
Any Trained FC or Operational Duty	Chronic Pain[2]	Yes MAJCOM/SGP	No, No

1. Waiver is unlikely for untrained personnel with active back pain.
2. If member does not meet retention standards (chronic back or neck pain, regardless of cause, which requires ongoing duty or deployment restrictions for over a year, or ongoing specialist follow-up more than annually, or frequent duty absences, or chronic/recurrent use of controlled medications), the waiver authority is AFMRA.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request for chronic low back pain should include the following:

1. History - Must define the back pain symptomatology to include onset, contributing event, specific etiology along with history of location, radiation, duration, conditions that improve or aggravate the pain, limitations of activities, previous, current, or ongoing treatment(s), and previous, current, or ongoing medication(s).
2. Discuss any "Red Flags" such as fever, night sweats, weight loss, bowel and bladder dysfunction, and address all pertinent negatives.
3. If present, include history of any social or psychological distress.
4. General physical exam including visual inspection, range of motion and neurological examinations consisting of muscle strength, gait, sensation, reflexes, etc.
5. All radiological or neurological reports and labs.For image submission process, see page 2.

6. All specialty consultation notes.
7. If applicable, MEB results.
8. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to the waiver authority.

B. Renewal Waiver Request for chronic low back pain should include the following:

1. Brief history of initial onset of back as provided in initial AMS. Include the interval history since last waiver with special attention to changes in symptoms, exasperation and occupational and operational impact.
2. All interim specialty consultation notes.
3. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to the waiver authority.

III. Aeromedical Concerns

Low back pain (LBP) is the fifth most common reason for visiting a US doctor. Annually, the prevalence of low back pain in the general US adult population is 10–30%, and the lifetime prevalence of US adults is as high as 65-80%. LBP encompasses three distinct sources of pain: axial lumbosacral, radicular, and referred pain. Axial lumbosacral back pain refers to pain in the lumbar (L1-5 vertebral region) and sacral spine (S1 to sacrococcygeal junction region). Radicular leg pain travels into an extremity along a dermatomal distribution secondary to nerve or dorsal root ganglion irritation. Referred pain spreads to a region remote from its source but along a non-dermatomal trajectory.

General risk factors of importance must be considered for appropriate mitigation strategies. LBP can be broken into three categories: acute (4 weeks), subacute (4-12 weeks), and chronic (≥12 week). While most non-chronic back pain presentations are acute with pain that is limited to 6 weeks or less, 10–40% of patients develop symptoms lasting over 6 weeks. The majority of LBP will be non-specific, but serious or concerning causes of back pain must be considered including: spinal cord or cauda equina compression, metastatic cancer, spinal epidural abscess, vertebral osteomyelitis, vertebral compression fractures, radiculopathy, and spinal stenosis.

Operational factors to consider are stress or strain on the musculoskeletal structures by transient high-G states, vibrations, prolonged seated posture, and physically strenuous activities. Differential diagnoses of importance to consider within aerospace and operational personnel include ankylosing spondylitis, osteoarthritis, scoliosis, piriformis syndrome, and SI joint dysfunction. Of note, psychosocial stressors may worsen back pain symptoms or be a cause of non-organic back pain. The aeromedical disposition for mechanical low back pain due to lumbar strain/sprain and degenerative processes is dependent on the degree of functional residual impairment that remains once treatment and rehabilitation are completed. The flight surgeon must ascertain that the aviator can safely perform all flight duties and there should be no significant limitation of motion, loss of strength, or functional impairment that compromises safety during operational control of the aircraft, parachuting duties, during ejection, or egress procedures. If the flyer responds well to therapy and there are minimal recurrences, the aviator may be eligible for

continuation of flight duties. If the back pain is recurrent or disabling, it is disqualifying for all flying and operational classes regardless of the cause. Chronic low back pain due to other causes such as herniated disc, spondylolisthesis, and spinal fractures have unique aeromedical concerns and is discussed in their respective waiver guides.

AIMWTS search from Jan 2015 to November 2021 revealed 91 individuals with waiver dispositions containing the diagnosis of LBP. Of the total, there was 1 FC I/IA case (1 disqualification), 32 FC II cases (6 disqualifications), 50 FC III cases (26 disqualifications), 6 ATC cases (1 disqualification), and 2 GBO cases (1 disqualification).

ICD-9 codes for low back pain	
724.2	Lumbago
724.5	Backache, unspecified

** ICD-9 to ICD-10 changed October 1, 2015, the last day for ICD-9 began September 30, 2015*

ICD-10 code for low back pain	
M54.40	Lumbago with sciatica, unspecified side
M54.50	Low back pain, unspecified
M54.89	Other dorsalgia

IV. Suggested Readings

1. Wheeler, S., Evaluation of Low Back Pain in adults. *UpToDate.* June 2021. https://www.uptodate.com/contents/evaluation-of-low-back-pain-in-adults?search=low%20back%20pain&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1 (accessed 3 Jan 2022).

2. Urits, I., Burshtein, A., Sharma, M., Testa, L., Gold, P. A., Orhurhu, V., Viswanath, O., Jones, M. R., Sidransky, M. A., Spektor, B., & Kaye, A. D. (2019). Low Back Pain, a Comprehensive Review: Pathophysiology, Diagnosis, and Treatment. *Current pain and headache reports*, *23*(3), 23.

3. DeHart, R. L., & Davis, J. R. (2022). Chapter 11 Musculoskeletal System and Performance. *Fundamentals of aerospace medicine 5th edition.* Philadelphia: Lippincott Williams & Wilkins

4. Posch, M., Schranz, A., Lener, M. *et al.* Prevalence and potential risk factors of flight-related neck, shoulder and low back pain among helicopter pilots and crewmembers: a questionnaire-based study. *BMC Musculoskelet Disord* 20, 44 (2019).

5. Chou R. (2014). In the clinic. Low back pain. *Annals of internal medicine*, *160*(11), ITC6–ITC1.

Guillain-Barré Syndrome (Acute Inflammatory Demyelinating Polyradiculoneuropathy) (Mar 2020)
Reviewed: Dr. Roger Hesselbrock (ACS Neurologist), Dr. Dan Van Syoc (ACS Division Deputy Chief), and Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes:
Updated Table 1 and References

I. Waiver Consideration

Guillain-Barré Syndrome (GBS) is disqualifying for all flying classes and for GBO and ATC personnel. Per Medical Standards Directory (MSD) L26: "Polyneuritis, whatever the etiology, unless: Limited to a single episode, the acute state subsided at least 1 year before examination, there are no residual effects which could be expected to interfere with normal function in any practical manner." The one-year observation period is specified to allow for maximal functional recovery and because most GBS recurrences or transformation to chronic inflammatory demyelinating polyradiculoneuropathy (CIDP) will occur within this time frame. For flying personnel with GBS, a waiver recommendation is very likely if there is full recovery. An ACS review/evaluation is required to determine eligibility for a return to flying status if residual deficits remain after recovery, but are minor and not felt to interfere with aircrew duties. GBS is not disqualifying for SWA and OSP duties per the MSD.

Table 1: Waiver potential for Guillain-Barré Syndrome

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	Yes[1]	AETC	Yes
FC II/III	Yes[2]	MAJCOM	Yes
ATC/GBO	Yes[2]	MAJCOM	Yes

1. IFC I/IA waiver generally not recommended for GBS patients with residual deficits.
2. Trained aviators with GBS and residual deficits are considered for waiver on a case-by-case basis.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. Summary of presentation, course, and treatment.
2. Reports of laboratory studies, lumbar puncture, electrodiagnostic studies, imaging studies, and copies of images from any CT/MRI studies. For image submission process, see page 2.
3. Neurology consultation reports, including follow-up notes with examination findings after disease resolution.
4. Pulmonary function testing after disease resolution.

5. If vision was involved, Optometry or Ophthalmology consultation, to include all tests listed in the MSD (stereopsis, ocular motility and alignment testing).
6. If obtained, Physical/Occupational Therapy/Rehabilitation Medicine consultation reports.
7. Documentation of return to full physical activity, including specific comments regarding any activity limitations.
8. Current physical and neurologic examination findings.
9. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

B. Renewal Waiver Request:

1. Interval history, with particular emphasis on neurologic examination findings and specific testing as annotated in the initial waiver section.
2. Copies of any interim specialty notes, interim diagnostic testing, and images from any interim radiographic studies.
3. Current physical and neurologic examination findings.
4. Comments regarding any current activity limitations.
5. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

III. Aeromedical Concerns

Aeromedical concerns include effects of any residual symptoms, signs, and medications used for treatment on operational safety and mission effectiveness, and future risk of symptom recurrence. Within six to twelve months about 85% of GBS patients have fully recovered, with maximal recovery of residual deficits usually seen within 18 months after symptom onset. Persistent minor weakness, areflexia, and paresthesias may remain, and approximately 7% to 15% of patients have permanent neurological sequelae (e.g. foot drop, intrinsic hand muscle wasting, sensory ataxia, painful dysesthesia), which could be aeromedically-significant. The relapse rate for GBS is uncommon and if this occurs, raises the possibility of the diagnosis of chronic inflammatory demyelinating polyradiculoneuropathy (CIDP) or other conditions. Most GBS recurrences or transformation to CIDP will occur within 6-12 months of the initial presentation.

AIMWITS search in Jun 2018 revealed a total of 15 cases of GBS. There were 8 FC II cases, 1 RPA pilot case, 5 FC III cases, and 1 MOD case. There were 3 disqualified cases; 1 FC II, 1 FC III, and 1 MOD individual who was disqualified for GBS and concomitant myasthenia gravis.

ICD-9 codes for Guillain-Barré Syndrome	
357.0	Acute infective polyneuritis
357.4	Polyneuropathy in other diseases classified elsewhere
357.8	Other inflammatory and toxic neuropathies

ICD-10 codes for Guillain-Barré Syndrome	
G61.0	Acute infective polyneuritis
G63	Polyneuropathy in diseases classified elsewhere
G61.89	Other inflammatory polyneuropathies

IV. Suggested Readings

1. Donofrio PD. Guillain-Barré Syndrome. Continuum (Minneap Minn) 2017; 23(5):1295-1309.

2. Allen JA. Chronic demyelinating polyneuropathies. Continuum (Minneap Minn) 2017; 23(5):1310-1331.

3. Vriesendorp F. Guillain-Barré Syndrome in adults: clinical features and diagnosis. UpToDate Dec 4, 2018.

4. Vriesendorp F. Guillain-Barré Syndrome in adults: treatment and prognosis. UpToDate May 21, 2019.

5. Diseases of the peripheral nerves. Principles of Neurology, 10th Edition (Ropper AH, Samuels MA, Klein JP Eds), McGraw-Hill 2014: 1322-1330.

6. Dimachkie MM, Barohn RJ. Guillain-Barre´ Syndrome and Variants. Neurol Clin N Am 2013; 31(2):491-510.

7. Walling AD, Dickson G. Guillain-Barré Syndrome. Am Fam Physician 2013; 87(3):191-98.

Aerospace Medicine Waiver Guide

Headache

Revised: Sep 2024

Reviewed: Lt Col Aven Ford (ACS Neurology/Neuropsychiatry Branch Chief), Col Kevin Heacock (ACS Aerospace Medicine Branch Chief)

Significant Changes: Simplify verbiage and tables; update waiverable medications.

I. Waiver Consideration

A headache syndrome or singe headache of any type is considered disqualifying if it meets any of the following criteria:

A. Headache causes impairment in social, vocational, or academic activities, **or**,
B. Need for any *abortive* headache intervention or medication other than over-the-counter therapies, **or**,
C. Need for prescription medication for headache *prophylaxis*, **or**,
D. Is diagnosed as migraine or its variants, to include acephalgic or ocular migraine, **or**,
E. Headache is incapacitating and/or associated with any neurologic or systemic symptoms, including, but not limited to, loss or alteration of consciousness, aphasia, visual aura, diplopia, vertigo, paralysis, or nausea/vomiting.

In addition, the appropriate evaluation of a headache may uncover other disqualifying conditions that may be related to the headache, such as a vascular malformation or neoplasm. It is necessary to exclude a serious underlying cause of headache prior to returning a service member to full operational duties. Finally, any headache disorder that causes frequent absences from duty, mobility restrictions, or frequent specialty follow-up requires review for retention.

While there is no longer any required minimum observation period before waiver application, a reasonable observation period prior to waiver submission ensures continued headache control and clinical stability. Generally, a waiver may be considered when the following criteria are fulfilled:

A. Three or fewer disqualifying headaches per year, **and**,
B. No associated neurologic dysfunction, deficit, or aura, **and**,
C. Negligible or mild functional impairment (i.e., absence of significant social or occupational impairment), nausea, photophobia, or phonophobia, **and**,
D. No prescription prophylactic or abortive medication is required.

In certain circumstances, a waiver may be considered by the waiver authority when the above criteria are not met. Such requests are reviewed on a case-by-case basis. The waiver authority holds the discretion to obtain an ACS consultation for any headache waiver request.

None of the current FDA-indicated *prophylactic* pharmacologic therapies are formally approved for the specific indication of headache prevention for any flying class, ATC, or SWA duties. However, there is waiver precedent for use of certain prophylactic agents in these personnel (please refer to the “Aeromedical Concerns” section for more information). Betablockers and

calcium channel blockers may be approved for waiver following a DOWN status in GBO members (See GBO medication list). When considering *abortive* therapy, the non-injectable formulations of the triptan medication class may be approved with waiver for FC II, FC III, ATC, GBO, OSF, and SWA duties. FC I/IA applicants requiring use of prescription abortive medication are not eligible for waiver consideration. FC II waivers for use of abortive therapy are generally restricted to nonhigh performance aircraft and duties with another qualified pilot. Consult the aircrew and GBO medication lists for details regarding which medications are approved within the triptan class and for operational prescribing parameters. When submitting a waiver request for use of pharmacotherapy, it is important to note that the underlying headache diagnosis must be determined to be suitable for a waiver before a waiver will be considered for any medication use.

Table 1: Waiver potential for *Headaches*

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
I/IA	Yes[1]	AFRS/CMO	No[3,4]
II//III	Yes[2]	MAJCOM	No[3,4]
ATC	Yes[2]	MAJCOM	No[3,4]
GBO	Yes[2]	MAJCOM	No[3,4]
Special Warfare	Yes[2]	MAJCOM	No[3,4]

1. FC I/IA applicants with a long headache-free interval may be considered for waiver on a case-by-case basis.
2. Waivers for history of migraine or other headache syndrome are considered for on a case-by-case basis. Waiver for cluster headache is unlikely, except in the setting of prolonged remission.
3. ACS Neurology review may be requested at the discretion of the waiver authority.
4. Triptan use requires ACS Neurology review.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines & recommendations.

Note: *It is required that all original imaging be submitted to ACS Neurology for independent review.* For image submission process, refer to page 2.

A. Initial Waiver Request:

1. Summary of presentation, course, and treatment. Documentation should include the following history points:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Age at onset of headache.
    c. Timing and mode of headache onset, including presence or absence of aura and prodrome.
    d. Quality of headache, intensity, duration, site of pain, presence or absence of radiating pain.
    e. Any precipitating or alleviating factors (include statement about effect of activity on headache, whether there is any association to food/alcohol, and any association with environmental factors).

    f. Any associated symptoms or complaints.
    g. Specify whether there is recent history of any of the following: vision change; trauma; change in weight; alteration in exercise, sleep, or dietary habits; alteration in work or lifestyle.
    h. For women, specify type of contraception (if applicable), any recent changes in contraception, association with menstrual cycle, and whether there is use of exogenous hormones.
    i. Frequency of headaches and number of headache days per month.
    j. Date of last headache attack.
    k. Current physical and neurological examinations.
    l. Family history of headaches.
2. Contemporaneous notes using a headache log or diary are preferred.
    a. Can use the ACS Headache Log provided at the end of this section or the 3-Month Headache Diary (link below in suggested readings), but other forms of tracking will be accepted.
3. Consultation report from any specialty provider and all subsequent consultation notes.
4. Results of all testing performed in the course of diagnosis, evaluation, and management of headache, including laboratory studies, imaging, and any other neurologic studies (see note above).
    a. Must include result of a non-contrasted MRI of the brain (at minimum). If MRI is contraindicated, specify the reason for contraindication.
5. Documentation of return to full physical activity, including specific comments regarding any activity limitations.
6. Current physical examination findings.
7. FL4 with RTD and ALC status, if member did not meet retention status.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. <u>Renewal Waiver Request:</u>

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination, including current neurological examination.
    b. Any changes to the historical information required for initial waiver request.
2. All interval consultation reports from specialty providers.
3. Results of all interval testing performed in the course of ongoing headache evaluation and management, including laboratory studies, imaging, and any other neurologic studies (see note above).
4. Contemporaneous notes using a headache log or diary are preferred.
    a. Can use the ACS Headache Log provided at the end of this section or the 3-Month Headache Diary (link below in suggested readings), but other forms of tracking will be accepted.
5. Form FL4 with return to duty and ALC status, if service member did not meet retention standards.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

The aeromedical concerns associated with headache relate to the risk of headache recurrence and the potential adverse effects of treatment. Recurrent headaches may occur suddenly and be associated with symptoms that would pose a threat to operational safety and mission effectiveness. Examples of symptoms of aeromedical importance include pain, visual disturbances, nausea or vomiting, vertigo, or other neurologic deficits such as speech, motor, or cognitive dysfunction. Severity of these symptoms varies between underlying etiologic mechanisms, between individuals, and between headache attacks. At a minimum, the pain from the headache itself or the effects of any associated symptoms may be distracting in an aviation or operational environment. At worst, a recurrent headache may result in sudden incapacitation.

When considering the appropriateness of a waiver, the primary aeromedical and operational concerns are twofold – the individualized risk for future recurrence, and the degree of incapacitation that a recurrent headache is likely to cause. The underlying headache diagnosis is a secondary consideration. In manned aviation, concern is greatest for those flying single-seat aircraft or for those in aircraft where complete crew participation and coordination are essential for mission completion. Similarly, concern is greatest for individuals who are required to function in austere environments without prompt access to medical care or in settings where there is a lack of redundant personnel capable of assuming essential aviation or operational duties. However, significant concerns exist for any aircrew member, GBO, ATC, or SWA.

Unfortunately, the future recurrence risk for most headache disorders is imprecisely predictable. Past historical patterns of frequency, severity, and associated symptoms are useful only as an estimate of future activity. A sufficient period of observation may reasonably ensure stability; the length of this observation will vary by the individual and headache type.

When considering preventive treatment, appropriate headache therapy depends upon a correct and complete diagnosis. Non-pharmacologic strategies such as lifestyle modification and behavioral techniques can be useful adjuncts to management in most headache types. Selected patients may benefit from measures such as dietary supplements, osteopathic manipulation, trigger point injections, or acupuncture. No FDA-approved headache preventive medications are formally approved for use in USAF manned airframe pilots. Use of prescription pharmacotherapy may or may not be amenable to a waiver and depends on the individual circumstances of each case. Waiver precedent exists for pilots of non-high performance aircraft treated with antihypertensive medications for the purpose of headache prophylaxis (i.e., pilots utilizing beta-blockers, calcium channel blockers, angiotensin-converting enzyme inhibitors, or angiotensin II receptor blockers for headache prevention may be considered for a FC IIA waiver). Betablockers and calcium channel blockers may be approved for waiver following a DOWN status in GBO members (See GBO medication list). CGRP antagonist medications, including oral (preventive and abortive) and injectable (preventive only) forms, have been recommended for waivers in select cases. Antidepressant and anticonvulsant medications used as headache prophylaxis are currently not recommended for waiver for pilots of manned or

unmanned aircraft due to the adverse effects associated with these medications, as well as the fact that the need for these medications generally indicates a more severe headache syndrome. Similarly, opioid analgesics, benzodiazepines, or musculoskeletal agents with sedative properties are not appropriate for a waiver. Waivers are unlikely for treatment with chemo-denervation (usually with botulinum toxin) or external stimulator devices. However, when these interventions are successful, a waiver may be entertained on a case-by-case basis. It is concerning that the indication for chemo-denervation is headaches occurring on 15 or more days per month, which even if controlled with injections, may not be compatible with sustained aviation or operational duties. Operational concerns may preclude waivers for external simulators.

When considering *abortive* therapy, the non-injectable formulations of the triptan medication class are approved for all flying class, GBO, ATC, and SWA duties. However, a waiver is required. FC I/IA applicants requiring use of prescription abortive medication are not eligible for waiver consideration. FC II waivers for use of abortive therapy are generally restricted to non-high performance aircraft and duties with another qualified pilot. Consult the aircrew and GBO medication lists for details regarding which medications are approved within the triptan class and for operational prescribing parameters. When submitting a waiver request for use of pharmacotherapy, it is important to note that the underlying headache diagnosis must be determined to be suitable for a waiver before a waiver will be considered for any medication use.

Proper diagnosis, recognition of secondary headache disorders, and careful evaluation for provoking factors can facilitate a reduction in headache frequency, duration, and intensity. Given that aeromedical risk is driven by the likelihood of recurrence and the severity of associated symptoms, the optimization of aeromedical risk is contingent upon the implementation of appropriate non-pharmacologic headache management strategies. If pharmacologic therapy is necessary, choosing the agent with the lowest clinical and aeromedical risk profile is essential.

AIMWTS review in Jan 2019 revealed a total of 2301 members with a waiver submissions including the diagnosis of headache. Of these, there were a total of 1211 disqualifications. Breakdown of the cases was as follows: 292 FC I/IA cases (95 disqualified), 439 FC II cases (161 disqualified), 60 RPA pilot cases (13 disqualified), 1000 FC III cases (580 disqualified), 403 ATC/GBC cases (278 disqualified), and 219 MOD cases (89 disqualified). The vast majority of DQ cases were primarily for the headache diagnosis.

Please use only *these* ICD-10 codes for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	ATC	GBO	SWA
G43.0	Migraine headache without aura						
G43.1	Migraine headache with aura						
G44.00	Cluster headache syndrome unspecified						
G44.20	Tension-type headache, unspecified						
R51.9	Headache, unspecified						
G44.1	Vascular headache, not elsewhere classified						

IV. Suggested Readings

1. VA/DoD Management of Headache Clinical Practice Guideline. Available at https://www.healthquality.va.gov/guidelines/Pain/headache/. Accessed 23 September 2024.
2. 3-Month Headache Diary. Available at https://www.healthquality.va.gov/guidelines/pain/headache/HA-Diary-3-months-final-11Jan2024.pdf. Accessed 23 September 2024.
3. National Headache Foundation. Available at https://headaches.org/resources/. Accessed 23 September 2024.
4. International Classification of Headache Disorders, 3rd edition. Available at https://ichd-3.org/. Accessed 23 September 2024.
5. Steiner TJ, Jensen R, Katsarava Z, et al. Aids to management of headache disorders in primary care (2nd edition). J Headache Pain 2019:20;57. Available at https://thejournalofheadacheandpain.biomedcentral.com/track/pdf/10.1186/s10194-018-0899-2. Accessed 28 October 2020.

ACS Headache Log/Tracker

Name:							Month:								Year:						Preventive meds:											
	Date:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Severity of pain	10 - Most severe	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	9 - Excrutiating	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	7 - Severe	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	4 - Moderately severe	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	1 - Barely noticable pain	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Disability	3 - Need to stop	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	2 - Slowed down	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	1 - Mostly normal function	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	0 - Normal function	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Duration of headache (hrs)																																
Features and symptoms (check if yes)	Light sensitive																															
	Noise sensitive																															
	Nausea																															
	Vomiting																															
	Dizzy																															
	Pain on one side of head																															
	Throbbing/pounding pain																															
	Worse with activity																															
	Visual aura																															
	Weakness/Numbness																															
	Menstural period																															
	Other (write in notes)																															
Rescue meds																																

Additional notes:

Meningitis and Encephalitis (Mar 2020)
Reviewed: Dr. Roger Hesselbrock (ACS Neurologist), Dr. Dan Van Syoc (ACS Division Deputy Chief), and Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes:
Updated Waiver Consideration, Table 1 and References

I. Waiver Consideration

A history of central nervous system (CNS) infection (e.g., meningitis, encephalitis, meningoencephalitis, brain abscess) is disqualifying for flying duties in the US Air Force according to the Air Force Medical Standards Directory (MSD. Waiver requests may be submitted as soon as the individual is symptom free, cleared by Neurology or Infectious Disease consultants, and has normal studies. Encephalitis and abscess cases may require more prolonged observation due to elevated seizure risk. CNS infections are not disqualifying for OSP duties per the MSD.

Table 1: Waiver potential for meningitis and encephalitis

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	Yes[1]	AETC	Yes
FC II/III/SWA	Yes[1]	MAJCOM	Yes
ATC/GBO	Yes[1]	MAJCOM	At discretion of waiver authority

1. Waiver consideration based on amount of residual symptoms and deficits. Encephalitis and non-aseptic meningitis cases may require additional observation due to seizure risk Indefinite waiver recommendation possible in selected cases with complete resolution or minimal non functionally-limiting residua.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed, all appropriate treatments have been initiated using best current clinical guidelines and recommendations, and the member is clinically stable.

A. Initial Waiver Request:

1. Complete history of event detailing all symptoms, evaluation, treatment, current symptoms and activity level.
2. Copies of relevant clinical notes (particularly consultation reports from Neurology and [if obtained] Infectious Disease), diagnostic studies (lumbar puncture results, other lab studies, and EEGs if obtained), imaging reports and copies of images.For image submission process, see page 2.
3. Current physical, mental status and neurologic examination findings
4. Audiogram in cases of encephalitis, meningoencephalitis or bacterial, fungal, or parasitic meningitis occurring within the last 3 years.

5. Sleep-deprived EEG in cases of encephalitis.
6. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

B. Renewal Waiver Request:

1. Interval history and level of symptom resolution.
2. Copies of any applicable interim specialty reports, labs, imaging reports and images. For image submission process, see page 2.
3. Current physical and neurologic exam findings.
4. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

III. Aeromedical Concerns

Aeromedical concerns include the effects of any residual neurologic or cognitive symptoms on operational safety and mission effectiveness, future risk of recurrent infection, and future risk of seizures. Meningitis is an inflammatory process involving the tissues surrounding the central nervous system, while encephalitis involves the brain parenchyma. Some patients have symptoms and signs suggesting involvement of both brain and meninges, blurring the distinction between the two. Acutely, cognitive impairment, obtundation, focal neurological deficits including cranial nerve deficits and hemiparesis, and seizures are significant issues, while residual neurocognitive impairments, movement disorders, and seizures are of future concern. For purposes of aeromedical disposition, aseptic meningitis is defined as no abnormality in brain function (e.g., altered cognitive function, focal neurological deficit), when the CSF findings include a mild pleocytosis (100-1000 cell/mm^3 with either mononuclear or polymorphonuclear cell predominance), negative bacterial smears and cultures, normal to mildly elevated protein concentration, and normal to slightly depressed glucose level, and when the clinical course is relatively short. If there is any alteration of cognitive function, obtundation, focal neurological deficit, or complicated hospital or recovery course, then for purposes of aeromedical waiver that is considered to be no longer simple aseptic meningitis but is in the meningoencephalitis or encephalitis continuum. The prognosis is highly variable depending upon the agent responsible for the meningitis or encephalitis. However, in general, simple aseptic (viral) meningitis has an excellent prognosis, although definitive therapy is still somewhat controversial. More complicated forms of viral meningitis, such as West Nile virus or HIV, as well as meningitis secondary to bacterial, fungal, or parasitic agents do not share the same good prognosis. All forms of encephalitis or meningoencephalitis carry a significant risk of chronic neurocognitive or neurological impairment and seizures, and require additional evaluation and observation prior to waiver consideration. Annegers' study from 1988 indicated a 10% risk of seizures over 20 years for viral encephalitis without early seizures, 22% risk with early seizures, 13% risk for bacterial meningitis with early seizures and only 2.4% risk for bacterial meningitis without early seizures.

Late unprovoked seizures may occur in up to 65% of patients following herpes simplex encephalitis. Other neurological complications may be seen, including a high incidence of

neurocognitive and movement disorders in West Nile and Japanese encephalitis. Bacterial brain abscesses carry an increased seizure risk for at least three years post-resolution.

Review of AIMWTS in Dec 2018 showed 104 cases of encephalitis and/or meningitis; 19 FC I/IA, 36 FC II, 2 RPA pilots, 41 FC III, and 6 ATC/GBC. Of the 104, 6 were disqualified (2 FC I and 4 FC III).

ICD-9 Codes for Meningitis and Encephalitis	
047.9	Unspecified viral meningitis
320.9	Meningitis due to unspecified bacterium
322.9	Meningitis, unspecified
323.9	Unspecified cause of encephalitis, myelitis and encephalomyelitis

ICD-10 Codes for Meningitis and Encephalitis	
A87.9	Viral meningitis, unspecified
G00.9	Bacterial meningitis, unspecified
G03.9	Meningitis, unspecified
B04.90	Encephalitis and encephalomyelitis, unspecified

IV. Suggested Readings

1. Davis LE. Acute bacterial meningitis. Continuum (Minneap Minn) 2018; 24(5):1264-1283.

2. Lyons JL. Viral meningitis and encephalitis. Continuum (Minneap Minn) 2018; 24(5):1284-1297.

3. Saylor D. Neurologic complications of human immunodeficiency virus infection. Continuum (Minneap Minn) 2018; 24(5):1397-1421.

4. Halperin JJ. Neuroborreliosis and neurosyphilis. Continuum (Minneap Minn) 2018; 24(5):1439-1458.

5. Sejvar JJ. Zika virus and other emerging arboviral central nervous system infections. Continuum (Minneap Minn) 2018; 24(5):512-1534.

6. Gluckman SJ. Viral encephalitis in adults. UpToDate, Oct 30, 2019.

7. Hasbun R. Initial therapy and prognosis of bacterial meningitis in adults. UpToDate, Nov 22, 2019.

8. Tunkel AR. Aseptic meningitis in adults. UpToDate, Sep 26, 2018.

9. Hasbun R. Clinical features and diagnosis of acute bacterial meningitis in adults. UpToDate, Feb 5, 2020.

10. Southwick FS. Treatment and prognosis of bacterial brain abscess. UpToDate, Oct 24, 2019.

11. Ropper AH, Samuels MA, Klein JP (Ed). Infections of the nervous system (bacterial fungal, spirochetal, parasitic) and sarcoidosis. *Adams and Victor's Principles of Neurology, Tenth Edition, McGraw-Hill Education*, 2014:697-742.

12. Ropper AH, Samuels MA, Klein JP (Ed). Viral infections of the nervous system, chronic meningitis, and prion disease. *Adams and Victor's Principles of Neurology, Tenth Edition, McGraw-Hill Education,* 2014:743-777.

13. Misra UK, Tan CT, and Kalita J. Viral encephalitis and epilepsy. Epilepsia 2008; 49 (Suppl 6):13-18.

14. Annegers JF et al. The risk of unprovoked seizures after encephalitis and meningitis. Neurology 1988; 38:1407-1410.

Multiple Sclerosis and Central Demyelinating Disorder (Mar 2020)
Reviewed: Dr. Roger Hesselbrock (ACS Neurologist), Dr. Dan Van Syoc (ACS Division Deputy Chief), and Lt Col David Gregory (AFMSA Physical Standards Development Chief)
Significant Changes:
Updated Table 1 and References

I. Waiver Consideration

The diagnosis of multiple sclerosis (MS), clinically or radiographically isolated syndrome (CIS/RIS), or other central demyelinating conditions such as optic neuritis, transverse myelitis, and neuromyelitis optica spectrum disorder, is disqualifying for all flying classes. As the diagnosis of MS is disqualifying for retention purposes, all flying and special operational personnel will require a waiver for this diagnosis. Along with submission of aeromedical waiver request, an initial RILO, or MEB as directed, must be performed to determine military service retention. Members who are retained in military service may then be aeromedically considered. Due to disease unpredictability and effects of military/environmental stressors on symptoms, waiver is generally not recommended for aviators with the diagnosis of MS or high-risk CIS/RIS. However, aviators with CIS/RIS and selected aviators with high-risk CIS/RIS or MS with long-term longitudinal stability may be considered for aeromedical waiver on an individual basis.

Table 1: Waiver potential for multiple sclerosis, CIS/RIS, and other central demyelinating disorders

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	No	AETC	No
FC II//III/SWA	Yes[1]	AFMRA	Yes
ATC/GBO	Yes[1]	AFMRA	Yes

1. If low-risk CIS/RIS, or longitudinally-stable (clinical and radiographic) high-risk CIS/RIS or MS

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed, all appropriate treatments have been initiated using best current clinical guidelines and recommendations, and the member is clinically stable.

A. Initial Waiver Request:

1. A complete discussion of the history of the demyelinating disorder.
2. Reports of consultations and diagnostic testing, including: neurology and (as applicable) ophthalmology consultations, reports and images from neuroimaging studies, laboratory testing (including lumbar puncture/cerebrospinal fluid studies, if performed), and sleep study reports (if performed).
3. Current physical, mental status and neurologic examination findings.
4. Neuropsychological testing if performed. Contact ACS Neuropsychology for questions or further guidance on need for testing and on which tests to administer.
5. RILO/MEB results, if obtained.

6. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

Renewal Waiver Request:

1. Interval history and level of symptom resolution.
   Copies of any applicable interim specialty reports, labs, imaging reports and images. For image submission process, see page 2.
2. Current physical, neurologic and mental status examination findings.
3. RILO/MEB updates as applicable. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

Aeromedical Concerns

Aeromedical concerns include effects of any residual neurologic or cognitive symptoms and signs and any medication effects on operational safety and mission effectiveness, and future risk of symptom development, which could be subtle and unrecognized. Initial imaging and cerebrospinal fluid findings in CIS/RIS cases can stratify for low or high risk of future conversion to MS. Unfortunately, there are no current clinical, biochemical or radiographic markers to prospectively identify those patients who will have 'benign' MS, and assessment of disease stability is based on retrospective analysis only. Even 'benign MS' patients with 10+ years of disease stability have an over 1% annual risk of developing new symptoms between years 10-20. Cognitive deficits are common and unpredictable effecting approximately 40-60% of MS patients. The incidence of cognitive impairments does not correlate well with the degree of physical deficits, as these may be present in all types of MS and at any stage of the disease. Aeromedically-valid neurocognitive testing can be performed only at a maximum of six month intervals. However, even with this level of monitoring, unpredictable interim neurocognitive changes could still pose a threat to self, crew safety, and mission completion. A further concern with MS is the potential of sleep disturbance that can result in daytime sleepiness, worsening fatigue, depression, and lowered pain threshold. Of particular importance, fatigue is considered the most frequent and often the most disabling symptom of MS, reported by at least 75% of patients at some point during their disease course. Finally, none of the current FDA-approved disease-modifying agents are approved for use in aviators due to their side effect profiles.

AIMWTS search in Jan 2019 revealed 100 cases diagnosed as MS, CIS, or as compatible with demyelinating disease. Breakout of the cases was: 3 FC I/IA cases (2 disqualified); 47 FC II cases (36 disqualified); 34 FC III cases (27 disqualified); 5 RPA pilot cases (2 disqualified); 7 ATC/GBC cases (7 disqualified); and 4 MOD cases (1 disqualified). There are several cases of MS not recommended for waiver by ACS, but granted an Exception to Policy from AF/A3 (continuity of ETPs is handled administratively as waivers from AFMRA).

ICD-9 Codes for MS and CIS	
340	Multiple sclerosis
377.30	Optic neuritis, unspecified
341	Other demyelinating diseases of central nervous system

ICD-10 Codes for MS and CIS	
G35	Multiple sclerosis
H46.9	Optic neuritis, unspecified
G37.8, G37.9	Other demyelinating diseases of central nervous system

IV. Suggested Readings

1. Solomon AJ. Diagnosis, differential diagnosis, and misdiagnosis of multiple sclerosis. Continuum (Minneap Minn) 2019; 25(3):611-635.

2. Gross RH, Corboy JR. Monitoring, switching, and stopping multiple sclerosis disease-modifying therapies. Continuum (Minneap Minn) 2019; 25(3):715-735.

3. Tonin WO. Management of multiple sclerosis symptoms and comorbidities. Continuum (Minneap Minn) 2019; 25(3):753-772.

4. Rae-Grant A et al. Practice guideline recommendations summary: disease-modifying therapies for adults with multiple sclerosis. Report of the Guideline Development, Dissemination, and Implementation Subcommittee of the American Academy of Neurology. Neurology 2018; 90:777-788.

5. Thompson AJ et al. Diagnosis of multiple sclerosis: 2017 revision of the McDonald criteria. Lancet Neurol 2018; 17:162-173.

6. Olek MJ, Howard J. Management of clinically and radiographically isolated syndromes suggestive of multiple sclerosis. UpToDate, Apr 23, 2019.

7. Olek MJ, Howard J. Evaluation and diagnosis of multiple sclerosis in adults. UpToDate, Oct 30, 2019.

8. Olek MJ, Mowry E. Disease-modifying treatment of relapsing-remitting multiple sclerosis in adults. UpToDate, Jan 2, 2020.

9. Novakova L et al. Monitoring disease activity in multiple sclerosis using serum neurofilament light protein. Neurology 2017; 89:2230-2237.

10. Sartori A, Abdoli M, and Freedman MS. Can we predict benign multiple sclerosis? Results of a 20-year long-term follow-up study. J Neurol, 2017; 264(5):1068-1075.

11. Ropper AH, Samuels MA, Klein JP (Ed). Multiple sclerosis and other inflammatory demyelinating disorders. *Adams and Victor's Principles of Neurology, Tenth Edition, McGraw-Hill Education*, 2014:915-945.

12. Optic Neuritis Study Group. Multiple Sclerosis Risk After Optic Neuritis: Final Optic Neuritis Treatment Trial Follow-up. Arch Neurol 2008; 65:727-732.

13. Rogers JM and Panegyres PK.. Cognitive impairment in multiple sclerosis: Evidence- base analysis and recommendations. J Clin Neuroscience 2007; 14:919-927.

Seizures, Epilepsy, and Abnormal EEG (Mar 2020)
Reviewed: Dr. Roger Hesselbrock (ACS Neurologist), Dr. Dan Van Syoc (ACS Division Deputy Chief), and Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes:
Updated Table 1 and References

I. Waiver Consideration

Medical standards for appointment, enlistment and induction state that epilepsy occurring beyond the 6th birthday is disqualifying, unless the applicant has been free of seizures for a period of 5 years while taking no medication for seizure control, and has a normal electroencephalogram (EEG). Childhood seizures are addressed by stating that "seizures associated with febrile illness before 5 years of age may be acceptable with waiver if recent neurological evaluation, MRI, and EEG including awake and sleep samples are normal". Childhood seizures with prolonged remission may be amenable to waiver consideration on an individual basis. Truly provoked seizures may also be aeromedically-acceptable for waiver consideration on an individual basis. Unprovoked seizures are generally not recommended for waiver due to unacceptably-high recurrence risk. For information on post-traumatic seizures and waiver potential, please consult the Waiver Guide chapter on traumatic brain injury.
For aviators with isolated epileptiform EEG abnormalities and no history of seizure or epilepsy, clinical surveillance is indicated, with categorical waiver recommendation for at least one year, based on data that most non-epileptic adult patients with isolated epileptiform EEG abnormalities who develop seizures will do so within one year of EEG abnormality identification.

Table 1: Waiver potential for seizures, epilepsy and abnormal (epileptiform) EEG findings

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	Yes[1]	AFMRA	Yes
FC II//III/SWA/OSF	Yes[1,2]	AFMRA	Yes
ATC/GBO	Yes[1]	AFMRA	Yes

1. Waiver usually not recommended for unprovoked seizures or epilepsy. Cases of isolated EEG abnormalities without seizures may be acceptable for waiver on a case-by-case basis after careful review by an epileptologist.
2. Isolated EEG abnormalities not disqualifying for OSF duty.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed, all appropriate treatments have been initiated using best current clinical guidelines and recommendations, and the member is clinically stable. The diagnosis of a seizure is still primarily clinical, and every effort must be made to try and reconstruct what happened before, during and after a suspected seizure event. Special attention should be paid to clinical notes from all who had contact with the patient, such as medical technicians, paramedics, nurses, emergency department personnel, and providers. The medical history should address the relevant period preceding and during the suspected event and include a review of travel, sleep, diet, work and all medications,

whether prescription or over-the-counter. Any ethanol, caffeine and nicotine intake should be listed. Accounts from witnesses must be included in the medical record, either as a written statement from the eyewitness, or as an account documented by a provider. If written accounts were not accomplished initially, then every effort should be made to identify possible witnesses and include their accounts.

A. Initial Waiver Request:

1. Historical details as listed above.
2. Reports of consultations and diagnostic testing, including: neurology consultations, neuroimaging studies (MRI reports and images), laboratory testing, and EEG reports. Recent brain MRI and EEG studies are needed in cases of remote seizures. For image submission process, see page 2.
3. Current physical, mental status and neurologic examination findings.
4. Neuropsychological testing if performed. Contact ACS Neuropsychology for questions or further guidance on need for testing and on which tests to administer.
5. RILO/MEB results, if obtained.
6. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

B. Renewal Waiver Request:

1. Interval history and level of symptom resolution.
2. Copies of any applicable interim specialty reports, labs, imaging reports and images.
3. Current physical, mental status and neurologic examination findings.
4. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

III. Aeromedical Concerns

Aeromedical concerns include effects of any residual neurologic or cognitive symptoms and signs and any medication effects on operational safety and mission effectiveness, and future risk of seizure occurrence, with resulting sudden incapacitation. For unprovoked seizures in adults, the risk of recurrence is greater than 40% over five years. This aeromedically-unacceptable risk is further increased with other factors such as prior brain lesion or insult causing the seizure, an EEG with epileptiform abnormalities, a significant brain imaging abnormality and nocturnal seizure occurrence. Truly provoked seizures may be amenable to waiver consideration on an individual basis. Sleep deprivation alone is not considered a provocative factor for seizures in neurologically intact individuals. Children with a nonfebrile unprovoked seizure and a normal EEG have a five-year recurrence rate of about 21% and recurrences after that time frame are not common. Absence seizures have a repeat seizure rate of 42% over the next 25 years (to include other types of seizures) and are therefore permanently disqualifying. Children with simple febrile seizures generally do not have significant risk for seizure recurrences in adulthood and this diagnosis is amenable to waiver consideration. Brain MRI with attention to medial temporal lobe structures ("seizure protocol") is the most appropriate imaging study to obtain. EEG studies are needed in diagnostic evaluation. These do not prove or disprove the diagnosis of epilepsy, although an unequivocally abnormal EEG

combined with a clinical history compatible with seizure does support the diagnosis. However, EEG studies can be completely normal in known epileptic patients, and a small percentage of the normal population will have apparent epileptiform patterns on EEG. A 1968 review of non-epileptic patients with epileptiform changes on EEG showed that the vast majority of adult patients who developed seizures did so within 12 months of discovery of the EEG abnormalities. In such cases, observation with restricted aviation duties and follow-up EEG studies are usually recommended to determine if a less restrictive waiver might be safely considered in the future. No anticonvulsant medications are aeromedically-approved for use in USAF aviators for management of seizures, although gabapentin and topirimate are approved for use in MOD personnel for non-epilepsy conditions such as pain and migraine.

AIMWTS search in Jan 2019 revealed 329 cases. Breakdown of the cases was as follows: 73 FC I/IA cases (29 disqualified); 84 FC II cases (46 disqualified); 10 RPA pilot cases (1 disqualified), 108 FC III cases (62 disqualified); 34 ATC/GBC cases (24 disqualified); and 20 MOD cases (12 disqualified). The vast majority of the approved cases were for childhood febrile seizures with several provoked seizures as well.

ICD-9 codes for seizures	
345	Epilepsy
780.3	Convulsions
780.31	Simple febrile convulsions
780.32	Complex febrile convulsions
780.33	Post traumatic seizures
780.39	Other (unspecified) convulsions

ICD-10 codes for seizures	
G40.919	Epilepsy, unspecified, intractable, without status epilepticus
R56.00	Simple febrile convulsions
R56.01	Complex febrile convulsions
R56.1	Post traumatic seizures
R56.9	Unspecified convulsions
R94.01	Abnormal EEG

IV. Suggested Readings

1. Schachter SC. Evaluation and management of the first seizure in adults. UpToDate, Aug 11, 2019.

2. Millichap JJ. Treatment and prognosis of febrile seizures. UpToDate, Dec 20, 2018.

3. Bergey GK. Management of a First Seizure. Continuum: Lifelong Learning in Neurology, 2016; 22(1): 38-50

4. Gupta A. Febrile seizures. Continuum: Lifelong Learning in Neurology, 2016; 22(1): 51-59

5. Chen DK and LaFrance WC. Diagnosis and Treatment of Nonepileptic Seizures. Continuum: Lifelong Learning in Neurology, 2016; 22(1): 116-31.

6. Krumholz A, Wiebe S, Gronseth GS, et al. Evidence-based guideline: Management of an unprovoked first seizure in adults: Report of the Guideline Development Subcommittee of the American Academy of Neurology and the American Epilepsy Society. Neurology 2015; 84(16):1705-13.

7. Ropper AH, Samuels MA, Klein JP (Ed). Epilepsy and other seizure disorders. *Adams and Victor's Principles of Neurology, Tenth Edition, McGraw-Hill Education*, 2014:318-356.

8. Lawn L et al. Are seizures in the setting of sleep deprivation provoked? Epilepsy & Behavior 2014; 33:122-125.

9. Benbadis SR. "Just like EKGs!" Should EEGs undergo confirmatory interpretation by a clinical neurophysiologist? Neurology 2013; 80 (Suppl 1):S46-S51.

10. Salinsky M, Kanter R, Dasheiff RM. Effectiveness of multiple EEGs in supporting the diagnosis of epilepsy: an operational curve. Epilepsia 1987; 28(4):331-334.

11. Robin JJ, Tolan GD, and Arnold JW. Ten-Year Experience with Abnormal EEGs in Asymptomatic Adult Males. Aviat Space Environ Med 1978; 49:732-36.

12. Zivin L and Marson A. Incidence and Prognostic Significance of "Epileptiform" Activity in the EEG of Non-Epileptic Subject. Brain 1969; 91:751-78.

Transient Ischemic Attack (TIA) and Stroke (Apr 2020)
Reviewed: Dr. Roger Hesselbrock (ACS Neurologist), Dr. Dan Van Syoc (ACS Division Deputy Chief), and Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes:
Updated References

I. Waiver Consideration

Irrespective of etiology, stroke and TIA are disqualifying for all flying classes. Waivers are generally not considered unless a correctable cause is discovered and treated. Examples of correctable etiologies might include iatrogenically-induced stroke from catheterization or trauma to the carotid artery without residual injury, and repair of a large patent foramen ovale with intracardiac shunting. Modifiable vascular disease risk factors such as hypertension and hyperlipidemia are not considered correctable etiologies. Additionally, supratentorial strokes leave a potential seizure focus. A 2-3 year seizure-free observation period after stroke and a 1-2 year observation period after TIA are required prior to any potential waiver consideration. Any manned-aircraft pilot waiver recommendations after stroke or TIA are almost invariably limited to non high-performance, multi-crew platforms, often with further restriction of another fully trained pilot to be present during aircraft operation. Stroke is a dynamic field, with evolving evaluation and management guidance.

Table 1: Waiver potential for stroke and TIA

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	Possibly[1]	AFMRA	Yes
FC II//III/SWA	Yes[2]	AFMRA	Yes
ATC/GBO	Yes[2]	AFMRA	Yes

1. Waiver recommendation may be considered in exceptional cases if felt secondary to a (treated) correctable cause, and with a suitable observation period
2. Must be 2-3 years post-stroke or 1-2 years post-TIA with no symptoms or clinically-insignificant residua

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed, all appropriate treatments have been initiated using best current clinical guidelines and recommendations, and the member is clinically stable.

A. Initial Waiver Request:

1. History – details of the incident to include the extent of symptoms, physical findings, timing of onset and resolution, and possible precipitating factors (i.e., Valsalva or +Gz preceding symptom onset).
2. Reports of consultations and diagnostic testing, including: neurology consultation, imaging studies (reports and images), laboratory testing, cardiac testing (ECG, echocardiogram (report and images), rhythm monitoring), and operative reports if applicable. For image submission process, see page 2.
3. Current physical, mental status and neurologic examination findings.

4. Neuropsychological testing for all stroke cases. Contact ACS Neuropsychology for questions or further guidance on specific tests to administer.
5. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

B. Renewal Waiver Request:

1. Interval history and level of symptom resolution.
2. Copies of any applicable interim specialty reports, labs, imaging reports and images. For image submission process, see page 2.
3. Current physical and neurologic exam findings.
4. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

III. Aeromedical Concerns

Aeromedical concerns include effects of any residual neurologic or cognitive symptoms and signs and any medication effects, on operational safety and mission effectiveness, future risk of recurrence, and future risk of seizures. Literature reports indicate stroke recurrence rate is highest immediately following the initial stroke and continues to remain aeromedically-unacceptably high indefinitely, up to 3-4% annually. However, these rates listed in the literature may overestimate the risk in USAF aviators, as many patients in these studies had significant, sometimes multiple vascular risk factors that are not present in the USAF aviator cohort. Also, strokes with a well-defined and correctable etiology, as well as cryptogenic strokes, may have an aeromedically-acceptable lower incidence of recurrence and potentially amenable to waiver consideration. The role and management of patent foramen ovale in stroke is evanescent. Current guidelines advise closure in cases of large openings, recurrent vascular events, or with associated atrial septal aneurysm. Prolonged implantable cardiac monitoring to assess for occult atrial arrhythmias should be obtained in cases of cryptogenic stroke. Trans-esophageal echocardiography should also be considered in cryptogenic stroke cases to more thoroughly assess left atrial anatomy. The recently-characterized designation of Embolic Stroke of Undetermined Source (ESUS) consists of non-lacunar cryptogenic strokes with likely embolic etiology. Unfortunately, recurrence risk of ESUS is estimated at over 4% annually, and such aviators may not be recommend for aeromedical waiver. Also, atrial fibrillation-associated stroke may have an unacceptably-high recurrence risk for aeromedical waiver consideration. The risk of post-stroke seizures is aeromedically-unacceptably high for at least the first several years following a supratentorial stroke. Supratentorial cortical locations are associated with a higher seizure risk, but seizures also occur following subcortical lacunar strokes. The incidence of new-onset seizures declines over time, with population studies suggesting the risk becomes aeromedically-acceptable after 2-3 years.

Review of AIMWTS through Jan 2019 showed 45 cases of TIA/stroke; 17 were disqualified. Breakdown of the cases revealed: 28 FC II (10 disqualified), 2 RPA pilots (0 disqualified), 12 FC III (6 disqualified), and 3 MOD (1 disqualified).

ICD-9 Codes for transient ischemic attack and stroke	
435.9	Transient cerebral ischemia
434.0	Cerebral thrombosis
434.1	Cerebral embolism
434.9	Cerebral artery occlusion, unspecified
432.9	Unspecified intracranial hemorrhage
443.21	Dissection of carotid artery
443.24	Dissection of vertebral artery

ICD-10 Codes for transient ischemic attack and stroke	
G45.9	Transient cerebral ischemia attack, unspecified
I63.00	Cerebral infraction due to thrombosis of unspecified precerebral artery
I63.19	Cerebral infarction due to embolism of other precerebral artery
I66.9	Occlusion and stenosis of unspecified cerebral artery
I62.9	Nontraumatic intracranial hemorrhage, unspecified
I77.71	Dissection of carotid artery
I77.74	Dissection of vertebral artery

IV. Suggested Readings

1. Furie K. Epidemiology and primary prevention of stroke. Continuum (Minneap Minn) 2020; 26(2):260-267.

2. Rabenstein AA. Update on treatment of acute ischemic stroke. Continuum (Minneap Minn) 2020; 26(2):268-286.

3. Rost NS, Etherton M. Cerebral small vessel disease. Continuum (Minneap Minn) 2020; 26(2):332-352.

4. Kamel H. The evolving concept of cryptogenic stroke. Continuum (Minneap Minn) 2020; 26(2):353-362.

5. Christensen H, Bushnell C. Stroke in women. Continuum (Minneap Minn) 2020; 26(2):363-385.

6. Putaala J. Ischemic stroke in young adults. Continuum (Minneap Minn) 2020; 26(2):386-414.

7. Kim AS. Medical management for secondary stroke prevention. Continuum (Minneap Minn) 2020; 26(2):435-456.

8. Wang JZ et al. Incidence and management of seizures after ischemic stroke. Systemic review and meta-analysis. Neurology 2017; 89:1220-1228.

9. Yaghi S, Kamel H, Elkind MSV. Atrial cardiopathy: a mechanism of cryptogenic stroke. Extert Rev Cardiovasc Ther 2017; 15(8):591-599.

10. Hart RG et al. Embolic stroke of undetermined source: a systematic review and clinical update. Stroke 2017; 48:867-872.

Traumatic Brain Injury (Mar 2020)
Reviewed: Dr. Roger Hesselbrock (ACS Neurologist), Dr. Dan Van Syoc (ACS Division Deputy Chief), and Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes:
Updated Waiver Consideration, Tables and References

I. Waiver Consideration

Traumatic brain injury (TBI) unfortunately occurs too commonly in aviators. A history of TBI is generally disqualifying for all flying classes. Each TBI case has unique characteristics, and waiver consideration is on an individual basis, taking into account all factors. This individual variability makes it quite challenging to comprehensively address TBI in guidance tables. Severity classification is based on the 2007 DoD guidance with additional incorporation of clinical and radiographic information. Recommended post-injury observation periods are evidence-based to allow post-injury seizure risk to become aeromedically-acceptable for waiver consideration. Head injuries without significant sequelae are not disqualifying for OSF personnel per the Medical Standards Directory.
Following discussion with Career Field Managers, the Aeromedical Standards Working Group established a difference in acceptable risk for sudden incapacitation for selected enlisted aircrew and GBO personnel based on AFSC, allowing potential for earlier return to fly following aeromedically-moderate or severe head injury. Table 4 below lists this guidance.

Please contact ACS Neurology and/or Neuropsychology for any case-specific questions.

Table 1: Waiver potential for TBI

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	Yes	AFMRA	For moderate or severe TBI cases[1]
FC II/III/SWA	Yes	AFMRA[2]	For moderate or severe TBI cases[1]
ATC/GBO	Yes	AFMRA[2]	For moderate or severe TBI cases[3]

1. ACS review/evaluation of mild head injury cases on request from the waiver authority
2. AETC is waiver authority for IFC II/III, I-GBO, I-SWA, and I-ATC cases.
3. No waiver required for uncomplicated ATC/GBO cases of aeromedically-mild TBI with normal examination

II. Information Required for Waiver Submittal

Table 2 applies to head injuries that occurred less than five years from time of waiver request.

Table 2: Aeromedical Classification and Evaluation of TBIs less than five years from time of waiver request.

Degree of Head Injury	Minimum Observation Time	Evaluation Requirements
Aeromedical Mild (LOC or amnesia < 30 minutes; normal MRI)	**1 month**	**Flying Class I, IA, II, III, RPA, SWA:** **Neurological exam**: Complete neurological and mental status examination by a Flight Surgeon **Imaging**: noncontrast MRI **Cognitive Assessment**: Clinical interview and screening (Montreal Cognitive Assessment or equivalent)
Aeromedical Moderate (LOC or amnesia > 30 minutes but < 24 hours or non-displaced skull fracture; normal MRI)	**6 months**	**Flying Class I, IA, II, III, RPA, ATC, GBO, SWA:** **Neurological exam**: Complete neurological and mental status examination by a Neurologist **EEG**: obtain locally if any seizure activity reported/observed **Imaging**: noncontrast MRI **Neuropsychological evaluation**: Local, to include assessment of general cognitive functioning and major cognitive domains. Contact ACS Neuropsychology for guidance on specific testing. Include any test scores with waiver package
Aeromedical Moderate (LOC or amnesia > 30 minutes but < 24 hours or non-displaced skull fracture; MRI demonstrating evidence of diffuse axonal injury or hemosiderin deposition/plugs)	**2 years for most AFSCs, 6 months for specific AFSCs[1]**	**Flying Class I, IA, II, III[1], RPA, ATC, GBO[1], SWA:** **Neurological exam**: Complete neurological and mental status examination by a Neurologist **EEG**: obtain locally if any seizure activity reported/observed **Imaging**: noncontrast MRI locally within one month of injury; follow-up MRI at time of waiver submission **Neuropsychological evaluation**: A local NP evaluation during the 3-9 month post-TBI period, to include assessment of general cognitive functioning and major cognitive domains. Contact ACS Neuropsychology for guidance on specific testing. Include any test scores with waiver package
Aeromedical Severe (LOC or amnesia > 24 hours; normal MRI or MRI demonstrating inconsequential hemorrhage or evidence of diffuse axonal injury or	**2 years**	**Flying Class I, IA, II, III, RPA, ATC, GBO, SWA:** **Neurological exam**: Complete neurological and mental status examination by a Neurologist **EEG**: locally or during ACS evaluation **Imaging**: noncontrast MRI locally within one month of injury; follow-up MRI at time of waiver submission **Neuropsychological evaluation**: A local NP evaluation during the 3-9 month post-TBI period, to include

hemosiderin deposition/plugs)		assessment of general cognitive functioning and major cognitive domains. Contact ACS Neuropsychology for guidance on specific testing. Include any test scores with waiver package
Aeromedical Severe (LOC or amnesia > 24 hours; presence of subdural hematoma or brain contusion; MRI demonstrating more significant abnormalities)	**5 years for most AFSCs, 2 years for specific AFSCs[1]**	**Flying Class I, IA, II, III[1], RPA, ATC, GBO[1], SWA:** **ACS:** evaluation **Neurological exam**: Complete neurological and mental status examination by a Neurologist **EEG**: locally or during ACS evaluation. **Imaging**: noncontrast MRI locally within one month of injury; follow-up MRI at time of waiver submission **Neuropsychological evaluation**: A local NP evaluation during the 3-9 month post-TBI period, to include assessment of general cognitive functioning and major cognitive domains. Contact ACS Neuropsychology for guidance on specific testing. Include any test scores with waiver package
Aeromedical Severe (penetrating injury, volume loss > 25cc, late seizure, shunt, significant deficits)	**No waiver possible**	**All Flying Classes**

1. FC III and GBO AFSCs that may be considered for waiver for moderate head injury at 6 months, or for waiver for severe head injury at 2 years, are listed in Table 4.

Table 3 applies to IFC applicants with a remote history of TBI, defined as five years or more post-injury.

Table 3: IFC applicants (all classes) with history of remote (>=5 years) TBI

Normal exam and imaging at time of injury	**Neurological exam**: Complete neurological and mental status examination by a Flight Surgeon **Imaging**: report and images of prior studies. Current non-contrast brain MRI if no prior MRI was performed **Neuropsychological evaluation**: not required unless felt clinically indicated by the Flight Surgeon **Review**: AETC/SGP. ACS review at discretion of waiver authority
Abnormal exam, imaging or EEG at time of injury	**Neurological exam**: Complete neurological and mental status examination by a Flight Surgeon **Imaging**: report and images of prior studies. Current non-contrast brain MRI if no follow-up neuroimaging was performed **EEG**: report of previous studies. Current sleep-deprived EEG if any previous EEG study was reported as abnormal **Neuropsychological evaluation**: not required unless felt clinically indicated by the Flight Surgeon **Review**: AETC/SGP. ACS review at discretion of waiver authority
Seizure within 24 hours of time of injury[1]	**Neurological exam**: Complete neurological and mental status examination by a Flight Surgeon **Imaging**: report and images of prior studies. Current non-contrast brain MRI if no follow-up neuroimaging was performed **EEG**: report of previous studies. Current sleep-deprived EEG if no previous studies were performed or if any previous EEG study was reported as abnormal **Neuropsychological evaluation**: not required unless felt clinically indicated by the Flight Surgeon **Review**: AETC/SGP. ACS review at discretion of waiver authority

1. Seizures occurring 24 hours or later following TBI are disqualifying. In such cases, please refer to the Seizures/Epilepsy/Abnormal EEG Waiver Guide chapter for further information.

Table 4 lists FC III and GBO AFSCs that can be considered for earlier TBI waiver (6 months for moderate and 2 years for severe injury).

Table 4: Specific AFSCs that qualify for earlier TBI waiver consideration

1A2X1	Aircraft Loadmaster
1A3X1	Airborne Mission Systems
1A4X1	Airborne Operations
1A6X1	Flight Attendant
1A8X1	Airborne Cryptologic Language Analyst
1A8X2	Airborne ISR Operator
1B4X1	Cyberspace Defense Operations
1C6X1	Space Systems Operations
1T0X1	Survival, Evasion, Resistance, and Escape
1T2X1	Pararescue
13BX	Air Battle Manager
13LX	Air Liaison Officer
13SX	Space & Missile
17DX	Cyberspace Operations

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed, all appropriate treatments have been initiated using best current clinical guidelines and recommendations, and the member is clinically stable.

A. Initial Waiver Request:

1. Historical details of the injury and initial treatment. Include clinical notes from initial evaluation and treatment.
2. Evaluation as outlined in Tables 2 and 3 above. Include reports of consultations and diagnostic testing, including: neurology consultations, neuroimaging studies (e.g. MRI reports and images), laboratory testing, any operative reports and EEG reports.
3. Current physical, mental status and neurologic examination findings.
4. Neuropsychological testing results (if performed). Contact ACS Neuropsychology for questions or further guidance on need for testing and on which tests to administer.
5. RILO/MEB results, if obtained.
6. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

B. Renewal Waiver Request:

1. Interval history and level of symptom resolution.
2. Copies of any applicable interim specialty reports, labs, imaging reports and images. For image submission process, see page 2.
3. Current physical, mental status and neurologic examination findings.
4. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

III. Aeromedical Concerns

Aeromedical concerns include effects of any residual neurologic or cognitive symptoms and signs and any medication effects on operational safety and mission effectiveness, and future risk of seizure with resulting sudden incapacitation. The risk to safety of flight from a fixed neurological deficit is readily apparent. Cognitive deficits may not be readily apparent but can be assessed with appropriate testing. Military aviation stressors such as hypoxia, high +G exposure and sleep disruption may precipitate seizures. Anticonvulsant medications are not currently approved for use in aviators for seizure prophylaxis, primarily due to their central-acting effects on cognition and alertness, and secondarily for the potential of withdrawal seizures following abrupt discontinuation. Interestingly, immediate and early (7 days or less) post-traumatic seizures do not produce an increased future seizure risk, while seizures occurring over 7 days post-TBI do. Annegers' seminal studies indicated the relative risk of seizures following even mild TBI compared to the normal population remains elevated for five years, while the relative risk after moderate or severe TBI remains elevated for over ten years. The actual incidence of seizures, however, becomes aeromedically acceptable much sooner, reflected in recommended observation periods listed in Table 2 above. In one study of USAF aircrew who met waiver criteria, seizures occurred at a rate of 24.53/100,000 person-years. A retrospective study of Vietnam War veterans with penetrating TBIs noted posttraumatic epilepsy in 53% at 15-years; of these 7% experienced their first seizure more than ten years following their trauma. A 0-25 cc volume loss was associated with a 42% seizure incidence while loss > 75 cc was associated with an incidence of 80%. Other imaging findings that increase post-traumatic seizure risk include subdural hematoma, contusions, microhemorrhages and blood breakdown product deposition. As noted earlier, every TBI case is unique, and all information must be taken into consideration when determining aeromedical waiver suitability.

AIMWTS search in Jan 2019 revealed 1337 individuals with a waiver that contained a diagnosis of closed head injury. The breakdown of cases was as follows: 342 FC I/1IA (38 disqualifications), 308 FC II (16 disqualifications), 17 RPA pilot cases, 592 FC III (83 disqualifications), 48 ATC/GBC (11 disqualifications), and 30 MOD (6 disqualifications). There were 154 cases resulting in a disposition of disqualify, and in well over half of the cases the major reason for the disqualification was the head injury.

ICD-9 codes for traumatic brain injury	
800-801	Skull fracture
850.1	Concussion with brief loss of consciousness
854.01	Intracranial injury of other and unspecified nature without open intracranial wound with no loss of consciousness
854.02	Intracranial injury of other and unspecified nature without open intracranial wound with brief (less than one hour) loss of consciousness
854.03	Intracranial injury of other and unspecified nature without open intracranial wound with moderate (1-24 hours) loss of consciousness
959.01	Head injury, unspecified

ICD-10 codes for traumatic brain injury	
S02.0	Fracture of vault of the skull, closed
S06.0X1 S06.0X2	Concussion with loss of consciousness of 30 minutes or less
S06.890	Other specified intracranial injury without loss of consciousness
S06.9X1	Unspecified intracranial injury with loss of consciousness of 30 minutes or less
S06.9X2	Unspecified intracranial injury with loss of consciousness of 31 minutes to 59 minutes
S06.9X3	Unspecified intracranial injury with loss of consciousness of 1 hour to 5 hours 59 minutes
S06.9X4	Unspecified intracranial injury with loss of consciousness of 6 hours to 24 hours
S09.80	Unspecified injury of head

IV. Suggested Readings

1. Evans RW, Whitlow CT. Acute mild traumatic brain injury (concussion) in adults. UpToDate, Mar 8, 2019.

2. Rajajee V. Management of acute moderate and severe traumatic brain injury. UpToDate, Dec 23, 2019.

3. Christensen J. The epidemiology of posttraumatic epilepsy. Semin Neurol 2015; 35:218-222

4. Ropper AH, Samuels MA, Klein JP (Ed). Craniocerebral trauma. *Adams and Victor's Principles of Neurology, Tenth Edition, McGraw-Hill Education*, 2014:885-914.

5. McGuire SA et al. Aeromedical decision making and seizure risk after traumatic brain injury: longitudinal outcome. Aviat Space Environ Med 2012; 83(2):140-43.

6. Christensen JC et al. Long-term risk of epilepsy after traumatic brain injury in children and young adults: a population-based study. Lancet 2009; 373:1105-1110.

7. Agrawal A et al. Post-traumatic epilepsy: an overview. Clinical Neurology and Neurosurgery 2006; 108:433-439.

8. Annegers J, Coan S. The risks of epilepsy after traumatic brain injury. Seizure 2000; 9:453-457.

9. Annegers JF et al. A population-based study of seizures after traumatic brain injuries. N Engl J Med 1998; 338:20-24.

10. Salazar AM, Jabbari B, Vance SC, et al. Epilepsy after penetrating head injury. I. Clinical correlates: A report of the Vietnam Head Injury Study. Neurology 1985; 35: 1406-14.

Birth Control

Revised: Mar 2022

Reviewed: Maj Catherine Blasser (RAM '23), Col Jason Massengill (AF/SG Obstetrics and Gynecology Consultant), Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Updated format and suggested readings.

I. Waiver Consideration

A waiver is not required for hormonal contraception (oral, vaginal, transdermal, subdermal, subcutaneous, and intrauterine) using approved medications that are well tolerated without significant adverse effects. Additionally, a waiver is not required for long-acting reversible contraceptives methods appropriately placed and well tolerated. Furthermore, non-hormonal methods of birth control, such as the copper intrauterine device, do not require aeromedical waiver. Moreover, a waiver is not required for a history of successful sterilization surgery after full recovery with appropriate follow-up, and without chronic adverse effects. For diagnoses that utilize hormonal contraceptives to regulate symptoms related to the condition (i.e. endometriosis, menstrual migraines, premenstrual dysphoric disorder, polycystic ovarian syndrome) refer to the appropriate aeromedical waiver guide.

II. Information Required for Waiver Submittal

N/A

III. Aeromedical Concerns

Safe and effective contraception that has been appropriately selected and used with the clinical guidance of a flight surgeon can play an important preventive role for the flyer and special duty operator. Choice of birth control method should be determined in a shared decision-making model while recognizing that some forms of birth control may carry increased risks in the aerospace environment. Factors to consider when choosing a contraceptive method include device or medication safety, efficacy, convenience, duration of action, reversibility potential, effect on uterine bleeding, frequency of adverse side effects, protection against sexually transmitted diseases, and a wish for a more permanent solution. Pregnancy, especially when unplanned, can create a variety of considerations for the operational and aviation environments. An unplanned pregnancy prior to or during a deployment can create unexpected risks to an individual and mission, while appropriate knowledge, prevention, and planning can significantly reduce the associated operational risks. Estimates for the general population show that half of all pregnancies are unplanned and in approximately half of these unintended pregnancies, some form of contraception was used.

Benefits:
The contraceptive and medical benefits of hormonal and non-hormonal contraceptives are well established. Physical or emotional stress can produce physiological responses which have reactionary effects on the pituitary-ovarian hormonal axis. This can result in irregular menstrual

cycles, irregular bleeding, menorrhagia, or amenorrhea during the periods of stress. Hormonal contraceptives can sustain hormonal levels that maintain regular menstrual cycles or amenorrhea. If the flyer is appropriately screened with monitoring during ground trial, there is no aeromedical contraindication for the use of oral contraceptives.

Adverse effects:
Distracting symptoms are most common when starting oral, transdermal, or implantable hormonal contraception. Intrauterine devices (IUDs) may be associated with increased menstrual pain, especially during the first cycle. Additionally, IUDs carry the risk of myometrial embedment, uterine perforation, cervical perforation, irregular bleeding, dysmenorrhea, expulsion, and increased incidence of ovarian cysts, all of which could potentially affect mission safety and completion. Irregular spotting or other transient symptoms are more common in the first 1-5 months of a hormonal contraceptive use. Estrogen containing oral contraceptives may be associated with hypertension, headache, nausea, or vomiting. Thus, the treating flight surgeon should council flyers on the risk for adverse events and instruct the operator to report adverse events to the treatment team.

Some hormonal contraceptives such as depot-medroxyprogesterone acetate (DMPA or Depo Provera®) may exacerbate depression. Etonogestrel sub-cutaneous implants and DMPA have been proven effective for control of endometriosis and menstrual conditions but have also been associated with decreased bone mineral density with prolonged use. In addition, there are increased concerns with space travel given the known effects of gravitational unloading on bone health and bone metabolism. Depo-Provera® has a higher association with dysfunctional uterine bleeding which could not only be distracting but can lead to more serious complications, such as anemia. Progesterone-only methods may decrease bone mineral density in some women with long-term use. Other potential adverse effects observed include weight gain, nausea, or vomiting. Of note, oral contraceptives may be beneficial for women with some types of headache, including menstrual migraine, but these estrogen containing oral contraceptives are contraindicated in women with a history of migraine headache with aura due to a significant increased risk of stroke.

The most significant aeromedical concern is related to venous thromboembolism (VTE) in estrogen containing oral contraceptives in high-risk women. Long-duration missions may lead to stasis and increased risk of lower extremity VTE in female aviators. Space travel could pose an even greater risk than aviation due to the alteration in fluid distribution, gravitational unloading, and altered hydrostatic gradients in the body. Women over age 35 and smokers are at increased risk of VTE and that risk is further elevated with the use of estrogen containing contraceptives. For this reason, estrogen containing oral contraceptives are not recommended in this population. Transdermal patches are not recommended for women with a BMI greater than 30 kg/m^2 and may be less effective in women with a BMI of 25 kg/m^2. Oral contraceptives with drospirenone (Yaz®, Yasmin®) can induce hyperkalemia in some women through this progestin's spironolactone-like activity and may induce diuretic and anti-androgenic effects.

Contraceptive options:
Vaginal non-hormonal birth control options include condoms, spermicides, diaphragms, cervical caps, and cervical sponges. These options are of variable efficacy depending on ideal usage and combinations of methods. Vaginal non-hormonal birth control options are unlikely to interfere with flying duties in the absence of adverse reactions.

In the US, the combined estrogen-progestin oral contraceptive preparations are the most commonly used effective and reversible method of contraception, with pregnancy rates reported as less than 0.5 per 100 woman-years. While oral contraceptive use is common and effective, it has a higher discontinuation rate within the first year than long-acting reversible devices. Most oral contraceptive compounds include 35 μg or less of estrogen along with varying types and amounts of progestins. Various progestins include first, second, or third generation forms, with differing profiles relating to their estrogenic effects, progesterone effect, and androgenic effect. Progesterone activity is highest, and estrogenic activity is lowest in the second and third generation progestins. Androgenic activity is highest in the second generation and lowest in the third generation progestins. The progestins vary in their beneficial and adverse side effects regarding breakthrough bleeding, acne, bloating, headaches, lipid profiles, and premenstrual mood symptoms. Modifying oral contraceptive use with clinically targeted progestin profile may improve benefits, reduce adverse effects, and increase compliance.

The three currently available long acting reversible contraceptive methods include one contraceptive implant and five intrauterine device (IUD) types. The FDA approved contraceptive implant is the etonogestrel single rod contraceptive implant (Implanon®). This single rod subdermal implant secretes the progestin etonogestrel systemically to suppress ovulation and the endometrium for contraception. This implant may remain in place for three years but requires providers to complete manufacturer training before beginning to insert them in patients. IUDs are the most commonly used method of long-acting reversible contraception because of its high efficacy and safety, ease of use, and cost effectiveness. There are both non-hormonal and hormonal IUDs available. The ParaGard® IUD is a non-hormonal, t-shaped, plastic and copper device that is immediately effective on insertion and can be used as emergency contraception if placed within 120 hours of unprotected sex and can remain in place for up to ten years. It does not contain hormones and does not suppress ovulation. However, ParaGuard® is more often associated with increased bleeding, pain and longer menses than hormone containing IUDs. Levonorgestrel (LNG) IUDs are t-shaped devices made of plastic that slowly release progestin. Several types (Mirena, Skyla, Kyleena, and Liletta) exist that vary in size, amount of progestin secreted, and time approved for contraceptive effectiveness. Non-contraceptive benefits of the higher dose LNG IUDs include reduction in heavy menstrual bleeding, anemia, dysmenorrhea, endometriosis-related pain, endometrial hyperplasia, pelvic inflammatory disease, and cervical cancer. However, higher dose LNG IUDs are more likely to induce menstrual suppression than the lower dose devices. For both category of IUDs, fertility returns immediately upon removal.

Additional options available to women are the transdermal patch (Ortho Evra®) and vaginal rings (NuvaRing® or Annovera). They act similarly to oral contraceptives, but require a lower dose by avoiding the “first pass” hepatic effect. The patch is applied once weekly for three weeks followed by one week without application. The efficacy of the patch has been found to be

similar to oral contraceptives with a high user satisfaction. The contraceptive vaginal ring is a flexible ring inserted into the vagina that releases estrogen and progestin at a constant rate for the three-week period of use. The ring has been found to have an effectiveness rate similar to oral contraceptives, a low incidence of adverse events, and a high satisfaction rate among users. Both of these methods have the additional benefit of easy reversibility after cessation of use. The NuvaRing® requires refrigeration when not in use, where as Annovera® does not. This make Annovera® more preferable for deployment purposes.

For men, two effective methods include condoms and vasectomy. Condoms are convenient in that they are readily available and do not require a prescription. When used correctly, their effectiveness can approach that of hormonal contraceptives with an additional benefit of protection against most sexually transmitted diseases. Vasectomy is the most commonly performed urologic surgical procedure performed in the US, with an estimated 500,000 performed annually. Vasectomy is less expensive and associated with less morbidity and mortality than female tubal procedures. It is employed by nearly 11% of all married couples, but is less prevalent than tubal procedures in women. With an experienced surgeon and a post-vasectomy semen analysis performed to confirm effectiveness, it is unusual to have a pregnancy result months to years after the procedure.

Female or male surgical procedures for permanent sterilization are common and are rarely associated with complications or adverse effects. When a sterilization procedure is uncomplicated and results in a full recovery, no restrictions or waivers are required to return to flight and operational duties.

IV. Suggested Readings

1. Davis, J. R. (2022). *Fundamentals of Aerospace Medicine*. Wolters Kluwer.

2. Hardeman, J., & Weiss, B. D. (2014, March 15). *Intrauterine devices: An update*. American Family Physician. Retrieved September 10, 2021, from https://www.aafp.org/afp/2014/0315/p445.html.

3. Saguil, A. (2015, March 1). *Risk of venous thromboembolism with use of combined oral contraceptives*. American Family Physician. Retrieved September 14, 2021, from https://www.aafp.org/afp/2015/0301/p287.html.

4. Dehlendorf, C. (2022, Jan 26). Contraception: Counseling and selection. UptoDate.com. Accessed February 23, 2022, from https://www.uptodate.com/contents/contraception-counseling-and-selection?search=contraception%20counseling%20and%20selection&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1

Dysmenorrhea (Apr 2021)
Reviewed: Lt Col Mark B. Dudley (RAM '22), Lt Col Jason Massengill (AF/SG OB/GYN Consultant), and Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes:
1. Updated language to reflect changes to the DoDI6130.03 V2 and the Medical Standards Directory.

I. Waiver Consideration

Dysmenorrhea is disqualifying for retention, as well as for all flying classes when symptoms result in an inability to perform duties, cause frequent absences from duty, or require ongoing specialty follow-up more than annually. It is also disqualifying for FC I/IA, II, III, ATC, GBO, OSF, and SWA personnel when it results in other disqualifying conditions (e.g., anemia, osteoporosis, endometriosis, uterine fibroids). Most medications used to prevent or treat dysmenorrhea are compatible with flying duties and the acute use of several NSAIDs (e.g., ibuprofen, naproxen, aspirin) are approved for flying/operational duties and do not require waiver if the underlying condition does not interfere with satisfactory performance.

Table 1: Waiver potential for dysmenorrhea

Flying Class (FC)	Condition[1]	Waiver Potential Waiver Authority	ACS Review/Evaluation
I/IA	Primary dysmenorrhea controlled with NSAIDS (ibuprofen, naproxen, aspirin) and/or hormonal contraceptives.	N/A	No
	Primary dysmenorrhea not controlled on approved NSAIDs and/or hormonal contraceptives.	No AFRS/CMO	No
II, III ATC/GBO/OSD/SWA	Primary dysmenorrhea controlled with NSAIDs and/or hormonal contraceptives.	N/A	No

	Primary dysmenorrhea not controlled on approved NSAIDs and/or hormonal contraceptives.	Maybe MAJCOM AFMRA[2]	No

1. For dysmenorrhea resulting from secondary causes see waiver guides for Endometriosis, Uterine Fibroid and Pelvic Inflammatory Disease.
2. Waiver in untrained personnel is unlikely; waiver authority for such cases is AFMRA.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. Summary of presentation, course, and treatment. History should include the following: age of menarche, onset of pain, relation with onset of menstrual flow, severity, location of pain, additional symptoms, impact on activities, presence of pain not related to menses, prior medical and surgical treatment and effectiveness.
2. Reports of any pertinent laboratory studies, imaging studies, copies of images (as indicated).
3. Documentation of a pelvic examination.
4. Gynecologic consultation reports, if NSAIDs and/or hormonal contraceptives do not control pain or if abnormal pelvic exam.
5. Documentation of return to full physical activity, including specific comments regarding any activity limitations.
6. Current physical examination findings.
7. FL4 with RTD and ALC status, if member did not meet retention status.
8. Any other pertinent information.
9. The above list is not an absolute requirement list. If there is a valid reason for not including an important item in medical care, document why.

A. Renewal Waiver Request:

1. Interval history since last waiver submission.
2. Pelvic examination.
3. Consultation report from the treating physician.
4. The above list is not an absolute requirement list. If there is a valid reason for not including an important item in medical care, document why.

A. **Aeromedical Concerns**

Dysmenorrhea is pain with menstruation which can be categorized into primary and secondary forms. Between 50 to 90 percent of reproductive-age women worldwide describe experiencing painful menstrual periods and most are young and have primary dysmenorrhea with decreased

prevalence with age. Secondary dysmenorrhea is usually associated with other gynecologic conditions. The clinical symptoms of dysmenorrhea include recurrent, crampy, lower abdominal pain that occurs during menses. Symptoms are typically time-predictable and time-limited, beginning one to two days before onset of menses with gradual resolution within 72 hours. Symptoms are often well-controlled with aeromedical approved medications. In most cases, it is not expected to be acutely incapacitating and continued flying should not be problematic. However, in some cases dysmenorrhea can cause menstrual pains severe enough to miss duty, distract, and impair operational performance rather than sudden incapacitation. Other associated symptoms which may be distracting during flying or ground operations may include nausea, vomiting, diarrhea, headaches, dizziness, or low back pain which could jeopardize the safety and health of member and risk mission completion. An oral GnRH antagonist, elagolix, has been recently approved for dysmenorrhea. However, GnRH class of medications are often associated with significant and unpredictable side effects that are aeromedically unacceptable. Therefore, if symptoms are not controlled or require non-approved medications, primary dysmenorrhea is disqualifying for all flying classes.

A review of AIMWTS through Mar 2021 revealed 26 aviators with a diagnosis of dysmenorrhea. There were 2 FC I/IA cases (no disqualifications), 2 FC II cases (no disqualifications), 13 FC III cases (2 disqualified), 2 ATC/GBC cases (no disqualifications), and 3 MOD cases (no disqualifications). Two disqualified cases were due to intractable pelvic pain, not amendable to treatment.

ICD-9 codes for Dysmenorrhea	
625.3	Dysmenorrhea

ICD-10 codes for Dysmenorrhea	
N94.4	Primary dysmenorrhea
N94.5	Secondary dysmenorrhea
N94.6	Dysmenorrhea, unspecified

IV. Suggested Readings

1. Smith RP and Kaunitz AM. Primary dysmenorrhea in adult women: Clinical features and diagnosis. UpToDate. Online version 48.0. Jan 2021.

2. Burnett M and Lemyre M. No. 345-Primary Dysmenorrhea Consensus Guideline. Journal of Obstetrics and Gynaecology Canada. 2017; 39(7): 585-595. DOI: https://doi.org/10.1016/j.jogc.2016.12.023

3. Osayande AS and Mehulic S. Diagnosis and Initial Management of Dysmenorrhea. Am Fam Physician. 2014; 89(5): 341-346.

4. Gorbandt MB and Knittig RA. Women's Health Issues in Aerospace Medicine. In Davis JR, Johnson R, Stepanek J, eds. Fundamentals of Aerospace Medicine, 4th ed. Philadelphia: Lippincott Williams & Wilkins; 2008: 480-490.

5. Powell-Dunford, Nicole. Dysmenorrhea: An Aeromedical Clinical Practice Guideline. Capstone, University of Texas Medical Branch. Aug 2008

Aerospace Medicine Waiver Guide

ENDOMETRIOSIS

Revised: Dec 2024

Reviewed: Dr. Justin B. Nast (Obstetrics Flight Surgeon Consultant) and Col Kevin Heacock (ACS Aerospace Medicine Branch Chief)

Significant Changes: Waiver consideration for long term use of gonadotropin releasing hormone analogues.

I. Waiver Consideration

Any history of endometriosis is disqualifying for FC I/IA and SWA duties. Endometriosis is disqualifying for retention, as well as for all flying and special duty classes when it results in an inability to perform duties, causes frequent absences from duty, or requires the need for ongoing specialty follow ups more than annually.

Table 1: Waiver potential for endometriosis

Flying Class	Medication/Treatment Required for Symptom Control of Endometriosis	Waiver Potential Waiver Authority	ACS Review/Evaluation
I/IA	Any documented history of endometriosis regardless of treatment[1]	No AFAC/CMO	No
II/III ATC/GBO/SWA	NSAIDs, estrogen/progesterone combinations, DepoProvera[2] GnRH analogues, any other medications not on the approved medications list Surgery	Yes MAJCOM Yes AFMRA Yes MAJCOM	No Yes No

1. Also applies to initial SWA personnel with waivers considered on a case-by-case basis similar to trained FC II and FCIII personnel.
2. All medications and medication combinations must be used in accordance with the Official Air Force Aerospace Medicine Approved Medications list.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. Summary of presentation, course, and treatment, to include a complete history of symptoms and degree to which they incapacitate the patient.
2. Reports of any pertinent laboratory studies, including the most recent hematocrit.
3. Gynecology consultation report, including follow-up notes with examination findings after treatment/resolution.
4. Any specific diagnostic tests performed, before and after treatment (as indicated).
5. Documentation of return to full physical activity, including specific comments regarding any activity limitations.
6. Current physical examination findings.
7. For long term medical therapy with GnRH analogues, minimum 3 months of use demonstrating treatment efficacy without significant side effects.
8. FL4 with RTD and ALC status, if member did not meet retention status.
9. Any other pertinent information.
10. The above list is not an absolute requirement list. If there is a valid reason for not including an important item in medical care, document why.

B. Renewal Waiver Request:

1. Interval history including treatments, tolerance, and any adverse side effects.
2. All applicable labs, particularly most recent hematocrit.
3. Consultation report from gynecologist or primary care physician.
4. The above list is not an absolute requirement list. If there is a valid reason for not including an important item in medical care, document why.

III. Aeromedical Concerns

Endometriosis is a progressive disease and there is little correlation between the physical extent of the disease and severity of reported symptoms. The pain associated with endometriosis usually begins as low-grade discomfort and may progress over hours or days to a severe discomfort or pain that may be distracting. The pain may initially be predictable and occur in a cyclic perimenstrual fashion but may become more persistent over time. Symptoms of endometriosis often require control with aeromedically approved medications, such as oral contraceptives or NSAIDS. At this stage, the symptoms of endometriosis may not be acutely incapacitating and would pose minimal aeromedical risk. However, when the disease progresses and/or is poorly controlled, the pain may be distracting and occur in an unpredictable pattern. In these cases, more aggressive medical therapy or surgical treatment may be required.

Gonadotropin releasing hormone analogues (GnRH) include the traditional agonists which are usually administered intramuscularly and the newer agonists that can be administered orally. GnRH class of medications can be associated with significant and unpredictable hypoestrogenic side effects that are aeromedically unacceptable but can be mitigated with hormone add back therapy. Danazol and aromatase inhibitors would be considered 2nd line therapy to GnRH analogues. Danazol is unlikely to be approved due to side effects and treatment with aromatase inhibitors is considered an off-label use for the treatment of endometriosis.

re uirement or sur ical treatment can be an indicator o the disease severit and ailure o medical therapy. Although a history of uncomplicated surgical treatment for endometriosis is not considered disqualifying for trained aircrew, the severity of the symptoms in these cases would likely be disqualifying and up to one third may require additional surgery. Although hysterectomy or oophorectomy may be therapeutic, hypogonadism caused by oophorectomy carries its own aeromedical concerns. Recurrence of endometriosis symptoms remains possible even after hysterectomy and/or oophorectomy, therefore post-surgical aeromedical monitoring is required. Evaluation of the hematocrit and/or hemoglobin levels is indicated since heavy menstrual bleeding is often associated with endometriosis and can cause anemia. Lastly, it is essential for the treating flight surgeon to ensure the diagnosis of endometriosis was made with objective evidence rather than the diagnosis being used as a substitute to describe dysmenorrhea.

Review of AIMWTS through Dec 2024 revealed 61 unique aviators with an AMS containing the diagnosis of endometriosis:

Flying Class	# Waived	# Requests	% Waived
FC I/IA	1	3	33%
FC II	13	17	76%
FC III	25	35	71%
ATC	1	1	100%
GBO	4	4	100%
SWA	0	1	0%
TOTAL	**44**	**61**	**72%**

ICD-9 code for Endometriosis	
617.9	Endometriosis, site unspecified

ICD-10 code for Endometriosis	
N80.9	Endometriosis, unspecified

IV. Suggested Readings

1. American College of Obstetricians and Gynecologists. Management of Endometriosis. ACOG Practice Bulletin Number 114, 2010 (Reaffirmed 2022).

2. Schenken RS. Endometriosis: clinical features, evaluation, and diagnosis. UpToDate. Updated September 10, 2024.

3. Schenken, RS. Endometriosis: treatment of pelvic pain. UpToDate. Updated May 14, 2024.

4. Hornstein, Mark D. and William E. Gibbons. Endometriosis: long term treatment with gonadotropin-releasing hormone agonists. UpToDate. Updated March 21, 2023.

Aerospace Medicine Waiver Guide

Polycystic Ovary Syndrome

Revised: May 2023

Reviewed: Lt Col Matthew Hoyt (RAM 23), Dr. Max Lee (ACS Waiver Guide Coordinator), Dr. Justin Nast (ACS OB/Gyn Consultant); Lt Col Meghan Ozcan (OB/Gyn Reproductive Endocrinology and Infertility Consultant)

Significant Changes: Updated Table 1 to reflect current flying and special duty classifications; updated ICD codes and waiverability table; updated Suggested Readings.

I. Waiver Consideration

While not directly identified by name in the MSD, polycystic ovary syndrome (PCOS) is a potentially disqualifying condition for all classes of flying and special duty in the US Air Force. Secondary causes including adult-onset congenital adrenal hyperplasia, hyperprolactinemia, and androgen-secreting neoplasms must be excluded. Per the MSD, ovarian cysts are disqualifying if it causes symptomatic persistent ovarian cysts and/or menstrual irregularities that (1) require the use of unapproved aircrew medications and/or (2) results in an inability to perform duties, frequent absences from duty, or the need for ongoing specialty f/u more than annually. For menstrual irregularities and dysfunctional uterine bleeding, refer to the Dysmenorrhea Aeromedical Waiver Guide.

Table 1: Waiver potential for Polycystic Ovary Syndrome (PCOS)

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation[1]
I/IA	Yes	AFRS/CMO	No
II/III/ATC/ GBO/OSF/SWA (Initial)	Yes	AFRS/CMO	No
II/III/ATC/ GBO/OSF/SWA (Trained)	Yes	MAJCOM	No

1. The waiver authority may request ACS review/evaluation on a case-by-case basis.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. List and fully discuss all clinical diagnoses and medications requiring a waiver.
2. A complete history to include a detailed menstrual history and an outline of the onset, duration, and stability of any symptoms of PCOS and its treatment.
3. Exam should include assessment of blood pressure, body mass index, careful skin exam, and waist circumference[1]. Include report of a current gynecological exam.
4. Labs: 2 hour oral glucose tolerance test or fasting glucose and HgbA1c, prolactin, TSH, serum total testosterone, early morning 17-hydroxyprogesterone, lipid panel, and any other endocrine studies used to evaluate for PCOS and its complications.
5. Radiology: current pelvic ultrasound report and any other pertinent radiological reports.
6. Statement from treating physician summarizing treatments and intended follow-up.
7. FL4 with RTD and ALC status.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Waiver Renewal Request:

1. Interval history specifically noting any changes in disease course and treatments since the last waiver submission.
2. Documentation of all interim consultations, procedures, and ancillary study reports.
3. Report of current exam with statement of patient condition from treating physician.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Most symptoms related to PCOS, when mild or well controlled, will usually not be problematic with aviation duties. However, if untreated or unrecognized, PCOS may lead to distracting gynecological problems such as abnormal uterine bleeding or pain, as well as non-gynecological problems such as glucose intolerance/diabetes, obesity, dyslipidemia, sleep apnea, mood disorders, and even atherosclerotic heart disease, all of which can be associated with significant aeromedical risk. These risks include anemia with fatigue, generalized weakness, decreased stamina, lightheadedness, chest pain, and decreased Gz tolerance. In the setting of concomitant hypoxia, there is not only decreased oxygen carrying capacity in the blood, but also decreased oxygen available for perfusion. Additionally, hyper/hypoglycemia can lead to fatigue, nervousness, lightheadedness, weakness, and changes in visual acuity. For full discussion on the aeromedical risks associated with anemia or diabetes please refer to the respective Aeromedical Waiver Guides.

The treatment of PCOS is individualized and is based on the patient's clinical symptoms and desire for pregnancy. Lifestyle treatments are consistently considered first-line therapy for most adolescent and adult women. These treatments include weight loss, consistent exercise, and low glycemic index food intake. Common medical options include hormonal contraceptives for menstrual irregularities and dermatologic issues, metformin for metabolic manifestations, and clomiphene citrate or letrozole for infertility. Please note that not all medications used to treat PCOS are aeromedically approved for use by the flyer in the US Air Force due to significant side effects. Please refer to the most current versions of the aircrew and GBO medication lists for further guidance on medications that might require waivers.

AIMWTS search from May 2020 to May 2023 revealed 45 submitted cases that contained an ICD-10 code associated with PCOS. Breakdown of cases are tabulated below. Of the 45 total cases, 6 resulted in a disqualification disposition: 1 FC I/IA, 5 FC III cases. Of note, the PCOS diagnosis or the medications utilized were the primary diagnosis for disqualification in only one of the six cases.

Please use only *these* ICD-10 codes for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	ATC	GBO	SWA
E28.2	Polycystic ovarian syndrome	0/1	17/17	16/21	5/5	1/1	0
N83.20	Unspecified ovarian cyst	0	0	0	0	0	0
N83.29	Other ovarian cysts	0	0	0	0	0	0

IV. Suggested Readings

1. Al Wattar BH, Fisher M, Bevington L, Talaulikar V, Davies M, Conway G, Yasmin E. Clinical Practice Guidelines on the Diagnosis and Management of Polycystic Ovary Syndrome: A Systematic Review and Quality Assessment Study. J Clin Endocrinol Metab. 2021 Jul 13;106(8):2436-2446. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8830055/

2. Teede HJ, Misso ML, Costello MF, et al. Recommendations from the international evidence-based guideline for the assessment and management of polycystic ovary syndrome. Fertil Steril, 2018; 110:364. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6112576/

3. Lim SS, Hutchison SK, Van Ryswyk E, Norman RJ, Teede HJ, Moran LJ. Lifestyle changes in women with polycystic ovary syndrome. Cochrane Database Syst Rev. 2019 Mar 28;3(3):CD007506. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6438659/

4. Williams, T, Mortada, R, and Porter, S. Diagnosis and treatment of polycystic ovary syndrome. Am Fam Physician, 2016; 94(2):106-113. https://www.aafp.org/pubs/afp/issues/2016/0715/p106.html

5. ACOG Practice Bulletin #194, "Polycystic Ovarian Syndrome", June 2018. https://journals.lww.com/greenjournal/Fulltext/2018/06000/Polycystic_Ovary_Syndrome__ACOG_Practice_Bulletin,.54.aspx

Aerospace Medicine Waiver Guide

Pregnancy

Revised: 10 April 2025

Reviewed: Col Larissa Weir (AF/SG Chief Women's Health Consultant), Col Mark Dudley (SGMED, Deputy Director), Brigadier General Eveline Yao (AFMEDCOM, Chief of Staff), Col Kristin Vogt (ACS Div Chief), & Dr. Amy Hicks (USAFSAM/FE Director of Clinical Medicine)

Significant Changes: Revised to reflect recent changes to MSD item J57, "Pregnancy." Local clearance process removed. Updates made to "Waiver Consideration," "Information Required for Waiver Submittal," and Table 1. Aircrew members/operators may request waiver as indicated by Flying Class status IAW DAFMAN 48-123.

I. Waiver Consideration

Pregnancy is a temporary condition; however, it is disqualifying for FC I/IA, II, III, OSF, and SWA duties. For FC II, III, and OSF duties, in uncomplicated pregnancy[1] from 12 weeks 0 days through 32 weeks 0 days of gestation, MAJCOM waiver is possible with certain occupational restrictions (see Table 1). Flight duties outside the occupational restrictions outlined in Table 1 will not be considered. When applicable, ground duties (such as SIM/SOF) should be considered even if the flyer remains DNIF; ground duties are generally appropriate during pregnancy. For FC I/IA and SWA duties, waiver may be requested for continued duties as outlined in Table 1. For GBO and ATC duties, uncomplicated pregnancy is NOT disqualifying, and waiver is not required for continued duties throughout the duration of the pregnancy. In the setting of high-risk pregnancy,[2] waiver to continue GBO/ATC duties may be requested.

The request to perform flying and operational support duties during pregnancy is voluntary. Manned flight duties during pregnancy involve exposure to known and suspected hazards to fetal development and maternal health that require individual aircrew member education and risk acceptance. Those members who do elect to perform flying and operational support duties during pregnancy may change their decision at any time. Given that pregnancy is inherently dynamic, regular follow-up throughout the duration of the waiver is important. Both the flight surgeon and the member must be aware of the need to reassess waiver eligibility if new symptoms arise or if any complications develop. Additionally, access to urgent obstetrical care should be considered throughout the pregnancy, and duty modification should be considered as needed based on pregnancy status (for example, in cases where the time to urgent obstetrical care is greater than 2 hours or another timeframe as specified by the treating obstetrician). Pregnancy is disqualifying for physiological training and hyperbaric/hypobaric duty. Per AFMAN 11-403, *Aerospace Physiological Training Program*, hypoxia training is waived for the duration of the pregnancy.

1. Uncomplicated pregnancy: Singleton, intrauterine pregnancy with no high-risk features; normal prenatal labs and vitas signs; no pregnancy-related medical conditions; pre-existing medical conditions, medications, and waivers should be considered in the context of the pregnancy (many pre-existing medical conditions can increase health risks during pregnancy, see Section III).
2. High-risk/complicated pregnancy: Multiple gestation; age > 35-years-old at time of delivery; in-vitro fertilization (IVF); pre-existing medical conditions such as hypertension, thyroid disease, and autoimmune disease; pregnancy-related conditions such as gestational hypertension, gestational diabetes, pre-eclampsia, HELLP syndrome, previous or current preterm labor or history of preterm birth, or as defined by the treating obstetrician.

Postpartum: After delivery, return to flight/operational duty may be considered after a minimum of six weeks. SIM duties may be considered earlier at the request of the member. If physiological training currency was extended to cover pregnancy, refresher training must be accomplished prior to first flight once medically cleared following delivery (see AFMAN 11-403).

Table 1: Waiver Authority for Pregnancy

Flying Class (FC)	Condition	Waiver Authority
I/IA	Uncomplicated pregnancy 12 weeks 0 days – 32 weeks 0 days of gestation[1]	MAJCOM[3]
II//III/OSF	Uncomplicated pregnancy 12 weeks 0 days – 32 weeks 0 days of gestation[2]	MAJCOM[3]
GBO	Uncomplicated pregnancy through delivery (no DNIF/DNIA)	MAJCOM: High-risk pregnancy[3]
ATC	Uncomplicated pregnancy through delivery (no DNIC)	MAJCOM: High-risk pregnancy[3]
SWA	Uncomplicated pregnancy through delivery (no DNIC) DNIF, including no jump/dive duties, from onset of pregnancy to post-partum	MAJCOM: High-risk pregnancy[3]

1. FC I/IA exam must be initially certified in the non-gravid state. FC I/IA waiver parameters: non-high performance, non-ejection seat, with a qualified pilot, up to 10,000 ft MSL (cabin altitude). Outside these parameters, waiver is not allowed.
2. FC II/III/OSF flying waiver parameters: non-high performance, non-ejection seat, with another qualified pilot, up to 10,000 ft MSL (cabin altitude). Outside these parameters, waiver is not allowed.
3. OB consultant and/or ACS review at MAJCOM SGP discretion.

II. Information Required for Waiver Submittal

Timely submission of the waiver package should be a priority given the dynamic nature of pregnancy and the potentially limited timeframe for continued flight/operational duties.

A. Waiver Request:

1. The AMS should include the following:
    a. Date of pregnancy confirmation, date of last menstrual period, estimated current gestational age, and estimated date of delivery (ultrasound-based, if available).
    b. Pregnancy status – uncomplicated (single, intrauterine with no high-risk features) or high-risk/complicated. See definitions on page 1 and item #4 below.
    c. Date of 12 weeks 0 days and date of 32 weeks 0 days of gestation.
    d. Any significant pregnancy-related symptoms or conditions.

e. Past obstetrical history and past gynecological history relevant to the pregnancy. Include past pregnancy dates, delivery types, complications, history of ectopic pregnancy, miscarriages, fibroids, etc.
f. Past medical and surgical histories, including current status of pre-existing conditions.
g. List of all current medications.

2. Labs/studies required:
    a. CBC.
    b. All other routine initial pregnancy labs.
    c. Obstetric ultrasound report.
3. Current physical examination findings:
    a. Vital signs.
    b. Visual acuity.
    c. Physical examination findings from obstetrical provider.
4. Forms:
    a. "Obstetric Provider Pregnancy Verification" form (select "aviator" or "operator" version as indicated), signed by the aircrew member/operator and the obstetrician. Located on Kx: https://kx.health.mil/kj/kx4/FlightMedicine/Pages/operationalmedhomeapril2012.aspx

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. <u>Follow-up for duration of waiver request:</u>

1. Monthly flight surgeon visits in the Flight and Operational Medicine Clinic, ideally timed following OB appointments since the flyer/operator must be cleared before conducting flight/operational duties after OB visits. Failure to complete the monthly FOMC evaluation should result in grounding until compliant.
2. The FOMC visit should include the following:
    a. Confirm continued desire to perform flight/operational duties. The aircrew member/operator may request to be grounded at any time.
    b. Vital signs.
    c. Visual acuity check if new symptoms or if not assessed at OB visit within the last four weeks.
    d. Assess for new symptoms, change in pre-existing medical conditions, development of pregnancy-related conditions or complications, etc.
    e. Confirm there are no issues that would impact performance of duties, fit and use of life support equipment, or ability to safely egress the aircraft.
    f. Assess need for access to urgent obstetrical care and appropriate timeframe (such as 2 hours) and consider duty modification as indicated.
3. Waiver eligibility should be reassessed in the setting of new symptoms, conditions or complications.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

A. Normal Physiologic Changes of Pregnancy with Aeromedical Relevance

Cardiovascular: Cardiac output rises across pregnancy. Early in pregnancy, an increase in stroke volume drives the change in cardiac output. Systemic vascular resistance begins to fall during the first trimester and plateaus at 35-40% below baseline mid-second trimester, reducing afterload to the heart. Additionally, blood volume expands approximately 40% in pregnancy, increasing preload. These changes drive an increase in stroke volume. Heart rate also rises during pregnancy, peaking in the third trimester. The result is a 30-50% increase in cardiac output compared to baseline. There is a 10-fold increase in uterine blood flow during pregnancy, which leads to a shift from 2% of total cardiac output pre-pregnancy to over 17% at term. As pregnancy progresses, the growing uterus exerts pressure on the inferior vena cava, and this effect becomes significant in the supine position. Due to a reduction in venous return to the heart (preload), maternal posture can decrease cardiac output by 25-30%, and 8% of individuals experience supine hypotension with possible syncope. During a normal pregnancy, the average blood pressure begins to decrease by 7 weeks of gestation, reaching a nadir by 24-32 weeks, gradually increasing in the third trimester, and returning to pre-pregnancy levels following delivery. The cardiovascular and hemodynamic changes that occur during pregnancy can have significant or subtle effects on G-tolerance, endurance, and hypoxia tolerance.

Endocrine: The major hormones of pregnancy are human chorionic gonadotropin hormone (hCG), human placental lactogen (hPL), estrogen and progesterone. These hormones are primarily responsible for the physiologic changes described throughout Section III.A of this waiver guide. Pregnancy is associated with insulin resistance, driven by hCG, hPL, progesterone, and other hormones elaborated by the placenta. In those individuals with insufficient pancreatic function to overcome this insulin resistance, relative hyperglycemia or frank (gestational) diabetes develops. In cases of gestational diabetes, control can be achieved with diet, although sometimes insulin is required. Maternal screening for diabetes generally occurs at 26-28 weeks of gestation but may be performed earlier for risk factors or clinical findings. Pregnancies complicated by gestational diabetes are at increased risk of adverse outcomes such as preeclampsia, macrosomia, and polyhydramnios and are classified as “high-risk” pregnancies.

Gastrointestinal: During normal pregnancies, high circulating levels of progesterone, a smooth muscle relaxant, cause hypoactivity of the gastrointestinal tract, a decreased transit time, relaxation of the lower esophageal sphincter, and increased vomiting. Pregnancy-associated vomiting occurs most commonly during the first trimester but can occur throughout the pregnancy. Nausea or vomiting can result in significant aeromedical distractions and contribute to dehydration. Esophageal reflux is more common in pregnancy and may also lead to symptoms distracting in the flight and operational environment.

Hematologic: Blood volume increases during pregnancy to accommodate the pregnancy requirements and support placental perfusion. Plasma volume increases by 40%, and red cell mass increases 20-30% over the non-pregnant state. A relative anemia is common in

pregnancy due to the increased ratio of plasma volume to red cell mass and the resulting hemodilution. Iron-deficiency anemia is also common in pregnancy due to the substantial increase in iron requirement for the growing fetus. Changes in maternal pH from respiratory changes cause a right shift in oxygen dissociation of hemoglobin to facilitate oxygenating the fetus. These volume, hemoglobin, and anemia-related circumstances can affect G-tolerance, hypoxia tolerance, and endurance. Pregnancy is a prothrombotic state with a risk of venous thromboembolism increased at least five-fold over the non-pregnant state, although the overall incidence is still low (fewer than 1% of pregnancies). The hypercoagulability of pregnancy is related to several mechanisms, including increases in fibrinogen, von Willebrand Factor, clotting factors (II, VII, VIII, and XII), and reduced activity of fibrinolytic inhibitors such as plasminogen activating inhibitor-1 and -2. In addition, venous stasis is more likely during pregnancy due to decreased systemic vascular tone and compression of the pelvic veins by the enlarging uterus. Periods of inactivity or remaining in a cramped cockpit during flying duties may exacerbate venous stasis and increase the risk of thrombosis. Underlying hypercoagulable states, such as Factor V Leiden, are associated with 20-25% of venous thromboembolism in pregnancy and as such, can add substantially to the venous thrombosis risk. Screening for thrombophilia is not recommended routinely in pregnancy but may be considered if indicated by clinical or family history.

Musculoskeletal and Ergonomic Considerations: As the uterus grows during pregnancy, it emerges from the pelvis after 12 weeks and begins to increase abdominal circumference thereafter. Breast tissue enlarges in response to human placental lactogen (hPL). Localized or generalized edema can occur in normal pregnancies and may increase the circumference of the lower extremities, the upper extremities, and occasionally other areas of the body. Gestational weight gain is also a normal effect of pregnancy. These changes may alter the fit and safety of life support equipment in the aircraft. In addition, the center of gravity changes in pregnancy while prostaglandins and relaxin increase joint mobility. This increases the risk of falls, especially later in pregnancy. Even minor falls or trauma can lead to significant complications, particularly during the late second trimester and the third trimester.

Neurologic: Sleep disturbances during pregnancy are common and can contribute to excess fatigue during pregnancy. These disturbances tend to increase as the pregnancy progresses, resulting in additional aeromedical significance. Neurocognitive changes may also be associated with pregnancy. Subjective symptoms of forgetfulness, poor concentration, and other cognitive changes are reported in up to 80% of pregnancies. Subtle but clinically significant changes on neurocognitive testing have been demonstrated, particularly in the third trimester. However, testing typically remains in the normal range, and changes might be noticed only by the individual or those who know them well.

Ophthalmologic: Corneal thickening due to edema can occur as early as 10 weeks gestation and may persist for several weeks postpartum. This change is variable and can affect visual acuity differently throughout the pregnancy. Visual acuity should be checked to ensure vision standards are met when waiver is requested. In addition, an immediate assessment should be performed for any visual complaint.

Pulmonary: The pulmonary changes of pregnancy may have a significant effect in the aviation environment. There is an increase in maternal oxygen consumption with a 40% increase in tidal volume and a stable baseline respiratory rate, leading to increased minute ventilation (up nearly 50% at term). This results in hyperventilation, hypocapnia, and pH changes. Lung volume is decreased from physiological changes and uterine encroachment. These changes lead to a 20% decrease in functional residual capacity in the second half of pregnancy and can result in early decompensation in the face of infection or other pulmonary disease. In the flight environment, these changes can affect hypoxia tolerance, especially in the event of rapid decompression.

Renal: In pregnancy, renal blood flow increases by 50%, renal plasma flow increases by 60-80%, and glomerular filtration rate increases by 50%. The increased renal function and uterine compression of the bladder result in more urine production during a normal pregnancy. This results in more frequent urination, which may be challenging in the flying environment. If intentional dehydration is used to combat urinary frequency, this can also lead to aeromedically significant symptoms, such as dizziness. The dry flight environment can further induce dehydration. These factors can have significant or subtle effects on G-tolerance, endurance, or hypoxia tolerance. Elevated systemic progesterone decreases the peristalsis of the ureters, which increases the risk of ureteral reflux and ascending urinary tract infections. As such, urinary tract infections must be treated with more vigilance in pregnancy due to the greater risk of pyelonephritis and its higher risk of complications.

B. Exposures in the Aerospace/Operational Environment

Altitude: At an altitude of 8,000 ft MSL, SaO_2 is 90-93% for non-pregnant, healthy volunteers, and at 10,000 ft MSL, SaO_2 is in the range of 87%. Normative values in flight during pregnancy have not been established. The effects of short, repeated exposures to increased altitude are unclear. Adverse effects have been found in studies of flight attendants and passengers, but results and methodologies in these studies are inconsistent. Both miscarriage and intrauterine fetal demise were increased in observational studies of flight attendants. A risk of preterm birth has been found in passengers but not flight attendants. Flight altitude restrictions are included for waiver consideration.

Emergency Egress: Emergency egress is an unpredictable and potentially violent event that can impact all airframes and aircrew. Flight surgeon familiarity with a flyer's crew position and aircraft is important when counseling the flyer about potential risks associated with egress during pregnancy. Emergency egress can involve operating aircraft doors, climbing, jumping from a variable height, running 200 yards, and donning appropriate survival gear. There are no studies addressing the impact of ejecting from an aircraft on pregnancy or maternal health. However, several studies have demonstrated that the risk of mortality with trauma increases during pregnancy. Pregnancies complicated by trauma also lead to higher incidences of spontaneous abortion, placental abruption, uterine rupture, preterm premature rupture of membranes, preterm birth, cesarean delivery, and stillbirth. Even minor abdominal trauma can lead to significant complications. As such, the member should be made aware of the increased risk to loss of life or miscarriage in an already dangerous situation.

Heat: Both the fetus and the metabolic demands of pregnancy generate additional heat above the pre-pregnancy baseline. The flight environment and safety equipment may introduce additional heat burden. This can lead to heat intolerance in the flyer and may also adversely impact fetal development. Elevated core body temperature has been shown to double the risk of neural tube defects in the fetus. The risk of preterm labor and growth restriction may also be increased, although results from epidemiologic studies on this phenomenon are mixed. The National Institute for Occupational Safety and Health (NIOSH) advises that core temperature should not exceed 102^{o}F and that even when core temperature does not exceed 100.4 ^{o} F in the workplace, "absolute safety" cannot be assured.

Noise and Vibration Exposure: Noise and vibration exposure during pregnancy have been associated with hearing changes identified in the newborn. Noise is unwanted sound that may induce adverse health effects in the adult human ear if it exceeds a time-weighted average (TWA) of 85 A-weighted deciBels (dBA) over 8 hours or exceeds an impulse level of 140 deciBels (dB). Vibration-creating sounds are usually divided into two groups based on frequency, high and low. The hearing organs are developed around 20 weeks gestation and may be susceptible to damage from both sources. A study of occupational noise exposure during pregnancy found exposure to noise >85 dBA throughout the course of pregnancy (<20 days absence) was associated with an increased risk of pediatric hearing loss (hazard ratio 1.82). During the last 15 weeks of gestation, fetal exposures to high- and low-frequency sounds may have a significant and sometimes negative effect on fetal behavior and central nervous system development. While higher frequency vibrations up to 20,000 Hz produce sound waves that can be heard by humans, lower frequency vibrations may not be heard but can induce stress in humans. The uterus and abdominal contents provide some noise attenuation, but frequencies less than 250 Hz are more likely to penetrate to the fetus, and sound pressures can be significantly higher in the uterus than outside. Significant noise and whole-body vibration exposure have been associated with preterm labor, as well, although the data are mixed. A reasonable reduction in frequency and duration of exposure can be considered when appropriate.

Radiation: Radiation exposure is a potential risk factor for the fetus, with the period of highest vulnerability during organogenesis in the first trimester. Evidence suggests that no adverse fetal effects have been seen with radiation exposures of less than 50 mSv. The average exposure during a 10-hour flight is 0.05 mSv. Population-based studies of commercial airline workers who flew during pregnancy are reassuring. Adverse fetal outcomes associated with radiation exposure in the aviation environment were not demonstrated. However, the commercial environment is not strictly analogous to military aviation.

C. Pregnancy-Related Medical Conditions

Many pregnancy-specific conditions are aeromedically significant. Examples include, but are not limited to: ectopic pregnancy, spontaneous miscarriage, molar pregnancy, incompetent cervix, vaginal bleeding, preterm labor, spontaneous rupture of membranes, preeclampsia, HELLP syndrome, hyperemesis gravidarum, gestational diabetes, struma

ovarii, uterine anomaly, and fetal conditions such as multiple gestation, birth defects, and growth restriction.

D. Pre-existing Medical Conditions and Medication Use Affected by Pregnancy

There are a variety of medical conditions where the disease, the treatment, or both are affected by pregnancy. Such conditions include chronic hypertension, impaired glucose tolerance, diabetes, thyroid disease, inherited thrombophilias, migraines with aura, or history of thromboembolic disease. In many cases, a chronic medication or its dose must be changed. Therefore, preexisting medical conditions and/or stable use of medication previously waived must be re-considered prior to conducting flight and operational duties during pregnancy.

E. Postpartum

The postpartum period is characterized by fatigue, sleep deprivation and significant physiological changes. This period is also associated with increased risk of bleeding, infection, depression (generally transient), and hypertension. The prothrombotic state associated with pregnancy persists for up to six weeks, and the highest risk of venous thromboembolism during pregnancy is in the postpartum period. If visual acuity changes develop during pregnancy, these typically resolve by six weeks postpartum.

ICD-10 code for Pregnancy	
Z33	Pregnant State

IV. Suggested Readings

1. FS Toolkit: https://kx.health.mil/kj/kx4/FlightMedicine/Pages/operationalmedhomeapril2012.aspx

2. ACOG Committee Opinion No. 746: Air Travel During Pregnancy. Obstet Gynecol. 2018 Aug;132(2):e64-e66.

3. Davies SJ, Lum JA, Skouteris H, Byrne LK, Hayden MJ. Cognitive impairment during pregnancy: a meta-analysis. Med J Aust. 2018 Jan 15;208(1):35-40.

4. Davis JR, et at. Fundamentals of Aerospace Medicine. 4th ed. Lippencott, Williams, and Wilkins. 481-485.

5. Facco FL, Kramer J, Ho KH, Zee PC, Grobman WA. Sleep disturbances in pregnancy. Obstet Gynecol. 2010 Jan;115(1):77-83.

6. Gerhardt KJ, Abrams RM. Fetal exposures to sound and vibroacoustic stimulation. J Perinatol. 2000 Dec;20:S21-30.

7. Magann EF, Chauhan SP, Dahlke JD, McKelvey SS, Watson EM, Morrison JC. Air travel and pregnancy outcomes: a review of pregnancy regulations and outcomes for passengers, flight attendants, and aviators. Obstet Gynecol Surv. 2010 Jun;65(6):396-402.

8. Naderan M. Ocular changes during pregnancy. J Curr Ophthalmol. 2018 Jan 3;30(3):202-210.

9. Ravanelli N, Casasola W, English T, Edwards KM, Jay O. Heat stress and fetal risk. Environmental limits for exercise and passive heat stress during pregnancy: a systematic review with best evidence synthesis. Br J Sports Med. 2019 Jul;53(13):799-805.

10. Selander J, Albin M, Rosenhall U, Rylander L, et al. Maternal Occupational Exposure to Noise during Pregnancy and Hearing Dysfunction in Children: A Nationwide Prospective Cohort Study in Sweden. Environ Health Perspect. 2016 Jun; 124(6): 855–860.

11. Van Dyke P. A Literature Review of Air Medical Work Hazards and Pregnancy. Air Med J, 2010; 29(1): 40-47.

12. Vincens, Natalia and Persson Waye, Kerstin. Occupational and environmental noise exposure during pregnancy and rare health outcomes of offspring: a scoping review focusing on congenital anomalies and perinatal mortality. Rev on Env Health, 2022. Accessed online at https://doi.org/10.1515/reveh-2021-0166.

Uterine Fibroids (Leiomyomas) (Apr 2021)
Reviewed: Maj Jason Burchett (RAM '21), Lt Col Jason Massengill (AF/SG OB/GYN consultant), and Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes:
1. Updated language to reflect changes to DoDI6130.03 V2 and Medical Standards Directory.
2. Edited for clarity, references reviewed, and updated references.

I. Waiver Consideration

Asymptomatic fibroids are not disqualifying and as such, require no waiver. Symptomatic uterine fibroids are disqualifying for flying classes (FC) I/IA, II, III, and SWA. The condition is not listed as disqualifying for ATC and GBO duties, nor is it disqualifying for retention purposes, but significant symptoms and/or treatments that require duty restrictions or limitations based on the medication and clinical evaluation are disqualifying for retention standards as well as ATC, GBO, and OSF duties. The use of hormone suppressive medications such as oral contraceptive pills (OCPs), progesterone supplementation, or a progesterone containing intrauterine device do not require a waiver. However, they require a 7 day ground trial to monitor for adverse effects and effectiveness in controlling symptoms. The use of other medications such as gonadotropin releasing hormone (GnRH) agonists/antagonists, aromatase inhibitors, or similar medications are associated with significant and unpredictable symptoms and a ground trial period to monitor adverse effects and effectiveness should be completed prior to waiver consideration. A history of a surgical treatment for symptomatic benign fibroids, such as myomectomy, uterine artery embolization, or hysterectomy, if uncomplicated, fully recovered, asymptomatic, and without evidence of malignancy, does not require waiver for any flying class exams and ACS case review is not required.

Table 1: Waiver potential for uterine fibroids

Flying Class (FC)	Condition	Waiver Potential Waiver Authority	ACS Review/ Evaluation
I/IA	Medically treated with OCPs, progestin, or NSAIDs Medically treated with GnRH analog[1]	Maybe AFRS/CMO No AFRS/CMO	No
II/III SWA	Medically treated with OCPs, progestin, or NSAIDs Medically treated with GnRH analog[1]	Yes MAJCOM No MAJCOM	No

ATC/GBO[2]	Medically treated with OCPs, progestin, or NSAIDs	Yes MAJCOM	No
	Medically treated with GnRH analog[1]	Maybe MAJCOM	No

1. GnRH analogs are used for a time limited duration and often in preparation of surgery then discontinued.
2. No waiver required for ATC and MOD personnel unless unable to perform duties or treated with unapproved medications.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. Summary of presentation, course, and treatment. History should include degree of impairment from the symptomatic uterine fibroids, level of functioning before and after uterine fibroid treatment modalities, presence and/or resolution of anemia/fatigue, treatment modalities used, and treatment option considerations (e.g., future fertility desired).
2. Reports of any pertinent laboratory studies, imaging studies, copies of images (as indicated), including a current complete blood count.
3. Gynecology consultation report, including follow-up notes with examination findings after treatment.
4. Any specific diagnostic tests performed, before and after treatment (as indicated), including a histology report, if applicable.
5. Documentation of return to full physical activity, including specific comments regarding any activity limitations.
6. Current physical examination findings.
7. Any other pertinent information.
8. The above list is not an absolute requirement list. If there is a valid reason for not including an important item in medical care, document why.

B. Renewal Waiver Request:

1. Interval history since last aeromedical summary with emphasis on any symptoms compatible with uterine fibroids.
2. Current complete blood count.
3. Consultation from gynecologist or treating physician.
4. The above list is not an absolute requirement list. If there is a valid reason for not including an important item in medical care, document why.

III. Aeromedical Concerns

Symptomatic fibroids can result in three classes of symptoms, heavy and prolonged menstrual bleeding, bulk related symptoms such as pelvic pressure and pain, and reproductive dysfunction. The first two of the above can have significant aeromedical impact. Heavy and prolonged bleeding can result in significant anemia which may become symptomatic in the hypoxic environment. Bulk symptoms can cause pressure and discomfort that may be distracting, in addition to this significant

bulk can cause bowel and bladder obstruction that may be exacerbated in the hypobaric environment.

There are many aeromedically approved medications for the treatment of fibroids and include hormone suppressive medications such as oral contraceptive pills, progesterone supplementation, or progesterone containing intrauterine devices. The use of non-aeromedically approved medications such as GnRH agonists/antagonists or aromatase inhibitors are often associated with significant and unpredictable side-effects and have an unacceptable aeromedical risk profile for waiver consideration. Additionally, GnRH medications are generally utilized on a temporary basis and often in preparation for surgical treatment. Lastly, due to the associated recovery period and possible complications related to surgical treatments (e.g. myomectomy, uterine artery embolization, hysterectomy) the aviator should be restricted from flying duties until the individual is fully recovered, benign histology report confirmed, and cleared for duty by the treating gynecologist.

A review of AIMWTS through April 2021 revealed 6 aviators with an AMS containing the diagnosis of uterine fibroids; two were FC II and four were FC III (one disqualified). Review of the sole disqualified case showed that the waiver was later approved after appropriate treatment and symptom management.

ICD-9 codes for Uterine Fibroids	
218	Uterine leiomyoma

ICD-10 codes for Uterine Fibroids	
D25.9	Leiomyoma of uterus, unspecified
N93	Other abnormal uterine and vaginal bleeding

IV. Suggested Readings

1. De La Cruz MD and Buchanan EM. Uterine Fibroids: Diagnosis and Treatment. Am Fam Physician, 2017; 95(2):100-107, https://www.aafp.org/afp/2017/0115/p100.html.

2. Mas A, Tarazona M, Dasi Carrasco J, et al. Updated approaches for management of uterine fibroids. Intl J Women's Health, 2017; 9: 607.

3. Vilos G, Allaire C, Laberge P, Leyland N. The Management of Uterine Leiomyoma: SOGC Clinical Practice Guideline. J Obstet Gynaecol Can, 2015; 318:157-178.

4. Stewart EA. Overview of treatment of uterine leiomyomas (fibroids). UpToDate. Online version 44.0 March 2021

Aerospace Medicine Waiver Guide

Cataract, Capsular Opacification, and Intraocular Lens Implant

Revised: April 2025

Reviewed: Capt Coty Winn (RAM 26), Col Jonathan Ellis (Chief, ACS Ophthalmology), Col Michael Parsons (Deputy Chief, ACS Ophthalmology), Dr. David Miller (ACS Waiver Guide Coordinator)

Significant Changes: Extended Range of Vision IOLs now approved on a case-by-case basis.

I. Waiver Consideration

Opacities, cataracts, or irregularities of the lens, which interfere with vision, or are considered to be progressive, are disqualifying for all flying classes. Pseudophakia (intraocular lens implantation during cataract surgery) and posterior and anterior capsular opacification are disqualifying for Flying Classes I/IA/II/III, GBO (RPA Pilot only), and SWA. For ATC, MOD, RPA SO, and Operational Support Flying (OSF) duties, pseudophakia and posterior/anterior capsular opacification are not a specifically disqualifying diagnosis, but it would become relevant if the vision was impaired. For all classes, no waiver is required if the lenticular opacity is asymptomatic, visually insignificant, and non-progressive (no potential for progression). Per Air Force policy, opacities, cataracts, or irregularities of the lens interfering with vision, render a member unfit for continued service, and require an IRILO to evaluate for the possibility of retention.

Table 1: Waiver potential for Cataracts, Capsular Opacification, and Intraocular Lens Implant.

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
I/IA	No	AFAC	No
II/III[1]	Yes	AFAC/MAJCOM[2]	Yes[3]
GBO[4]	Yes	MAJCOM	Only at the request of MAJCOM
Special Warfare Airmen	Yes	MAJCOM	Only at the request of MAJCOM

1. For initial flying class II and III physicals, waiver is not likely for cataracts deemed potentially progressive. Applicants with a history of cataract surgery will be considered on a case-by-case basis.
2. Air Force Accessions Center (AFAC) includes the Air Force Recruiting Service (AFRS), as listed in DAFMAN48-123, and will be the waiver authority for Initial Waivers only. MAJCOMs will be the waiver authority for renewals.
3. ACS evaluation required initially after diagnosis of symptomatic/visually significant/progressive cataract or pseudophakia then review only on subsequent renewals.
4. Pseudophakia and posterior and/or anterior capsular opacification are not disqualifying for ATC, MOD, RPA SO, or OSF duties.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines & recommendations.

A. Initial Waiver Request:

1. Description of any symptoms associated with condition, any noted progression and any prior medical evaluation or treatment for the condition (including operative note, if

applicable).
2. Comment on location and stability of intraocular lens (IOL), model number, and type of IOL used (if applicable).
3. Best corrected visual acuities at distance and near.
4. Any contact lens or spectacle correction prescriptions.
5. Dilated retinal exam.
6. Cone contrast test (CCT) scores for each eye individually.
7. Humphrey visual field 30-2 testing for each eye.
8. Low contrast acuity testing with Precision Vision 5% acuity chart corrected and uncorrected for each eye.
9. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

B. Renewal Waiver Request:

1. Description of any symptoms associated with condition, any noted progression and any prior medical evaluation or treatment for the condition (including operative note, if applicable).
2. Comment on location and stability of intraocular lens (IOL), model number, and type of IOL used (if applicable).
3. Best corrected visual acuities at distance and near.
4. Any contact lens or spectacle correction prescriptions.
5. Dilated retinal exam.
6. Cone contrast test (CCT) scores for each eye individually.
7. Humphrey visual field 30-2 testing for each eye.
8. Low contrast acuity testing with Precision Vision 5% acuity chart corrected and uncorrected for each eye.
9 If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

From an aeromedical perspective, lens changes are classified into two primary categories: opacities, which are non-progressive developmental defects, and cataracts, which are progressive opacities that may compromise visual function. While lens opacities generally do not pose a disqualifying concern, cataracts—including congenital polar cataracts—are inherently disqualifying due to their potential impact on visual acuity, contrast sensitivity, glare susceptibility, color perception, and visual field integrity. Even in cases where visual function remains unaffected initially, cataracts must be closely monitored for progression, as certain environmental conditions, such as nighttime operations or bright lighting, may exacerbate their impact.

Medical treatment for USAF aircrew follows standard clinical guidelines, and surgical intervention is not subject to prior aeromedical approval. However, unlike civilian patients, who

typically undergo cataract surgery when personal functional limitations arise, aircrew often require earlier intervention to maintain flight readiness and ensure mission effectiveness. The timing of surgery is therefore a critical consideration in balancing individual clinical needs with operational requirements.

Pseudophakia introduces unique aeromedical concerns. A 1993 FAA analysis identified a significantly increased mishap rate among pseudophakic pilots relative to their phakic counterparts, with the most pronounced risk observed in younger aircrew. Specifically, pseudophakic pilots under 50 exhibited a 3.72-fold increased risk, while those over 50 demonstrated a 1.41-fold increase. Additionally, concerns regarding IOL dislocation under high-G conditions have been investigated, though no cases have been reported among USAF aircrew. Experimental data from animal studies, which subjected implanted IOLs to forces up to +12 G_z, demonstrated no evidence of dislocation. Furthermore, a documented high-G ejection in 2000 provided empirical evidence of IOL stability under extreme conditions.

To mitigate aeromedical risks, only specific IOLs are approved for use in aircrew. Surgical selection and IOL implantation must align with ACS guidelines to ensure flight safety. The preferred approach is extracapsular cataract extraction with a posterior chamber IOL positioned in the capsular bag or ciliary sulcus. Acceptable IOLs include one-piece acrylic models or three-piece lenses with tissue-fixable haptics composed of polypropylene, polyethylene, or polymethylmethacrylate, incorporating ultraviolet filtration and a 6-7 mm optic. In contrast, one-piece silicone IOLs are disallowed due to suboptimal fixation and an increased inflammatory response. Additionally, multifocal, accommodating, and extended-range IOLs are not approved for aircrew use, with plate-haptic and positioning-hole IOLs remaining under review.

Recent aeromedical policy updates reflect advances in IOL technology. Blue-blocking IOLs were approved in 2016, contingent upon passing the cone contrast test (CCT). No cases of disqualification due to CCT failure following implantation have been reported, and research supports their safety, with no adverse effects on color vision or contrast sensitivity under photopic or mesopic conditions. Toric IOLs, also approved in 2016, offer significant benefits for individuals with corneal astigmatism, including improved uncorrected visual acuity and contrast sensitivity. Among available models, the Tecnis Toric and Acrysof Toric are preferred due to superior rotational stability, while silicone-based and plate-haptic designs remain less favorable.

Extended depth-of-focus (EDOF) IOLs represent a newer presbyopia-correcting technology. Unlike multifocal IOLs, which rely on distinct focal points, EDOF lenses extend the depth of focus to enhance intermediate vision while reducing glare and halos. However, excessive aberrations may degrade image quality. Presently, only monofocal and "enhanced" monofocal IOLs—designed with a peripheral monofocal zone and a gradual central power increase—are aeromedically approved. Multifocal lenses remain unapproved but may be considered for waiver on an individual basis, subject to further review of their operational impact.

Note: Aeromedical summaries may not be submitted any earlier than 30 days after extraction and IOL implant. Due to FAA requirements, ACS evaluation will not be scheduled until 90 days following the procedure; assuming the aircrew member is stable and off postoperative medications. If just YAG laser surgery is done for a posterior capsule opacification then

aeromedical summary may be submitted 30 days after procedure if asymptomatic and off postoperative medications.

A March 2025 AIMWTS search revealed 415 individuals with the diagnosis of cataract and/or cataract with IOL. Of the total, 17 were FC I/IA cases (14 disqualified), 195 FC II cases (30 disqualified), 6 RPA Pilot cases, 183 FC III cases (38 disqualified), 6 ATC/GBC cases, and 5 MOD cases. There were a total of 82 disqualifications dispositions. Fewer than half of the disqualified cases were directly related to the cataract diagnosis and the majority of individuals were disqualified for additional diagnoses.

Please use only the ICD-10 codes below for AIMWTS coding purposes. ICD-10 and ICD-9 codes for cataract, cataract surgery:	
H25.011-H25.9, 366	Cataract
H26.8	Other specified cataract
H26.9	Unspecified Cataract
H27.0 1/2/3, 379.31.	Aphakia, unspecified eye, right eye, left eye, bilateral
V43.1, V45.61	Lens replaced by other means, Cataract extraction
Q12.3, Q12.0, 743.30	Congenital aphakia, Congenital cataract

IV. Suggested Readings

Kessel L, et al. Toric Intraocular Lenses in the Correction of Astigmatism During Cataract Surgery. Ophthalmology, 2016; 123(2): 275-286.

Leibovitch I, Lai T, Porter N, et al. Visual Outcomes with the Yellow Intraocular Lens. Acta Ophthalmologica Scandinavica, 2006; 84: 95-99.

Lubiński W, Kaźmierczak, B, Gronkowksa-Serafin J, and Podborączyńska-Jokdo K. Clinical Outcomes after Uncomplicated Cataract Surgery with Implantation of the Tecnis Intraocular Lens. Journal of Ophthalmology, 2016; Article ID 3257217: 6 pages. http://dx.doi.org/10.1155/2016/3257217

Nakagawara VB and Wood KJ. Aviation Accident Risk for Airmen With Aphakia and Artificial Lens Implants. US Department of Transportation, Federal Aviation Administration. DOT/FAA/AM-93/11. Oklahoma City, OK. July 1993.

Raj SM, Vasavada AR, and Nanavaty MA. AcrySof Natural SN60AT versus AcrySof SA60AT intraocular lens in patients with color vision defects. J Cataract Refract Surg, 2005; 31: 2324-2328.

Rodriguez-Galietero A, Montés-Micó R, Muñoz G, and Albarrán-Diego C. Blue-Light Filtering Intraocular Lens in Patients with Diabetes: Contrast Sensitivity and Chromatic Discrimination. J Cataract Refract Surg, 2005; 31:2088-2092.

Rodriguez-Galietero A, Montés-Micó R, Muñoz G, and Albarrán-Diego C. Comparison of Contrast Sensitivity and Color Discrimination After Clear and Yellow Intraocular Lens Implantation. J Cataract Refract Surg, 2005; 31:1736-1740.

Rosenfeld SI, Blecher MH, Bobrow JC, et al. In: *Basic and Clinical Science Course: Lens and Cataract.* American Academy of Ophthalmology. 2013-2014: 52-94.

Smith P, Ivan D, LoRusso F, et al. Intraocular Lens and Corneal Status Following Aircraft Ejection by a USAF Aviator. Aviat Space Environ Med, 2002; 73: 1230-34.

Tredici TJ and Ivan DJ. Ocular Problems of the Aging Military Aviator. Presented at the RTO HFM Symposium, RTO MP-33, Toulon France, Oct 1999.
Waltz KL, et al. Clinical Outcomes of Tecnis Toric Intraocular Lens Implantation after Cataract Removal in Patients with Corneal Astigmatism. Ophthalmology, 2015; 122: 39-47.
Yuan Z, Reinach P, and Yuan J. Contrast Sensitivity and Color Vision with a Yellow Intraocular Lens. American Journal of Ophthalmology, 2004; 138: 138-140.

Central Retinal Vein Occlusion (Mar 2020)
Reviewed: Lt Col Jonathan Ellis (Chief, ACS Ophthalmology), Lt Col Michael Parsons (Deputy Chief, ACS Ophthalmology), Dr. Dan Van Syoc (ACS Waiver Guide Coordinator), Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes:
New Ground Based Operator (GBO) Standards. MSD C43, C46.

I. Waiver Consideration

Central retinal vein occlusion (CRVO) and branch retinal vein occlusion (BRVO) are disqualifying for Flying Class I, IA, II, III, and SWA duties. For ATC, GBO, and Operational Support Flying Duty (OSF) personnel, these conditions would be disqualifying if there are residual visual symptoms such as loss of visual acuity, visual field defects, or loss of color vision below standards. An Aeromedical Consultation Service (ACS) evaluation is required for aviators for all initial waivers for CRVO/BRVO. The probability of waiver approval is dependent on the final visual acuity, visual field, and absence of other significant pathology or complications. Any underlying contributing pathology must also be waiverable for the individual to be returned to flight status. For waiver renewals, ACS review is required. Depending on the results of local work-up, an ACS evaluation may be required prior to waiver renewal.

Table 1: Waiver potential for Retinal Vein Occlusion

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Evaluation/Review
I/IA	Maybe[1, 2]	AETC	Yes
II/III SWA	Yes[2]	MAJCOM	Yes
ATC/GBO/OSF	Yes[2, 3]	MAJCOM	At the discretion of the waiver authority

1 No waiver potential for RVO with residual visual defects in initial FC I/IA applicants.
2 Visual outcome needs to have returned to baseline without presence of any recognized risk factors. The Waiver Authority for untrained aircrew is AETC.
3 Waiver only required if RVO residual symptoms are disqualifying (visual field defect, color vision loss, etc.)

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. Consideration of any potentially underlying disease etiologies, to include hypertension, heart disease, diabetes, hematologic disease, or collagen vascular disease with appropriate work-up and lab testing results.
2. List and fully discuss all clinical diagnoses requiring a waiver.
3. History of disease, including treatment modalities attempted.
4. Full ophthalmology exam to include:
   a. Presence or absence of any visual symptoms.
   b. Best corrected visual acuities at distance and near.
   c. Examination of fellow eye with pertinent findings.
   d. Cone contrast testing (CCT) for each eye.
   e. Best corrected 5% Precision Vision (low contrast) acuity testing, if available.
   f. Humphrey visual field 30-2 and 10-2 testing for each eye, if available.
   g. Specialist report must comment on the presence or absence of macular edema, retinal hemorrhage, neovascularization, and glaucoma. Include Optical Coherence Tomography and/or Fluorescein Angiography, if available.
5. Lab testing results for fasting blood glucose, A1C, CBC + differential, PT/PTT, ESR, CRP, Lipids, ANA, Treponemal AB, and homocysteine.
6. If the local base cannot provide all of the above information, an explanation needs to be given to the MAJCOM as to why not.

B. Renewal Waiver Request:

1. Interim history since last waive and ACS visit.
2. Ongoing treatment modalities
3. Full ophthalmology exam to include items as noted above.
4. If the local base cannot provide all of the above information, an explanation needs to be given to the MAJCOM as to why not.

❖ Note: if above items are not available, member must come for full ACS evaluation.

III. Aeromedical Concerns

The primary aeromedical concerns with CRVO/BRVO are loss of best-corrected visual acuity, loss of visual field, decreased night vision, loss of color vision, loss of low contrast vision, and loss of stereopsis. Other concerns include persistent complications such as neovascular glaucoma, macular edema, as well as ensuring proper management of any predisposing medical conditions. The risk of BRVO developing in the non-affected eye is approximately 10% within three years of initial presentation. The risk of fellow eye involvement in CRVO cases is 1% per year based on published data. A common complication following RVO is the development of neovascular glaucoma in eyes with ischemic CRVO, which approaches 40% over one year. Persistent, chronic macular edema is not waiverable due to the risk of worsening of this condition during flight and associated reduced visual function. Even if vision is adequately restored to meet vision standards, the underlying systemic conditions leading to RVO may pose potential serious risks to safe flight. Therefore, investigation of the underlying cause is critical to

both management and aeromedical disposition. Also of aeromedical concern is exposure to the hypoxic environment of altitude. A small case report series discussed the implications of high-altitude as a possible cause to RVO. Though these patients were typically exposed to the high-altitude environment for several weeks, one patient did develop BRVO while driving to altitude. These occurrences create some concern specifically for recurrence of events especially in light of literature suggesting decreased oxygen saturation in the venous circulation of the retina up to three months following the acute event.

AIMWTS review in Jan 2019 revealed 24 cases containing the diagnosis of retinal vein occlusion. There were no FC I/IA cases, 14 FC II cases and 10 FC III cases. There were three cases disqualified, one FC II and two FC III.

ICD 9 Codes for Retinal Vein Occlusion	
362.35	Central Retinal Vein Occlusion
362.36	Branch Retinal Vein Occlusion

ICD-10 Codes for Retinal Vein Occlusion	
H34.81 1, 2, 3, 9	Central Retinal Vein Occlusion, Right, Left, Bilateral, Unspecified
H34.83 1, 2, 3, 9	Branch Retinal Vein Occlusion, Right, Left, Bilateral, Unspecified
H34.9	Unspecified Retinal Vascular Occlusion

IV. Suggested Readings

1. Ehlers JP and Fekrat S. Retinal Vein Occlusion: Beyond the Acute Event. Surv Ophthalmol, 2011; 56(4): 281-299.
53(2): 112-20.

2. Hardarson SH and Stefánsson E. Oxygen Saturation in Central Retinal Vein Occlusion. Am J Ophthalmol, 2010; 150(6): 871-75.

3. Gupta A, Singh S, Ahluwalia TS, and Khanna A. Retinal Vein Occlusion in High Altitude. High Altitude Med Bio, 2011; 12(4): 393-97.

Central Serous Chorioretinopathy (Mar 2020)
Reviewed: Lt Col Jonathan Ellis (Chief, ACS Ophthalmology), Lt Col Michael Parsons (Deputy Chief, ACS Ophthalmology), Dr. Dan Van Syoc (ACS Waiver Guide Coordinator), and Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes: New Ground Based Operator (GBO) Standards. Oral eplerenone can speed recovery of CSR. Half dose photodynamic therapy should be considered for members who do not respond to oral eplerenone. MSD C43.

I. Waiver Consideration

Central Serous Chorioretinopathy (CSR) is disqualifying for all FC I/IA, II, III, and SWA duties and requires ACS evaluation for waiver consideration. CSR is not specifically disqualifying for ATC, GBO (RPA Pilot, RPA SO, and MOD), and OSF duties, but will be disqualifying if it results in visual acuity problems or significantly alters color vision. Although CSR is not disqualifying for these members, they should still get referred to an ophthalmologist for diagnosis and treatment to speed resolution and ensure preservation of good vision. After documented resolution of CSR by a fundus exam and optical coherence tomography (OCT), a waiver may be requested. Even if the aviator's vision returns to 20/20 or is correctable to 20/20, a local eye specialist must demonstrate that the sub-retinal fluid has resolved prior to waiver request submission. Waivers may be requested for aviators with best-corrected vision less than 20/20 or residual visual symptoms (metamorphopsia, color vision deficits), however, the visual acuity and visual symptoms must be stable (not improving or worsening). If photodynamic therapy (PDT) or laser photocoagulation is performed, the airman must remain DNIF for 30 days following the procedure and requires a full local ophthalmologic exam to include a dilated fundus exam and Humphrey visual field 30-2 testing prior to waiver request submission. The eye exam must demonstrate resolution of the sub-retinal fluid by fundus exam and OCT. If CSR recurs in an aviator with a known history of prior CSR, it is treated the same as an initial occurrence. The aviator will require a new waiver request to be submitted prior to return to flight status with a possible ACS review/evaluation.

Current literature supports initiating oral mineralocorticoid receptor antagonists (spironolactone or eplerenone) earlier after diagnosis to speed recovery.[1,2,3] Given the side effect profile of spironolactone, eplerenone use is preferred and should be started at a dose of 50 mg daily for one week and then increased to 50 mg BID until fluid resolves (typically 1-2 months). Once the fluid is resolved, eplerenone may be tapered to daily for one to two weeks and then stopped. Hyperkalemia is a known side effect and potassium levels should be monitored for any member who requires eplerenone use longer than two months in duration. Members who do not respond to medical treatment should be considered for half-dose photodynamic therapy (PDT).

Table 1: Waiver potential for Central Serous Chorioretinopathy.

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review/Evaluation
I/IA	No	AETC	No
II/III/SWA	Yes[1]	MAJCOM	Yes
ATC/GBO/OSF	N/A	N/A	N/A

1. Waiver in untrained FC II and III individuals is unlikely but will be considered on a case-by-case basis.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines & recommendations.

A. Initial Waiver Request:

1. Complete history of symptoms (negatives included), medical or laser treatment, and residual visual complaints.
2. Medical History including possible contributing factors such as steroid use, HCTZ use, or Obstructive Sleep Apnea.
3. Attach studies (optical coherence tomography [OCT], fluorescein angiograms [FA] or indocyanine green angiograms) if performed.
4. Full ophthalmology exam to include:
   a. Documentation of resolution of CSR by fundus exam and an OCT.
   b. Documentation of visual acuities at or better than 20/20 in each eye or documented stability of a visual acuity less than 20/20.
   c. Results from Amsler grid testing.
   d. Results of CCT for each eye individually.
   e. OVT-DP results, if not within standards then AO Vectograph results.
   f. Humphrey visual field 30-2 testing for each eye if laser photocoagulation was performed (waiver request may not be submitted until 30 days after the procedure).
5. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority

B. Renewal Waiver Request:

1. A brief medical history summarizing the initial occurrence of the CSR, any recurrences and any treatment, as well as a full description of any residual visual complaints.
2. Full ophthalmology exam to include:
   a. Documentation of continued resolution of CSR by fundus exam and an OCT.
   b. Visual acuity in each eye, uncorrected and corrected.
   c. Results from Amsler grid testing.
   d. CCT scores from each eye individually.
3. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to the waiver authority.

III. Aeromedical Concerns

Normal visual function is crucial in the aerospace environment. Central serous chorioretinopathy (CSR) can adversely impact visual function with symptoms of metamorphopsia (distortion of vision), micropsia (smaller visual images), scotomata (areas of the visual field missing or blurred), blurred vision, color desaturation (reduced brightness of colors), or sub-standard visual acuity. A 1988 Aeromedical Consultation Service (ACS) study that examined 47 rated airmen with 55 eyes affected by CSR found that all but one of the patients was returned to flying status. Fifty-one percent of airmen had recurrent episodes, 86% had better than 20/20 visual acuity after resolution of the CSR, 87% had normal color vision and 90% had normal stereopsis. A current study is pending legal review and IRB approval to review the current outcomes of the CSR Management Group.

The effect of the aerospace environment on active CSR is currently unknown. The presence of sub-retinal fluid introduces new dynamics into the eye that are not present otherwise. The effect of applying G-forces or relative hypoxia upon the pathophysiologic process of CSR is unclear. Further, sub-retinal fluid indicates active disease, which introduces the possibility of fluctuating visual acuity and could have an adverse impact on flight safety. Because of the aeromedical implications of these variables, aircrew members will not be considered for return to flight status until complete resolution of the sub-retinal fluid occurs as demonstrated by ophthalmologic exam and ancillary studies.

For aircrew members that have a history of CSR, regular follow-up care and monitoring are critical for flight safety and continued ocular health. If contributing medical factors such as steroid use, HCTZ use, or a history of Obstructive Sleep Apnea are identified, these should be addressed to minimize recurrences and to hasten resolution of the subretinal fluid. Self-administered Amsler grid testing is the primary method for aircrew to assess for recurrence or worsening of CSR. Aircrew members should obtain an Amsler grid from the local optometrist office and test each eye individually daily for the first year following the CSR. Any new distortion of the lines (metamorphopsia) or missing parts of lines (scotomas) should be immediately reported to the local flight surgeon with subsequent referral to ophthalmology. If no recurrence has occurred within the first year, then weekly Amsler grid testing is appropriate. In addition to Amsler self-testing, aircrew members with a history of CSR require annual full local ophthalmology evaluations as follow-up. These exams should specifically note visual acuity, Amsler grid testing, OVT depth perception testing, CCT color testing, and dilated funduscopic examination results. The result of these exams should be included in the AMS with submission for waiver request.

AIMWTS search in Jan 2019 revealed 164 members with a diagnosis of CSR. Breakdown of the cases reveals: 3 FC I/IA cases (3 disqualified), 98 FC II cases (8 disqualified), 5 RPA pilot cases (1 disqualified), 55 FC III cases (9 disqualified), and 3 ATC/GBC cases (1 disqualified).

ICD-9 code for central serous chorioretinopathy	
362.41	Central serous retinopathy

ICD-10 code for central serous chorioretinopathy	
H35.71 1, 2, 3, 9	Central serous retinopathy, right, left, bilateral, unspecified eye

IV. Suggested Readings

1. Bousquet E, et al. Mineralocorticoid Receptor Antagonism in the Treatment of Chronic Central Serous Chorioretinopathy: A Pilot Study. Retina 2013; 33:2096-2102.

2. Zucchiatti I, et al. Eplerenone Versus Observation in the Treatment of Acute Central Serous Chorioretinopathy: A Retrospective Controlled Study. Ophthalmol Ther 2018; 7:109-118.

3. Kapoor KG and Wagner AL. Mineralocorticoid Antagonists in the Treatment of Central Serous Chorioretinopathy: A Comparative Analysis. Ophthalmic Res 2016; 56:17-22.

4. Green RP, Carlson DW, Dieckert JP, and Tredici TJ. Central Serous Chorioretinopathy in US Air Force Aviators: A review. Aviat Space Environ Med, 1988; 59(12): 1170-75.

Color Vision Deficiencies (Mar 2020)
Reviewed: Lt Col Jonathan Ellis (Chief, ACS Ophthalmology), Lt Col Michael Parsons, (Deputy Chief, ACS Ophthalmology), Dr. Dan Van Syoc (ACS Waiver Guide Coordinator), and Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes: None. Despite the change in Flying Class categories, the RPA, RPA SO standard remains at CCT-55 minimum, and the MOD remains at CCT-35. MSD C80.

I. Waiver Consideration

Moderate and Severe color vision deficiencies are disqualifying for FC I/IA, II, III, ATC, SWA, and GBO personnel. Severe color vision deficiency is disqualifying for MOD personnel. A normal score on the CCT is 75 or better. A score of 55 or better is required for FC I/IA, II, III, ATC, SWA, RPA and RPA SO duties and a score of 35 or better is required for MOD duties. Untrained aircrew will not be considered for waiver below the MSD standard. Trained aircrew may be considered for a waiver for defective color vision. ACS review/evaluation is required as part of the waiver consideration for trained aircrew. Waiver recommendations and management are primarily dependent on the etiology, severity of the color deficiency, and are made on a case by case basis. Indefinite waivers for color vision deficiency are authorized. CCT testing is required once at initial qualification. A CCT score of 55-74 is considered mild color deficiency; a score of 35-54 is moderate color deficiency, and a score < 35 is considered severe color deficiency.

Table 1: Waiver potential for Color Vision Deficiencies.

Flying Class	Passing Score	Waiver Potential	ACS Review/Evaluation
FC I/IA, Initial FC II/III, ATC, SWA, GBO (RPA, RPA SO)	CCT - 55	No	No
Initial MOD	CCT - 35	Maybe[1]	Yes
Trained FC II /III ATC, SWA, GBO (RPA, RPA SO)	CCT - 55	Yes FCIIC[2]	Yes - At the discretion of MAJCOM.
MOD	CCT - 35	Yes[1]	Yes - At the discretion of AFMRA[1]

1 MOD waivers are unlikely but will be considered on a case-by-case basis, with inputs from the career field manager and AFMRA if needed.
2 Flying Class IIC waiver restricted to all previously flown aircraft. If selected to cross train into a new airframe, or assigned to a previous airframe that has undergone a significant cockpit upgrade that requires interpretation of different color symbology, an operational evaluation is recommended to verify capability to accurately recognize and respond to all display information. This operational evaluation should be performed by an instructor pilot in the new airframe.

AIMWTS search in Jun 2018 revealed a total of 3467 individuals with an AMS containing a diagnosis of color deficiency. Of that total, 1536 were disqualified. Breakdown of the cases was as follows: 501 FC I/IA (476 DQ), 785 FC II (41 DQ), 52 RPA pilots (34 DQ), 1509 FC III (592

DQ), 372 ATC/GBC (226 DQ), and 248 MOD (167 DQ). Within the DQ category, there were 13 ETP cases (3 FC I, 9 FC III, and 1 MOD). Of this total, 11 were denied and 2 were granted (both FC III).

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines & recommendations.

A. First-time (Indefinite) Waiver Request:

1. History – history of previous color vision testing results (MEPS, commissioning, initial flying physicals, preventive health assessments), family history of color vision defects, medications, and any impact on job/daily life.
2. Physical – Full eye exam to include funduscopic results and current color testing results on the most recent CCT version (ensure proper positioning and alignment with correction to at least 20/20 at distance and near or best corrected if member does not have 20/20 vision potential).
3. Optometry or ophthalmology consultation report.

III. Aeromedical Concerns

Color deficient individuals are at a distinct disadvantage in terms of receiving and processing information in an efficient manner in the aviation and occupational environment. This can be demonstrated in aviation history as witnessed in the FedEx mishap in 2002, where color vision was found to be a contributing factor. Several other examples have been cited in a work on military aviation history and color vision. With regards to aviation, color defectives are more vulnerable to low-light and hypoxic effects on color vision than normals. Additionally, one must consider the compounding effects induced by certain required protective or performance enhancing optical appliances that can potentially degrade existing levels of color perception even further. These currently include blue-blocker sunglasses, yellow high-contrast visors, and assorted laser eye protection devices. While these devices cause changes in color perception with color normal subjects, the impact is far more profound with subjects who have an underlying color deficit. This finding is the basis for restriction from use of the yellow high contrast visor by color defective members, as stated in AFI 48-123. In addition to concerns with flying members, color vision can pose a significant risk for ground personnel. Color discrimination is an integral capability in the function of many ground based duties, to include remotely piloted aircraft operations and air-traffic control duties. Previous studies have demonstrated the importance of normal color vision in performing crucial tasks in air-traffic control. In light of changing technology both in operational symbology and color vision screening, the Operational Based Vision Assessment (OBVA) lab and ACS Ophthalmology are testing to determine if any updates on color vision requirements can be made for the various career fields. However, the current device being investigated by OBVA, the Konan CCT-HD, has not been validated for accuracy and consistency at scoring for a 55 cutoff and is not approved for initial flying class physical exam testing. Additionally, Innova is now selling

tablets to various flight medicine clinics for color vision testing to be held anywhere from 18-24 inches from the tester. As a result, there is a surge of applicants who are able to pass on the tablet at the local base by holding the screen closer (which makes the image larger), but ultimately fail at MFS when the approved NCI test at 36 inches and confirmatory ancillary testing are properly administered. Therefore, the Konan CCT-HD and the Innova are not approved or recommended for initial flying class physical exams.

In general, most color vision screening tests involve one of three types: pseudo-isochromatic plates [or PIP (e.g. Ishihara)], an arrangement test (e.g. D-15 or FM-100), or an operationally derived test (e.g. FALANT). While these tests are appropriate for screening purposes, they are highly dependent on proper administration and they are not designed to quantify severity of color deficiencies. To address these concerns, USAF School of Aerospace Medicine scientists developed the computer-based Rabin Cone Contrast Test (CCT). A study with aircrew applicants demonstrated that the CCT significantly improves sensitivity relative to pseudo-isochromatic plates and provides quantification on the level of color deficiency. Due to these advances, the CCT is now the only acceptable device for evaluating color vision of USAF aircrew and applicants to aircrew positions. A normal score on the CCT is 75 or better. A passing score on the CCT is now 55 or greater (mild deficiency or better) for the red, green, and blue cone types with each eye (35 or better is required for MOD duties). To ensure the most accurate results, testing should be accomplished with the patient corrected to 20/20 at distance and near or best corrected if member does not have 20/20 vision potential. It is appropriate to use a reading lens for the test distance (36 inches) for presbyopic patients as needed. Alignment of the monitor should be confirmed using the alignment tube and the patient should not be allowed to move their head during the test sequence (refer to the KX for further guidance). Improper test administration can result in false positive and false negative results.

ICD-9 codes for color vision deficiency	
368.51	Protan defect
368.52	Deutan defect
368.59	Color vision deficiencies, unspecified

ICD-10 codes for color vision deficiency	
H53.54	Protanomaly
H53.53	Deuteranomaly
H53.50	Unspecified color vision deficiencies
H53.59	Other color vision deficiencies

IV. Suggested Readings

1. National Transportation Safety Board. Collision with Trees on Final Approach Federal Express Flight 1478… Aircraft Accident Report NTSB/AAR-04/02. Washington, DC. 2004.

2. Hovis J, Milburn N, and Nesthus T. Trichromatic and Dichromatic Relative Sensitivity to Green Light in a Mild Hypoxic Environment. Aviat Space Environ Med, 2013; 84(11): 1125-30.

3. Hovis JK, Lovasik JV, Cullen AP, and Kothe AC. Physical Characteristics and Perceptual Effects of "Blue-Blocking" Lenses. Optom and Vision Sci, 1989; 66 (10): 682-89.

4. Mertens H and Milburn N. Performance of Color-Dependent Air Traffic Control Tasks as a Function of Color Vision Deficiency. Aviat Space Environ Med, 1996; 67(10): 919-27.

5. Rabin J, Gooch J, and Ivan D. Rapid Quantification of Color Vision: The Cone Contrast Test. Investigat Ophthalmol Vis Sci, 2011; 52(2): 816-20.

Dry Eye Syndrome (Keratoconjunctivitis Sicca) (Mar 2020)
Reviewed: Lt Col Jonathan Ellis (Chief, ACS Ophthalmology), Lt Col Michael Parsons (Deputy Chief, ACS Ophthalmology), Dr. Dan Van Syoc (ACS Waiver Guide Coordinator), and Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes: None since last review. Grading is post-treatment when considering waiver potential. MSD C24.

I. Waiver Consideration

Dry eye is disqualifying for Flying Class I, IA, II, III, and SWA duties. Quality of vision can easily be compromised with chronic dry eye syndrome, so visual acuity standards apply. Generally, Grade 1 Dry Eye Syndrome does not require waiver action as it is easily controlled by lid hygiene and occasional use of artificial tears. Grade II and III dry eyes would require waiver action if only controlled with artificial tears, topical medications, or punctual plugs. Grade IV Dry Eye Syndrome would generally not be waiverable on maximal medical therapy. There is no disqualification for ATC, GBO, or OSF personnel with Dry Eye Syndrome. However, if the dry eye affects visual acuity to a level that the member cannot meet vision standards, then that is disqualifying. Dry Eye Syndrome is not disqualifying for retention.

Table 1: Waiver potential for Dry Eye Syndrome

Flying Class (FC)	**Waiver Potential** **Waiver Authority**	**ACS Review/Evaluation**
FC I/IA	Yes – Grade 1 only (may not be considered disqualifying) No – Grade 2 or worse on tears for at least 3 months AETC	At the request of AETC
FC II/III SWA	Yes – Grade 2 and 3 No – Grade 4 on treatment (tears, Restasis®, Xiidra®) MAJCOM	At the request of the MAJCOM
ATC/GBO/OSF	N/A	N/A

AIMWTS review in Jun 2018 revealed a total of 96 cases submitted for waiver consideration with the diagnosis of dry eye with 84 cases approved for waiver. Breakdown of the cases revealed 7 FC I/IA cases (1 disqualification), 44 FC II cases (4 disqualifications), 7 RPA cases (1 disqualification), 33 FC III cases (4 disqualifications), and 7 ATC/GBC cases (1 disqualifications).

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. List and fully discuss all clinical diagnoses requiring a waiver.
2. History – history of all dry eye symptoms; any underlying causative factors, all treatments attempted and effectiveness of the therapy (medical and surgical), and any impact on job/ daily life. History of contact lens use, including length and pattern of wear must be included in history. Specific description of medical interventions tried, and current treatment regimen if applicable.
3. Physical – full eye exam to include visual acuity measurement, an external examination, and slit-lamp examination. In addition, include results of the tear film break-up time, ocular surface dye testing, and the Schirmer test.
4. Ophthalmology consultation report (cornea specialist preferred).
5. If the local base cannot provide any of the above listed information, they should document why, explaining the reason to the waiver authority.

B. Renewal Waiver Request:

1. Interval AMS with particular attention to clinical changes on Ophthalmologist Consultation.

III. Aeromedical Concerns

The aeromedical issues relate to the subjective annoyance of dry eye symptoms and also with visual performance decrements. In more severe cases individuals can have significant visual impairment and should not participate in military aviation duties. The dry air of most cockpits will exacerbate symptoms in most affected airmen. The increase in use of contact lens among aircrew has significantly increased the incidence of dry eyes, and it is vitally important that new dry eye medications are not inappropriately used to treat contact lens intolerance or contact lens related dry eyes. Most artificial tear drops are safe in the aviation environment, as are punctal plugs if declared stable by the treating ophthalmologist.

An attempt to grade severity of dry eye symptoms is depicted in Table 2. The results of this grading scheme may drive the level of treatment. However, symptoms of dry eye syndrome do not necessarily reflect the severity of the disease. The lack of concordance between signs and symptoms presents a problem not only in the diagnosis but also in the construction of a treatment plan and when designing adequate clinical trials.[2]

Table 2: Dry Eye Disease Severity Grading Scheme

Dry Eye Severity level	1	2	3	4
Discomfort, severity, and frequency	Mild and/or episodic; occurs under environmental stress	Moderate, episodic, or chronic; stress or no stress	Severe, frequent, or constant without stress	Severe and/or disabling and constant
Visual Symptoms	None or episodic mild fatigue	Annoying and/or activity-limiting, episodic	Annoying, chronic, constant limiting activity	Constant and/or possibly disabling
Conjunctival injection	None to mild	None to mild	Mild	Moderate to Severe
Conjunctival staining	None to mild	Variable	Mild to Moderate	Marked
Corneal staining(severity/ location)	None to mild	Variable	Marked central	Severe punctuate erosions
Corneal tear signs	None to mild	Mild debris, decreased meniscus	Filamentary keratitis, mucus clumping, increased tear debris	Filamentary keratitis, mucus clumping, ↑ tear debris, ulceration
Lid/Meibomian glands	MGD variably present	MGD variably present	Frequent	Trichiasis, keratinization, symblepharon
TBUT (seconds)	Variable	≤ 10	≤ 5	Immediate
Schirmer score (mm tears/5 minutes)	Variable	≤ 10	≤ 5	≤ 2

MGD = Meibomian gland disease
TBUT = tear film break-up time

ICD-9 code for Dry Eye Syndrome	
375.15	Dry eye syndrome

ICD-10 code for Dry Eye Syndrome	
H04.12	Dry eye syndrome of lacrimal gland

IV. Suggested Readings

1. Galor A, Feuer W, Lee DJ, et al. Prevalence and Risk Factors of Dry Eye Syndrome in a United States Veterans Affairs Population. Am J Ophthalmol, 2011, 152(3), 377-84.

2. Lemp MA. Advances in Understanding and Managing Dry Eye Disease. Am J Ophthalmol, 2008; 146: 350-56.

Glaucoma and Ocular Hypertension (Mar 2020)
Reviewed: Lt Col Jonathan Ellis (Chief, ACS Ophthalmology), Michael Parsons (Deputy Chief, Aerospace Ophthalmology), Dr. Dan Van Syoc (ACS Waiver Guide Coordinator), and Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes: New Ground Based Operator (GBO) Standards. MSD C6, C7, C8.

I. Waiver Consideration

Glaucoma is disqualifying for all flying classes (except GBO and OSF), and for retention. There is no waiver potential for *initial* aircrew applicants. Glaucoma is most simply defined as an acquired and progressive optic neuropathy, often associated with raised intraocular pressure over time. However, glaucoma is disqualifying for all flying classes including GBO and OSF duties if there are demonstrable changes in the optic disc or visual fields or if the condition is not amenable to treatment. Additionally, initial GBO and OSF applicants with the diagnosis of glaucoma who do not meet the retention standard (only C7 applies) will require a waiver to commission or access into the Air Force prior to flying or special operational duty consideration. The waiver authority for those cases is the Air Education and Training Command (AETC) and each applicant will be considered on a case-by-case basis.

Glaucoma in *trained* aircrew (all flying classes) is potentially waiverable, provided the following conditions are met. First, that there is stable glaucoma controlled by medications or aeromedically approved laser treatment modalities, without aeromedically significant visual field defect within the central 30 degrees of either eye. Second, a full binocular visual field is documented. Finally, no evidence of visual or systemic medication side effects. The degree of systemic beta-blockade resulting from ophthalmic timolol is proportionately much less than oral, with perhaps a 20-30% reduction in reflex cardiovascular responses at the plasma levels achieved with such therapy. All topical eye drop medication are aeromedically approved after an uneventful one-week ground trial. Laser surgical procedures such as argon laser trabeculoplasty (ALT), selective laser trabeculoplasty (SLT), peripheral iridotomy (PI), or iridoplasty may be performed on aviators with demonstrated uncontrolled OHT or progressive glaucoma. Waiver request for these procedures should be submitted following successful laser treatment once the treated eye/s have stabilized (usually at least one month), IOP is controlled and topical post-op steroids have been discontinued. Incisional surgery such as trabeculotomy or glaucoma shunt surgery has no waiver potential for aircrew trained or untrained.

By definition, the diagnosis of Ocular Hypertension (OHT) requires absence of optic nerve damage (as defined by normal 30-2 visual fields, no retinal nerve fiber layer (RNFL) or ganglion cell layer (GCL) thinning, and non-progressive optic nerve cupping). Ocular Hypertension (OHT) is disqualifying for *initial* FC I/IA, II, III, ATC, and SWA applicants provided the following conditions are met: either the intraocular pressure (IOP) is greater than 26mm Hg or the corneal thickness is less than 540um with an IOP greater than 21. Otherwise, this condition meets standards for both initial and trained aircrew.

Waiver request and Aeromedical Consultation Service (ACS) case review is not required for symmetric or asymmetric physiologic (normal variant) enlargement of the optic nerve cup.

Table 1: Waiver potential for Glaucoma (trained aircrew only)[1, 2]

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
II/RPA Pilot/III	Yes	MAJCOM	Yes
ATC/SWA	Yes	MAJCOM	Yes
GBO/OSF[3]	N/A	N/A	N/A

1. There is no waiver potential for initial applicants with Glaucoma or Ocular Hypertension with an IOP greater than 26 mmHg or corneal thickness less than 540 um with an IOP greater than 21 mmHg.
2. Glaucoma for the setting of waiver criteria is defined as any history of an IOP of 30 or greater or the presence of glaucomatous optic neuropathy. Only trained aircrew will be considered for a waiver recommendation.
3. Only disqualifying if there is glaucoma progression NOT amenable to treatment (C6)

Table 2: Qualification Matrix for Ocular Hypertension (initial aircrew only)[1]

Corneal Thickness	IOP = 21-26 mmHg	IOP > 26 mmHg
> 540 um	Yes	No
< 540 um	No	No

1. Ocular Hypertension (IOP greater than 21 mmHg, but less than 30 mmHg with normal OCT and visual field) in *trained* aircrew is *not* disqualifying.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines & recommendations.

A. Initial Waiver Request:

1. Aeromedical summary with a thorough review of past medical history and family history. Past ocular history should include a review of eye injuries, surgery, previous infectious or inflammatory eye disease, intraocular pressure history, previous visual field findings and presence or absence of associated risk factors including family history of glaucoma.
2. Complete eye examination to include:
    a. Refraction to best visual acuity.
    b. Humphrey visual field testing (30-2).
    c. Applanation tonometry with diurnal measurements (at least three measurements, performed two hours apart).
    d. Dilated funduscopic exam, and retinal nerve fiber layer analysis by optical coherence tomography (OCT) results.
    e. OHT and glaucoma examination should also include central corneal thickness by ultrasound or with other computerized devices, such as Pentacam or anterior segment OCT (if available), and include optic disc photographs (if available).
3. Results of ophthalmology consultation (if required).
4. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

ACS review is required for all flying classes for waiver recommendation of OHT and glaucoma as part of the Ocular Hypertension/Glaucoma Management Group. A Medical Evaluation Board (MEB) is required for glaucoma if there are changes in the optic disc, visual field defects, or the condition is not amenable to treatment. An MEB is not required for ocular hypertension.

B. Renewal Waiver Request:

1. Summary of any changes with a review of history and a list of quarterly measurements of intraocular pressure by applanation tonometry, unless the treating specialist specifies less frequent assessment.
2. A complete eye examination to include: retinal nerve fiber layer analysis by optical coherence tomography (OCT), dilated funduscopic exam with optic disc photographs, and Humphrey visual field exam (30-2) of each eye separately (if OCT abnormal).
3. Results of ophthalmology consultation (if required).
4. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

III. Aeromedical Concerns

Enlarged optic nerve cupping and OHT may be indicators of early glaucoma. Elevated IOP may result in difficulty with night vision secondary to the appearance of halos and flares around lights, and decreased contrast sensitivity. Left undiagnosed or inadequately treated, glaucoma can cause acquired changes in color vision, loss of central or peripheral visual fields, loss of visual acuity, and blindness. All of these visual disturbances have the potential to impair the aviator's visual performance and may present a significant safety hazard or adversely impact mission effectiveness. Glaucoma associated visual degradation occurs insidiously without subjective complaints which makes the screening program even more vital.

AIMWITS search in Jun 2019 for the previous five years revealed 444 members with an aeromedical summary with the diagnoses of glaucoma or intraocular hypertension. There 48 disqualifications. Breakdown of the cases revealed: 41 FC I/IA cases (18 disqualified), 170 FC II cases (5 disqualified), 16 RPA pilot cases (1 disqualified), 178 FC III cases (23 disqualified), 33 ATC/GBC cases (0 disqualified), 3 MOD cases (0 disqualified), and 3 SWA cases (1 disqualified).

ICD-9 codes for optic nerve cupping, intraocular hypertension, and glaucoma	
743.57	Specified anomalies of optic disc (increased cup-to-disc ratio)
365.04	Ocular Hypertension
365	Glaucoma

ICD-10 codes for optic nerve cupping, intraocular hypertension, and glaucoma	
Q14.2	Congenital Malformation of optic disc
H40.05	Ocular Hypertension, right eye, left, bilateral, unspecified

1, 2, 3, 9	
H40.9	Unspecified glaucoma
H40.10X0	Unspecified open-angle glaucoma, stage unspecified

IV. Suggested Readings

1. Leisegang TJ, et al. American Academy of Ophthalmology. Basic and Clinical Science Course, 2007-2008, Section 10: *Glaucoma.*

2. Saeedi OJ, Ramulu P, and Friedman DS. Epidemiology of Glaucoma. Ch. 10.1 in *Yanoff: Ophthalmology*, 4th ed., Saunders, 2013.

3. Mims JL, Tredici TJ. Ocular Hypertension and Chronic Open-Angle Glaucoma in USAF Pilots and Navigators. National Technical Information Service. December 1974. TR-74-48.

4. Gordon MO, Beiser JA, Brandt JD, et al. The Ocular Hypertension Treatment Study: baseline factors that predict the onset of primary open-angle glaucoma. Arch Ophthalmol. 2002; 120(6):714-720.

Aerospace Medicine Waiver Guide

Implantable Collamer Lens (ICL) Surgery

Revised: Dec 2022 Reviewed: Col Jonathan Ellis (ACS Ophthalmology Branch Chief), Dr. Austen Tanner (Senior Research Optometrist), and Dr Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: ICL surgery is now authorized for trained and untrained USAF aircrew including FC I/IA. Refractive error limits should be within waiver tolerances of other laser refractive surgical procedures however cases in excess of these limits will be considered on a case by case basis. MSD C33, 34, and 59.

I. Waiver Consideration

Uncomplicated implantable collamer lens implantation surgery is disqualifying but waiverable for all classes of flying duties, GBO-RPA Pilot, and SWA. Implantation of phakic intraocular lenses other than the ICL is not authorized. To be eligible for ICL surgery trained members must first be disqualified for PRK/SMILE/LASIK surgery and be granted a permission to proceed letter from the Aviation Program Manager (APM) located at Wright-Patterson AFB. Waiver is required before certification for initial applicants or return to flight duties for trained members. Waivers may be initiated one-month post-op from surgery for trained members and six months for untrained applicants. All complications (if any) must be appropriately managed and resolved.

For ATC, GBO-RPA SO, GBO-MOD, and OSF personnel, a history of ICL surgery is only disqualifying if the surgical outcome results in the member's inability to meet visual standards for the career field.

Active duty members may have surgery at any DoD Refractive Surgery center. Members not eligible for TRICARE medical benefits (ANG/AFRC) may go to a civilian provider.

Table 1: Waiver potential for ICL surgery

Category	Waiver Potential	Waiver Authority	ACS Review/Evaluation
FC I/IA	Yes	AFRS/CMO	Yes
IFC II-FS, IFC III Initial GBO-RPA Pilot/Initial SWA	Yes	See DAFMAN48-123 Attachment 2	Yes
Trained FC II/III/ GBO-RPA Pilot/SWA	Yes	MAJCOM/SGP	Yes
ATC/GBO-RPA SO/GBO-RPA MOD/OSF	Yes[1]	See DAFMAN48-123 Attachment 2	Yes

1. ICL surgery is only disqualifying for ATC, GBO-RPA SO, GBO-MOD, and OSF personnel if the surgical outcome results in the member's inability to meet established vision standards or interferes with the member's ability to perform his/her duties.

Table 2: Pre-ICL Cycloplegic Refractive Error Limits[1,2]

Myopia (Most myopic meridian)	≤ –10.00 Diopters
Hyperopia (Most hyperopic meridian)	N/A[2]
Astigmatism	≤ 3.00 Diopters

1. ICL surgery may not be approved outside of these refractive error limits, however cases in excess of these limits will be considered on a case by case basis. Special warfare airmen must meet sister service standards for jump, dive, and military free fall training.
2. ICL implant choice must be a currently FDA approved implant (ICLs for hyperopia are not yet FDA approved).

Table 3: Waiverable Examination Results

Examination	**Waiverable Results**
Best corrected visual acuity (OVT)	20/20 or better each eye
Precision Vision 5% low contrast chart	20/50 or better each eye
Refractive error	Stable, no more than 0.50 diopter shift in **manifest** sphere or cylinder refractive power between two readings at least 2 weeks apart
Intraocular Pressure	≤ 21 mmHg
Depth perception (OVT-DP)	Line B or better. If fails, refer to Substandard Stereopsis Waiver Guide.
ICL Vault	Greater than or equal to 20% corneal thickness based on slit lamp measurements or 100 microns based on anterior segment OCT/Arc Scan measurements
Slit Lamp Exam	Open angles and no cataract formation
Fundus Exam	No new or previously unrecognized retinal pathology

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

The member must be examined by an ophthalmologist who has been certified in ICL surgery to make the final determination of surgical candidacy. After the surgery, the ophthalmologist will evaluate the member for their one day, one week, and one month examinations. The three month, six month, and twelve month follow-up appointments, may be accomplished by a refractive surgeon or certified optometric co-manager to meet refractive surgery standard of care requirements. Any abnormalities or concerns found should be immediately reported to the ophthalmologist to expedite evaluation and intervention. After the 12 month postoperative appointment, annual routine Flight or Special Operational Duty Qualification (PHA) and vision (optometry or ophthalmology) exams will be required.

The aircrew member will be placed on non-mobility status, restricting the individual from deployment via AF Form 469 for a minimum of one month after surgery, even if no longer on steroid eye drops.

A. Initial Waiver Request for **trained** Aviation and Aviation Special Duty Members:

1. History:
   a. Pre-op cycloplegic refraction.
   b. Surgical procedure, date, location, and management of any complications.
   c. Assessment (negative and positive) of post-op symptoms of glare, halos, reduced night vision and diplopia.
   d. Eye medications usage, past and current, include discontinuation date.
2. Physical (Current):
   a. Uncorrected visual acuity high contrast (OVT) and Precision Vision 5% low contrast.
   b. Best corrected visual acuity high contrast (OVT) and Precision Vision 5% low contrast.
   c. Cycloplegic refraction and dilated fundus exam.
   d. Two post-op refractions at least 2 weeks apart that shows stability (no more than 0.50 diopter shift in **manifest** sphere or cylinder power).
   e. Slit lamp exam.
   f. Intraocular pressures (IOPs).
   g. OVT Stereopsis. If fails and previously waived for substandard stereopsis using AO Vectograph, then include AO Vectograph.
   h. ICL vault determine by slit lamp measurement, anterior segment OCT or ArcScan.
   i. Endothelial cell count (pre-operative and post-operative measurements), if available.
3. Attach copy of "Permission to Proceed" letter (member must be disqualified for PRK/SMILE/LASIK surgery).
4. Attach copy of the operative report for each eye treated, post-ICL surgery evaluations (1, 3, 6, 12 months post-op and annually, and any other additional follow-ups) and any ICL surgery-related incidents.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Waiver Renewal Request for **trained** Aviation and Aviation Special Duty Members:

1. History:
   a. Pre-op cycloplegic refraction.
   b. Surgical procedure, date, and location.
   c. Assessment (negative and positive) of post-op symptoms of glare, halos, reduced night vision and diplopia.
   d. Eye medications usage, past and current.
2. Physical (current):
   a. Uncorrected visual acuity high contrast (OVT) and Precision Vision 5% low contrast.
   b. Best corrected visual acuity high contrast (OVT) and Precision Vision 5% low contrast.
   c. Manifest refraction
   d. Slit lamp exam noting stability of the lens, patency of the peripheral iridotomy (if performed), and presence or absence of postoperative cataract formation.
      Note: ICLs with a central port may not require a peripheral iridotomy (PI). Use of PIs for these lenses is at the discretion of the surgeon.
   e. Intraocular pressures (IOPs)

f. OVT Stereopsis. If fails and previously waived for substandard stereopsis using AO Vectograph, then include AO Vectograph.
g. ICL vault determine by slit lamp measurement, anterior segment OCT or ArcScan.
h. Endothelial cell count (pre-operative and post-operative measurements), if available.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

C. Initial Waiver Request for **untrained** Aviation and Aviation Special Duty Members:

1. AD pilot applicants are considered Warfighters until selected for training [they must have a qualified physical exam (pending MFS) before selection]. They must meet the AASD or waiver criteria.
2. History/Physical:
   a. Certification/waiver for FC I application must be at least six months after date of surgery. For USAFA cadets, ACS review/evaluation is required prior to waiver (no "contingent on MFS" waivers) if there was a complication.
   b. All other items required for History and Physical for trained AASD members above in section A.
3. Attach copy of the operative report for each eye treated, post-ICL surgery evaluations and any ICL related-related incidents (this will meet the requirement to send this info to the APM. The following is a link to the post-RS evaluation form which should be used: https://kx.health.mil/kj/kx1/AFRefractiveSurgery/Pages/home.aspx **or** https://kx.health.mil/kj/kx1/AFRefractiveSurgery/Documents/CRS%20Forms/Forms%20for%20Treatment%20at%20a%20DoD%20Location/Refractive%20Surgery%20Follow%20Up%20Form%20Fillable.pdf
4. Initial waiver term of validity will be three years; however, AASD applicants are not eligible for waiver until any complications have been managed and member has stabilized and otherwise meets vision standards. Post-ICL surgery evaluations are desired at 1, 2, 3, 6, and 12 months post-op. All examination documentation obtained to date is required for submission for the initial waiver.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Implantable collamer lens implantation is a refractive surgery involving implantation of an artificial lens on top of the natural lens for individuals who are not candidates for traditional laser refractive surgical procedures (PRK, LASIK, or SMILE). While the FDA has approved much higher levels of myopia, current Air Force policy allows treatment with ICL surgery in aircrew with refraction from -3.00 D to -10.00 D with eligibility of cases exceeding these values determined on a case by case basis. With ICL surgery, the major concerns are quality of visual outcome, postoperative cataract formation, pupillary block glaucoma, and endothelial cell loss causing corneal edema.

An independent Air Force Surgeon General directed review was conducted at Wilford Hall to determine the safety and efficacy of the ICL in Air Force personnel from 2016-2018. Even

though the implantable collamer lenses used at the time did nothing to correct for astigmatism, 100% achieved uncorrected vision 20/30 or better without glasses. In terms of cataract formation, a meta-analysis reviewed 15 studies involving a total of 1,387 eyes and found an overall incidence of 0.3%.

The risk of pupillary block glaucoma is mitigated by proper ICL sizing to ensure a vault less than 1000 microns as well as the creation of a peripheral iridotomy for current FDA approved models. Newer models, such as the EVO, have a central port created in the lens, which negates the need for a peripheral iridotomy in most cases.

Endothelial cell loss is a known complication of intraocular surgery and happens to a greater extent the closer a lens implant is placed in relation to the endothelial cells. The initial FDA trials indicated an annual endothelial cell loss as high as 2.47% per year that was felt to continue indefinitely. More recent studies demonstrate cumulative losses are lower than the earlier FDA trials and indicate no corneal adverse events were noted in any of the studies, which indicates that this risk is not as concerning as it initially appeared.

Steroid eye drops used to treat or prevent inflammation after implantable collamer lens implantation surgery does not automatically lead to DNIF/DNIC status. However, topical steroids may increase the risk of infection, produce elevated intraocular pressure in some individuals, and may cause development of cataracts. To date, two aircrew members have sustained permanent visual field defects and vision loss because of topical steroid related complications. Therefore, frequent monitoring of intraocular pressure and close follow-up is required.

AIMWTS search in April 2023 for the prior 7 years revealed a total of 70 cases submitted with a diagnosis of intraocular lens. All but one of the disqualified cases were due to other medical and ophthalmologic conditions than for ICL. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use only these ICD-10 Codes for AIMWTS coding purposes		(# of waivers / total # of cases)				
		FC I/IA	FC II	FC III	GBO	SWA
Z96.1	Presence of intraocular lens	2/2	34/34	25/26	4/4	1/1

IV. References

1. Dougherty PH and Priver T. Refractive outcomes and safety of the implantable collamer lens in young low-to-moderate myopes. Clin Ophthalmol, 2017: 11: 273-77.

2. Packer M. Meta-analysis and review: effectiveness, safety, and central port design of the intraocular collamer lens. Clin Ophthalmol, 2016; 10: 1059-77.

3. Sander DR. Anterior Subcapsular Opacities and Cataracts 5 Years After Surgery in the Visian Implantable Collamer Lens FDA Trial. JRefract Surg, 2008: 24(6): 566-70.

4. Zeng Q, Xie X, Chen Q. Prevention and management of collagen copolymer phakic intraocular lens exchange; causes and surgical techniques. J Cataract Refract Surg, 2015; 41: 576-84.

5. Food and Drug Administration. Summary of safety and effectiveness data, STAAR Visian ICL. Date of Notice of Approval: December 22, 2005. Available from: http://www.accessdata.fda.gov/cdrh_docs/pdf3/P030016b.pdf. Accessed July 2, 2019.

6. Moya T, Javaloy J, Montes-Mico R, et al. Implantable Collamer lens for myopia: assessment 12 years after implantation. J Refract Surg, 2015; 31(8): 548-56.

7. Igarashi A, Shimizu K, and Kamiya K. Eight-Year Follow-up of Posterior Chamber Phakic Intraocular Lens Implantation for Moderate to High Myopia. Am J Ophthalmol, 2014; 157(3): 532-39.

8. Alfonso JF, Baamonde B, Fernandez-Vega L, et al. Posterior chamber collagen copolymer phakic intraocular lenses to correct myopia: five-year follow-up. J Cataract Refract Surg, 2011: 37(5): 873-80.

Aerospace Medicine Waiver Guide

Keratoconus, Abnormal Corneal Topography, and Corneal Collagen Crosslinking

Revised: Apr 2023
Reviewed: Col Jonathan Ellis (Chief, ACS Ophthalmology), Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Modified waiver submission criteria in Note 1 of Table 2.

I. Waiver Consideration

Keratoconus (KCN), including similar ectatic corneal disorders to include Pelucid Marginal Degeneration (PMD) and Keratoglobus, is a disqualifying condition for all flying classes in the Air Force, to include GBO, ATC, and SWA. An FC I/IA, IFC II, and IFC III waiver for abnormal corneal topography, which is a topography that is not normal but also not diagnostic of KCN, is possible and will be considered on a case-by-case basis with ACS review. Abnormal corneal topography is not disqualifying for ATC, GBO, or OSF duties.

Contact lenses, if worn, must be fitted appropriately and achieve adequate wearing times prior to use while flying. Trained aircrew diagnosed with KCN require frequent evaluations and management to ensure that they are adequately corrected to mitigate the optical side effects of the condition. Although contact lenses, particularly rigid lenses, are frequently required to optimize vision performance in these cases, aircrew must also be adequately corrected with spectacle back-ups. A key element in correction of KCN is to ensure adequate stereopsis with both contact lenses and spectacles. Trained aircrew who require specialty contact lenses (e.g. rigid gas permeable, hybrid, scleral lens) to meet stereopsis standards may be granted a FC IIC waiver (restricted to flying with another qualified pilot) and must carry a back-up pair of both contact lenses and spectacles on person at all times while flying. Specialty contact lenses for KCN are fitted and dispensed by the ACS.

As discussed above, historically, treatment of KCN typically consists of correction of refractive error with spectacle or contacts (soft, rigid, or hybrid) until the patient no longer can be corrected with these modalities; that member may then require penetrating keratoplasty (corneal transplant surgery). A more recent treatment procedure was developed and FDA approved (2016) which utilizes Riboflavin (Vitamin B2) and ultraviolet light to polymerize stromal collagen and induce corneal stiffening, with the goal to halt progression of KCN. This method is known as collagen cross-linking (CXL) and has widespread use in Europe since 2003. Several studies have shown very promising results with reduction in corneal steepness, improved corrected visual acuity, and halting of progression of KCN.

There is a gain of one to three lines of best-corrected visual acuity ranging from 21-54% after CXL. In terms of safety, there is a loss of best-corrected visual acuity at a rate of 0-2.9% and failure rates ranging from 0-7.6%. Larger studies have shown the overall failure rate to be at 1%.[7] Corneal haze can be seen after this procedure at a rate as high as 8.6%. However, Scheimpflug analysis following the natural history of post-CXL haze shows this to peak at one month postop with resolution of haze within the first three to six months and a near return to baseline by one year. This pattern of healing is very similar to that of PRK. Therefore, CXL shows incredible promise to help aircrew with keratoconus to see better while having an acceptable risk profile. The ACS will follow waived aircrew who have had CXL in a study

group to determine if the aviation environment impacts the ultimate outcome and the best time postoperatively to return to flying status.

Table 1: Waiver potential for Keratoconus

Flying Class (FC)	Waiver Potential	Waiver Authority[2]	ACS Review or Evaluation
FC I/IA, IFC II, IFC III	Maybe[1]	AFRS/CMO	Yes
FC II, FC III, SWA	Yes	MAJCOM	Yes
ATC, GBO, OSF	Maybe[3]	MAJCOM	Yes

1. Cases will be considered as a case-by-case basis and keratoconus must be stable for at least one year for initial applicants and at least two years if the member has not already been assessed/commissioned in the USAF.
2. Cases that are progressive, require long-term treatment, surgical intervention or results in spectacle corrected visual acuity below that specified in the MSD require AFMRA waiver after RILO/MEB.
3. Condition **only** disqualifying if demonstrates progression, requires long term treatment or surgical intervention, or does not meet best spectacled correction standards; requires RILO/MEB prior to waiver submission.

Table 2: Waiver potential for Abnormal Corneal Topography

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I	Yes, if meets REACT study criteria	AFRS/CMO	Yes
FC IA, IFC III	Maybe[1]	AFRS/CMO AFMRA	Yes
IFC II (FS), FC II, FC III, SWA	Yes[1]	MAJCOM	Yes
ATC, GBO, OSF	N/A	N/A	N/A

1**.** Any corneal findings that exceed the following criteria should be submitted for waiver when I-S > 1.4, corneal pachymetry < 475 microns by any device, steepest K > 48 diopters by any measurement, pachymetry progression > 1.2 on Belin-Ambrósio Enhanced Ectasia. Waivers will be considered on a case-by-case basis.

Table 3: Waiverable Postoperative CXL Examination Results

Examination	Waiverable Results
Best corrected visual acuity (OVT)	20/20 or prior waivered baseline vision[1]
Precision Vision 5% low contrast	20/50 or prior waivered baseline vision[1]
Slit lamp exam	No more than trace corneal haze[1]
Refractive error	Stable, no more than 0.50 diopter shift in **manifest sphere** refractive power between two readings at least 2 weeks apart[1]
Keratometry	Stable, no more than 0.50 diopter shift in steepest keratometry reading on CT or Pentacam® tangential view[1]
Preoperative Corneal Pachymetry	Corneal pachymetry $\geq$ 400 microns
Fundus exam	No new or previously unrecognized retinal pathology[2]
Depth perception (OVT-DP)	Line B. If fails, see substandard stereopsis waiver guide.

1. If outside these limits, refer to local eye care provider and/or treating surgery center prior to referral to ACS to ensure member is ready for ACS evaluation.
2. Work-up and submit waiver request for new diagnosis.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines/recommendations. First-time waiver for KCN in trained aircrew or for abnormal corneal topography in aircrew or applicants requires an in-person ACS evaluation. Following first-time waiver, trained aircrew with KCN will be followed at the ACS every 1-3 years depending on clinical and optical stability. For those enrolled in the REACT study, an annual corneal evaluation including corneal topography and Orbscan® or Pentacam®, OVT-DP stereopsis, refraction to best visual acuity, and ultrasound central pachymetry (corneal thickness) is required with an ACS review prior to waiver renewal. If KCN or abnormal corneal topography demonstrates progression, requires long term treatment, surgical intervention, or results in spectacle corrected visual acuity below the level specified in item in MSD for vision standards or KCN requiring frequent and long term follow-up (which also is a retention standard), and RILO/MEB results are required for inclusion into AMS submission.

A. Initial Waiver Request:

1. History of previous refractions and progression of astigmatism (if available) and other visual symptoms.
2. Family history of KCN and any impact on job/daily life.
3. Full eye exam to include:
   a. 5% Precision Vision chart.
   b. Manifest Refraction to best visual acuity.
   c. Corneal Topography. Submissions should be formatted in **Axial** view using a standard dioptric scale (39.0 to 50.0 Diopter range, 0.50 Diopter increments) and standard color palette. The **OD/OS Display** with an **Axial Map** and an **Axial Numeric View** is preferred. All ATLAS topographies should display the **Axial I-S** value.
   d. Retinoscopy findings (+/- scissoring).
   e. Slit Lamp Exam with comment on positive/negative findings in the cornea.
4. Orbscan® or Pentacam® (Holladay and Belin-Ambrósio), if available.
5. Ophthalmology consultation report in advanced cases.
6. Pre-operative, operative, and post-operative ophthalmology notes if crosslinking performed to include:
   a. All requirements listed above.
   b. Preoperative corneal pachymetry.
   c. Cycloplegic refraction and dilated fundus exam.
   d. Two post-op refractions at least 2 weeks apart that shows stability (no more than 0.50 diopter shift in **manifest sphere**).
   e. Keratometry readings pre- and post-surgery.
7. Slit lamp exam which must include grading of haze, if present. RILO/MEB results, if member demonstrates progression, requires long term treatment, surgical intervention (to include corneal collagen crosslinking), or results in spectacle corrected visual acuity below the level specified in the MSD, Section C, TABLE ONE.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. An interval AMS with particular attention to clinical changes and disease stability.
2. Interval eye exam results to include:
   a. Manifest Refraction Slit Lamp Exam
   b. Corneal Topography (with parameters as above)
   c. Slit Lamp Exam
   d. Pentacam® (if available).

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Keratoconics frequently have poor quality of vision. Optical correction mitigates those effects somewhat, but many cases eventually require hard contact lenses to optimize correction. These contact lens fittings, however, are complicated and not always successful. Blurred vision, distorted images, decreased contrast sensitivity, degradation in stereopsis, monocular diplopia, and optical side effects caused by KCN are undesirable and detrimental to flight safety. It is imperative that aircrew carry a set of backup spectacles (and backup contacts if used) on all missions in the event problems arise with contacts making removal necessary.

In addition, corneal hydrops is a known complication in approximately 2-3% of KCN patients.[9] Corneal hydrops is the development of acute and significant corneal edema following a break in Descemet's membrane and endothelium, producing corneal clouding and vision loss. This complication typically only occurs in severe cases of KCN but would be a significant event if it occurred during operations. However, the risk of simultaneous bilateral corneal hydrops is considered to be low and is aeromedically acceptable. Fortunately, hydrops has rarely been observed within the USAF flying population. This may be due to the fact that hydrops is typically associated with younger patients who develop a severe form of KCN that presents at an early age. These individuals would likely be aware of their impaired visual condition and self-select out of an occupation with strict vision requirements. Additionally, as described above, the aeromedical risks of CXL specifically include loss of best corrected vision, treatment failure (progression despite treatment), and corneal haze. However, treating earlier in the disease process and proper patient selection can greatly reduce these risks.

AIMWTS search in Apr 2023 for the past 7 years revealed a total of 63 cases submitted with a diagnosis of keratoconus and 481 cases submitted with a diagnosis of other disorders of the cornea. The breakdown of the number of waivers and number of total cases are tabulated below.

ICD-10 code for keratoconus		(# of waivers / total # of cases)					
		FC I/IA	FC II	FC III	ATC	GBO	SWA
H18.609	Keratoconus, unspecified, unspecified eye	3/13	22/23	13/18	0/1	2/4	4/4
H18.899	Other specified disorders of cornea, unspecified eye	224/259	97/99	71/83	5/6	11/12	21/22

IV. Suggested Readings

1. Asri D, Touboul D, Fournié P, et al. Corneal Collagen Crosslinking in Progressive Keratoconus: Multicenter Results From the French National Reference Center for Keratoconus. J Cataract Refract Surg, 2011; 37: 2137-43.

2. Caporossi A, Mazzotta C, Baiocchia S, and Caporossi Tl. Long-term Results of Riboflavin Ultraviolet A Corneal Collagen Cross-linking for Keratoconus in Italy: The Siena Eye Cross Study. Am J Ophthalmol, 2010; 149(4): 585-93.

3. Hersh PS, Greenstein SA, and Fry KL. Corneal Collagen Crosslinking for Keratoconus and Corneal Ectasia: One-year results. J Cataract Refract Surg, 2011; 37(1): 149-60.

4. Agrawal VB. Corneal collagen cross-linking with riboflavin and ultraviolet – a light for keratoconus: results in Indian eyes. Indian J Ophthalmol. 2009; 57(2): 111–14.

5. Janov MR, Jovanovic Vm Nikolic L, et al. Corneal Collagen Cross-linking. Middle East Afr J Ophthalmol, 2010; 17(1): 21-27.

6. Koller T, Mrochen, and Seiler T. Complication and failure rates after corneal crosslinking. J Cataract Refract Surg, 2009; 35: 1358-62.

7. Raiskup-Wolf F, Hoyer A, Spoerl E, and Pillunat LE. Collagen cross-linking with riboflavin and ultraviolet-A light in keratoconus: Long-term results. J Cataract Refract Surg, 2008; 34(5): 796-801.

8. Greenstein SA, Fry KL, Bhatt J, and Hersh PS. Natural history of corneal haze after collagen crosslinking for keratoconus and corneal ectasia: Scheimpflug and biomicroscopic analysis. J Cataract Refract Surg, 2010; 36(12): 2105-14.

9. Gaskin JCF, Patel DV, and McGhee CNJ. Acute Corneal Hydrops in Keratoconus-New Perspectives. Am J Ophthalmol, 2014; 157(5): 921-28.

10. Al Suhaibani AH, Al-Rajhi AA, Al-Motowa S, and Wagoner MD. Inverse relationship between age and severity and sequelae of acute corneal hydrops associated with keratoconus. Br J Ophthalmol, 2007; 91(7): 984–85.

11. Tuft SJ, Gregory WM, and Buckley R. Acute Corneal Hydrops in Keratoconus. Ophthalmology, 1994; 101(10): 1738-44.

Lattice Degeneration (Mar 2020)
Reviewed: Lt Col Jonathan Ellis (Chief, ACS Ophthalmology), Lt Col Michael Parsons (Deputy Chief, ACS Ophthalmology), Dr. Dan Van Syoc (ACS Waiver Guide coordinator), and Lt Col David Gregory (AFMRA Physical Standards Development Chief)

Significant Changes: LD and low risk atrophic retinal holes with refraction ≤-5.50 is not disqualifying. Waiver potential for LD and low risk atrophic retinal holes with refraction from -5.75 to -8.00. MSD C42.

I. Waiver Consideration

Lattice degeneration (LD) is disqualifying for Flying Class I, IA, II, III, and SWA duties when refraction exceeds -5.50. Lattice degeneration is not disqualifying for ATC, GBO, and OSF personnel, nor is it disqualifying for retention purposes. LD is considered high risk if there is a retinal hole present with subretinal fluid or vitreous traction. No waivers are currently being recommended for LD with high-risk characteristics for FC I/IA. The ACS is currently studying the axial length (length of the eye) to determine a better association with lattice degeneration, refractive error, and retinal detachment risk. Current members of the ACS Lattice Degeneration Management Group may be asked to come to the ACS for data collection, but generally, waiver recommendation is made by ACS case review only.

Table 1: Waiver potential for lattice degeneration and low risk atrophic retinal holes

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	Yes[1]	AETC	Yes
FC II/III	Yes[1,2]	MAJCOM	Yes
SWA	Yes[1,2]	MAJCOM	MAJCOM
ATC/GBO/OSF	N/A	N/A	N/A

1. LD and low risk atrophic retinal holes may be waived for FC I/IA, as well as initial FC II, SWA, and FC III, if the member has been evaluated by an ophthalmologist or retinal specialist, who has ruled out the presence of untreated high risk peripheral holes or breaks, retinal traction or sub-retinal fluid, and native refractive error (pre-corneal surgery, if applicable) does not exceed -8.00 diopters. ACS review/evaluation required for initial waivers and at the discretion of the MAJCOM for waiver renewals. LD and low risk atrophic retinal holes with refraction ≤-5.50 are not disqualifying.
2. Waiver for history of retinal detachment is possible if treatment results in stable vision that is within accepted standards.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines & recommendations.

A. Initial Waiver Request:

1. List and fully discuss all clinical diagnoses requiring a waiver.
2. Symptoms, degree of lattice degeneration, degree of myopia (pre-refractive surgery, if applicable), and axial length of both eyes.
3. If there is a history of retinal detachment; discuss fully to include all treatments and post-treatment results (visual acuity, visual fields, status of other eye).
4. Details of complete ophthalmologic exam, to include presence and location of retinal holes, presence or absence of subretinal fluid, and presence or absence of vitreo-retinal traction.
5. Comprehensive ophthalmologist exam (Retinal specialist exam if there is a history of retinal detachment).
6. Copies of any photos, if they exist (photograph or digital).
7. Medical Evaluation Board results, if applicable.
8. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

B. Renewal Waiver Request:

1. Interim history specifically discussing any recurrences or any changes in the disease pattern and vision status.
2. Details of complete ophthalmologic exam.
3. Comprehensive ophthalmologist exam to include presence and location of retinal holes, presence or absence of subretinal fluid, and presence or absence of vitreo-retinal traction (Retinal specialist exam if there is a history of retinal detachment).
4. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

III. Aeromedical Concerns

Retinal detachment is the primary aeromedical concern. This can result in decreased or loss of vision, visual field changes, abnormal stereopsis, and proliferative vitreoretinopathy. All of these conditions can compromise visual function to such a degree that continued aviation duty is not possible. Detachment is usually sudden and without warning and can be quite incapacitating.

Although LD remains stable in most cases (97%), it can cause, or be associated with RD, especially in higher degrees of myopia. LD is the direct cause of RD in 21% of cases, and is present in 41% of all RD cases. Seventy percent of RD, associated with LD, occurs in patients younger than 40 years of age. LD is more common in myopia; 70% of RD are seen in myopic eyes, with 75% of those RD in myopes with refractive error of -3.00D or greater. The risk of RD in association with any amount of LD increases with the degree of myopia, especially when the refractive error is greater than -5.00D.

In 1989, two major studies were conducted regarding the incidence of retinal detachment in myopic patients with LD. One was a retrospective study observing the characteristics of 176 retinal detachments. Using an annual RD risk of 0.38% and assuming an average lifespan of 79 years, they extrapolated a lifetime RD risk of 35.9% in patients with lattice degeneration and

myopia greater than -5.00, whereas those with lesser myopic refractive errors between -1.00D and -3.00D incurred a 5.3% lifetime RD risk. The other major study at that time observed 423 eyes over 1-25 years (mean 10.8 years) and found three clinical retinal detachments with an overall rate of 0.7%. This translates to a 0.07% annual risk of retinal detachment over the average observed time. This study further followed patients out up to 25 years and no patients had additional clinical retinal detachments. More recently, a study in Japan found a cumulative risk of retinal detachment from atrophic holes at a rate of 1.5% by age 40.

To take the most conservative approach possible, prior waiver recommendations were made on the most concerning statistic available, which was the 35.9% lifetime RD risk. However, this statistic was an estimation and the majority of the retinal detachments occurred at a mean age of 52, which is much older than the typical active duty pilot population. Other studies have subsequently shown a much lower 10-year RD risk ranging from 0-1.4%. To rectify this difference, the ACS has been tracking progression to retinal tears or retinal detachments in aviators with lattice degeneration through the Lattice Degeneration Study Group. While only 4.6 years into the 10 year study, preliminary data shows an annual rate of retinal tears of 0.48% and retinal detachment of 0.08%. This aligns much better with the other studies quoted and supports a much more favorable aeromedical risk profile.

There is no specific treatment for lattice degeneration, but high-risk atrophic holes or breaks can be treated by cryothermy, laser photocoagulation, or diathermy. In an evidence-based analysis of prophylactic treatment of asymptomatic retinal breaks and LD, a panel of vitreoretinal experts reviewed the ophthalmology literature. They concluded that there was insufficient information to strongly support prophylactic treatment of lesions other than symptomatic flap tears. If the condition leads to a retinal detachment, the vast majority can be repaired permanently, allowing the flyer to return to aviation duty due to a lack of increased further risk of retinal detachment.

A theoretical concern with LD is an increased risk of open angle glaucoma, specifically from pigment dispersion. It is recognized that various types of pigmentary disturbances can be seen in up to 80% if LD cases, particularly in cases with high myopia.

Review of AIMWTS data in Sep 2019 revealed 1046 cases since 1 Jan 2014 with a listed diagnosis of lattice degeneration. There were a total of 171 FC I/IA cases (21 disqualified), 372 FC II cases (13 disqualified), 56 RPA pilot cases (11 disqualified), 415 FC III cases (48 disqualified), 8 ATC/GBC cases (0 disqualified) 20 SWA cases (0 disqualified), and 4 MOD cases (1 disqualified).

ICD-9 codes for Lattice Degeneration	
362.6	Peripheral retinal degenerations
362.63	Lattice degeneration

ICD-10 codes for Lattice Degeneration	
H35.40	Unspecified peripheral retinal degenerations
H35.411	Lattice degeneration of retina, right eye, .412 left eye, .413 bilateral, .419 unspecified

IV. Suggested Readings

1. Burton TC. The Influence of Refractive Error and Lattice Degeneration on the Incidence of Retinal Detachment. Trans Am Ophthalmol Soc, 1989; 87: 143-57.

2. Byer N.E. Long-term Natural History of Lattice Degeneration of the Retina. Ophthalmology, 1989; 96(9):1396-1401.

3. Sasaki K, Ideat H, Yonemoto J, Tanaka S, Hirose A, Oka C. Risk of Retinal Detachment in Patients with Lattice Degeneration. Jpn J Ophthalmol. 1998; 42(4):308-313.

4. Lewis H. Peripheral Retinal Degenerations and the Risk of Retinal Detachment. Am J Ophthalmol, 2003; 136:155-160.

5. Steel D and Fraser S. Retinal Detachment. Clin Evidence, 2010; 11: 710-746.

6. Wilkinson CP. Evidence-Based Analysis of Prophylactic Treatment of Asymptomatic Retinal Breaks and Lattice Degeneration. Ophthalmology, 2000; 107: 12-18.

7. Green RP and Chou TY. Retinal Detachment in US Air Force Flyers. Aviat Space Environ Med, 1996; 67:874-79.

8. Rahimi M. Relationship between retinal lattice degeneration and open angle glaucoma. Med Hypothesis, 2007; 64: 86-7.

Aerospace Medicine Waiver Guide

Ocular Histoplasmosis Syndrome

Revised: Jun 2023
Reviewed: Maj Micah Rejcek (RAM 2023), Col Jonathan Ellis (Chief, ACS Ophthalmology), and Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Update AIMWTS review, waiverability table, and Suggested Readings

I. Waiver Consideration

Ocular histoplasmosis syndrome (OHS) is a condition caused by the fungus *Histoplasma capsulatum* where the disease spreads from the lungs to the eyes with potential to affect central and peripheral vision. Patients who have active OHS lesions are disqualified for all flying class duties. If an active lesion is treated by laser photocoagulation or photodynamic therapy (PDT), patients should have at least one follow-up evaluation completed by the treating ophthalmologist 3-4 weeks post therapy prior to waiver submission. Follow-up examination must indicate extent of choroidal neovascularization (CNV) eradication and if residual disease is present requiring further therapy. Inactive lesions which allow the airman to meet vision standards will be waived on a case-by-case basis. In these cases, waivers will not be considered until the disease has resolved or the active lesions have been adequately treated. In addition, any disease, injury, infection process, or sequelae involving the eye that is resistant to treatment and/or results in: distant visual acuity that cannot be corrected to the retention vision standards and/or a central field of vision defect in the better eye that reduces the field of view less than 20 degrees from fixation in any direction are disqualifying for retention and will require an MEB.

Table 1: Waiver potential for *ocular histoplasmosis syndrome*

Flying Class (FC)	Waiver Potential	Waiver Authority[4]	ACS Review or Evaluation
I/IA	Yes[1,2,3]	AFRS/CMO	Yes
II//III (untrained)	Yes[1,2,3]	AFRS/CMO	Yes
II//III (trained)	Yes[1,2,3]	AFMRA/MAJCOM[5]	Yes
ATC	N/A	N/A	N/A
GBO	N/A	N/A	N/A
SWA	Yes[1,2,3]	MAJCOM	Yes

1. History of macular disease or choroidal neovascularization in an initial applicant is highly unlikely to be waived.
2. Must meet retention and Flying Class-specific vision standards. Must not be expected to progress or recur. Active or reactivated disease will unlikely be waived.
3. No indefinite waivers.
4. If individual does not meet retention standard outlined in MSD, then waiver authority becomes AFMRA.
5. For initial waiver consideration, AMS goes to AFMRA. Subsequent requests may go to MAJCOM.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. List and fully discuss all clinical diagnoses and diagnoses requiring a waiver.
2. Eye exam to include:
   a. Visual acuity.
   b. Humphrey visual fields (30-2 and 10-2).
   c. Stereopsis testing.
3. Ophthalmology consultation report to include all follow-up reports.
4. If active lesions are part of the history and were treated by laser photocoagulation, intravitreal injections, or photodynamic therapy, patients should have at least one follow-up evaluation, at least 3-4 weeks post therapy, completed by the treating ophthalmologist prior to waiver submission.
5. Ophthalmologic imaging test results to include fundus photos, optical coherence tomography (OCT), and fluorescein angiography.
6. MEB results, if required.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Interim History since last waiver and ACS visit.
2. Ongoing treatment modalities.
3. Full ophthalmology exam to include Amsler grid, dilated fundus exam, and OCT of the maculae.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

The primary aeromedical concern in OHS is its potential to affect central and peripheral vision. Patients with peripheral inactive disease without evidence of macular involvement will likely maintain excellent visual acuity and have a good visual prognosis. Some patients may have residual visual field defects, but most are minor and do not have substantial effects on peripheral vision. For those patients who develop macular disease, the prognosis is more guarded. Progression of disease with loss of vision depends upon the size and location of the lesion, development of CNV, and subsequent scaring. After three years, more than 75% of patients with subfoveal CNV will have a best-corrected visual acuity of 20/100. If the patient is less than 30 years of age and has a small subfoveal CNV lesion with no visual loss secondary to OHS in the other eye, a visual acuity of 20/40 or better may be achievable in up to 14% of eyes. Currently, available treatments may preserve vision, although treating the macular area with laser therapy may degrade visual acuity. If subfoveal or juxtafoveal lesions are present, treatment should involve intravitreal anti-VEGF injections, PDT, or a combination of both.

Local ophthalmology evaluation to include visual acuity, Amsler grid testing, Humphrey 10-2 and 30-2 visual fields, stereopsis, and funduscopic evaluation are required. Submit any ophthalmologic imaging obtained including OCT and fluorescein angiography. All cases require either ACS review or in-person evaluation by ACS Ophthalmology.

Review of AIMWTS in May 2023 identified 57 cases of OHS submitted for waivers. The waivers returned as medically acceptable all had inactive disease and met vision standards. The breakdown of the number of waivers and number of total cases are tabulated below.

ICD-9 Codes for Ocular Histoplasmosis Syndrome		(24 waivers / 28 cases)					
		FC I/IA	FC II	FC III	ATC	GBO	SWA
115.02	Ocular histoplasmosis syndrome	1/1					
115.9	Histoplasmosis unspecified without manifestations	0/1	3/6				
115.92	Histoplasmosis retinitis, unspecified	1/1	14/15	2/2			1/1
115.99	Histoplasmosis unspecified with other manifestation		1/1	1/1			

Please use only these ICD-10 codes for Ocular Histoplasmosis Syndrome for AIMWTS coding purposes		(26 waivers / 29 cases)					
		FC I/IA	FC II	FC III	ATC	GBO	SWA
B39.4	Histoplasmosis capsulati, unspecified		1/2				
B39.9	Histoplasmosis, unspecified	1/1	13/13	7/8			
H32	Chorioretinal disorders in diseases classified elsewhere	1/1	3/3	0/1			

IV. Suggested Readings

1. Diaz RI, Sigler EJ, Rafieetary MR, Calzada JI. Ocular histoplasmosis syndrome. Survey of Ophthalmology. 2015 Jul;60(4):279–95. https://www.clinicalkey.com/#!/content/playContent/1-s2.0-S0039625715000399?returnurl=https:%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS0039625715000399%3Fshowall%3Dtrue&referrer=

2. Oliver A, Ciulla TA, Comer GM. New and classic insights into presumed ocular histoplasmosis syndrome and its treatment. Current Opinion in Ophthalmology. 2005 Jun;16(3):160–5. https://journals.lww.com/co-ophthalmology/Fulltext/2005/06000/New_and_classic_insights_into_presumed_ocular.5.aspx

3. Shah GK, Blinder KJ, Hariprasad SM, Thomas MA, Ryan EH, Bakal J, et al. Photodynamic Therapy For Juxtafoveal Choroidal Neovascularization due to Ocular Histoplasmosis Syndrome. Retina. 2005 Jan;25(1):26–32. https://journals.lww.com/retinajournal/Fulltext/2005/01000/PHOTODYNAMIC_THERAPY_FOR_JUXTAFOVEAL_CHOROIDAL.3.aspx

Optic Nerve Head Drusen (Mar 2020)
Reviewed: Lt Col Jonathan Ellis (Chief, ACS Ophthalmology), Lt Col Michael Parsons (Deputy Chief, Aerospace Ophthalmology), Dr. Dan Van Syoc (ACS Waiver Guide Coordinator) and Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes: New Ground Based Operator (GBO) standards. C54.

I. Waiver Consideration

Optic nerve head drusen is a disqualifying condition for flying classes I/IA, II, III, and SWA personnel. It is not listed as a disqualifying diagnosis for ATC, GBO (RPA Pilot, RPA SO, and MOD), or OSF personnel, but for ATC/GBO personnel, it would be disqualifying if it results in a visual field defect. Aeromedical Consultation Service (ACS) evaluation is required for initial waiver of optic nerve head drusen for cases eligible for waiver. FC I/IA candidates with optic nerve head drusen are not eligible for waiver. Optic nerve head drusen in untrained FC II and FC III are also typically not eligible for waiver. ACS review is required for waiver renewal; depending on the results of local work-up, an ACS evaluation may be required. Waiver potential is based upon ophthalmologic examination including visual acuity, color vision, stereopsis, absence of transient visual loss, and an absence of aeromedically significant visual field defect.

Table 1: Waiver potential for Optic Nerve Head Drusen.

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review/Evaluation
I/IA	No	AETC	No[1]
II/III/SWA	Yes[2]	MAJCOM	Yes
ATC/GBO	N/A[3]	N/A	N/A
OSF	N/A	N/A	N/A

1. ACS evaluation only required if diagnosis is in question.
2. Waiver for untrained flying class II and III is unlikely but will be considered on a case-by-case basis.
3. Waiver will be required if the condition causes loss of visual acuity, visual field, or color vision.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines & recommendations.

A. Initial/Renewal Waiver Request:

1. Complete aeromedical history to include pertinent positives and negatives (e.g. headaches, pulsatile tinnitus, hypertension, diabetes, family history of drusen, etc.)
2. Presence or absence of visual symptoms and their operational impact (e.g. transient visual obscurations, perceived scotomas or metamorphopsia)

3. Results of complete optometric or ophthalmologic eye examinations to include:
    a. Refraction to best Snellen visual acuity
    b. Intraocular pressure by applanation tonometry
    c. CCT results for each eye individually
    d. Amsler grid
    e. Humphrey visual field testing (preferably 30-2)
    f. Ocular coherence tomography (OCT) of the retinal nerve fiber layer (RNFL)
    g. Stereoscopic optic disc evaluation.
4. Diagnostic test(s) supporting diagnosis (e.g. ophthalmic B-scan ultrasound, computed tomography of the orbit, or autofluorescence.)
a. Confirmatory diagnostic testing is only required for the initial diagnosis. Images and report of at least one confirmatory test must be included in the initial waiver request.
b. Waiver renewal requires items #1 through #3 be performed. The results of the testing in item #4 used for the initial waiver should be included in the AMS with the date and results of the initial testing performed. Confirmatory diagnostic testing is not required for each waiver renewal.
5. If the local base cannot provide any of the above listed information, they should document why, explaining the reason to the waiver authority.

III. Aeromedical Concerns

Clinically and aeromedically, the main concern with optic disc drusen is their propensity to induce slowly progressive visual fields loss. As high as 87% of individuals with optic nerve head drusen can expect to have visual field abnormalities. Furthermore, transient disturbances in central acuity and visual field may occur in association with optic nerve head drusen. Color vision anomalies have also been described in 41% of USAF aviators with ODD in preliminary data collected at the Aeromedical Consultation Service. ODD have also been associated with retinal hemorrhage in 2-10% of patients, though most cases are incidental findings without visual impairment.[1]

Once the diagnosis of drusen is established, careful evaluation of optic nerve function is imperative. This should include visual acuity, visual field testing, Amsler grid, and color vision testing. Visual field loss has the most potential for aeromedical grounding and as such, visual field testing should be performed on a regular basis to ensure visual function remains adequate and consistent with mission effectiveness and flying safety. In addition, applanation tonometry should be completed in cases with known visual field or RNFL and GCC loss on OCT. This recommendation comes due to the risk of hypoxic nerve injury. Ischemia is the cause of the visual field loss and optic nerve damage associated with optic nerve head drusen. In a normal healthy optic nerve, the redundancy of blood supply allows aircrew to have adequate blood flow to the optic nerve in most instances, to withstand the hypoxia associated with flight. The optic nerve of a member with drusen is already a compromised nerve. As reported above, even in the civilian population, 71-87%, have ischemic related optic nerve injury even without the hypoxia risk. Optic disc photodocumentation should be obtained for comparison during future monitoring. It is also important for patients to self-monitor their vision periodically with Amsler Grid testing. Periodic surveillance to assess visual function in aircrew with optic nerve head drusen is appropriate, since drusen-related optic nerve problems are often asymptomatic. Routine cases should be monitored every six to twelve months.

AIMWTS search revealed a total of 140 members with an AMS containing the diagnosis of optic nerve head drusen. There were 51 disqualifications in that total. Breakdown of the cases revealed:

24 FC I/IA cases [22 disqualified (2 FC I/IA waivers exist in AIMWITS; both cases were misdiagnosed at the time of waiver submission as optic nerve head drusen and the diagnosis remained. However, subsequently no disc drusen were definitively identified following full ophthalmology evaluation in these individuals)], 54 FC II cases (1 disqualified), 58 FC III cases (26 disqualified), 4 ATC/GBC cases (2 disqualified), and no MOD cases.

ICD-10 Codes for Optic Nerve Head Drusen	
H47.329	Drusen of optic disc, unspecified eye

IV. Suggested Readings

1. Auw-Haedrich C, Staubach F, Witschel H. Optic Disk Drusen. Survey of Ophthalmology, 2002; 47(6): 515-532

Optic Neuritis (Mar 2020)
Reviewed: Lt Col Jonathan Ellis (Chief, ACS Ophthalmology), Lt Col Michael Parsons (Deputy Chief, ACS Ophthalmology), Dr. Dan Van Syoc (ACS Waiver Guide Coordinator), and Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes:
New Version. MSD C49.

I. Waiver Consideration

Optic neuritis (ON) is disqualifying for flying classes I/IA, II, III, and SWA duties. It is not specifically listed as disqualifying for GBO, ATC, and OSF duties, unless MS has also been diagnosed, in which case the member is disqualified. If the ON is visually symptomatic (decreased visual acuity or visual field defect), it would then be disqualifying for ATC, GBO, and OSF duties.

Table 1: Waiver potential for Optic Neuritis.

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
I/IA	No	AETC	No
II/III/SWA[1,2]	Yes	MAJCOM[3]	Yes
ATC/GBO/OSF[2]	Yes	MAJCOM[3]	Maybe

1. In untrained FC II and III, waiver recommendation is unlikely.
2. All waivers are recommended to be valid for only one year. ACS evaluations should be "in person" for initial waiver after a normal MRI and a normal repeated MRI 3 months later. Waiver renewal may be performed by review or evaluation.
3. If the case also demonstrates positive MRI/CSF or definitive Multiple Sclerosis, the waiver authority is AFMRA.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. List and fully discuss all clinical diagnoses requiring a waiver.
2. A complete discussion of the history of the optic neuritis.
3. Results of consultation from Ophthalmology AND Neurology
4. Visual Field (30-2) results at initial diagnosis and 3 months later.
5. Labs: If lumbar puncture clinically indicated by a neurologist, submit cerebrospinal fluid results including oligoclonal bands and myelin-basic protein.
6. Brain T1 and T2-weighted MRI with gadolinium and FLAIR sequences at initial presentation and 3 months later. Send report(s) and images to the ACS. For image submission process, refer to page 2.
7. If the local base cannot provide any of the above listed information, they should document why, explaining the reason to the waiver authority.

B. Renewal Waiver Request:

1. Interval history.
2. Interval labs (if indicated).
3. Interval brain T1 and T2-weighted MRI with gadolinium and FLAIR sequences. Send report(s) and images to ACS. For image submission process, see page 2.

4. Optical Coherence Tomography (OCT) of the retinal nerve fiber layer (RNFL).
5. Interval Threshold 30-2 Visual Field Studies.
6. Follow-up consultations from Ophthalmology and Neurology.
7. If the local base cannot provide any of the above listed information, they should document why, explaining the reason to the waiver authority.

III. Aeromedical Concerns

The primary aeromedical concerns with isolated ON (as defined by the absence of radiologic or clinical criteria for MS) are variable decreases in visual performance that are unpredictable by either clinical exam or imaging study and may go unrecognized by aircrew member with or without treatment. These visual changes include decreased visual acuity, degradation in color vision, visual field defects, and photopsias. Symptoms can present over a period of hours and may increase under physiologic stresses such as dehydration, hypoxia, fatigue, or increases in body temperature. Additionally, Uhthoff's phenomenon, which is a decrease in vision associated with a rise in body temperature, was a common observation amongst USAF aircrew with ON. Military operational extremes characterized by increased heat exposure, such as in desert operations and in hot closed cockpits/crew stations, may place military personnel at an increased risk for Uhthoff related functional impairments.

The risk of relapse from typical isolated ON with normal brain CSF and MRI findings is low enough, as evidenced by the Optic Neuritis Treatment Trial (ONTT), that disease modifying immunomodulatory treatment is not recommended, and waiver is possible. Treatment with high dose intravenous methylprednisolone may be considered to hasten visual return in severe cases with possible earlier return to duty with isolated ON. However, this must be balanced with the risks of such therapy since long term visual performance is not changed. When ON is not isolated, the risk of relapse is very high. Unfortunately, the reduction in relapses seen with treatment is insufficient for aviation purposes and immunomodulatory therapy for MS is not currently approved for waiver. Thus, the issue of treatment is largely irrelevant for aeromedical purposes at this time.

AIMWTS search in Jan 19 revealed 41 cases with the diagnosis of ON. There were 0 FC I/IA cases, 16 FC II cases (8 disqualifications), 22 FC III cases (9 disqualifications), 2 RPA pilot cases (1 disqualification), and 1 ATC/GBC case.

ICD 9 code for Optic Neuritis	
377.30	Optic neuritis, unspecified

ICD 10 code for Optic Neuritis	
H46.9	Optic neuritis, unspecified
H46	Optic neuritis

IV. Suggested Readings

1. Clark D, Kebede W, and Eggenberger E. Optic Neuritis. Neurol Clin, 2010; 28: 573-80.

2. Optic Neuritis Study Group. The Clinical Profile of Optic Neuritis: Experience of the Optic Neuritis Treatment Trial. Arch Ophthalmol, 1991; 109(12): 1673-78.

3. Gerling J, Meyer JH, Kommerell G. Visual field defects in optic neuritis and anterior ischemic optic neuropathy: distinctive features. Graefes Arch Clin Exper Ophthalmol, 1998; 236: 188-92.

4. Keltner JL, Johnson CA, Cello KE, et al. Visual Field Profile of Optic Neuritis: A Final Follow-up Report From the Optic Neuritis Treatment Trial From Baseline Through 15 Years. Arch Ophthal, 2010; 128: 330-37.

5. Ivan DJ, Tredici TJ, Burroughs JR, et al. Primary Idiopathic Optic Neuritis in U.S. Air Force Aviators. Aviat Space Environ Med, 1998; 69(2): 158-65.

6. The Optic Neuritis Study Group. Visual Function More Than 10 Years After Optic Neuritis: Experience of the Optic Neuritis Treatment Trial. Am J Ophthalmol, 2004; 137: 77-83.

Aerospace Medicine Waiver Guide

Refractive Error, Excessive

Revised: Feb 2022

Reviewed: Col(s) Jonathan Ellis (Chief, ACS Ophthalmology), Dr. Max Lee (ACS Waiver Guide Coordinator), and Maj Paul Vu (AFMRA Physical Standards Development Chief)

Significant Changes: Correction of Waiver Authority. Per Note 8 of Table One of the MSD, standards for refraction and anisometropia only apply to initial aircrew applicants.

I. Waiver Consideration

Refractive errors standards are listed in Section C, TABLE ONE of the Medical Standards Directory for all flying classes and special operational duty. Excessive refractive error is not listed specifically as disqualifying for ATC, GBO (RPA SO and MOD), and SWA duties. Members must correct to 20/20 in each eye at distance and near for ATC and SWA duties. Members must correct to 20/20 in the better eye and 20/400 in the worse eye for GBO. SWA personnel must also meet sister service standards IAW AR40-501 and NAVMED 15-102/105. For trained assets without other disqualifying conditions listed in the MSD, waiver renewals are not required. Assets training into a new careerfield must meet initial waiver requirements appropriate for the new flying class or operational duties.

The following tables cover the different flying classes, waiver potential, and ACS review/evaluation for myopia, hyperopia, astigmatism, and anisometropia. If refractive errors are greater than those listed in the tables below for FC I/IA, no waiver will be granted.

Table 1: Myopia

Flying Class	Refractive error	Waiver Potential	Waiver Authority	ACS review/evaluation
FC I	> -3.00	No	AFRS/CMO	No
FC IA	> -4.50	No	AFRS/CMO	No
FC II(non-pilot)/FC III/GBO (RPA Pilot)	> -5.50	Yes	AFRS/CMO	No
ATC/GBO (RPA SO/MOD)	N/A	N/A	N/A	N/A
SWA	> -8.00	No	AFRS/Army/Navy	No

Table 2: Hyperopia

Flying Class	Refractive error	Waiver Potential	Waiver Authority	ACS review/evaluation
FC I	> +2.00 but ≤ +3.00 [1] > +3.00 but ≤ +4.00 [2]	Yes	AFRS/CMO	Yes
FC IA	> +3.00 but ≤ +4.00 [1] > +4.00 but ≤ +5.50 [2]	Yes	AFRS/CMO	Yes
FC II(non-pilot)/FC III	> +5.50 [1]	Yes	AFRS/CMO	Maybe[3]
GBO (RPA Pilot)	> +5.50	Yes	AFRS/CMO	Yes
ATC/GBO (RPA SO/MOD)	N/A	N/A	N/A	N/A
SWA	> +8.00	No	AFRS/Army/Navy	No

1. If waiverable degradation in stereopsis, (meets waiver criteria for defective depth perception, see waiver guide on stereopsis), then waiver potential exists.
2. If no degradation in stereopsis, then waiver potential exists.
3. Hyperopes with defective depth perception may be referred to the ACS at the discretion of the waiver authority.

Table 3: Astigmatism

Flying Class	Refractive Error	Waiver Potential	Waiver Authority	ACS review/evaluation
FC I/IA	>3.00	No	AFRS/CMO	No
FC II/FC III GBO (RPA Pilot)	>3.00	Yes	AFRS/CMO	Yes
ATC/GBO (RPA SO/MOD)/SWA	N/A	N/A	N/A	N/A

Table 4: Anisometropia

Flying Class	Refractive Error[1]	Waiver Potential	Waiver Authority	ACS review/evaluation
FC I	> 2.00	Yes	AFRS/CMO	Yes
FC IA	> 2.50	Yes	AFRS/CMO	Yes
FC II(non-pilot/FC III GBO (RPA Pilot)	> 3.50	Yes	AFRS/CMO	No
ATC/GBO (RPA SO/MOD)/SWA	N/A	N/A	N/A	N/A

1. If normal stereopsis or waiverable degradation in stereopsis and no asthenopic symptoms or diplopia. Waiverable degradation of stereopsis means meets waiver criteria for defective depth perception (see waiver guide on subject).

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines & recommendations.

Myopia

Initial Waiver Request:

1. Cycloplegic refraction (Initial FC II/III/GBO-RPA Pilot applicant) to 20/20 each eye and manifest refraction to best corrected visual acuity each eye.
2. Optometry/ophthalmology exam to include a dilated peripheral retina exam of each eye.
3. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

Hyperopia

Initial Waiver Request:

1. Cycloplegic refraction (FC I/IA and initial FC II/III/GBO-RPA Pilot applicant) to 20/20 each eye and manifest refraction to best corrected visual acuity each eye.
2. Stereopsis testing (OVT).
3. Optometry/ophthalmology exam to include:
    a. Ductions, versions, cover test and alternate cover test in primary and 6 cardinal positions of gaze.
    b. AO Vectograph stereopsis and suppression tests at 6 meters
    c. Randot or Titmus stereopsis test (near stereopsis tests).
    d. Red lens test.
    e. Four-diopter base-out prism test at 6 meters.
4. History of asthenopic (eye pain/fatigue) symptoms, diplopia.
5. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

Astigmatism

Initial Waiver Request:

1. Cycloplegic refraction (Initial FC II/III/GBO-RPA Pilot applicant) to 20/20 each eye and manifest refraction to best corrected visual acuity each eye.
2. Corneal topography imaging. All corneal topography (CT) submissions should be formatted in **Axial** view using a standard dioptric scale (39.0 to 50.0 Diopter range, 0.50 Diopter increments) and standard color palette. The **OD/OS Display** with an **Axial Map** and an **Axial Numeric View** is preferred. All ATLAS topographies should display the **Axial I-S** value.
3. Corrected visual acuity with spectacles, and contact lenses if applicable, each eye.
4. Corrected low contrast acuity (PV 5% chart) with spectacles, and contact lenses if applicable, each eye.
5. Stereopsis testing (OVT).
6. Optometry/ophthalmology exam to include slit lamp and fundus exam.

7. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

Anisometropia

Initial Waiver Request:

1. Cycloplegic refraction (FC I/IA and initial FC II/III/GBO-RPA Pilot applicant) to 20/20 each eye and manifest refraction to best corrected visual acuity each eye.
2. Stereopsis testing (OVT).
3. Optometry/ophthalmology exam to include:
    a. Ductions, versions, cover test and alternate cover test in primary and 6 cardinal positions of gaze.
    b. AO Vectograph stereopsis and suppression tests at 6 meters
    c. Randot or Titmus stereopsis test (near stereopsis tests).
    d. Red lens test.
    e. Four-diopter base-out prism test at 6 meters.
6. History of asthenopic (eye pain/fatigue) symptoms, diplopia or fusional problems, to include negative responses.
7. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

Note: For all FC I/IA applicants, confirmation that individual has discontinued wear of soft contacts for at least 30 days or hard/rigid gas permeable contact lenses for at least 90 days at the time of exam is required.

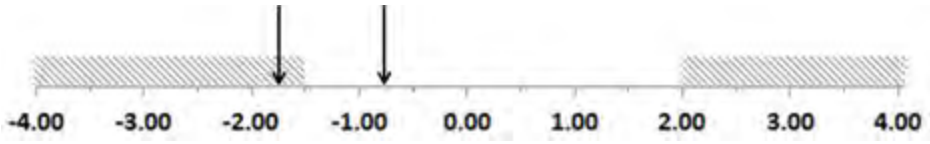
III. Aeromedical Concerns

Aeromedical refractive error is based on the cycloplegic refraction for all initial flying class exams. The authorized cycloplegic exam technique uses 1% cyclopentolate (Cyclogyl), 2 drops each eye, 5 to 15 minutes apart, with examination performed no sooner than one hour and no later than two hours after the second drop. The cycloplegic refractive error is the minimum refractive power needed to achieve 20/20 visual acuity in each eye. The refractive error standard for aeromedical purposes is that produced following transposition. The rules of transposing are: (1) Algebraically add the cylinder power to the sphere power to determine the transposed power of the sphere (2) Change the sign of the cylinder (3) Change the axis by 90 degrees (do not use degrees greater than 180 or less than 0). Note: 180 degrees is used in place of 0 degrees.

	Sphere	Cylinder		Axis
Example 1:	-0.75	-1.00	X	179
Transposed	-1.75	+1.00	X	089
Example 2:	-4.25	-1.25	X	068
Transposed	-5.50	+1.25	X	158

By transposing a refractive error, the most plus and most minus meridians can easily be determined. In example 1, -0.75 is the most plus meridian and -1.75 is the most minus meridian. When applying aeromedical standards and waiver criteria, both of these values must fall within the allotted range based on the flying class. If the candidate in example 1 was applying for FCI,

Table One of the Medical Standards Directory (MSD) would show that the most plus meridian can be no greater than +2.00 and the most minus meridian can be no less than -1.50. Graphically, this would be represented as shown below, and it is apparent that this refraction would exceed the standard for myopia.



Astigmatism may be represented by either a positive or negative cylinder value depending on the axis referenced. When applying aeromedical standards and waiver criteria, the sign of the value is irrelevant as the physical meaning of astigmatism is simply a difference between two points.

Improper or unbalanced correction with spectacles or contact lens can degrade stereopsis and contrast sensitivity as well as induce generalized ocular pain and fatigue (asthenopia). Myopia is more likely to progress, with respect to the degree of myopia, regardless of age, while hyperopia tends to remain static over time. In addition, myopes may see halos or flares around bright lights at night and are also at risk for worsening vision under dim illumination and with pupil enlargement, a phenomena known as "night myopia." Myopes also have an increased risk of retinal detachment, open angle glaucoma and retinal degenerations, such as lattice.

Hyperopes, especially those with greater than +3.00 D of correction, will experience greater problems with visual acuity after treatment with atropine or topical cycloplegic agents. They have a greater predisposition for tropias, microstrabismus, and phorias that can decompensate under the rigors of flight. They also have a higher prevalence for amblyopia due to the accommodative esotropia and anisometropia. Moreover, hyperopes have more problems with visual aids, such as night vision goggles, as they develop presbyopia at earlier ages compared to myopes. Lastly, hyperopes are more likely to develop angle closure glaucoma than myopes.

Higher levels of astigmatism or progressive astigmatism can be associated with potentially progressive corneal conditions, such as keratoconus, that can degrade image quality and visual performance during productive years of flying career. Anisometropias have greater association with diplopia, fusional discrepancies (e.g. defective stereopsis), and amblyopia, especially when greater than 2.00 D refractive error difference between the two eyes.

In general, corrective measures presently available to correct refractive errors include spectacles, contact lenses, and corneal refractive surgical techniques such as PRK, LASIK, and ICL implantation. Spectacles impose an additional optical interface between the aircrew's eyes and the outside world. This increases the risk of internal reflections, fogging, as well as reduction in the light reaching the retina leading to visual distortion. These phenomenon are especially more common in high myopes and in higher levels of astigmatism. Finally, spectacle frames interfere with the visual field, cause potential hot spots, and displace under G forces. Depending on nature and magnitude of the refractive error, the lenses themselves can induce optical blind spots (scotomas), optical image size changes, and can create unacceptable effects on other visual performance parameters, such as stereopsis. Contact lenses share some of these same problems,

but reduce some of the drawbacks of spectacles, such as changes in image size, peripheral vision interference, hot spots from frames, fogging, and blind spots. However, contact lenses introduce their own unique aeromedical problems particularly related to maintenance and wear. In addition, further concern exists with the risk of acutely having to perform without the corrective lenses, such as after spontaneous lens loss, e.g. after ejection or during a deployment without adequate backups. See corneal *Refractive Surgery* and *Implantable Collamer Lens* Waiver Guides for further discussion on advantages and risks of refractive surgery.

AIMWTS review of each of these four diagnoses produces a large number of cases. In 2015, there were 8420 cases of myopia, 496 cases of hyperopia, 2079 cases of astigmatism and 153 cases of anisometropia. It is no longer necessary to do new searches that will produce even larger numbers. These are common diagnoses in the aviation population, but it is important that we continue screening our aviators for quality of vision.

ICD-9 Codes for Refractive Errors	
367.0	Hyperopia
367.1	Myopia
367.2	Astigmatism
367.31	Anisometropia

ICD-10 Codes for Refractive Errors	
H52.0, 1, 2, 3	Hypermetropia, right, left, both
H52.1, 1, 2, 3	Myopia, right, left, both
H52.20, 1, 2, 3, 9	Unspecified astigmatism, right, left, both, unspecified
H52.31	Anisometropia
H52.7	Unspecified disorder of refraction

IV. Recommended Readings

No external references were used in producing this waiver guide.

Refractive Surgery (Nov 2020)
Revised: November 2020
Authors/Reviewers: Lt Col Jonathan Ellis (ACS Ophthalmology Branch Chief), Dr Christopher Keirns (ACS Waiver Guide Coordinator), and Lt Col Ric Speakman (AFMRA Physical Standards Development Chief)

Significant Changes: SMILE and ICL surgery now approved but requires a waiver prior to return to flying and operational duties.

I. Waiver Consideration

Uncomplicated Refractive Surgery is not disqualifying for all classes of flying duties and Aviation and Aviation Related Special Duty (AASD) if pre-refractive Surgery Cycloplegic refractive error limits were met (Table 3). Waiver is required only if complications occurred or if surgery was performed beyond the standards but does not exceed waiver limits (Table 4). Members who don't require a waiver are managed locally with a DNIF and may return to flying duties once cleared by the flight surgeon, co-managing optometrist, and surgeon (if needed). All LASIK flap dislocations need to be evaluated in person at the ACS even if treated promptly and deemed healed by the treating ophthalmologist. There is a risk in such cases of quality of vision deficits. Return to Flying Duties/Waiver may be initiated as early as 30 days postop for LASIK and 6 weeks postop for PRK if the surgery and/or complication has been managed appropriately with return of good visual acuity (Table 2). In cases where no waiver is necessary (within standards as stated in Table 3 and without complications), member may return to flying duties two weeks after surgery at the earliest, but not until they can pass vision standards with at least two weeks of stability (Table 2).

The currently approved laser refractive surgery procedures include LASIK, PRK, and SMILE. LASIK and PRK are generally not disqualifying and do not require a waiver unless one of the above conditions are met. SMILE is a newer procedure and requires a waiver prior to return to flying duties. ICL surgery is the only approved intraocular refractive surgery for aircrew and also requires a waiver prior to return to flying duties (see ICL Waiver Guide).

For ATC, GBO and SWA personnel, a history of refractive surgery is only disqualifying if the surgical outcome results in the member's inability to meet visual standards for the career field.

Steroid eye drops used to treat or prevent inflammation after approved CRS do not automatically lead to DNIF. The member should remain DNIF until cleared by flight surgeon, optometrist, and surgeon once the member meets vision standards, and is deemed clear, as outlined in Table 2. Members may need anti-inflammatory drops after they have been deemed clear to return to flight status, but do not need to be DNIF during the rest of their time using these drops.

Table 1: Waiver potential for Refractive Surgery with Complications

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
I/IA	Yes	AETC	Yes
II/III	Yes	MAJCOM	Yes
ATC, GBO, SWA	Yes	MAJCOM	Yes

Table 2: Vision Standards for Return To Flying Duties or to Initiate Waiver (if required)

Examination	**Waiverable Results**
Best corrected visual acuity (OVT)	20/20 or better each eye
Precision Vision 5% low contrast chart	20/50 or better each eye
Refractive error	Stable, no more than 0.50 diopter shift in **manifest** sphere or cylinder refractive power between two readings at least 2 weeks apart
Slit lamp exam	LASIK – no visually significant striae or flap complications PRK – no visually significant corneal haze
Fundus exam	No new or previously unrecognized retinal pathology
Depth perception (OVT-DP)	Line B or better. If fails, refer to defective depth perception/stereopsis waiver guide.

Table 3: Pre-RS Cycloplegic Refractive Error Limits (AASD)

Myopia (Most myopic meridian)	≤ –8.00 Diopters
Hyperopia (Most hyperopic meridian)	≤ +3.00 Diopters
Astigmatism	≤ 3.00 Diopters

Table 4: Pre-RS Cycloplegic Refractive Error Limits (Exceeds AASD and Requires Waiver)[1]

Refractive Error	**Untrained Applicants**	**Trained Applicants**
Myopia (Most myopic meridian)	≤ –10.00 Diopters	≤ -10.00 Diopters
Hyperopia (Most hyperopic meridian)	≤ +5.00 Diopters	≤ +4.00 Diopters
Astigmatism	≤ 6.00 Diopters	≤ 3.00 Diopters

1. Applicant/Member may not qualify for a waiver for surgery in excess of AASD standards unless member had a good outcome and is able to meet other vision standards. Special warfare airmen must meet sister service standards while training with sister services.

Table 5: USAF Corneal Refractive Surgery Clinical Guidelines (AADS CRS Program and Standards)

		PRK[8, 9]	LASIK[7, 9]	Hyperopia[6,9]
		Plano to ≤ -8.00	**Plano to ≤ -8.00**	**Plano to ≤ +3.00**
Trained Aircrew	Surgery	Any DoD RS Center/Civilian[1]	Any DoD RS Center/Civilian[1]	Any DoD RS Center/Civilian[1]
	1-year post-op exam	Local Eye Clinic/Civilian[1]	Local Eye Clinic/Civilian[1]	Local Eye Clinic/Civilian[1]
	Waiver Authority[5]	MAJCOM	MAJCOM	MAJCOM
Pilot Applicants[2]	Surgery	USAFA/Civilian & Any DoD RS Center[1]	USAFA/Civilian & Any DoD RS Center[1]	USAFA/Civilian & Any DoD RS Center[1]
	Exam requirement for initial waiver[3]	USAFA/ACS at time of MFS	USAFA/ACS at time of MFS	ACS[4]/ACS at time of MFS
	Waiver Authority	AETC	AETC	AETC[4]
RPA Pilot Applicants	Surgery	Any DoD RS Center/Civilian[1]	Any DoD RS Center/Civilian[1]	Any DoD RS Center/Civilian[1]
	Initial follow-up for waiver	Local Eye Clinic/Civilian[1]	Local Eye Clinic/Civilian[1]	USAFA/ACS at time of MFS

1. If not eligible for TRICARE medical benefit (e.g. civilian, ROTC & most ANG/AFRC), will go to civilian provider.
2. AD pilot applicants are considered Warfighters until selected for training [they must have a qualified physical exam (pending MFS) before selection]. They must meet the AASD or waiver criteria.
3. Post-op exam for initial FC I application must be at least three months after date of surgery (e.g. history of PRK or LASIK no sooner than three months ago). Applicants must be one year after surgery for hyperopic treatments.
4. For USAFA cadets, ACS review/evaluation is required prior to waiver (no "contingent on MFS" waivers) if there was a complication.
5. Waiver authority for initial and renewal, if the surgery was in excess of AASD standards and/or complications were experienced.
6. For both PRK and LASIK.
7. Members who have LASIK should have a minimum two-week DNIF period, however, it may take up to 1 month to fully stabilize following LASIK. Initial waiver can be requested once applicable vision standards are met and refractive stability is established if the surgery was in excess of AASD standards and/or there was a complication.
8. Members who have PRK should have a minimum two-week DNIF period, however, it may take up to 2-3 months for enough corneal healing to occur to meet applicable vision standards and for refractive stability to occur.
9. All initial waivers must meet other set vision standards and meet the waiver criteria in Table 4 above.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines & recommendations. Waiver potential and waiver limits are outlined in Tables 1, 2, 3, and 4. The essential elements of the USAF Refractive Surgery Program are outlined in Table 5 above.

If the **trained aircrew member** has an uncomplicated postoperative course, meets applicable vision standards, and met pre-refractive cycloplegic refractive error limits in Table 3, member may resume flying duties once cleared by their flight surgeon, co-managing optometrist, and surgeon (if necessary). All follow-up appointments, including the 12-month post op evaluation should still be accomplished to meet RS standard of care requirements. Annual routine PHA vision exams will be required after this point. Complicated cases, cases that exceed AASD standards, or cases not meeting vision standards post-operatively should be referred to the ACS for review.

While on anti-inflammatory (steroid) eye drops, the aviator will be placed on non-mobility status, restricting the individual from deployment via AF Form 469. For LASIK, the aircrew member will similarly be placed on non-mobility status, restricting the individual from deployment via AF Form 469 for a minimum of one month after surgery, even if no longer on steroid eye drops.

Any complications that arise will require waiver after the complication is successfully managed.

Initial Waiver Request for **trained** AASD members:

1. History
    a. Pre-op cycloplegic refraction.
    b. Surgical procedure, date, location, complication, and management of the complication.
    c. Assessment (negative and positive) of post-op symptoms of glare, halos, reduced night vision and diplopia.
        i. Eye medications usage, past and current, include discontinuation date.
2. Physical (current):
    a. Uncorrected visual acuity high contrast (OVT) and Precision Vision 5% low contrast.
    b. Best corrected visual acuity high contrast (OVT) and Precision Vision 5% low contrast.
    c. Cycloplegic refraction and dilated fundus exam.
    d. Two post-op refractions at least 2 weeks apart that shows stability (no more than 0.50 diopter shift in **manifest** sphere or cylinder power).
    e. Slit lamp exam, which must include grading of haze, if present.
    f. Intraocular pressures (IOPs).
    g. Depth perception (OVT-DP). (If fails and previously waived for defective depth perception using AO Vectograph, then include AO Vectograph).
3. Attach copy of "Permission to Proceed" letter.
4. Attach copy of the operative report for each eye treated, post-RS evaluations (1, 3, 6, 12 months post-op and annually, and any other additional follow-ups) and any RS-related incidents (this will meet the requirement to send this info to the USAF-RS APM). The following is a link to the post-RS evaluation form to be utilized:
5. https://kx.health.mil/kj/kx1/AFRefractiveSurgery/Pages/home.aspx **or**
6. https://kx.health.mil/kj/kx1/AFRefractiveSurgery/Documents/Forms/ShowFolders.aspx?RootFolder=/kj/kx1/AFRefractiveSurgery/Documents/New%20CRS%20PDF%20forms&FolderCTID=0x01200042E4CD4D09D1524EB5B8D337F9AD1615&View=%7bD5DE7241-B6EB-4E3D-A94E-D3E74D33084D%7d
7. If any of the above requested items cannot be provided, please provide an explanation to the waiver authority in the AMS why that could not be provided.

Initial Waiver Request for **untrained** AASD applicants:

1. History/Physical:
    a. Address whether all clinical criteria prior to RS were met. If not, describe exceptions in detail.
    b. Description of other surgical or post-operative complications (e.g. corneal haze, flap striae, ocular hypertension, etc.)
    c. Must be 6 months post-RS, at minimum, for application consideration (one year for hyperopic treatments).
    d. All other items required for History and Physical for trained AASD members above in section A.

Attach copy of the operative report for each eye treated, post-RS evaluations and any RS-related incidents (this will meet the requirement to send this info to the APM. The following is a link to the post-RS evaluation form which should be used:
https://kx.health.mil/kj/kx1/AFRefractiveSurgery/Pages/home.aspx **or**

https://kx.health.mil/kj/kx1/AFRefractiveSurgery/Documents/Forms/ShowFolders.aspx?RootFolder=/kj/kx1/AFRefractiveSurgery/Documents/New%20CRS%20PDF%20forms&FolderCTID=0x01200042E4CD4D09D1524EB5B8D337F9AD1615&View=%7bD5DE7241-B6EB-4E3D-A94E-D3E74D33084D%7d

1. Initial waiver term of validity may be indefinite at the waiver authority's discretion; however, AASD applicants are not eligible for waiver until the complication has been managed and member has stabilized and otherwise meets vision standards. Post-RS evaluations are desired at 1, 2 (if PRK), 3, 6, and 12 months post-op. All examination documentation obtained to date is required for submission for the initial waiver.
2. If any of the above requested items cannot be provided, please provide an explanation to the waiver authority in the AMS why that could not be provided.

III. Aeromedical Concerns

These elective surgical procedures, although highly successful in general, are not risk free and represent an investment by the patient and his/her squadron initially. Topical steroids are required following RS to control the healing response and reduce the risk of corneal haze and scarring. However, topical steroids may increase the risk of infection, produce elevated intraocular pressure in some individuals, and may cause development of cataracts. To date, two aircrew members have sustained permanent visual field defects and vision loss because of topical steroid related complications. Therefore, frequent monitoring of intraocular pressure and close follow-up is required.

AASD personnel are restricted from deployment as long as steroid eye drops are in use; however, if waiver required, the aircrew member may be waived by the MAJCOM waiver authority to return to local flight duties in order to maintain qualifications. Participation in flight simulator and altitude chamber training while on steroid eye drops is permissible after initial waiver is granted by the waiver authority. An aeromedical summary submitted to MAJCOM waiver authority must provide evidence that all applicable vision standards are met, any post-operative complications have resolved, and the refraction is stable (two refractions separated by at least two weeks with no more than 0.50D change.) When the aviator has been directed to discontinue steroid eye drop use, the member may be returned to world-wide-qualified status for deployment purposes.

Degradation in the quality of vision following RS can affect operational visual performance, despite a finding of high contrast visual acuity (standard vision charts) that meets flight standards. Significant complications include dry eye symptoms, corneal haze, glare, halos, diplopia, reduced low contrast sensitivity, unaided night vision, and night vision goggles (NVG) performance. Recovery from RS complications may require extended recuperation time extending to a year or more. Under- and over-corrections of refractive errors can result from both PRK and LASIK treatments. Refractive surgery enhancement (secondary treatment) or requirement to wear traditional correction (spectacles or contact lenses) may be required. UV protection is required post-RS to reduce UV-induced phototoxic damage than can potentiate corneal haze.

LASIK procedures uniquely present flap complication risks. Intra-operative complications, while rare, include thin flap, incomplete flap, buttonhole flap or free flap. In addition, flap striae (wrinkles) can develop intra-operatively or at any time during the convalescent period. Surgical

intervention is usually required to address striae complications if visual acuity is affected. The risk of corneal flap displacement by high Gz forces or ejection sequences is low. The effect of chronic, low-grade hypoxia on visual performance following LASIK has not been completely studied. A single study at sea level (normobaria) with simulated hypoxic environment equivalent to 25K feet revealed no reduction in vision.[1] The effects of altitude up to 35K feet in an aviation environment following both PRK and LASIK has been studied with no adverse effects noted. Infectious keratitis can occur during the immediate postoperative period, which can be vision threatening. Best-corrected visual acuity may decrease by two or more lines in up to 3.6% of patients if keratitis occurs.

Flight surgeons should encourage post-RS aircrew to prepare for long duration flights and pending deployments. A bottle of sterile lubricating eye drops assists aviators in managing dry eye symptoms (a common post-RS complication) and thus minimizes rubbing of the eyes, which can precipitate corneal abrasions or LASIK flap dislocation. Post-operatively, aircrew must continue to be alert and vigilant in the use of eye protection in both operational and recreational environments, especially after LASIK.

Recently, a change was made to allow waivers for members in excess of AASD limits (Table 4). This change was recommended based on nearly two decades of success of the USAF refractive surgery program as well as numerous studies showing the continued safety of the procedures. For myopia, the most feared complication is that of retinal tears and retinal detachment. A retrospective review of 1554 eyes who underwent LASIK for refractive error between -8.00 to -27.50 showed only four retinal detachments (0.25%). The rate of retinal detachment in aircrew in the excessive myopia management group (members who had refractive surgery from -5.50 to -8.00 diopters) was found to be 0.08% and was 0.22% for retinal tears. With hyperopic treatments, the concern is the quality of vision and risk of regression. Current literature on modern laser platforms show 86% of eyes +0.50 to +8.50 have best corrected acuity of 20/20 one year after procedure and there is a 2.13% loss of two lines or more of best corrected visual acuity. Another study looking at a sixth generation laser platform found outcomes to be very stable with regression of only 0.14 diopters reported over a one year period. Therefore, even in more extreme refractive errors, it does seems reasonable to offer refractive surgery, especially as these are the members with the most to gain from having surgery.

A newer laser refractive surgical procedure called SMILE (SMall Incision Lenticule Extraction) was approved for aircrew in March 2020. This procedure involves the use of a femtosecond laser to cut an intralamellar (within the cornea) lenticule that is removed through a small incision created with the laser. This procedure was first performed in the Air Force at Wilford Hall Ambulatory Surgical Center (WHASC) in Dec 2018. An unpublished internal review of 213 procedures on 117 patients at WHASC revealed that with SMILE, 16.67% of patients had 20/15 UCVA and 97.60% had 20/20 UCVA by 6 months after surgery. The 5% PV showed that SMILE did not perform as quite as well as LASIK and PRK, but 100% of patients saw 20/40 or better. Additionally, 94.6% of patients were within 0.50 D of the intended postoperative refraction. Based on these results, SMILE was approved as an alternative to LASIK and PRK for USAF aircrew. However, since this is a newer procedure and has not specifically been studied in the aviation environment, a waiver will still be required prior to return to flying duties for members who have had SMILE.

A waiver may be granted by the waiver authority at initial waiver following **complicated approved refractive surgery, uncomplicated surgery in excess of AASD limits, or for members who underwent SMILE surgery** once the aircrew member is off all medications and meets post-op stability and vision criteria.

ICD-10 Codes for Corneal Refractive Surgery	
H52.0 1, 2, 3	Hypermetropia, right, left, both
H52.1 1, 2, 3	Myopia, right, left, both
H52.20 1, 2, 3, 9	Unspecified astigmatism, right, left, both, unspecified
08Q8XZZ	Repair right cornea, external approach
08Q9XZZ	Repair left cornea, external approach

IV. References

1. Larys RP. LASIK at high altitude – a study of the worst-case mission scenario. Presented at the International Military refractive Surgery Symposium, February 5-7, 2007 in San Antonio, Texas.

2. Tutt RC, Baldwin JB, Ivan DJ, et al. Simulated altitude and G-force tolerance after photorefractive keratectomy (PRK). Brooks City Base, TX: USAF School of Aerospace Medicine; 2005 June. Report No: SAM-FE-BR-TR-2005-0002.

3. Aaron M, Wright S, Gooch J, et al. Stability of Laser-Assisted In Situ Keratomileusis (LASIK) at Altitude. Aviat Space Environ Med, 2012; 83: 958-61.

4. Ruiz-Moreno JM, Perez-Santonja, JJ, and Alio JL. Retinal Detachment in Myopic Eyes After Laser In Situ Keratomileusis. Am J Ophthalmol, 1999; 128(5):588-594.

5. Sandoval HP, Donnenfeld ED, Kohnen T, et al. Modern Laser In Situ Keratomileusis Outcomes. J Cataract Refract Surg 2016; 42:1224-1234.

6. Gharaibeh Villanueva A, Mas D, et al. Corneal Stability Following Hyperopic LASIK with Advanced Laser Ablation Profiles Analyzed by a Light Propagation Study. J Ophthalmol, vol. 2018, Article ID 3060939, 10 pages, 2018.

Retinal Holes, Retinal Tears, Retinal Detachment, and Retinoschisis (Mar 2020)
Reviewed: Lt Col Jonathan Ellis (Chief, ACS Ophthalmology), Lt Col Michael Parsons, (Deputy Chief, ACS Ophthalmology), Dr. Dan Van Syoc (ACS Waiver Guide Coordinator), and Lt Col Ian D. Gregory (AFMRA Physical Standards Development Chief)

Significant Changes:
New Ground Based Operator (GBO) Standards. MSD C39-42.

I. Waiver Consideration

Bilateral retinal detachment is disqualifying for all classes and for retention. Unilateral retinal detachment from organic progressive disease or with persistent defects may be disqualifying for all classes and for retention. Retinal breaks and retinoschisis are only disqualifying for Flying Classes I/IA, II, III, and SWA. Low risk atrophic retinal holes with a refraction less than or equal to -5.50 are not considered disqualfying. Waiver potential exists for low risk atrophic retinal holes with refraction from -5.75 to -8.00 diopters.

Table 1: Waiver potential for Retinal Holes, Retinal Tears, Retinal Detachment, and Retinoschisis.

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
I/IA	Maybe[1]	AETC	Yes
II/III	Yes[2]	MAJCOM	Yes
ATC/GBO/SWA/OSF	Yes[3,4]	MAJCOM	Yes

1 Low risk features for retinal detachment are defined as absence of symptoms (flashes or floaters), no prior history of retinal detachment, no subretinal fluid, myopia between -5.75 to -8.00 diopters, and no evidence of vitreo-retinal traction. In addition, there should be no retinal breaks at the edge or outside the area of lattice degeneration, except in the case of operculated peripheral retinal hole.
2. Untrained FC II/III treated similar to FC I/IA.
3. Not disqualifying if treated and/or determined to be stable by a vitreo-retina specialist.
4. No waiver potential if bilateral retinal detachment or unilateral retinal detachment resulting from organic progressive disease, and/or associated with diplopia, field of view <20 degrees, or loss of acuity below standards.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines & recommendations; MEB may be required for retinal detachment. If the treating ophthalmologist or retinal specialist determines surgical treatment is required then waiver submission should occur after adequate recovery time without complications and adequate pigment changes in the post-laser scar has occurred (one month minimum). If no treatment is required, then the 1 month waiting period prior to waiver submission is not required. All initial waivers (or recurrence of retinal tear or detachment) require an ACS evaluation/review.

A. Initial Waiver Request:

1. List and fully discuss all clinical diagnoses requiring a waiver.
2. Complete aeromedical history to include pertinent negatives (trauma, myopia, lattice degeneration, etc.), high-risk features, or treatment(s), if applicable.
3. Optometric exam to include:
   a. Manifest refraction (previous refraction if underwent CRS)
   b. Visual acuity
   c. Humphrey 30-2 visual field
   d. Amsler grid
   e. CCT results from each eye individually (if macular involvement)
4. Ophthalmology or retinal specialist consultation to include: history, positive risk factors, exam findings, treatment(s), and surgical outcome.
5. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to the waiver authority.

B. Renewal Waiver Request:

1. Interval history to include presence or absence of current visual symptoms and operational impact of condition.
2. Results of interval ophthalmology exams.
3. Summary of any interval medical or surgical treatments (if required).
4. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to the waiver authority.

III. Aeromedical Concerns

Retinal holes and tears can lead to retinal detachment. Retinal detachment can result in loss of visual acuity, loss of stereopsis, visual distortion, visual field loss, relative night blindness, reduced color vision, and lowered contrast sensitivity. The specific visual impact depends on the area and extent of the retina involved and the success of any reattachment surgery. In 90% of cases, eyes with no macular detachment present can be expected to have 20/40 vision or better following surgery. Consideration must also be given to the risk of progression, recurrence or involvement of the fellow eye based on the mechanism of retinal pathology, or type of retinal detachment. Although routine exposure to G-forces has not been shown to increase the risk of retinal detachment, the risk is increased with pre-existing vitreoretinal abnormalities, especially in the case of tractional retinal detachment, and this should be considered in the case of unrestricted waivers. All patients with documented retinal holes or breaks should have their manifest refractions included in the Aeromedical Consultation Service (ACS) referrals (these should be pre-corneal refractive surgery measurements if applicable), as higher levels of myopia lend to a higher risk of retinal detachment as discussed above. This risk is due to the fact that myopic eyes tend to have longer axial lengths, which is the real risk factor for retinal detachment. The ACS Ophthalmology Branch is currently investigating this association and its applicability to aeromedical standards. All retinal breaks need careful examination to identify the types of holes present and to determine if active vitreo-retinal traction or other signs of impending retinal detachment are present. This can be accomplished by any ophthalmologist or vitreo-retinal subspecialist (retinal detachment) but should also be reviewed by the ACS once the underlying disease process has stabilized.

AIMWTS search in Sep 2019 back to 1 Jan 2014 revealed 241 members with an AMS containing one of the above retinal diagnoses. There were 21 cases that were disqualified. Breakdown of the cases revealed: 23 FC I/IA cases (3 disqualified), 106 FC II cases (3 disqualified), 7 RPA pilot cases (2 disqualified), 92 FC III cases (11 disqualified), 4 ATC/GBC cases (0 disqualified), 6 SWA cases (1 disqualified), and 3 MOD cases (1 disqualified).

ICD-9 codes for retinal hole, retinal detachment, and retinoschisis	
361.3 361.31	Retinal holes
361.0 361.2 361.8 361.9	Retinal detachment
361.1	Retinoschisis

ICD-10 codes for retinal hole, retinal detachment, and retinoschisis	
H33.309	Unspecified retinal break, unspecified eye
H33.329	Round hole, unspecified eye
H33.2 0, 1, 2, 3	Serous retinal detachment
H33.8	Other retinal detachments
H33.10 0, 1, 2, 3	Unspecified retinoschisis

IV. Suggested Readings

1. Greven CM. Retinal Breaks. Ch. 6.37 in *Yanoff: Ophthalmology*, 4th ed., Saunders, 2013.

Substandard Stereopsis
(Formerly Defective Depth Perception)

Revised: Jul 2021

Reviewed: Lt Col Jonathan Ellis (Chief, ACS Ophthalmology), Dr. Austen Tanner (Optometrist, ACS Ophthalmology), Lt Col Amy Hicks (ACS Division Chief), Dr. Max Lee (ACS Waiver Guide coordinator), and Lt Col Ric Speakman (AFMSA Physical Standards Development Chief)

Significant Changes:

1. New Special Warfare Airmen Standards added.
2. Indefinite SWA waiver will be considered for members/applicants who can consistently demonstrate proficiency at 120 arc seconds.
3. AO Vectograph administration instructions have been added.

I. Waiver Consideration

The Medical Standards Directory (MSD) sets the standards for stereopsis as OVT line "B" (40 arc sec) is the standard for FC I/IA/II/III, and SWA. All FC I/IA with VTA-DP or OVT-DP failure (unable to consistently read line B) who are otherwise qualified will require a depth perception waiver workup and are required to either have a case review or in-person evaluation by the Aeromedical Consultation Service (ACS).

All FC II and FC III aircrew positions that require depth perception for scanning duties to safely clear their aircraft or themselves from objects or other aircraft in the air or on the ground within 200 meters (i.e. boom operators, flight engineers, loadmasters, and military free fall) who fail the annual required depth perception testing (VTA or OVT), or who have failed in the past (using the 40 arc sec standard) and never been evaluated at the ACS for defective stereopsis are required to have an ACS records review and/or in-person evaluation before waiver consideration. The Monofixation-Microtropia and the Prospective Defective Stereopsis management groups have been closed as the requisite data has been collected and interpreted.

If the trained aviator has previously failed the VTA or OVT during the annual flight physical but has an existing ACS review or evaluation with **indefinite** waiver, and can pass the VTA or OVT with a score of 4/4 (60 arc sec) on the AO Vectograph distance stereopsis test, or achieve a previously waivered baseline score on the AO Vectograph (as determined by the ACS), no further workup is needed until next annual flight physical. Do **NOT** retire the indefinite waiver unless advised by ACS after a review of current and prior testing results. If depth perception capability has declined from the previously waivered level or if binocular fusional control has diminished, i.e. onset of diplopia, previous waiver is nullified and a full workup should be accomplished as outlined below in the Information Required for Waiver Submission section. If spectacles or contact lenses were needed to pass depth perception testing, regardless of unaided visual acuity i.e. 20/20, then spectacles are required for aviation duties, to meet depth perception standards.

Defective depth perception requirement is outlined in the Air Force Officer and Enlisted Classification Directories (AFOCD/AFECD) and generally is not waiverable for initial FC III applicants for the following career fields: 1A0 (Boom Operators), 1A1 (Flight Engineers), 1A2 (Loadmasters), 1A3 (Airborne Mission System Operators), and 1A7 (Airfield Managers). More extensive work up for waiver submission will only be required for FC I/IA/II, SWA, FC III and GBO career fields that carry a depth perception requirement as outlined in the AFOCD/AFECD.

There is no depth perception standard for ATC or GBO personnel. Initial RPA Pilot applicants will meet FAA Third Class Medical Certificate standards for Undergraduate RPA Training if they do not have a history of strabismus or diplopia. Additionally, SERE technicians, who otherwise fall under SWA standards, have no depth perception requirement to perform operational duties.

SWA personnel other than SERE technicians must meet the stereopsis standard of 40 arc sec on the OVT-DP line "B" to qualify for SWA duties. If the member or applicant fails to meet this standard, they should have a refraction exam performed by an optometrist or ophthalmologist and repeat testing on the OVT-DP once adjusted to the new prescription. If the member still fails, an indefinite waiver can be considered if the member is able to pass 3 out of 4 lines on the AO Vectograph (120 arc seconds). No alternative testing methods are currently accepted for waiver consideration with the exception of a 120 arc second slide for the OVT-DP obtained from the ACS for use at the high volume initial SWA exam locations. A waiver will not be considered for any SWA personnel or applicants unable to pass this standard with or without best corrected lenses.

Table 1: Waiver potential for Defective Depth Perception

Flying Class (FC)	**Waiver Potential Waiver Authority**	**Required ACS Review/Evaluation**
FC I/IA	Yes[2] AFRS/CMO	Yes
FC II FC III[1]	Yes[2] MAJCOM	Yes
SWA	Yes[2] MAJCOM	Yes, review only
ATC/GBO/OSF	N/A	N/A

1. Aircrew positions that require depth perception for scanner duties (i.e. boom operators, flight engineers, loadmasters, and military freefall) will require work up for waiver submission.
2. If spectacles or contact lenses were needed to pass depth perception testing, regardless of unaided visual acuity, i.e. 20/20, then spectacles are required for aviation duties, to meet depth perception standards.

Table 2: Passing Scores

Flying Class (FC)	OVT-DP / VTA-DP	AO Vectograph (requires waiver)
FC I/IA/II/III	Line "B" (40 arc secs)	4/4 (60 arc secs) or 3/4 (120 arc secs) only by ACS review / evaluation
SWA	Line "B" (40 arc secs)	3/4 (120 arc secs) or ACS 120 arc sec slide
ATC/GBO/OSF	N/A	N/A
Initial FC III for AFSC 1A0, 1A1, 1A2, 1A3 or 1A7	Line "B" (40 arc secs)	Not waiverable.

A review of AIMWTS through Jun 2018 showed 5,438 aeromedical summaries containing a diagnosis of substandard stereopsis. There were a total of 904 cases disqualified, the majority which were either for another unrelated diagnosis or for untrained assets. There were 888 FC I/IA cases, 1,442 FC II cases, 163 RPA pilot cases, 2,713 FC III cases, 213 ATC/GBC cases, and 19 MOD cases.

Previous retrospective analysis conducted by the Ophthalmology Branch of the ACS found 524 aviators were evaluated for defective stereopsis/depth perception. The final ACS diagnosis underlying defective stereopsis/depth perception the aviators in this group was as follows: vergence issue or phoria in 31%, microesotropia in 29%, monofixation in 24%, microexotropia in 10% and vertical microtropia in 1%.[2]
A 2017 reviewed 753 subjects from the prospective ACS Defective Stereopsis Study Group established in 1997. Of those, 540 were analyzed with 213 excluded from analysis for not having follow-up exams (178), not meeting study criteria (32), or uninterpretable findings (3). Of the 540 analyzed, 536 documented stability over an average period of 7.7 years (0.7-18.8). There were 4 subjects who decompensated, which occurred over an average period of 6.6 years (0.9-10.9). Therefore, 4 of 540 (0.7%) decompensated over 7.7 years, resulting in an annual rate of <0.1%.[2]

II. Information Required for Waiver Submittal

The most common cause of an acquired depth perception defect is uncorrected refractive error. Depth perception testing should not be attempted until optimal correction has been achieved. Failure of depth perception with best corrected visual acuity is disqualifying, but may be considered for waiver.

After initial ACS evaluation or review for stereopsis failure, **an indefinite waiver may be recommended**. Annual flight PHA demonstrating a decrease in stereopsis status will nullify existing waiver and require ACS review or evaluation.

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using the best current clinical guidelines and recommendations. Underlying conditions such as microtropia (8 diopters or less), monofixation syndrome, and anisometropia that are identified during evaluation by the local

optometrist or ophthalmologist should be listed as a separate disqualifying condition along with a diagnosis of defective stereopsis. It should be noted that if after a thorough examination, no underlying diagnosis is found, a disqualifying diagnosis of defective stereopsis is sufficient for AMS submission.

A complete AMS with a local ophthalmologist or optometrist work-up to include all of the following is required for **indefinite waiver** consideration:

1. Complete ocular history noting particularly any history of eye patching, spectacle wear at an early age, strabismus, eye surgery, and previous depth perception testing performance.
2. Ductions, versions, cover test, and alternate cover test in primary and six cardinal positions of gaze.
3. Optimal refraction with further testing, including repeat VTA-DP or OVT-DP, to be accomplished with best optical correction of any refractive errors, regardless of unaided visual acuity.
4. AO Vectograph stereopsis test at 6 meters. (4 line version) (distant stereopsis)*
5. AO suppression test at 6 meters.
6. Randot or Titmus stereopsis test (near stereopsis tests).
7. Red lens test.
8. Four-diopter base-out prism test at 6 meters.
9. Direct/indirect macula and optic nerve exam.

***Note: Use only the American Optical (AO) version of the vectograph projection slide graded in 60 arc sec increments (60, 120, 180, 240 arc sec).** Isolate each line of the slide and present them multiple times in random order. The lines must also be shortened to four circles and also presented in isolated vertical columns to increase randomization. Line four (60 arc sec) is tested a minimum of six times in various presentations. A correct response must be given for every presentation of a line in order to be given credit for that line. Displaying all four lines of the stereopsis test at one time is not a valid way to administer the test.

III. Aeromedical Concerns

Stereopsis is generally not considered to be a factor in the perception of depth beyond 200 meters, as monocular cues tend to prevail at these distances. In aviation, accurate perception of spacing or depth within 200 meters is critical in a number of situations, such as aerial refueling, formation flying, holding/hover rescue-type operations, taxiing, and parking. Stereopsis also facilitates closure maneuvers and rejoins. Microtropia and monofixation syndrome may be intermittent in nature and susceptible to decompensation in the aerospace environment due to such exposure as relative hypoxia and fatigue over time.[3]

The analysis from the 1997-2017 Defective Stereopsis (Prospective) Study Group demonstrated an annual risk of decompensation of <0.1% per year. While there is a chance of decompensation, it is well below the acceptable aeromedical risk threshold. All aviators must continue to have stereopsis testing at their flight physical and monitor for changes.

Fourth cranial nerve (superior oblique) palsy, as with other forms of vertical phorias and tropias, has been shown by ACS experience to more likely decompensate over time in aircrew with

resultant diplopia than the horizontal microtropias. Therefore, a waiver for this diagnosis will generally NOT be recommended.

ICD-9 Code for Defective Stereopsis (Depth Perception)	
368.3	Other disorders of binocular vision

ICD-10 Codes for Defective Stereopsis (Depth Perception)	
H53.30	Unspecified disorder of binocular vision
H53.34	Suppression of binocular vision

IV. Suggested Readings

1. Steinman SB, Steinman BA, Garzia RP. (2000) *Foundations of Binocular Vision: A Clinical perspective*. McGraw-Hill Medical.

2. Parsons, M, Wright S, Ellis, J. Stereopsis testing in the US Air Force: Where we have been and where we are going. Ramstein Aerospace Medicine Summit NATO STO Technical Course, 2018, poster session.

3. Hunt MG, Keech RV. Characteristics and course of patients with deteriorated monofixation syndrome. J AAPOS, 2005; 9: 533-6.

Uveitis (Mar 2020)
Reviewed: Lt Col Jonathan Ellis (Chief, ACS Ophthalmology), Lt Col Michael Parsons (Deputy Chief, ACS Ophthalmology), Dr. Dan Van Syoc (ACS Waiver Guide Coordinator) and Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes:
New Ground Based Operator (GBO) Standards. MSD C38

I. Waiver Consideration

Acute, chronic or recurrent inflammation of the uveal tract, except for healed traumatic iritis is disqualifying for flying classes I/IA, II, III, and SWA duties. For all initial flying classes, waivers will be considered if the uveitis was a single episode that occurred greater than one year ago, was nongranulomatous, unilateral, and did not result in recurrent episodes or ongoing visual symptoms or sequelae. Trained assets will be considered for a waiver. If the uveitis is secondary to a systemic disease, waiver consideration will also depend on the status of the causative systemic disease, see applicable waiver guides. While not specified in either AFI 48-123 or the MSD as disqualifying for ATC and GBO personnel, uveitis should be disqualifying if it is recurrent or chronic, leads to frequent absences from duty, or results in decrease or loss of vision.

Table 1: Waiver potential for Uveitis

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review/Evaluation
I/IA or II/III (untrained)	Maybe[1]	AETC	Yes
II/III (trained) SWA	Yes	MAJCOM	Yes
ATC/GBO/OSF	N/A	N/A	N/A

1. For all initial flying classes, waiver recommendation will be considered if the uveitis was a single episode that occurred greater than one year ago, nongranulomatous, unilateral, and did not result in recurrent episodes or ongoing visual symptoms or sequelae.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines & recommendations.

A. Initial Waiver Request (Items 4-6 required for granulomatous, recurrent, or bilateral cases):

1. History – signs, symptoms, duration, treatment and must include pertinent review of system negatives.
2. Physical – complete.
3. Ophthalmology consultation.
4. Chest x-ray to rule out sarcoidosis and tuberculosis.
5. Labs: Syphilis serology, Lyme titer, HLA-B27, erythrocyte sedimentation rate (ESR).

6. IPPD.
7. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to the waiver authority.

B. Waiver Renewal:

1. History – signs, symptoms, duration, treatment and must include pertinent review of system negatives.
2. Physical – complete.
3. Ophthalmology consultation.
4. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to the waiver authority.

III. Aeromedical Concerns

For the flight surgeon, uveitis of any etiology is of concern due to possible complications and sequelae. The acute condition can cause distracting pain. Floaters and blurred vision can impair performance and affect flight safety. Long-term sequelae include pupillary abnormalities, cataract, glaucoma, retinal scarring, retinal detachment, keratopathy, and loss of vision. The flight surgeon also needs to be concerned with possible underlying disease processes which may require aeromedical disposition as well.[1]

A review of the AIMWTS database in May 2015 revealed 137 cases of uveitis; 19 were disqualified. There were 0 FC I/IA cases, 72 FC II cases (5 disqualifications), 57 FC III cases (11 disqualifications), 6 ATC/GBC cases (2 disqualifications), and 2 MOD cases (1 disqualification). Of the 19 disqualified, all but 2 were secondary to the uveitis symptoms.

A review of the AIMWTS database in Jan 2019 revealed 109 cases of uveitis; 18 were disqualified. There was 1 FC I/IA cases (1 disqualified), 52 FC II cases (4 disqualified), 1 RPA pilot case, 47 FC III cases (10 disqualified), 6 ATC/GBC cases (2 disqualified), and 2 MOD cases (1 disqualified). Of the 18 disqualified, all but 2 were secondary to the uveitis symptoms.

ICD-9 Codes for Uveitis	
364.3	Unspecified iridocyclitis
363.2	Unspecified forms of chorioretinitis and retinochoroiditis
360.12	Panuveitis

ICD-10 Codes for Uveitis	
H20.9	Unspecified iridocyclitis
H30.93 1, 2, 3, 9	Unspecified chorioretinal inflammation
H44.11 1, 2, 3, 9	Panuveitis

IV. Suggested Readings

1. Rayman R, Hastings J, Kruyer et al. Ophthalmology: Uveitis. Ch. 9 in Rayman's Clinical Aviation Medicine, 5th ed., Castle Connolly Graduate Medical Publishing, Ltd; 2013: 280-83

Aerospace Medicine Waiver Guide

Abnormal Spinal Curvature (Scoliosis, Kyphosis, Lordosis)

Revised: Apr 2023

Reviewed: Dr. Max Lee (ACS Waiver Guide coordinator), Col Joseph Stuart (AF/SG Orthopaedic Surgery Consultant), Lt Col Paul Vu (AFMRA Medical Standards Policy Chief)

Significant Changes:

Updated format for AIMWTS search reporting, updated suggested readings with hyperlinks.

I. Waiver Consideration

For FC I/IA, FC II, FC III, and SWA, lumbar scoliosis (LS) >20° or thoracic scoliosis (TS) >25° by Cobb method, any abnormal curvature producing pain, interference with function, or noticeable deformity when dressed, or abnormal curvature which is progressive are disqualifying IAW the MSD. Additionally, LS >30°, TS >30°, kyphosis or lordosis (K/L) >50° K/L or any spinal deviation interfering with function, vocation or wear of the military uniform or equipment is disqualifying for retention as well as all flying and special operator duties. Table 1 outlines the aeromedical waiver potential for all flying classes.

Table 1: Waiver potential for flying class and degree of scoliosis, kyphosis, and lordosis

Flying Class (FC)	Condition	Waiver Potential / Waiver Authority
FC I/IA	Lumbar Scoliosis: >20° **or** Thoracic Scoliosis: >25° **or** Kyphosis >50°	Unlikely AFRS/CMO
	Any abnormal curvature producing noticeable deformity when dressed, pain, interference w/function or is progressive	Unlikely AFRS/CMO
FC II/III/ SWA	Asymptomatic Lumbar Scoliosis: >20 and ≤30° **or** Asymptomatic Thoracic Scoliosis: >25 and ≤45°	Yes[1] MAJCOM
	Asymptomatic Lumbar Scoliosis: >30° **or** Asymptomatic Thoracic Scoliosis: >45° **or** Asymptomatic Kyphosis: >50°	Yes[1,2] MAJCOM
	Any abnormal curvature producing noticeable deformity when dressed, pain, interference w/function or is progressive	Yes[1,3,4] MAJCOM
ATC/ GBO	Lumbar or Thoracic Scoliosis >30° **or** Kyphosis: >50° **or** Any abnormal curvature interfering with function, vocation, or wear of military uniform.	Yes[1,3] MAJCOM

1. Untrained assets may be eligible for waiver on a case-by-case basis and waiver/certification authority is AFRS/CMO.
2. Trained FC II personnel will be restricted from ejection seat airframes and waiver authority is AFMRA.
3. Trained personnel may be eligible for waiver on a case-by-case basis.
4. Any abnormal curvature that interferes with function, vocation, or wear of military uniform is also disqualifying for retention. Waiver authority for symptomatic trained aircrew with abnormal curvature is AFMRA.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. Summary of presentation, course, and any treatment.
    a. History – when deformity first noticed, who discovered, symptoms, treatment.
    b. Physical – document gait, range of motion, motor and sensory testing of lower extremities, including reflexes.
2. X-ray results of the spine, measured by the Cobb method.
3. Orthopaedic consult, including any follow up notes.
4. Document full physical activity or include any specific activity limitations.
5. FL4 with RTD and ALC status, if applicable.
6. If available, include most recent AF Fitness Assessment with total and component scores.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Summary noting any interval change.
    a. History – symptoms and activity level.
    b. Physical – document gait, range of motion, motor and sensory testing of lower extremities, including reflexes.
2. X-ray results if symptoms develop (i.e.: back pain, neurologic symptoms).
3. Orthopaedic consult if there are symptoms or evidence of progression.
4. Any other pertinent info.
5. The above list is not an absolute requirement list.
6. Include most recent AF Fitness Assessment with total and component scores.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Abnormal spinal curvature includes excessive scoliosis, kyphosis, and lordosis. In adolescents with Cobb angles >20^{o}, the likelihood of progression is increased. In those who have stopped growing, scoliosis <30^{o} is considered stable but scoliosis >30^{o} may be expected to progress at a rate of 1^{o} per year. Treatments may include physical therapy, bracing, or surgery. For FC I/IA, orthopaedic referral is requested when back pain is refractive to conservative therapy, when there is any neurological abnormality, or when the Cobb angle is:

1) >20° for the lumbar curve, or
2) >25° for the thoracic curve, or
3) >50° for thoracic kyphosis or lordosis.

Primary aeromedical concerns involve potential for increased risk of fracture or other spinal injuries due to significant forces encountered in the aerospace environment. Abnormal spine curvature may increase risk of spine fracture during high-G exposures, with ejection seat use, hard landings. Vertebral fractures frequently occur at loads exceeding the set ejection seat exposure limit of +20 Gz but can occur with forces as low as +10-12 Gs when the spine is not vertically aligned since the thoracoabdominal center of gravity is anterior to the spine and kyphoscoliosis further shifts the center of gravity forward out of vertical alignment which increases the biomechanical moment arm with resultant increased risk for flexion compression fractures. Moreover, spinal injuries may be amplified during through-canopy ejections as found in modern trainer aircraft.

Review of AIMWTS from Sep 2017 to Sep 2022 revealed 66 submitted waivers for abnormal spinal curvature. The breakdown of the number of waivers and number of total cases are tabulated below. For FC III, 6 of 11 disqualified cases had other aeromedical conditions incompatible with aviation duties. For GBO, the disqualification was related to a different diagnosis.

Please use only these ICD-10 codes for Abnormal Spinal Curvature for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	ATC	GBO	SWA
M40.40	Postural lordosis, site unspecified	1/8	14/14	19/30	1/1	6/7	3/6
M40.50	Lordosis, unspecified, site unspecified						
M41.9	Scoliosis, unspecified						
M41.30	Thoracogenic scoliosis, site unspecified						
M41.80	Other forms of scoliosis, site unspecified						
M41.50	Other secondary scoliosis, site unspecified						

IV. Suggested Readings

1. Negrini S, Donzelli S, Aulisa AG, et al. 2016 SOSORT guidelines: orthopaedic and rehabilitation treatment of idiopathic scoliosis during growth. Scoliosis and Spinal Disorders, 2018; 13(3). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5795289/

2. Horne JP, Flannery R, and Usman S. Adolescent Idiopathic Scoliosis: diagnosis and Management. Am Fam Physician, 2014; 89(3): 193-98. https://www.aafp.org/pubs/afp/issues/2014/0201/p193.html

3. Scherl SA and Hasley BP. Adolescent idiopathic scoliosis: Management and prognosis. Updated Jul 21, 2022. Accessed Sep 27, 2022. https://www.uptodate.com/contents/adolescent-idiopathic-scoliosis-management-and-prognosis

4. Lewis ME. Spinal Injuries Caused By The Acceleration OF Ejection. J R Army Med Corps 2002; 148: 22-26. https://militaryhealth.bmj.com/content/148/1/22.long

5. Ernsting F, King P. *Aviation Medicine*, 4th ed. Butterworths, Boston. 2006; 24:379.

6. Davis JR, Johnson R, et al. Fundamentals of Aerospace Medicine, 4th ed. Lippencott, Williams & Wilkins, Philadelphia. 2008; 25:601-605.

Herniated Nucleus Pulposus (HNP) and Spinal Fusion (Mar 2020)
Reviewed: Dr. Roger Hesselbrock (ACS Neurologist), Dr. Dan Van Syoc (ACS Division Deputy Chief), Lt Col James Dunlap (AF Ortho Spine Specialist), and Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes:
Updated Waiver Considerations, Tables 1-3, Aeromedical Concerns and References

I. Waiver Consideration

A history of HNP or surgery for it is disqualifying for FC I/IA/II/III and requires a waiver under MSD K6. All flying classes and OSD personnel require a waiver when they fall under MSD K5: "Herniation of nucleus pulposus, when symptoms and associated objective findings are of such a degree as to require repeated hospitalization, significant duty limitations, or frequent absences from duty." MSD K5 is disqualifying for retention standards, so would also require an MEB or RILO. **If surgical intervention is contemplated, note that cervical disc arthroplasties (artificial disc replacements) are not routinely aeromedically-approved for high-performance aircraft operation waiver, and may also be duty-limiting for personnel on jump status**.

Aviation personnel must fulfill all of the following applicable qualifying criteria for the initial waiver request:

- Need to be asymptomatic or with non functionally-limiting symptoms or signs
- Need to have adequate waiting period after treatment - see Table notes
- Please note difference in waiting times for different categories.

Table 1: Waiver potential for HNP treated conservatively, or surgically without fusion or disc replacement

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	No	AETC	No
FC II	Yes[1,2]	MAJCOM	Yes[3]
FC III	Yes[1,2]	MAJCOM	No
ATC, GBO, SWA	Yes[1]	MAJCOM	No

1. Minimum observation period post-treatment: 6 months if on jump status, otherwise 3 months
2. **Multi-level cervical spine surgery waivers restricted to non high-performance aircraft**
3. For cases with over 4 years stability, ACS review is not required, and is at the discretion of the waiver authority

Table 2: Waiver potential for HNP treated with spinal fusion, with or without hardware

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	No	AETC	No
FC II	Yes[1,2]	MAJCOM	Yes[3]
FC III	Yes[1,2]	MAJCOM	No
ATC, GBO, SWA	Yes[1]	MAJCOM	No

1. Minimum observation period post-treatment: 6 months for FC II, 4 months for FC III/GBO
2. **Multi-level cervical fusion waivers restricted to non high-performance aircraft**
3. For cases with over 4 years stability, ACS review is not required, and is at the discretion of the waiver authority

Table 3: Waiver potential for HNP treated with artificial disc replacement

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	No	AETC	No
FC II	Yes[1]	AFMRA	Yes[2]
FC III, ATC, GBO, SWA	Yes[1]	AFMRA	Yes[2]

1. Minimum observation period post-treatment: 6 months
2. **Cervical disc arthroplasty waivers currently routinely restricted to non high-performance aircraft**

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. Detailed history of back/neck pain and previous treatments; surgical history; any specialty consultative reports and follow-up notes.
2. Current physical, musculoskeletal (spinal) and neurological examinations.
3. Operative report (if surgically treated).
4. Consultant statement clearing member for unrestricted activities or flying duties
5. Follow-up dynamic (flexion-extension) radiographs to confirm stability if treated with spinal fusion, instrumentation, hardware or disc replacement.
6. Reports and images from all relevant imaging studies performed.
7. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

B. Renewal Waiver Request:

1. Interval history, to include any residual signs and symptoms, current symptoms, current medications, current treatment, current pain level, and any activity limitations.
2. Physical – musculoskeletal (spinal) and neurological exam.
3. Copies of any interim specialty consultations, follow-up notes, imaging studies and images.
4. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

III. Aeromedical Concerns

Aeromedical concerns include effects of any current symptoms or signs on operational safety and mission effectiveness, and future risk of symptom development, especially with stressors of high-performance aircraft operations or aircraft ejection, which could be of sudden onset and severe intensity. Following surgical treatment of HNP, concerns also include potential for vertebral joint stability and hardware failure. There are documented cases of disc herniations, vertebral fractures, and neck injuries with high-G maneuvers and ejections. After spinal fusion, there is concern over the possibility of repeat injury to a fused spine as a result of ejection and rapid-onset Gz-forces. The normal acceleration magnitude during ejection from the ACES II seat is 12-14 +Gz, but may vary with flight parameters and weight of occupant. Parachute opening shock can range from 10 to 20 +Gz, especially if outside the ejection envelope. Vertebral fracture occurs frequently with forces of greater than 20 +Gz, but with poor positioning, forces as low as 10 +Gz have caused fractures. Non-waiverability of multi-level cervical fusions for high-performance and ejection seat aircraft is based on the concern of increased stress concentration at adjacent non-fused vertebral joints during flexion, extension, and rotation. Multi-level lumbar or thoracic fusions may be considered for waiver in ejection seat aircraft as the thoracolumbar joints are not generally as mobile as the cervical joints, resulting in less severe focal stress concentrations at adjacent non-fused levels, and a lumbar fracture or other injury is far less likely to result in permanent neurological impairment. In cases of fusion, it is essential to establish successful complete fusion prior to consideration of returning to fly, particularly in high-performance aircraft operations. This can take up to 12 months in some cases. Artificial disc replacement devices have not been adequately assessed for stability with anticipated stressors experienced in high-performance aircraft operations, and cervical spine disc arthroplasties are currently not routinely recommended for such waivers. Further studies are needed to demonstrate equivalence or superiority of disc arthroplasty vs. fusion in both cervical and lumbar regions, and studies demonstrating device stability under sustained high-performance aircraft operation conditions.

AIMWTS search in Mar 2019 revealed 838 members with a diagnosis of HNP and/or spinal fusion since Jan 2014. There were 97 cases resulting in disqualification. Breakdown of the cases demonstrated: 13 FC I/IA cases (8 disqualified), 442 FC II cases (30 disqualified), 18 RPA pilot cases (1 disqualified), 344 FC III cases (50 disqualified), 19 ATC/GBC cases (8 disqualified), and 2 MOD cases (0 disqualified).

ICD-9 Codes for HNP and Spinal Fusion	
722	Intervertebral Disc Disorders
81.0	Spinal Fusion
81.3	Refusion of Spine
84.60	Insertion of Spinal Disc Prosthesis, NOS

ICD-10 Codes for HNP	
M50.20	Other cervical disc displacement unspecified cervical region
M51.26	Other intervertebral disc displacement, lumbar region

IV. Suggested Readings

1. Rayman RB. *Rayman's Clinical Aviation Medicine*, 5th Ed., Castle Connolly Graduate Medical Publishing, LTD, 2013; 293-94.

2. Wahezi SE, Lederman L, and Elowitz EH. Conservative Versus Operative Management for Lumbosacral Radiculopathy With Motor Deficit. Phys Med Rehab 2015; 7(7):770-76.

3. Zarkadis NJ et al. Outcomes following multilevel cervical disc arthroplasty in the young active population. Military Medicine 2017; 182:e1790

4. Garcia R Jr et al. Lumbar total disc replacement for discogenic low back pain: two-year outcomes of the activL multicenter randomized controlled IDWE clinical trial. Spine 2015; 40:1873-1881.

5. Gao S, Geng X, Fang Q. Spontaneous disappearance of large lumbar herniation. JAMA Neurology 2018; 75(1):123-124.

6. Kisher S. Degenerative disc disease. Medscape Mar 15, 2019. Link: http://emedicine.medscape.com/article/1265453-overview

7. Robinson J, Kothari MJ. Treatment and prognosis of cervical radiculopathy. UpToDate, Aug 31, 2018.

8. Levin K, Hsu PS, Armom C. Acute lumbosacral radiculopathy: treatment and prognosis. UpToDate, Jun 3, 2019.

RETAINED ORTHOPÆDIC DEVICE AND JOINT REPLACEMENT

Revised: February 2022
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Significant Changes: Waiver guide restructured; updated to reflect the most recent MSD.

I. Waiver Consideration

Individuals with fractures are grounded until evidence of bone healing and return of full function can be documented. For fractures with retained fixation devices, waiver is required for FC I/IA, II, III, and SWA personnel when there is obstruction of motion or if easily irritated or painful when hit or pressure applied to the affected area. Medical Evaluation Board (MEB) and waiver for all flying duties are required for all joint replacements and prosthetics if it results in ongoing duty or deployment limitations for over a year, requires ongoing specialist follow up more than annually, or causes frequent absences from duty. An unrestricted FC II and III waiver may be considered for joint prosthetics. Joint prosthetics are NOT considered waiverable for FC I/IA, untrained FC II, III, and SWA duties. Joint replacements without complication are disqualifying for flying duties and require waiver for FC I/IA, II, III, and SWA personnel.

Table 1: Summary of Clinical Conditions and Waiver Potential

Flying Class	Condition	Waiver Potential Waiver Authority
I/IA Untrained II/III/SWA	Retained orthopædic device with no pain or limitation of motion (able to lead physically active lifestyle)	No waiver required, medically qualified
	Retained orthopædic device with obstruction of motion or if easily irritated/painful when hit/pressure applied	Maybe AFRS/CMO
	Joint replacement	No AFRS/CMO
II/III/SWA ATC/GBO	Retained orthopædic device with no pain or limitation of motion (able to lead physically active lifestyle)	No waiver required, medically qualified
	Retained orthopædic device with obstruction of motion or if easily irritated/painful when hit/pressure applied	Maybe MAJCOM
	Joint replacement, minimum four months post-op.[1]	Yes[2] MAJCOM
Individuals with parachuting duties (not including emergency bailout)	Retained orthopædic device with no pain or limitation of motion (able to lead physically active lifestyle)	No waiver required, medically qualified
	Retained orthopædic device with obstruction of motion or if easily irritated/painful when hit/pressure applied	Maybe MAJCOM
	Joint replacement	No MAJCOM

1. If history of affected joint dislocation, ACS review is required. A waiver is more likely if total hip arthroplasty dislocation occurred within the first 6 weeks, but it will require a minimum of 6 months post dislocation.
2. This includes "minimally invasive" hip replacement procedures.

II. Information Required for Waiver Submission

The aeromedical summary should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines/recommendations.

A. Initial Waiver Request for Retained Orthopædic Device:
   1. History - brief summary of trauma, surgery and recovery, complications, symptoms, current activity level, and medications.
   2. Physical - addressing range of motion, muscle strength, and point tenderness.
   3. Operative reports.
   4. X-ray documenting radiographic healing.
   5. Orthopædic consult that addresses device, muscle strength, range of motion of proximal and distal joint, and limitations in activities.
   6. If functionality is reduced, include a statement regarding performance of routine and emergency duties in aircraft.

B. Waiver Renewal Request for Retained Orthopædic Device:
   1. History – brief summary of trauma, surgery and recovery, complications, symptoms, current activity level, and medications.
   2. Physical - addressing range of motion, muscle strength, and point tenderness.
   3. Orthopædic consult, if symptoms have changed.

C. Initial Waiver for Prosthetic Joint:
   1. History of symptoms, limitations prior to surgery, summary of surgery and recovery, present level of activity, medications, and limitations.
   2. Physical - addressing range of motion, and muscle strength.
   3. Orthopædic consult - range of motion, muscle strength, activity level, and limitations.
   4. Operative reports.
   5. X-rays documenting radiographic healing.
   6. Include a statement regarding performance of routine and emergency duties in aircraft.
   7. Medical evaluation board (MEB) results if required.

C. Waiver Renewal for Prosthetic Joint:
   1. History and physical – to include summary of surgery and recovery, present level of activity, medications, and limitations.
   2. Orthopædic consult.
   3. X-rays results.

III. Aeromedical Concerns

Fractures requiring open reduction and internal fixation (ORIF) are fairly common among our active aircrew and operators. Less common are degenerative joint diseases requiring prosthetic joint implants due to the relatively young population served. Fixation devices in the spine and artificial intervertebral disks are considered separately in the Herniated Nucleus Pulposus and Spinal Fusion waiver guide.

RETAINED ORTHOPÆDIC DEVICE:

Retained device(s), except in the case of joint replacement, consist primarily of screws, plates, wires, and intramedullary rods (nails). These components are placed to stabilize the fracture and allow for adequate healing. Fracture healing time depends on the nature of the fracture (amount

of energy involved in creating the fracture, disruption of soft tissue around the fracture, and the particular bone involved).[1] In the vast majority of fractures, medical standard of care no longer dictates removal of fixation devices. In some cases after adequate bone regeneration, implanted hardware removal may be indicated because of patient preference or to restore skeletal strength (usually in children). Additional removal may be required if the device causes pain, device migration such as loose screws, or reduction in function.

For fractures with retained device, waiver is required when there is obstruction/limitation of motion or if the device is easily irritated/painful when hit or when pressure is applied in common activities. These symptoms can become distracting in the aeromedical environment. Limitations in motion can also preclude safe operation of the aircraft or ability to egress in a safe and timely manner in the event of an emergency. Removal of the device may rectify symptoms resultant from retained hardware. Waiver is required in such cases when the aviator has aeromedically significant limitations or pain and the device can't be removed or if the individual declines removal.

JOINT REPLACEMENT:

Total knee arthroplasties (TKAs) are a common surgery in the US, with over 600,000 operations performed annually.[2] The most frequent indications are severe osteoarthritis (OA) or inflammatory arthritis conditions. The average age of knee replacement patients is 65-years-old, limiting the utility of available information on outcomes in a population more representative of military aircrew. Despite these limitations, the procedure is becoming more common in younger populations (defined as patients under 45 years old). Younger patients experience higher rates of joint loosening, leading to more revisions than the general population (8% versus 6%).[3,4] This is one of the reasons surgeons historically were more reserved in performing TKA on younger patients. Results are also mixed regarding any variation in outcomes among post-traumatic arthritis TKAs versus in traditional OA TKA patients. However, both groups consistently report improvements in overall pain and function following TKA.[5]

Total hip arthroplasties (THAs) are also quite common among the general population, with over 370,000 surgeries performed annually in the US.[6] As with TKAs, a THA is indicated when a patient fails conservative therapies and continues to have debilitating pain or functional limitations. A 2014 study in THA patients under 30 demonstrated similar joint survivability to older patients (90% at 10 years).[8] Similar to TKA, higher THA revision rates are reported in younger populations due to joint loosening. Early loosening is more often associated with rheumatoid arthritis or congenital diseases that may be associated with musculoskeletal deformations or deficiencies that impact the stability of surgical implants.[8] Of note, "minimally invasive" replacement procedures, such as hip resurfacing or procedures that decrease the incision size still have extensive soft tissue trauma, require experienced orthopædic surgeons, and recovery times for these procedures are not necessarily shorter. One of the most concerning aeromedical issues for THA patients is the risk of joint dislocation. There is a 1% risk of dislocation in the first month after THA, and 2% in the first year. That figure increases 1% every five years to a rate of 7% after 25 years based on a 2004 study by Dargel, Oppermann, et al.[9] Dislocation risk is much greater following hip revisions, with rates as high as 28%.[9] History of dislocation of THA suggests that the individual's hip is unstable and will continue to be unstable,

or that the individual is non-compliant with hip precautions and adversely affect flight safety or mission accomplishment.

Although dislocations and failures of joint replacement are of significant aeromedical concern, the most likely risks for TKA and THAs center on distracting discomfort or pain as well as functional limitations that impede the member's abilities to safely perform aviation duties or aircraft egress. However, certain roles, such as parachute duties, are not conducive to the post-TKA or THA patient as the physical stresses risk catastrophic failure of the joint and sudden incapacitation of the member. Wear and tear from parachute operations also likely decreases the expected lifetime of the joints, with high numbers of knee and hip injuries reported among military parachutists at baseline.[10] While G-forces sustained in an ejection would also place significant strain on artificial joints, the likelihood of ejection is very low, not considered to be a routine operational event. Therefore, joint replacement is considered acceptable in the absence of other concerns.

Aeromedical risks can either be exacerbated or mitigated by overall physical activity levels and selection of appropriate activities in the post-TKA or THA patient. Physical activity is key for overall health, as well as improving bone health and reducing the risk of early TKA or THA loosening and need for revision.[11] It is important to understand factors such as wear, joint load, and activity intensity when generating an exercise regimen. Lastly, a TKA or THA also impacts the stability and function of other anatomic areas, and this information needs to be incorporated when building the overall aeromedical risk profile of aircrew with a TKA or THA. Replacing a hip or knee can place additional strain on the opposing hip or knee and increase the likelihood of musculoskeletal injury or arthritis in other joints.[12] This risk is magnified in those with underlying inflammatory or congenital pathologies. Similarly, the mechanics of the hip and pelvis are complex, and bilateral THAs generate additional and different stressors than unilateral THA and need to be considered when determining potential risks to crew safety and mission completion.

Review of AIMWTS through March 2021 showed 38 cases of retained orthopædic device with a total of 4 disqualifications (1 FC I, 1 FC II, and 2 FC III). Breakdown of the cases was as follows: 1 FC I/IA, 19 FC II, 17 FC III, and 1 ATC case. Of the 4 disqualifications, 1 was an IFC 1 with retained cranial device, and 3 were trained assets with other medical issues.

Review of AIMWTS through March 2021 showed 30 cases of TKA with 3 disqualifications (1 FC II and 2 FC III). There were 17 FC II cases and 13 FC III cases. One of the disqualification was due to CAD, and the other two were for multiple medical issues.

Review of AIMWTS through March 2021 showed 78 aviators with an AMS containing the diagnosis of THA with 3 disqualifications (2 FC II and 1 FC III). Breakdown of the cases was as follows: 50 FC II cases, 25 FC III cases and 3 ATC/GBC cases. Two disqualifications were due to unrelated medical conditions and the third case was disqualified secondary to pain after surgery and persistent inflammatory arthritis symptoms.

ICD-10 codes for Joint Replacement	
0SR9	Hip joint, right
0SRA	Hip joint, acetabular surface
0SRB	Hip join left
0SRC	Knee joint, right
0SRD	Knee joint, left

ICD-10 codes for Retained Orthopædic Device	
Z96.9	Presence of functional implant, unspecified
Z47.2	Encounter for removal of internal fixation device

IV. Suggested Readings

1. Graves MF. Principles of Internal Fixation. Ch. 8 in Browner: Skeletal Trauma: Basic Science, Management, and Reconstruction, 5th ed., Saunders, 2015.

2. Martin GM and Harris I. Total knee arthroplasty. UpToDate. Feb 2021.

3. Castagnini F, Sudanese A, Bordini B, Tassinari E, Stea S, Toni A. Total Knee Replacement in Young Patients: Survival and Causes of Revision in a Registry Population. J Arthroplasty. 2017 Nov; 32(11):3368-3372.

4. Pabinger C, Berghold A, Boehler N, Labek G. Revision Rates After Knee Replacement. Cumulative Results from Worldwide Clinical Studies Versus Joint Registers. Osteoarthritis and Cartilage. 2013: 21(2): 263-268.

5. Shearer DW, et al. The Predictors of Outcome in Total Knee Arthroplasty for Post-Traumatic Arthritis. Knee. 2013 Dec; 20(6):432-436.

6. Erens GA, Walter B, Crowley M. Total Hip Arthroplasty. UpToDate. Jan 2021.

7. Evans JT, Evans JP, Walker RW, Blom AW, Whitehouse MR, Sayers A. How long does a hip replacement last? A systematic review and meta-analysis of case series and national registry reports with more than 15 years of follow-up. Lancet. 2019 Feb;16:393(10172):647-654.

8. Pakos EE, Paschos NK, Xenakis TA. Long Term Outcomes of Total Hip Arthroplasty in Young Patients under 30. Arch Bone Jt Surg. 2014;2(3):157-162.

9. Dargel J, Oppermann J, Bruggermann GP, Eysel P. Dislocation Following Total Hip Replacement. Dtsch Artebl Int. 2014;111(51-52):884-890.

10. Ekeland A. Injuries in military parachuting: a prospective study of 4499 jumps. Injury. 1997;28(3):219-222.

11. Vogel LA, Carotenuto G, Basti JJ, Levine WN. Physical activity after total joint arthroplasty. Sports Health. 2011;3(5):441-450.

12. van Lieshout WAM., Valkering KP, Koenraadt. KLM. The Negative Effect of Joint Line Elevation after Total Knee Arthroplasty on Outcome. Knee Surg Sports Traumatol Arthrosc. 2019; 27; 1477–1486.

Spinal Fracture Mar (2020)
Reviewed: Dr. Roger Hesselbrock (ACS Neurologist), Dr. Dan Van Syoc (ACS Division Deputy Chief), and Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes:
Updated Waiver Considerations and References

I. Waiver Consideration

Fractures or dislocations of the vertebrae are disqualifying for US Air Force FC I, II and III aircrew, as well as for SWA airmen. Fractures or dislocations of the vertebrae are not disqualifying for ATC or GBO personnel. Transverse or spinous process fractures are not disqualifying if asymptomatic following recovery. Ejection/high Gz waiver limitation recommendations are based on severity of fracture, time since injury, treatment, and functional status of the aviator. For compression fractures with vertebral body height loss less than or equal to 25%, an unrestricted waiver recommendation is possible. For vertebral body fractures with greater than 25% compression, pilots and navigators may be considered for categorical FC IIB waiver, but FC I/IA applicants will typically not be considered for a waiver. If, after adequate healing time, there are residua such as chronic pain, decreased mobility, neurological injury, or other medical disease, aeromedical disqualification may be appropriate. Surgically-treated compression fractures normally heal well and are usually recommended for categorical waiver. Traumatic thoracolumbar compression fractures treated with vertebroplasty (VP) or balloon kyphoplasty (BKP) may be considered for unrestricted waiver after six months. VP is injection of bone cement into a vertebral body and BKP is placement of a balloon into the vertebral body, followed by an inflation/deflation sequence to create a cavity prior to cement injection. These procedures primarily address neurologic instability-related pain symptoms and do not affect mechanical stability. The use of a biologic-based cement agent is recommended, as this does allow the potential for new bone deposition.

Burst fractures managed nonoperatively can be aeromedically managed as a compression fracture for waiver consideration. Waived burst fracture aviators should have annual radiographs with interim evaluation to ensure no progression of kyphosis, until they are demonstrated to be stable. Spinous process fractures are commonly seen with direct trauma involving sudden deceleration and forced flexion, and tend to be stable. Parachutists who have fully healed from an uncomplicated and non-surgical spinal fracture should have at least one year post-injury/surgery observation and recovery before waiver consideration.

For cases of spinal fracture with an associated herniated nucleus pulposus, please consult the Waiver Guide chapter on Herniated Nucleus Pulposus and Spinal Fusion, and apply the more restrictive waiver criteria.

Table 1: Waiver potential for spinal fracture

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	No	AETC	No
FC II	Yes[1]	AFMRA	Yes
FC III	Yes[1]	MAJCOM	At MAJCOM Request
Parachute	Yes[1,2]	MAJCOM	At MAJCOM Request
SWA	Yes[1,2]	MAJCOM	At MAJCOM Request

1. Compression fractures with >25% vertebral body height loss are usually recommended for restricted waiver.
2. Spinal fractures treated with hardware in parachutists are generally disqualifying for continued parachute duties.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed, all appropriate treatments have been initiated using best current clinical guidelines and recommendations, and the member is clinically stable.

A. Initial Waiver Request:
Waiver Request:

1. Minimum observation times before aeromedical waiver consideration:
    a. Compression fractures:
        3 months for FC II/FC III managed conservatively
        6 months for FC II/FC III if treated with BKP or VP
        1 year for parachute duties
    b. Burst fractures:
        6 months for FC II/FC III
        1 year for parachute duties
2. History of injury, immediate exam results, and treatment.
3. Reports of consultations, diagnostic testing, imaging, procedures or operations as applicable, and images from initial and current radiographic studies.
4. Reports and images from current dynamic (flexion-extension) radiographs and also, if applicable, current MRI or CT studies.
5. Consultant note clearing the aviator for return to duty, listing any specific activity limitations.
6. Current spinal and neurologic examination findings.
7. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

B. Renewal Waiver Request:

1. Interval history and level of symptom resolution.
2. Copies of any applicable interim specialty reports, labs, imaging reports and images.

If

3. Current spinal and neurologic examination findings.
4. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

III. Aeromedical Concerns

Aeromedical concerns include the effects of any residual neurologic or cognitive symptoms on operational safety and mission effectiveness, future risk of new symptom development, and future risk of recurrence. Even after healing, ejection or high Gz load stressors may predispose to repeat fracture and, more ominously, spinal cord damage. Limited mobility after cervical fracture healing, fusion, or fixation can limit scanning from the cockpit and performance under Gz loading with neck rotation. Thoracolumbar fractures can also limit mobility or distract due to pain, but are generally not as limiting for aviation duties. A fully healed uncomplicated spinal fracture should tolerate the traumatic forces from military parachuting.

Review of AIMWTS through Jan 2019 revealed a total of 364 cases submitted with a diagnosis of spinal fracture. Of this total, 45 were FC I/IA (14 disqualified), 150 were FC II (14 disqualified), 6 were RPA pilots (0 disqualified), 151 were FC III (31 disqualified), 10 were ATC/GBC (3 disqualified), and 2 were MOD (0 disqualified).

ICD-9 Codes for Spinal Fractures	
805	Fracture of vertebra without mention of cord injury
806	Fracture of vertebra with spinal cord injury

ICD-10 Codes for Spinal Fractures	
S12.0 – S12.9	Fracture cervical vertebra
S22.0	Fracture of thoracic vertebra
S32	Fracture of the lumbar spine

IV. Suggested Readings

1. Kaji A. Evaluation and acute management of cervical spinal column injuries in adults. UpToDate, Oct 0, 2019.

2. Kaji A, Hockberger RS. Spinal column injuries in adults: definition, mechanisms and radiographs._UpToDate, Apr 11, 2018

3. Kaji A, Hockberger RS. Evaluation of thoracic and lumbar spinal column injury. UpToDate, Aug 30, 2018.

4. Amorosa LF, Vaccaro AR. Subaxial Cervical Spine Trauma. Ch. 34 in *Skeletal Trauma: Basic Science, Management, and Reconstruction*, 5th ed., Saunders, 2015.

5. Wood KB, Li W, Lebl DR, and Ploumis A. Management of thoracolumbar spine fractures. Spine J, 2014; 14: 145-64.

6. McBratney CM, Rush S, and Kharod CU. Pilot Ejection, Parachute, and Helicopter Crash Injuries. J Spec Oper Med 2014; 14:92-94.

7. Pavlovic M, Pejovic J, Mladenovic J, et al. Ejection experience in Serbian Air Force, 1990-2010. Vojnosanit Pregl 2014; 71(6):531-33.

8. Manen O, Clément J, Bisconte S, and Perrier E. Spine Injuries Related to High-Performance Aircraft Ejections: A 9-Year Retrospective study. Aviat Space Environ Med 2014; 85:66-70.

9. Papanastassiou ID, Phillips FM, Van Meirhaeghe J, et al. Comparing effects of kyphoplasty, vertebroplasty, and non-surgical management in a systematic review of randomized and non-randomized controlled studies. Eur Spine J 2012; 21:1826-43.

Aerospace Medicine Waiver Guide

Spondylolysis and Spondylolisthesis

Revised: May 2023

Reviewed: Capt Robert Wright (RAM 2023), Dr. Max Lee (ACS waiver guider coordinator), Col Erik Nott (AF/SG Orthopaedic Consultant)

Significant Changes: Updated Table 1, new Disposition Table, and Suggested Reading.

I. Waiver Consideration

Spondylolysis is a defect involving the pars interarticularis of the vertebrae. Spondylolisthesis is a condition in which there is anterior slipping of a vertebrae. The most common location for these conditions occurs at the lower lumbar vertebrae.

Symptomatic spondylolysis or spondylolisthesis that requires repeated hospitalizations, duty restrictions, or frequent absences from duty is disqualifying for all flying classes, ATC, GBO and SWA duties, as well as for retention. Spondylolysis and spondylolisthesis are often associated with other spinal pathologies (e.g. spina bifida, disc protrusion, spinal stenosis, disc disease) that are also disqualifying.

If spondylolysis or spondylolisthesis is treated with surgery, refer to the waiver guide on Herniated Nnucleus Pulposus (HNP) and Spinal Fusion for additional waiver considerations.

Table 1: Waiver potential for *Spondylolysis and/or Spondylolisthesis*

Flying Class (FC)	Condition	Waiver Potential Waiver Authority	ACS Review /Evaluation
I/IA	Symptomatic spondylolysis and/or symptomatic Grade I/II spondylolisthesis	Yes AFRS/CMO	No
	Symptomatic spondylolysis preventing active lifestyle, missed work, or neurologic symptoms and/or asymptomatic or symptomatic spondylolisthesis Meyerding Grade III or higher (treated or not)	Unlikely AFRS/CMO	No

II/III/ATC/ GBO/SWA	Symptomatic spondylolysis and/or symptomatic spondylolisthesis controlled only with exercise or NSAIDs	Yes[1,2,3] MAJCOM	No
	Spondylolysis and/or spondylolisthesis treated with surgery	Maybe[2] AFMRA/MAJCOM[4]	No
	Spondylolysis or spondylolisthesis, when symptoms and associated objective findings require repeated hospitalization, duty restrictions, or frequent absences from duty	Maybe AFMRA	No

1. If spondylolisthesis is Meyerding grade III or greater, waiver unlikely for untrained FC II and FC III.
2. Waiver unlikely for untrained FC II and FC III personnel.
3. Condition not disqualifying for ATC and GBO personnel.
4. See Herniated Nucleus Pulposus and Spinal Fusion waiver guide.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. History – Presentation, course, and a thorough back history including:
    a. any adolescent sports injuries; and
    b. vehicular accidents, operational ejections, hard landings, parachute deployments
    c. document nature of pain and treatment received
2. Orthopaedic spine or neurosurgical consultation report.
3. Diagnostic imaging –X-ray (AP, LAT, obliques), and CT/MRI results.
4. Documentation of return to full physical activity, including specific comments regarding any activity limitations and current component fitness assessment scores.
5. Current physical examination - spine (range of motion), extremities (range of motion, strength, sensation, and reflexes).
6. Any other pertinent information such as MEB result, if completed.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Interval history – Describe circumstances of any back pain, severity, limitations, treatment, duration of symptoms, and DNIF period; current activity level.
2. Current physical examination - spine (range of motion), extremities (range of motion, strength, sensation, and reflexes) and current component fitness assessment scores.
3. Diagnostic imagining –X-ray (AP, LAT, obliques) if recurrent symptoms.
4. Any interim orthopaedic spine or neurosurgical consultation report.
5. MEB updates, if applicable.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Spondylolysis (SL):

SL is a common cause of low back pain in athletic adults, affecting ~6% by age 18, due to repetitive hyperextension, rotation, and axial loading, such as during weight-lifting or other sports. This may cause a stress reaction which can lead to fracture of the pars interarticularis, the weakest part of the vertebrae. Fracture typically occurs at L5 and is often bilateral.

Flyers/operators may present with low back pain that is worse with activity especially hyperextension hence a positive "single leg hyperextension" test on exam and reduced range of lumbar flexion and extension. Radiculopathy into the buttock and posterior leg can occur though neurologic symptoms are very rare. Oblique X-rays may or may not show the stereotypical "Scotty dog" sign fracture as only ~50% of cases have positive plain film radiographic findings. CT is the gold standard for diagnosis though MRI is commonly used in conjunction with plain film studies as it can show early stress reaction without undue radiation burden in younger patients and reveal other potential causes of low back pain such as degenerative disease, herniated disc, spinal stenosis, as well as infectious, inflammatory, and malignant conditions.

Management is typically conservative and includes rest for 6-12 weeks rest for stress reactions and at least 3 months for fractures, along with early physical therapy focusing on deep core and lumbar multifidus musculature. Prompt diagnosis and management increases the odds and speed of recovery. Bracing is not typically recommended in the first 6-12 weeks of rehabilitation as outcomes data are mixed. Most patients can safely return to exercise and aviation duties when pain free with normal range of motion with exercise. Imaging is not required to confirm healing as osseous union only occurs in ~28% of SL patients and is not consistently associated with clinical outcome.

If a Flyer/Operator fails conservative management or has severe symptoms or neurological defects, surgery may be indicated. It is uncertain if or how high-G environment such as ejection sequence or opening shock from parachute deployment will affect the surgically-repaired posterior spine. Review of the surgical literature suggests that most patients can return to full activity levels within 6 months of surgery. For additional information or for patients who require surgery, please refer to the Herniated Nucleus Pulposus and Spinal Fusion waiver guide for additional information.

Spondylolithesis (ST):

ST is a cause of low back pain in ~5-10% of adults and is most common at L4-L5. Patients typically present with low back pain and occasional radiculopathy to buttock or back leg. Severe ST can present with neurologic findings such as neurogenic claudication due to spinal nerve root compression and rarely cauda equina syndrome. On examination, patients may display a vertically-oriented sacrum and/or vertebral step-off on exam, pain with extension, lumbar spasm, and hamstring tightness.

ST progression is directly related to degree of slippage which is outlined in the Meyerding classification system with Grades I through V corresponding to increasing percentage of anterior displacement over the caudal vertebral body on lateral lumbar radiographs. Grade I denotes 0 to 25% displacement and Grade II 25 to 50%. Both are considered "low-grade" ST. Grade III 50 to 75%, Grade IV 75 to 100% and greater than 100% is Grade V, also known as full anterior subluxation or spondyloptosis, are "high-grade" ST. Slip progression is rare in adolescent patients, approximately 0.6% per year in 1 study, with 90% of total slippage remaining stable past the initial exam. ST progression is also rare in adults, although increasing age and evidence of degenerative joint diseases are associated with progression. Progression in grades I and II is low but physical activity may hasten progression in athletic populations which may be relevant to flyers/operators exposed to high-G and/or high-vibration environment.

Similar to SL, most patients, especially those with low-grade ST, can be managed conservatively with rest and physical therapy to prevent further slippage and expect a full return of function. Full return to activity and aviation duties can occur when pain resolves, typically up to 4 months for those with conservative management. Recurrence or persistent pain for 6-12 months should prompt evaluation for progression and surgical consideration which likely involves some form of spinal fusion. Surgical complications of aeromedical concern include L5 radiculopathy and cauda equina syndrome. Return to sport after surgery averaged 6.7 months though complete fusion can take 12 months. Therefore, flying duties in high-performance aircraft or high-G environments and contact sports should be avoided for 12 months after surgery. Please refer to the Spinal Fracture waiver guide for additional information regarding timelines.

Aeromedical concerns of SL and ST include incapacitation from pain and/or radiculopathy while severe ST may cause leg weakness and sensory loss through neurogenic claudication and rarely, catastrophic cauda equina syndrome. Of note, symptomatic disease, NOT radiographic findings, are of primary aeromedical importance as many patients with radiographic disease are asymptomatic. Additionally, symptomatic patients may have negative imaging and imaging does not necessarily correlate with symptom severity or resolution. Additionally, the aviator's response to continued exposure to vibration and accelerative forces should be considered. An AF Aerospace Medical Research Laboratory report on spinal column considerations for flight physical standards reported no acute incapacitation or worsening of disease due to the flight environment though "limited operational evidence" suggests high-G maneuvering may worsen low back pain.[4] Minimally symptomatic Grade I and II ST are less likely to progress, and a FC I/IA waiver may be considered on a case-by-case basis.

Review of AIMWTS showed 67 members with a waiver disposition for “spondylolysis” or “spondylolisthesis” from November 2015 to March 2023. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use only these ICD-10 Spondylolysis and Spondylolisthesis codes for AIMWTS coding purposes		(# of approved waivers / total # of cases)					
		FC I/IA	FC II	FC III	ATC	GBO	SWA
M43.10	Spondylolisthesis site unspecified	0	34/34	24/27	0/1	2/2	3/3
M43.00	Spondylolysis, site unspecified						

IV. Suggested Readings

1. Chung, CC, Shimer, A. Lumbosacral Spondylolysis and Spondylolisthesis. Clin Sports Med 40 (2021):471-490.

2. American Academy of Orthopedic Surgeons. “ Spondylolysis and Spondylolisthesis - OrthoInfo - AAOS, 2020.

3. Kazarian LE and Belk WF. (1979). Flight physical standards of the 1980's: spinal column considerations. Aerospace Medical Research Laboratory (AMRL) Technical Report (TR)-79-74; October 1974.

4. Floman Y. Progression of lumbosacral isthmic spondylolisthesis in adults. Spine (Phila Pa 1976). 2000 Feb 1;25(3):342-7.

Aerospace Medicine Waiver Guide

Allergic Rhinitis & Vasomotor Rhinitis

Reviewed: Sep 2024
Authors/Reviewers: Dr. Christopher Keirns, Dr. Luke Menner, Maj Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Col Kevin Heacock (Aerospace Medicine Branch Chief)

Significant Changes: Updated to include vasomotor rhinitis. Updated to reflect the most recent MSD, aerospace medicine approved medication list, and GBO approved medication list.

I. Waiver Consideration

Allergic rhinitis is disqualifying for all flying class, ATC, OSF and SWA duties unless it is mild in degree, controlled with approved medications, and unlikely to limit duty performance. Vasomotor non-allergic rhinitis is not specifically disqualifying for aviation or operational duties, but the use of certain medications may require a waiver and any use of non-approved medications is disqualifying. If symptoms of allergic or vasomotor rhinitis are controlled on medications that are approved for the specific career field (e.g., selected second-generation antihistamines, montelukast, or nasal corticosteroids), then a waiver is not required. Nasal azelastine (Astelin®) is approved for use without a waiver. Nasal ipratropium (Atrovent®) is approved for use with a waiver in certain career fields.

Considered in isolation, treatment of allergic rhinitis with allergen immunotherapy is not disqualifying for aviation or operational duties; however, the severity of the allergic rhinitis itself may be disqualifying if symptoms are not adequately controlled. After a ground-trial period to exclude idiosyncratic reactions, treatment with allergen immunotherapy (i.e., desensitization or "allergy shots") requires a 4-hour DNIF/DNIC/DNIA after each treatment and is not compatible with deployment but no longer requires a waiver for continued aviation or operational duties. waiver for all flying class and SWA duties.

The use of any medication not included on the career field-approved medication list in the treatment or management of allergic or vasomotor rhinitis is disqualifying, but a waiver may be considered on an individualized basis. There is no career field medication list for OSF or SWA personnel. As with the use of any medication or supplement in military members, the use of a prescription medication or supplement for the treatment of allergic or vasomotor rhinitis in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

This waiver guide chapter only addresses allergic rhinitis and vasomotor rhinitis. Other causes of rhinitis such as atrophic rhinitis are not addressed. Related conditions such as chronic sinusitis with or without nasal polyps, deviated nasal septum, or Eustachian tube dysfunction may be disqualifying if present. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for all potentially disqualifying conditions. Additionally, please refer to the Waiver Guide chapters on *Eustachian Tube Dysfunction* and *Sinusitis (Rhinosinusitis), Hypertrophic Sinus Tissue, and Nasal Polyps* for further information.

Table 1: Waiver potential for Allergic Rhinitis and Vasomotor Rhinitis

Flying Class	Condition	Waiver Potential Waiver Authority[1]	ACS Review or Evaluation
FC I/IA	Allergic and vasomotor rhinitis (controlled with approved medications that do not require waiver)[2]	N/A	N/A
	Allergic and vasomotor rhinitis (medication requiring waiver, or non-approved medication)[2]	Yes[3] AFRS/CMO	No[4]
FC II/III/ ATC/GBO/ OSF/SWA	Allergic and vasomotor rhinitis (controlled with approved medications that do not require waiver)[2]	N/A	N/A
	Allergic and vasomotor rhinitis (medication requiring waiver, or non-approved medication)	Yes[3] MAJCOM	No[4]

1. Certification authority for untrained assets is AFRS/CMO. Waiver authority for non-approved medication use is AFMED.
2. Mild allergic and vasomotor rhinitis that is controlled with approved medications is not disqualifying and does not require a waiver. Use of allergen immunotherapy does not require a waiver after an appropriate ground-trial period to exclude idiosyncratic reactions. A 4-hour DNIF/DNIC/DNIA is required after each immunotherapy treatment.
3. Waivers for untrained assets and use of non-approved medications may be considered on a case-by-case basis.
4. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete description of presenting features, including full history and all pertinent physical findings (positive and negative).
    b. Specify presence or absence of pertinent symptoms, including any impact on both quality of life and occupation.
    c. Document all comorbidities (e.g., food allergies, asthma, eczema, etc.).
    d. Specify current treatment regimen. Include dosages, and comment on tolerance of treatment.

2. Consultation report from the treating specialist (e.g., allergist, otolaryngologist) and all subsequent consultation notes. These notes must include the following:
    a. Discussion of current treatment (e.g., allergen avoidance, allergen immunotherapy, antihistamines, glucocorticoid nasal sprays, etc.) including dose, frequency, and formulation, as applicable.
    b. Recommendations for ongoing specialist follow-up, if any.
3. If applicable, results of all testing performed during diagnosis, evaluation, and management of allergic and vasomotor rhinitis, including other laboratory studies, all imaging reports, and any other ancillary studies.
4. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Complete updated history and physical examination. Include report of any new subjective symptoms or objective findings.
    b. Complete list of current medications with dates of initiation, dosages, and all adverse effects.
    c. Plan for monitoring of recurrence.
2. All relevant interval consultation reports from specialty providers (e.g., allergist, otolaryngologist).
3. Results of all interval testing performed in the course of ongoing evaluation and management, including (as applicable) laboratory studies, imaging reports, and any other ancillary tests.
4. FL4 with return to duty and ALC status if servicemember didn't meet retention standards.

    Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Clinically, allergic and vasomotor rhinitis are considered to be relatively benign. However, in the unique environment of aviation or under the physiologic stress of military operations, uncontrolled or under-controlled rhinitis can lead to serious consequences for individual health and mission success. Allergic and vasomotor rhinitis are of aeromedical concern due to the symptoms and complications of the underlying condition as well as the adverse effects of common treatments. For example, symptoms of rhinitis such as congestion would be expected to worsen at altitude, potentially leading to distracting discomfort at a minimum or resulting in serious ear or sinus barotrauma at worst. Likewise, exposures to allergens or irritants during military operations may cause duty-limiting symptoms that could impact individual safety and mission completion. Such symptoms include, but are not limited to, severe nasal and sinus congestion and obstructed nasal breathing; impaired olfaction or anosmia; impaired hearing due to congestion; headaches; and upper airway cough syndrome (i.e., postnasal drip). Although not often reported by the affected individual, impaired sleep, fatigue, and cognitive impairment are frequent when symptoms of allergic rhinitis are not adequately controlled. Distracting symptoms

such as rhinorrhea and sneezing may be of particular concern during high-speed, low-level flight. Eustachian tube dysfunction from post-nasal drainage can lead to prolonged periods of flying restriction, reducing operational readiness. Additionally, many of the widely available over the counter (OTC) products that successfully treat the symptoms of allergic or vasomotor rhinitis also result in fatigue or other adverse effects of significant degree that their use poses serious risks in the aviation and operational setting.

Though the standard medications used to treat allergic and vasomotor rhinitis are generally safe, they may all cause adverse effects of aeromedical and operational importance. Consult the appropriate career field medication list for details regarding approved medications and their operational prescribing parameters. The medication lists are nuanced and updated regularly; therefore, referencing the medication list frequently is advised. Whenever a new mode of therapy is initiated, it is critical to both exclude idiosyncratic reactions/significant adverse effects and ensure complete symptomatic control prior to flight status or, if necessary, submission of an aeromedical waiver request. For example, the second-generation antihistamines that are included in the approved medications list for aircrew (i.e., loratadine and fexofenadine) are associated with the lowest risk for sedation compared to alternative agents within their class. However, they are not completely free of sedative effects. Therefore, a minimum ground trial of 72 hours is required prior to operational use.

Allergen immunotherapy is associated with an ongoing risk for systemic reaction including anaphylaxis. However, this risk is still relatively low, and the risk of delayed reactions is lower still. Therefore, a waiver is no longer required for allergen immunotherapy, but a four-hour verbal DOWN is required after each injection. Deployment is not permitted while on allergen immunotherapy, but immunotherapy may be discontinued (interrupted) for purposes of deployment, provided allergic symptoms are adequately controllable with other acceptable means.

Review of the AIMWTS database from Aug 2021 through Aug 2024 revealed 229 waiver packages with a diagnosis of allergic rhinitis that required an aeromedical waiver. The breakdown of the number of approved waivers and number of total cases are tabulated below. Disqualifications were for reasons other than allergic rhinitis alone.

Please use *only* this ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	GBO	ATC	SWA
J30.9	Allergic rhinitis, unspecified	9/13	90/93	85/95	14/16	5/6	6/6

IV. Suggested Readings

1. Dykewicz MS, Wallace DV, Amrol DJ, et al. Rhinitis 2020: A practice parameter update. *J Allergy Clin Immunol* 2020;146:721-767. Available at https://www.jacionline.org/action/showPdf?pii=S0091-6749%2820%2931023-X. Accessed 11 September 2024.
2. Seidman MD, Gurgel RK, Lin SY, et al. Clinical practice guideline: Allergic rhinitis. *Otolaryngol Head Neck Surg* 2015;152:S1-S43. Available at https://journals.sagepub.com/doi/epub/10.1177/0194599814561600. Accessed 11 September 2024.

3. Wise SK, Damask C, Roland LT, et al. International consensus statement on allergy and rhinology: Allergic rhinitis - 2023. *Int Forum Allergy Rhinol* 2023;13:293-859. Available at https://onlinelibrary.wiley.com/doi/epdf/10.1002/alr.22741. Accessed 11 September 2024.

Aerospace Medicine Waiver Guide

Cholesteatoma

Revised: Aug 2022
Reviewed: Col David Gregory (RAM), Dr. Max Lee (ACS Waiver Guide Coordinator), Lt Col Brent Feldt (AF/SG consultant for Otolaryngology), and Lt Col Paul Vu (AFMRA Physical Standards Development Chief)

Significant Changes: Formatting change to waiver demographics table, updated references with hyperlinks, new format for previous waiver dispositions

I. Waiver Consideration

History of cholesteatoma or history of surgical removal of cholesteatoma is specifically disqualifying for flying classes I/IA, II, III, OSF, and SWA duties. Cholesteatoma is not specifically disqualifying for GBO or ATC duties, unless it is associated with otitis media or mastoiditis that interferes with satisfactory job performance, requires more than annual specialist follow up, or results in H-3 or worse hearing. Due to the requirement for long-term follow-up, it is recommended that initial waivers be limited to one year. Patients with cholesteatoma will require regular and prolonged follow-up with otolaryngology while on flying status as recurrence is best managed when caught early. Indefinite waivers will be uncommon.

Table 1: Waiver potential for Cholesteatoma

Flying Class (FC)	Disease/Condition	Waiver Potential Waiver Authority	ACS Review/ Evaluation
FC I/IA and FC II/III/SWA (initial)	Cholesteatoma	Maybe[1,2] AFRS/CMO	Yes
FC II/III SWA (trained)	Cholesteatoma	Yes[1,2] MAJCOM	Yes
ATC GBO	Cholesteatoma	N/A	N/A

1. For FC I/IA, initial FC II/III, surgery for cholesteatoma must have occurred at least two years previous to waiver submission with documentation indicating the cholesteatoma was completely removed; hearing profile must be H-1. AFRS/RSG is the certification authority for all untrained assets except for MOD candidates which go to AFGSC. Indefinite waiver may be considered for cases that occurred years prior to consideration if there has been no recurrence and hearing is excellent.
2. IFC I/IA candidates need to wait a minimum of two years post treatment before consideration of waiver. For all others, after 6 months, individuals must demonstrate normal Eustachian tube function (i.e., a normal valsalva), and a stable or waiverable hearing profile (if a conductive hearing loss is present). For non-trained assets an H-2 hearing profile requires waiver submission, and for trained assets an H-3 requires waiver. Individuals will need close otolaryngology/flight surgeon observation during the first year post-op.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. History of risk factors (i.e., Eustachian tube dysfunction, pressure equalization (PE) tubes, age at first and subsequent PE tube placement, a history of other ear surgeries, episodes of otitis media, smoking status, etc.). Symptoms, including pertinent negatives, should be addressed, (e.g., dizziness, vertigo, facial paralysis, Eustachian tube dysfunction, etc., treatments, and prognosis).
2. Reports of any pertinent laboratory studies, imaging studies, copies of images (as indicated).
3. Physical exam: Valsalva results, status of tympanic membrane.
4. Any specific diagnostic tests performed, before and after treatment (as indicated).
5. Audiogram. (If an audiogram profile is not H-1, a full audiology evaluation is needed).
6. Documentation of return to full physical activity, including specific comments regarding any activity limitations.
7. Otolaryngology consultation; attach referral report FL4 with RTD and ALC status.
8. Copy of operative report.

Note: For any of the above listed conditions, specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Assessment for recurrence (e.g., otorrhea, otalgia, hearing loss, etc.).
2. Physical exam: Valsalva results and status of tympanic membrane.
3. Audiogram. (If an audiogram profile is not H-1, a full audiology evaluation is needed).
4. Otolaryngology consultation; attach referral report.

Note: For any of the above listed conditions, specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Cholesteatomas are typically defined as keratinzed masses in the middle ear, mastoid, or temporal bones that are benign, expanding, and locally destructive lesions. They are typically classified based upon their pathogenesis, being either acquired or congenital. Acquired cholesteatomas are the most common form of cholesteatoma found in the general population and in USAF aircrews. Acquired cholesteatomas may be further subdivided into primary or secondary. Primary acquired cholesteatomas, which account for up to 80% of all middle ear cholesteatomas, usually occur behind an intact TM. They occur as a consequence of tympanic membrane retraction, where the uncontrolled growth of squamous keratinized epithelium in the middle ear damages the ossicles, as it progresses into the aditus ad antrum and mastoid. Secondary acquired cholesteatomas, which account for 18% of middle ear cholesteatoma, seem to “grow” into the middle ear through a

perforated TM. Congenital cholesteatomas are rare, and account for only about 2 to 4% of all middle ear cholesteatomas.

The pathogenesis of acquired cholesteatoma has been debated for over a century, but the most commonly agreed upon etiological factors include chronic Eustachian tube dysfunction, poor pneumatization of the middle ear and mastoid process, and inflammatory conditions (e.g., chronic otitis media with effusion) with subsequent retraction pocket formation.

Aeromedical concerns regarding cholesteatomas include hearing loss, vertigo, facial paralysis, intracranial suppurations, recurrence, persistent Eustachian tube dysfunction, and otalgia which may be aggravated with headset or helmet use. The growing mass can cause a mass effect as it impinges parts of the ear/outer skull, including ossicles, cranial nerves, and mastoid cavity spaces. Although improved surgical techniques have decreased morbidity and mortality from this disease, patient outcome depends on the extent of the disease at the time of surgery, how much damage has already been done, and the skill of the surgeon. Although many patients will have normal ear function for decades after surgical excision, cholesteatomas may recur and require multiple operations resulting in hearing loss. In most patients, the underlying cause, such as Eustachian tube dysfunction, will persist.

A review of AIMWTS from Jun 2017 to Jun 2022 looking revealed a total of 32 cases with an AMS containing the diagnosis of cholesteatoma, only 1 of these cases resulted in a disqualification disposition in a Ground Based Controller. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use only *these* ICD 10 codes for Cholesteatoma for AIMWTS coding purposes		(# of waivers / total # of cases)			
		IFC I/IA	FC II	FC III	ATC
H71.9 0, 1, 2, 3	Unspecified cholesteatoma, right, left, bilateral	4/4	9/9	16/16	2/3
H71.0 0, 1, 2, 3	Cholesteatoma of attic, unspecified ear, right, left, bilateral				
H71.1	Cholesteatoma of tympanum, unspecified ear				
H71.2 0, 1, 2, 3	Cholesteatoma of mastoid, unspecified ear, right, left, bilateral				
H71.30	Diffuse cholesteatoma, unspecified ear				
H95.00	Recurrent cholesteatoma of postmastoidectomy cavity, unspecified ear				

IV. Suggested Readings

1. Basic Otorhinolaryngology: A Step-by-Step Learning Guide, 2nd Edition. (2018). *ProtoView, 2018*(9), ProtoView, Vol.2018(9). https://books.google.com/books?id=_tTKXJ8OY0QC&printsec=frontcover#v=onepage&q&f=false

2. Kennedy KL, Singh AK. Middle Ear Cholesteatoma. [Updated 2021 Jul 10]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK448108/

3. Lustig, LR, Limb CJ. Chronic otitis media, cholesteatoma, and mastoiditis in adults. Post TW, ed. UpToDate. Waltham, MA: UpToDate Inc., https://www.uptodate.com/contents/chronic-otitis-media-cholesteatoma-and-mastoiditis-in-adults

4. Spilsbury K, Miller I, Semmens JB, and Lannigan FJ. Factors Associated With Developing Cholesteatoma: A Study of 45,980 Children With Middle Ear Disease. *Laryngoscope*, 2010; 120: 625-30. https://onlinelibrary.wiley.com/doi/10.1002/lary.20765

Aerospace Medicine Waiver Guide

Eustachian Tube Dysfunction

Revised: Mar 2024
Reviewed: Col Kevin Heacock (ACS Aerospace Medicine Branch Chief), Lt Col Brent Feldt (AF/SG Otolaryngology consultant)

Significant Changes: ACS review only indicated following surgery/procedure.

I. Waiver Consideration

Acute eustachian tube dysfunction (ETD) secondary to a transient illness (e.g. viral URI or SAR) requires no waiver but is grounding for flyers until symptom resolution. However, chronic or recurrent ETD is disqualifying and requires a waiver for all flying classes, except ATC and GBO. Similarly, any surgical procedure for correction of ETD is disqualifying for all flying classes, except ATC and GBO. Resolution of ETD and adequacy of eustachian tube (ET) function will be assessed on a case-by-case basis. Regardless of cause or treatment modality, adequate ET function must be demonstrated to be considered for an aeromedical waiver. In general, the permanent use of pressure equalization (PE) tubes in flyers is not advisable, but adults tend to tolerate chronic use of PE tubes better than children. Careful consideration related to operational necessity of using PE tubes and the clinical judgment of the flight surgeon and treating otolaryngologist are essential in assessing and mitigating risk for flyers and operators with PE tubes.

For ATC and GBO personnel, ETD is not listed specifically as disqualifying. However, per DAFMAN 48-123, 4.2, servicemembers must also meet retention standards when satisfactory duty performance is affected or if there is a requirement for extensive and prolonged treatment. If these conditions exist, please submit Form FL4 and ALC outcomes with the waiver submission. Additionally, ETD may represent only one of the dysfunctions related to the servicemember's otolaryngologic system. Please refer to the *Allergic Rhinitis, Cholesteatoma, Hearing Loss, and/or Sinusitis* Waiver Guide chapters as applicable.

Table 1: Waiver potential for ETD

Flying Class (FC)	Condition	Waiver Potential Waiver Authority	ACS Review or Evaluation
I/IA	ETD, regardless of cause, controlled with nasal steroids and/or approved oral antihistamines	Yes[1] AFRS/CMO	No
	ETD, regardless of cause, controlled via surgery or procedure	Maybe[1, 2] AFRS/CMO	Yes
II/III/OSF/SWA	ETD, regardless of cause, controlled with nasal steroids and/or approved oral antihistamines	Yes[1] MAJCOM	No
	ETD, regardless of cause, controlled via surgery or procedure	Yes[1, 2] MAJCOM	Yes
ATC/GBO	ETD, regardless of cause	N/A	N/A

1. Waiver in FC I/IA and untrained FC II/III requires at least 3-months of symptoms controlled on or off medication before waiver consideration.
2. Waiver may be considered if at least 6-weeks after surgery, resolved symptoms, clearance by otolaryngology. ACS review for clearance is strongly recommended as different surgical procedures (e.g. PET vs. cholesteatoma resection) have dramatically different recovery periods, postoperative sequelae, and complications.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. History – symptoms (flying and on ground), duration, and treatment. Reports of any pertinent laboratory studies, imaging studies, copies of images (as indicated).
2. Physical – HEENT exam to include Valsalva.
3. Otolaryngology consultation reports to include any surgical reports if applicable.
4. Audiology with impedance test consultation report.
5. Altitude chamber flight evaluation (up to 8,000 - 10,000 ft with rapid descent to ambient pressure is required. If treated with surgery, altitude chamber assessment no earlier than 6 weeks after surgery or when cleared by otolaryngologist, whichever is later).

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. History – interim summary of any symptoms (flying and on ground), treatments, or recurrences/exacerbations since last waiver.
2. Physical – HEENT exam to include Valsalva.
3. Otolaryngology consultation if symptoms recurrent.
4. Audiology consult if symptoms recurrent.
5. Status report of ET functional capacity during flight (i.e. in-flight symptoms).

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

ETD may result in the failure to equilibrate middle ear pressures which may lead to pain, hearing impairment, and vertigo, with or without rupture of the tympanic membrane, resulting in compromised aircraft safety. Although ETD may only be minimally symptomatic at ground level, dysfunction can block the flow of air in and out of the middle ear space. In the presence of ETD, dynamic perturbations of atmospheric pressure may result in acute barotrauma, resulting in sudden, incapacitating pain. Should such an event occur during critical phases of flight, it could lead to sudden incapacitation and an aircraft mishap. If symptoms occur during flying operations, the aircrew may attempt to return to the pre-symptomatic altitude to allow for a more gradual equilibration of the middle ear and/or the use of oxymetazoline nasal spray (Afrin®). If the ear block persists after landing, a Politzer bag may be used to assist in equalizing the middle ear. Aircrew need to take caution with the use of alpha-agonists nasal sprays as overuse can lead to inhibition of normal smooth muscular tonality of the vascular nasal mucosa, leading to mucosal swelling and secretions (rhinitis medicamentosa). Minimally invasive procedures such as ET balloon dilation have been FDA approved and may provide a treatment option.

There is no quick test to ensure the ET patency prior to flight. However, being free of sino-nasal and URI symptoms and being able to Valsalva or prior successful completion of altitude chamber training are reasonable approximations. Further, any middle ear disturbance (e.g. ETD, otitis media) raises concern for decreased hearing, disequilibrium, and cholesteatoma formation.

There are some concerns about the chronic use of PE tubes in aviators. Few patients requiring prolonged PE tubes will end up with a large central perforation which can persist to persist as long as the ear is not being ventilated. Also, the PE tubes can rarely fail but can get plugged, extrude, cause granulation tissue which then causes bleeding and infection and may lead to TM perforations. PE tubes can also act as a conduit for fluids getting in the middle ear especially soapy fluids with low surface tensions that then can potentially cause a chemical irritation of the middle ear and subsequent otorrhea and/or infection. Additional challenges include requirement for microscope and other specialized otologic instrumentation to accurately evaluate and treat PE tube problems which may be difficult in deployed or austere operational environments.

Review of AIMWTS from May 2018 to May 2023 revealed 23 cases with the diagnosis of ETD. The breakdown of the number of waiver approvals and number of total submitted cases are tabulated below.

Please use only *these* ICD-10 codes for eustachian tube dysfunction for AIMWTS coding purposes		(# of waivers / total # of cases)					
		FC I/IA	FC II	FC III	ATC	GBO	SWA
H68.00 1, 2, 3, 9	Unspecified eustachian salpingitis, right ear, left, bilateral, unspecified ear						
H68.10 1, 2, 3, 9	Unspecified obstruction of the eustachian tube, right ear, left, bilateral, unspecified ear	1/1	1/1	1/1			
H69.0 0, 1, 2, 3	Patulous eustachian tube, unspecified ear, right, left, bilateral			1/1			
H69.8 0, 1, 2, 3	Other specified disorders of the eustachian tube, unspecified ear, right, left, bilateral	2/3	8/8	3/5	1/1		1/2

IV. Suggested Readings

1. Cocco D, Bogle JM, Herold N, and Shelhamer M. Otorhinolaryngology and Vestibular Function in Aerospace Medicine. Ch. 5 in Fundamentals of Aerospace Medicine. *Ernsting's Aviation Medicine*. Davis JR, Stepanek J, et al, editors, 5th Ed., Wolters Kluwer, 2022.

2. Tucci DL, McCoul ED, Rosenfeld RM, Tunkel DE, Batra PS, Chandrasekhar SS, Cordes SR, Eshraghi AA, Kaylie D, Lal D, Lee J, Setzen M, Sindwani R, Syms CA 3rd, Bishop C, Poe DS, Corrigan M, Lambie E. Clinical Consensus Statement: Balloon Dilation of the Eustachian Tube. Otolaryngol Head Neck Surg. 2019 Jul;161(1):6-17. doi: 10.1177/0194599819848423. Epub 2019 Jun 4. PMID: 31161864. https://aao-hnsfjournals.onlinelibrary.wiley.com/doi/10.1177/0194599819848423

3. Poe D, Corrales ED, et al. *Eustachian tube dysfunction*. UpToDate. Accessed Jun 1, 2023. https://www.uptodate.com/contents/eustachian-tube-dysfunction

4. Maddineni S, Ahmad I. Updates in Eustachian Tube Dysfunction. Otolaryngol Clin North Am. 2022 Dec;55(6):1151-1164. doi: 10.1016/j.otc.2022.07.010. PMID: 36371132. https://www.sciencedirect.com/science/article/pii/S0030666522001025?via%3Dihub

5. Groth P, Ivarsson A, Nettmark A, and Tjernstrom O. Eustachian Tube Function in Selection of Airmen. Aviat Space Environ Med, 1980; 51(1): 11-17.

Hearing Loss, Asymmetric Hearing Loss, and Use of Hearing Aid(s)

Revised: June 2024
Reviewed: Col Kevin Heacock (Aerospace Medicine Branch Chief), Lt Col Brandon Tourtillott (AF/SG Audiology consultant)

Significant Changes: Clarified Table 2 – ACS review not required, but if requested to identify clinical question to be reviewed by Audiology consultant.

I. Waiver Consideration

Hearing loss that precludes safe, effective performance of duty despite use of hearing aid(s) (i.e. H-4) is disqualifying for all flying and special duty personnel, as well as retention. Use of a hearing aid is disqualifying but may be waiverable for FC I/IA, II, III, ATC, GBO, and SWA duties. Initial applicants for FC I/IA, II, III, ATC, and SWA must be H-1 for selection; initial applicants for GBO and OSF personnel require H-2 or better hearing threshold. Trained FC II, FC III, ATC, GBO, and SWA with H-2 hearing threshold require evaluation for conductive or retrocochlear pathology (includes comprehensive audiologic evaluation and potential otolaryngology evaluation). Restriction from flying duties are not required during this work-up. No waiver is required for H-2 hearing threshold for trained personnel unless indicated by audiology and/or otolaryngology findings. All trained flyers and special duty personnel with H-3 profiles or asymmetric hearing loss are disqualified and require aeromedical waiver. Table 1 outlines the definition for H-1, H-2, H-3, and H-4 hearing. Hearing profiles are based on an unaided audiogram (no hearing aids) and removal from hazardous noise for at least 14 hours.

Table 1: Hearing profile standards and asymmetry definition.

	500 Hz	1000 Hz	2000 Hz	3000 Hz	4000 Hz	6000 Hz
H-1 Profile If no single value exceeds (dB)	25	25	25	35	45	45
H-2 Profile If no single value exceeds (dB)	35	35	35	45	55	--
H-3 Profile	Any hearing loss exceeding at least one value for H-2 profile, but does not qualify for H-4.					
H-4 Profile	Hearing loss sufficient to preclude safe and effective performance of duty, regardless of level of pure tone hearing loss, and despite use of hearing aids.					
***Hearing Proficiency Validation**	Written validation of ability to safely perform all assigned aircrew duties in flying environment signed by flying SQ/CC or Operations Officer, ***supplemented by*** the flight surgeon's written memo for record stating that Speech Recognition Levels (from the audiology report) are adequate to perform flying duties (>70%).					
Asymmetry	≥25 dB difference comparing left and right ear, at any two consecutive frequencies.[1]					

1. Asymmetry at 3000 Hz is considered by recent studies to be an important predictor of retrocochlear pathology.

Waivers are valid for no greater than three years or until a shift of 10 dB or greater on the average of 2,000, 3,000 and 4,000 Hz in either ear from the previous waiver's audiogram, whichever occurs first. Indefinites hearing waivers will not be granted. If the cause of the hearing loss is secondary to acoustic neuroma, cholesteatoma, eustachian tube dysfunction, otosclerosis, or a peripheral vertiginous disorder, refer to the respective waiver guides.

Table 2: Degree of hearing loss and waiver potential.

Flying Class	Hearing Loss	Waiver Potential Waiver Authority	ACS Review/ Evaluation[7]
I/IA	H-1 with asymmetry	Yes AFRS/CMO	No
	H-2 with or without asymmetry	Maybe[1] AFRS/CMO	No
	H-3/H-4 with or without asymmetry	No AFRS/CMO	No
	Hearing aids	No AFRS/CMO	No
II/III ATC/GBO SWA	H-2	Initial/untrained – Maybe[2] Trained – N/A[3] MAJCOM	No
	H-3	Initial/untrained – No Trained – Maybe[4] MAJCOM	No
	H-4	No MAJCOM	No
	Asymmetry	Initial/untrained – Maybe[5] Trained – Maybe MAJCOM	No
	Hearing aids	Initial/untrained – No Trained – Maybe[6] MAJCOM	No

1. Waiver for FC I/IA may be considered if H-2 due to one frequency in one ear.
2. Waiver for initial/untrained FC II and III may be considered if H-2 due to one frequency in one ear. H-2 is qualifying for GBO applicants.
3. For trained FC II, FC III, GBO, ATC, and SWA, no waiver or grounding required but must have comprehensive audiologic work-up.
4. For inactive flyers, hearing proficiency validation/waiver may be delayed; FC IIC or modified FC III waivers may be granted by the waiver authority (must have hearing proficiency validation, inflight test or letter from SQ/CC or DO, before flying).
5. Waiver for initial/untrained FC II and III with H-2 may be considered if H-2 due to one frequency in one ear; no waiver for initial/untrained FC II and III with H-3.
6. If flyer has H-3 and does not wear hearing aids performing flying duties, they must pass hearing proficiency validation without hearing aids.
7. Review by ACS is not required, but if requested by the waiver authority please identify the clinical question to be reviewed by the Audiology consultant.

Note: No indefinite waivers will be granted for asymmetric hearing loss or H-3; maximum duration of waiver is 3 years.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial/Renewal Waiver Request:

1. Summary of presentation, course, and treatment. Include history related to hearing loss (including noise exposure history). If hearing aids are used, include if worn while flying and address the ability to wear hearing protection.
2. Reports of any pertinent laboratory studies, imaging studies, copies of images (as indicated), including baseline and latest audiograms.
3. Any consultation reports, including follow-up notes with examination findings after disease resolution. Include documentation of complete and current, within 12 months of waiver submission, audiology evaluation. Consider otolaryngology evaluation if there is any concern for conductive or retrocochlear disease.
4. Any specific diagnostic tests performed, before and after treatment (as indicated).
5. Validation of hearing proficiency for H-3 waivers (initial waivers and waiver renewals with a shift of 10 dB or greater on the average for 2,000, 3,000 and 4,000 Hz from the previous waiver's audiogram).
    a. In-flight hearing test available at https://apps.dtic.mil/sti/pdfs/AD0767586.pdf or,
    b. Written validation of ability to safely perform all assigned aircrew duties in flying environment signed by flying SQ/CC or Operations Officer, supplemented by the flight surgeon's written MFR stating that Speech Discrimination Levels (from the audiology report) are adequate to perform flying duties (≥70%).
6. If the local base is not able to provide any of the above listed information, they should document why, explaining reasoning to the waiver authority.

III. Aeromedical Concerns

It is essential that aviators have hearing adequate to recognize and understand verbal communications and warning tones. This includes adequate binaural hearing in aircraft with warning tones presented specifically to the left or right sides. Significant tinnitus associated with hearing loss may interfere with communications as well as sleep. Hearing loss can be an early symptom of other medical problems, for example, a vestibular schwannoma which could directly affect vestibular function and flight safety. Lastly, aviators with noise induced hearing loss will likely experience some degree of worsening hearing loss secondary to continued noise exposure.

If the design of the hearing aid allows the proper fit of hearing protection devices, and are programmed appropriately to minimize feedback, hearing aids may be worn during flight. It is important to emphasize that hearing aids are not a substitute for hearing protection. Lack of proper hearing protection in hazardous noise places an individual at risk for increased hearing loss. In noisy environments where double hearing protection is required, hearing aids are not

allowed. Cochlear implants or implantable amplification devices are not allowed in any hazardous noise environment and thus not allowed in aviators. Hearing aid battery life varies, with the shortest being about 4 days; due to the potential disruption incurred related to changing batteries during flying and special mision duties, hearing aid batteries should be changed prior to flying if hearing aids are worn while performing aircrew duties.

Individuals with otosclerosis or other causes of conductive hearing loss may have a paradoxical improvement in hearing in a noisy environment. This is due to a phenomenon called the Paracusis of Willis where the low frequency background noise is sometimes filtered and allows the individual to perceive communications better in the higher frequency range. In this unique situation, hearing aids may be used on the ground but not recommended or needed in flight.

Review of AIMWTS from Apr 2019 through Mar 2022 revealed 935 waivers for H-2 or greater hearing loss. There were 58 FC I/IA cases (13 disqualified), 398 FC II cases (1 disqualified), 328 FC III cases (28 disqualified), 49 GBO cases (4 disqualified), 33 ATC/GBC cases (4 disqualified), 49 GBO/MOD cases (4 disqualified), and 69 SWA cases (6 disqualified). Of the 56 disqualified cases, 22 had other aeromedically significant conditions that resulted in aeromedical disqualification.

ICD-10 Codes for Hearing Loss and Hearing Aids	
H90.0, H90.2	Conductive hearing loss, bilateral, unspecified
H90.3, H90.5	Sensorineural hearing loss, bilateral, unspecified
H90.6, H90.8	Mixed conductive and sensorineural hearing loss, bilateral, unspecified
Z97.4	Presence of external hearing-aid

IV. Suggested Readings

1. Weber PC. Evaluation of hearing loss in adults. UpToDate. Jan 19, 2021. Accessed Mar 2, 2022. https://www.uptodate.com/contents/evaluation-of-hearing-loss-in-adults?search=evaluation%20of%20hearing%20loss%20in%20adults&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1

2. Smith SD, Goodman JR, and Grosveld FW. Vibration and Acoustics. In Davis JR, Johnson R, Stepanek J, eds. *Fundamentals of Aerospace Medicine*, 4th ed. Philadelphia: Lippincott Williams & Wilkins; 2008: 110-41.

3. Atalay H, Babakurban ST, Aydın E. Evaluation of Hearing Loss in Pilots. Turk Arch Otorhinolaryngol. 2015 Dec;53(4):155-162. doi: 10.5152/tao.2015.1330. Epub 2015 Dec 1. PMID: 29392000

4. AFI 48-127, Occupational Noise and Hearing Conservation Program, 26 February 2016.

5. Michels TC, Duffy MT, Rogers DJ. Hearing Loss in Adults: Differential Diagnosis and Treatment. Am Fam Physician. 2019 Jul 15;100(2):98-108. PMID: 31305044.

6. Walker JJ, Cleveland LM, Davis JL, Seales JS. Audiometry screening and interpretation. Am Fam Physician. 2013 Jan 1;87(1):41-7. PMID: 23317024.

7. Ahsan SF, Standring R, Osborn DA, Peterson E, Seidman M, Jain R. Clinical predictors of abnormal magnetic resonance imaging findings in patients with asymmetric sensorineural hearing loss. JAMA Otolaryngol Head Neck Surg. 2015 May 1;141(5):451-6. doi: 10.1001/jamaoto.2015.142. PMID: 25719460.

Aerospace Medicine Waiver Guide

Motion Sickness

Revised: Sep 2022
Reviewed: Lt Col Jeffrey Harris (RAM 22), Dr. Max Lee (ACS Waiver Guide coordinator), Lt Col James Davis (USAF physiologist), and Lt Col Paul Vu (AFMRA Medical Standards Policy Chief)

Significant Changes:
Updates in accordance with DAFMAN 48-123 (8 Dec 20), AFMAN 11-402 (24 Jan 19), AETCI 36-2605V1 (17 Sep 19), and AETCI 48-102 (7 Mar 19), new format for previous waiver dispositions

I. Waiver Consideration

Motion sickness experienced in aircraft, automobiles, or watercraft after the age of 12 with any significant frequency in applicants for undergraduate pilot training (UPT), undergraduate navigator training (UNT) (FC I/IA), and Special Warfare training requires a waiver. Any history of motion sickness occurring before age 12 does not specifically require a waiver, but does require exploration. A thorough history of motion sickness should be discussed in the aeromedical summary. Airsickness is *not* disqualifying for FC II or FC III personnel, unless there is medical evidence of organic or psychiatric pathology.

UPT (FC I), UNT (FC IA), and non-rated aircrew (FC III) trainees and who have intractable airsickness after completing, or attempting to complete, the Airsickness Management Program are handled administratively in accordance with AFMAN 11-402 because they are unable to meet syllabus requirements and/or demonstrated "lack of adaptability" to the flying environment. Prior to administrative actions, these cases should be evaluated by an experienced aeromedical provider to rule out an organic or psychiatric etiology. Trained aircrew who remain symptomatic after repeated exposures to the flying environment and fail desensitization training are dispositioned through a Flying Evaluation Board (FEB).

Airsickness requiring pharmacologic therapy beyond the Airsickness Management Program is disqualifying.

Table 1: Waiver potential for Motion Sickness

Flying Class (FC)	Disease/Condition	Waiver Authority Waiver Potential	ACS Review/ Evaluation
IFC I/IA, SWA (initial)	History of Motion Sickness age >12 yrs[1]	AFRS/CMO Maybe	No
	Airsickness/Motion Sickness during UPT/UNT/Special Warfare training	MAJCOM Maybe	No
FC II, III, SWA (trained)	Airsickness with medical evidence of organic or psychiatric pathology[2]	MAJCOM Maybe	Maybe
ATC, GBO	History of Motion Sickness	N/A	N/A
	Simulator/Motion Sickness during training	N/A	N/A
	Simulator/Motion Sickness with evidence of an organic or psychiatric pathology	N/A	N/A

1. History of motion sickness before the age of 12 that has resolved does not require a waiver, but should be completely explored.
2. There is no specific MSD disqualification requirement for FC II and III without organic or psychiatric pathology, however an AMS may be submitted for MAJCOM review on a case-by-case basis.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. Summary of presentation, course, and treatment.
    a. Childhood and adolescent history of any type of motion sickness.
    b. History of vestibular disorders.
    c. Motion sickness risk factors.
    d. Treatments/medications attempted with results.
    e. How symptoms affect mission and/or training.
2. Any specific diagnostic tests performed, before and after treatment (as indicated).
3. If vision was involved, Optometry or Ophthalmology consultation, to include all tests.
4. If concerns for anxiety manifestations or motivation, include Mental Health consultation.
5. Current physical examination findings (specific focus on CNS and ENT exams)
6. Any other pertinent information.
    a. Include notes and results from all Airsickness Management Program training.
    b. Include a statement from the aerospace physiologist regarding training and conditioning.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Motion sickness is a common, even normal, physiologic response by an unadapted individual to unfamiliar movement with significant variation in susceptibility by individuals. The term 'motion sickness' includes airsickness, seasickness, car sickness, simulator sickness, space motion sickness, as well as other related entities. It is not typically considered a medical disorder and can be induced in anyone with an intact vestibular system given the right type and duration of provocative stimuli. The effects of motion sickness range from subtle performance deficit and distraction to incapacitation. Motion sickness is thought to occur as a result of conflicting inputs to the brain from visual, vestibular, proprioceptive, and rarely, auditory systems. The terms "airsickness" and "motion sickness" are used interchangeably in this waiver guide.

It is possible to experience characteristic symptoms in the absence of motion, as in the case of "simulator-sickness," "virtual-reality- sickness," or "visually induced motion sickness" (VIMS). While there is no MSD disqualification for a GBO with motion sickness, an individual could theoretically be ineffective at their job due symptoms of VIMS. In such cases, the flight surgeon should apply aeromedical judgment in the context of personnel and mission safety when determining aeromedical risk not specifically addressed in the MSD.

The USAF has defined two types of airsickness: active and passive. Passive airsickness can include pallor, cold sweats, dizziness, headaches, belching, nausea, apprehension, hyperventilation, lightheadedness, drowsiness, apathy, and sopite syndrome. Active airsickness progresses to retching and vomiting. The affected individual may become distracted even by passive symptoms, leading to a decreased situational awareness and performance degradation. Some individuals may experience significant improvement after vomiting, while others may continue to experience symptoms, including lethargy, fatigue, and drowsiness, long after the motion has stopped. Motion sickness is most commonly encountered among personnel early on in flight training, although it may still occur in more experienced aircrew, especially when switching aircraft types, or when returning to flying after an extended period of non-flying. It is thought that adaption is almost completely retained for 1 month and partially retained for 1 year.

Prevention education and early intervention through the Airsickness Management Program have proven to be effective in helping aviator students to overcome motion sickness. The role for pharmacologic intervention is limited in flyers, and may only be utilized early on in pilot training with coordination between the Flight Surgeon and the Aerospace Physiologists per Airsickness Management Program guidelines. Medication usage is not approved for solo flight, or within 5 sorties of solo flight.

Approved medications, used as part of the Airsickness Management Program, can be found in the Aircrew Med List on the KX and are not approved for use in trained aviation personnel. Medication use, efficacy, and side effects should be documented clearly in the medical record and in the Airsickness Management Program reporting tools with the final outcome of each case documented and tracked for annual reporting to AETC/SGP. For more information about the AMP and medication usage, reference AETCI 48-102. Bases without physiology support may request assistance in identifying resources from their MAJCOM/SGP.

It is important to consider the aeromedical and safety concerns related to airsickness, as the effects can range from mild distraction to near-incapacitation. The corresponding degradation of situational awareness and performance is incompatible with flying duties. Most affected aircrew will adapt with repeated exposures to the flying environment, so it is important to keep flying them as often as possible, while doing so in a safe manner (e.g. with an IP). Trained aircrew who experience their first episode of airsickness should be evaluated by the aeromedical provider to rule out an organic or psychiatric etiology. If no such etiology is found, the affected individual should be enrolled in the Airsickness Management Program at the local base prior to determining a final aeromedical disposition.

AIMWTS search for Motion Sickness waivers within the past 5 years found 65 total waiver cases with a diagnosis of motion sickness. Majority of cases not waived were due to other disqualifying diagnoses also in the waiver package, or a DQ recommendation by the local flight surgeon for ARMA-UNSAT. Only a few DQs were truly due to severely debilitating motion sickness unresponsive to therapy.

ICD-10 code for Motion Sickness		(# of waivers / total # of cases)				
		IFC I/IA	FC II	FC III	OSF	SWA
T75.3XXA	Motion sickness, initial encounter	17/21	4/5	6/30	2/2	5/7
T75.3XXD	Motion sickness,					
T75.3XXS	Motion sickness, sequelae					

IV. Suggested Readings

1. Parmet AJ and Ercoline WR. Spatial Orientation in Flight. Ch. 6 in *Fundamentals of Aerospace Medicine*, 4th ed. Williams and Wilkins, Philadelphia, 2008: 195-203.

2. Murdin L, Golding J, and Bronstein A. Managing Motion Sickness. BMJ, 2011; 343: 1213-17. https://www.bmj.com/content/343/bmj.d7430.long

3. Shupak A and Gordon CR. Motion Sickness: Advances in Pathogenesis, Prediction, Prevention, and Treatment. Aviat Space Environ Med, 2006; 77: 1213-23.

4. Hu S and Stern RM. The Retention of Adaptation to Motion Sickness Eliciting Stimulation. Aviat Space Environ Med, 1999; 70(8): 766–68.

5. Zhang LL, Wang JQ, Qi RR, Pan LL, Li M, Cai YL. Motion Sickness: Current Knowledge and Recent Advance. CNS Neurosci Ther. 2016 Jan;22(1):15-24. doi: 10.1111/cns.12468. Epub 2015 Oct 9. PMID: 26452639; PMCID: PMC6492910. https://onlinelibrary.wiley.com/doi/epdf/10.1111/cns.12468

6. AETC Instruction 36-2605, Vol 1, *Formal Flying Training Administration and Management*, Ch 3.4, 17 Sep 2019. https://static.e-publishing.af.mil/production/1/aetc/publication/aetci36-2605v1/aetci36-2605v1.pdf

7. AETC Instruction 48-102, *Medical Management of Undergraduate Flying Training Students*, Ch 15, 7 Mar 2019. https://static.e-publishing.af.mil/production/1/aetc/publication/aetci48-102/aetci48-102.pdf

8. AETC Instruction 36-2605, Vol 1, *Formal Flying Training Administration and Management*, Chapter 3.3, 16 Feb 2016.

9. AETC Instruction 48-102, *Medical Management of Undergraduate Flying Training Students*, Chapter 15, 7 Mar 2019.

Aerospace Medicine Waiver Guide

Otosclerosis/Stapedectomy

Revised: Sep 2022
Reviewed: Dr. Max Lee (ACS Waiver Guide Coordinator), Lt Col Brent Feldt (AF/SG Otolaryngology Consultant), and Lt Col Paul Vu (AFMRA Medical Standards Policy Chief)

Significant Changes: Minor revisions and updated references with hyperlinks, new format for previous waiver dispositions

I. Waiver Consideration

Otosclerosis is an ankylosis involving the stapes footplate and the surrounding bone of the inner ear. Otosclerosis is addressed in the MSD and is disqualifying for all flying and special operations duties when it interferes with normal hearing. Any surgical procedures in the middle ear, including stapedectomy, are disqualifying for FC I/IA, II, III, OSF, and SWA duties.

There are various medical and surgical treatments that may be considered to address the condition. The most common surgical procedures are a total or partial stapedectomy, or stapedotomy. In addition to meeting the hearing standards, an ACS review is recommended for operators in single seat and high performance aircraft following stapes surgery.

Table 1: Waiver potential for Otosclerosis/Stapedectomy

Flying Class (FC)	Waiver Potential[1] Waiver Authority	ACS Review/Evaluation
I/IA	Yes AFRS/CMO	ACS review necessary if stapes surgery performed
II/III/SWA	Yes MAJCOM	ACS review necessary if stapes surgery performed[2]
ATC/GBO	Yes MAJCOM	No

1. No indefinite waivers.
2. Single seat high performance aircrew only.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should be submitted after diagnostic evaluation has been completed and appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. Summary of presentation, course, and treatment for all clinical diagnoses.
2. Complete history to include all hearing and vertiginous symptoms along with impact on activities of daily living and aviation duties. Discuss all attempted treatments (e.g. hearing aids).
3. Otolaryngologist and audiologist consultation reports, including follow-up notes with examination findings after disease resolution.

4. Complete audiologic exam to include:
    a. Air conduction threshold measurement;
    b. Bone conduction threshold measurement (if indicated);
    c. Speech reception threshold;
    d. Speech discrimination testing;
    e. Acoustic impedance testing; and
    f. Electronystagmography if clinically indicated.
5. All surgical reports to include:
    a. Details of technique used;
    b. Type of prosthesis; and
    c. Type of graft used.
6. Documentation of return to full physical activity, including specific comments regarding any activity limitations.
7. Any other pertinent information.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. If any abnormalities surface in the interim, they will need to be addressed appropriately.
2. Interim history to include any change in hearing, any side effects such as vertiginous symptoms, and any operational issues.
3. Exam: Otolaryngology and audiology evaluations.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

The chief aeromedical concerns of otosclerosis relate to progressive hearing loss. In addition, otosclerosis may result in vestibular symptoms significant enough to impact flight safety.

Most aviators with otosclerosis will present with a chief complaint of hearing loss as the pathologic process affects the speech range frequencies. Although it is important to consider the impact of Paracusis of Willis, an improved perception of speech in a noisy environment, hearing loss will eventually impair communication leading those affected to seek surgical or audiometric remediation. Corrective surgery is highly successful in restoring the aviator's auditory acuity. However, there are post-operative risks, which although rare, include; injury to the facial nerve, inner or middle ear infection, meningitis, disturbances of equilibrium, conductive hearing loss, persistent perforation of the tympanic membrane, and perilymphatic fistula; each of which may prevent the proper use of safety equipment or cause incapacitation through loss of hearing or decreased situational awareness.

Previously, medical waivers post-stapedectomy were rarely recommended. Fortunately, the majority of known complications of stapes surgery become evident within the first one or two months following the procedure. Only disturbances in equilibrium and delayed sudden hearing loss are believed to present beyond the first few weeks, although there are reports of chronic perilymphatic fistulas. Perilymphatic fistula is the most serious long-term complication for

aviators due to the potential for vertigo as the cabin or ambient barometric pressures can rapidly change with military aviation, jump, and dive duties. On account of extensive post-operative data and altitude chamber experience, there is consensus that after an appropriate waiting period to rule out immediate post-operative complications, return to flying status after stapedectomy can meet aeromedical risk tolerance.

AIMWTS search for otosclerosis, stapedectomy, or stapedotomy from Jan 2018 – Jul 2022 revealed 20 adjudicated cases. The breakdown of the number of waivers and number of total cases are tabulated below.

ICD 10 Codes for Otosclerosis and Stapedectomy		(# of waivers / total # of cases)				
		IFC I/IA	FC II	FC III	OSF	SWA
H80.83	Other otosclerosis, bilateral	0	12/12	4/4	2/2	1/2
H80.93	Unspecified otosclerosis, bilateral					
19.1	Stapedectomy					
19.19	Other stapedectomy					
19.9	Stapedotomy					

IV. Suggested Readings

1. American Academy of Otolaryngology. Position Statement: Management of Otosclerosis. 2014 July. https://www.entnet.org/resource/position-statement-management-of-otosclerosis/

2. Cureoglu S, Schachern PA, Ferlito A, et al. Otosclerosis: Etiopathogenesis and histopathology. Am J Otolaryngol, 2006 Sep-Oct; 27(5): 334-40. https://www.sciencedirect.com/science/article/pii/S0196070905002176?via%3Dihub

3. Danesh AA, Shahnaz N, Hall JW,3rd. The Audiology of Otosclerosis. Otolaryngol Clin North Am. 2018 Apr; 51(2): 327-42. https://www.sciencedirect.com/science/article/pii/S0030666517302244?via%3Dihub

4. Rudic M, Keogh I, Wagner R, et al. The pathophysiology of otosclerosis: Review of current research. Hear Res. 2015 Dec; 330(Pt A): 51-6. https://www.sciencedirect.com/science/article/pii/S0378595515001549?via%3Dihub

Peripheral Vertiginous Disorders

Revised: Mar 2023

Reviewed: Col Joseph Connolly III (Neurology Master Clinician), 2Lt John Tyler DiModica (ACS Neurology Research Investigator), Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: BPPV recurrence rates, important vertigo definitions, updated AIMWTS data, updated ICD Codes, updated references.

I. Waiver Consideration

Air Force aviators with vertigo of any etiology are disqualified for all flying classes and need to be carefully evaluated before waiver consideration. For waiver consideration, all symptoms must be resolved, with sufficiently normal remaining vestibular function that would not cause clinical disability. Vestibular neuritis is the only major form of peripheral vertigo to have a minimal risk of recurrence and is the only form of peripheral vertigo for which FC I and unrestricted FC II waivers may be recommended. The likelihood of recurrence of benign paroxysmal positional vertigo may be acceptable in the aeromedical population with appropriate treatment and remission of 6 months or more. Ménière's disease has an unpredictable course and recurrent symptoms with a high potential for sudden incapacitation, which also precludes aeromedical waiver consideration except in rare cases with prolonged remission. Superior semicircular canal dehiscence cases, if confirmed by temporal bone CT imaging and resolved with definitive treatment, may then be considered for aeromedical waiver. Vestibular migraine, while a central etiology for vertigo, can sometimes explain recurrent vertigo symptoms and should be referred to the Headache aeromedical waiver guide waiver consideration. Aviators with unexplained vertigo, dizziness, or disequilibrium symptoms without a definitive diagnosis are generally not recommended for aeromedical waiver due to inability to assess or predict future recurrence risk.

Table 1: Waiver potential for peripheral vertiginous disorders

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	Yes[1]	AFRS/CMO	No
FC II//III/SWA	Yes[2]	MAJCOM/AFMRA	Yes
ATC/GBO/OSF	Yes	MAJCOM	At the discretion of the waiver authority

1. IFC I/IA waiver recommended only for cases of resolved vestibular neuritis
2. Multi-place aircraft waiver may be possible in cases of Ménière's disease with prolonged remission.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed, all appropriate treatments have been initiated using best current clinical guidelines and recommendations, and the member is clinically stable.

A. Initial Waiver Request:

1. Careful history describing: frequency, duration, severity, and character of vertiginous attacks; type of maneuvers that provoke symptoms; presence or absence of associated symptoms such as hearing loss, aural fullness, tinnitus, headaches, or focal neurologic symptoms. Also note any past history of syphilis, mumps, or other serious infections, inflammation of the eye, autoimmune disorders, allergies, and ear surgery.
2. Otolaryngology consultation notes. For complex or undiagnosed cases, strongly consider obtaining formal Neuro-Otology consultation through SAMMC, WRNMMC, or an academic medical center.
3. Audiogram results, to include speech discrimination, tympanometry, and acoustic reflexes.
4. Vestibular function testing results, which may include electronystagmography (ENG, VNG and calorics), vestibular evoked myogenic potentials (VEMP), computerized dynamic posturography (CDP), or rotary chair testing.
5. Laboratory testing results, which may include CBC, ESR, TFTs, lipids, glucose, and syphilis serology.
6. Pre/post-contrast MRI of the brain and internal auditory canal (IAC) to rule out retrocochlear pathology such as cerebello-pontine angle (CPA) tumors, multiple sclerosis, anatomical variants, etc. Send report and images for review and reference.
7. Current physical, ENT and neurologic examination findings. Include assessment for nystagmus, balance, and results of Dix-Hallpike testing.

For image submission process, refer to Page 2 of the waiver guide compendium.
Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package

B. Renewal Waiver Request:

1. Interval history and level of symptom resolution.
2. Copies of any applicable interim specialty reports, labs, imaging reports and images.
3. Current physical, ENT and neurologic examination findings. Include assessment for nystagmus, balance, and results of Dix-Hallpike testing.
4. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

For image submission process, refer to Page 2 of the waiver guide compendium.
Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package

III. Aeromedical Concerns

Important Vertigo Diagnoses and Definitions:

1. Benign Paroxysmal Positional Vertigo (BPPV)
    a. The most common cause of peripheral vertigo that is both brief (<1 min) and caused by sudden head movement.
2. Vestibular neuritis
    a. An acute viral or post-viral inflammatory disorder that causes severe, persistent vertigo.
3. Ménière's Disease:
    a. Episodic inner ear dysfunction that causes spontaneous, episodic vertigo lasting minutes to hours, unilateral tinnitus, and hearing loss.
4. Vestibular Migraine:
    a. A central etiology of vertigo that has highly variable symptoms but is often associated with migraine headache or other migraines phenomena (visual aura, photophobia, phonophobia).

Aeromedical concerns include the effects of any residual symptoms on operational safety and mission effectiveness, future risk of new symptom development, and future risk of recurrence. The threat posed by ongoing vertigo in the flying environment is self-evident. Since all vertigo is potentially incapacitating (albeit to varying degrees), whether a syndrome is likely to recur or not following apparent resolution of symptoms is the key to whether an aeromedical waiver may be considered. Vestibular neuritis is the only major form of peripheral vertigo to have a minimal risk of recurrence after resolution of symptoms. Benign Paroxysmal Positional Vertigo (BPPV) recurrence of the USAF aviator population, based on a preliminary ACS retrospective case-series, has a recurrence rate of less than 1% in the first year and approximately 24% in five years after 6 months of remission (this is significantly lower than the general population that shows recurrence of 15-18% in the first year and 35-50% in five years). Aviators with BPPV can be considered for an aeromedical waiver after appropriate treatment (Epley maneuver) and 6 months of confirmed remission. Categorical multi-place aircraft waiver is recommended for all cases of BPPV, including those who demonstrate prolonged remission. Ménière's disease has unpredictable and recurrent symptoms with potential for sudden incapacitation, and few reliable, aeromedically-compatible treatment options. Aeromedical waiver would therefore be recommended only under exceptional circumstances, such as cases with prolonged remission. Superior semicircular canal dehiscence produces vestibular symptoms evoked by loud noises or pressure-changing maneuvers such as coughing, straining or sneezing. If confirmed by temporal bone CT imaging, definitive treatment is possible by surgical resurfacing or plugging the superior semicircular canal. Vestibular migraine may respond to migraine medications and be potentially waiverable as per the Headache aeromedical waiver guide. Cases of unexplained vertigo, dizziness or disequilibrium with no definitive diagnosis are generally not recommended for aeromedical waiver due to inability to accurately assess future recurrence risk.

AIMWITS search in Mar 2022 revealed a total of 316 aviators with the diagnosis of vertigo. A total of 128 were disqualified. Breakdown of the number of waivers and number of total cases are tabulated below. The diagnosis of vertigo was a factor is all 128 disqualified cases.

Please use only *these* ICD-10 codes for AIMWTS coding purposes	(# of waivers / total # of cases)				
	FC I/IA	FC II	FC III	ATC	GBO
H81.4 (1, 2, 3, 9) Vertigo of central origin	4/10	89/123	38/75	14/25	4/8
H81.0 (1, 2, 3, 9) Ménière's Disease					
H81.39 (1, 2, 3, 9) Other peripheral vertigo					
H81.13 (1, 2, 3, 9) Benign paroxysmal positional vertigo					
H81.2 (1, 2, 3, 9) Vestibular neuronitis					
H81.31 (1, 2, 3, 9) Aural vertigo, unspecified ear					
H83.0 (1, 2, 3, 9) Labyrinthitis					
H83.1 (1, 2, 3, 9) Labyrinthine fistula					
H83.8X9 Superior Semicircular Canal Dehiscence					
A88.1Epidemic vertigo					

IV. Suggested Readings

1. Furman JM and Barton JSS. Evaluation of the patient with vertigo. UpToDate, Feb 11, 2020.
2. Furman JM. Causes of vertigo. UpToDate, Mar 23, 2021.
3. Branch WT and Barton JJS. Approach to the patient with dizziness. UpToDate, Feb 11, 2020.
4. Barton JSS. Benign paroxysmal positional vertigo. UpToDate, Feb 28, 2022.
5. Moskowitz HS and Dinces EA. Ménière's disease: Evaluation, diagnosis, and management. UpToDate, Oct 18, 2021.
6. Furman JM. Vestibular neuritis and labyrinthitis. UpToDate, Jul 29, 2020.
7. Robertson CE and Eggers SDZ. Vestibular migraine. UpToDate, Sep 8, 2021.
8. Fife TD. Dizziness in the outpatient care setting. Continuum (Minneap Minn) 2017; 23(2):359-395.
9. Bhattacharyya N, Gubbels SP, Schwartz SR, Edlow JA, El-Kashlan H, Fife T, Holmberg JM, Mahoney K, Hollingsworth DB, Roberts R, Seidman MD, Steiner RW, Do BT, Voelker CC, Waguespack RW, Corrigan MD. Clinical Practice Guideline: Benign Paroxysmal Positional Vertigo (Update). Otolaryngol Head Neck Surg. 2017 Mar;156(3_suppl):S1-S47. doi: 10.1177/0194599816689667. PMID: 28248609.
10. Chen J, Zhang S, Cui K, Liu C. Risk factors for benign paroxysmal positional vertigo recurrence: a systematic review and meta-analysis. J Neurol. 2021 Nov;268(11):4117-4127. doi: 10.1007/s00415-020-10175-0. Epub 2020 Aug 24. PMID: 32839838.
11. Hilton MP, Pinder DK. The Epley (canalith repositioning) manoeuvre for benign paroxysmal positional vertigo. Cochrane Database Syst Rev. 2014 Dec 8;(12):CD003162. doi: 10.1002/14651858.CD003162.pub3. PMID: 25485940.

Aerospace Medicine Waiver Guide

Sinusitis (Rhinosinusitis), Hypertrophic Sinus Tissue, and Nasal Polyps

Revised: Oct 2022
Reviewed: Col David Gregory (RAM), Dr. Max Lee (ACS Waiver Guide Coordinator), Lt Col Brent Feldt (AF/SG Otolaryngology Consultant), and Lt Col Paul Vu (AFMRA Medical Standards Policy Chief)

Significant Changes: Clarification of altitude chamber assessment, updated references, Table 1 clarified for initial training vs trained servicemembers, new format for previous waiver dispositions, for waiver submittal documentation either sinus ostia visualization or CT showing sinus ostia patency is acceptable

I. Waiver Consideration

Episodes of acute viral or bacterial rhinosinusitis requires no waiver but is grounding for flyers until symptom resolution. However, chronic sinusitis resulting in chronic and/or recurrent clinical symptoms or need for surgical intervention is disqualifying for FC I/IA, II, III, and OSF duties. Nasal polyps that result in symptoms which are incompatible with flight or altitude chamber duties are disqualifying for FC I/IA, FC II, FC III, OSF, and SWA duties. In addition, any surgical procedure for sinusitis, polyposis, or hyperplastic tissue is disqualifying for FC I/IA duties. For ATC and GBO, rhinosinusitis and nasal polyps warrant retention consideration if they interfere with daily work duties/military activities or require ongoing otolaryngology follow-up more than annually.

Table 1: Waiver potential for chronic sinusitis, nasal polyps and/or surgery for same

Flying Class (FC)	Condition	Waiver Potential Waiver Authority	ACS Review/ Evaluation[4]
I/IA and II/III/SWA (untrained)	Nasal polyps controlled with nasal steroids and/or approved oral antihistamines.	Yes[1] AFRS/CMO	No
	Chronic sinusitis controlled with nasal steroids and/or approved oral antihistamines.	Maybe[1] AFRS/CMO	No
	Chronic sinusitis, nasal polyps	Maybe[2, 3] AFRS/CMO	No
II/III/SWA (trained)	Nasal polyps controlled with or without nasal steroids and/or approved oral antihistamines.	Yes MAJCOM	No
	Chronic sinusitis controlled with nasal steroids and/or approved oral antihistamines.	Yes[3] MAJCOM	No
	Chronic sinusitis, nasal polyps	Yes[3] MAJCOM	No
ATC/GBO	N/A	N/A	N/A

1. Waiver in any untrained candidate should have at least 12 months of symptoms controlled on medication before waiver consideration.
2. Waiver may be considered if at least 12 months after surgery and symptoms entirely resolved.
3. Altitude chamber evaluation at 8,000 -10,000 ft with rapid decompression is strongly recommended for aircrew in high-performance aircraft. If treated with surgery, altitude chamber ride no earlier than 6 weeks after surgery or when cleared by otolaryngology physician (whichever is later). See Section III.
4. ACS review not required, but can be requested on a case-by-case basis.

II. Information Required for Waiver Submittal

Submit the aeromedical summary (AMS) after the clinical disposition is finalized and the servicemember is stable on appropriate treatments following the best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. Information to include in history:
    a. Complete history of symptoms, to include flying and on the ground, with duration, frequency, exacerbating factors, and treatment.
2. Otolaryngology consultation and operative reports from all treating providers.
3. Current physical examination findings, specifically HEENT documentation of sinus ostia or CT scan of the sinuses with documentation reflecting status of sinus ostia patency.

4. Altitude chamber assessment for aircrews in high performance aircraft. (For aircrew in non-high performance aircraft, report functional assessment in a non-high performance or commercial pressurized aircraft.)
5. Form FL4 with return to duty and ALC status, if applicable.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Updated AMS with interval history.
2. Current physical examination findings, specifically HEENT.
3. Otolaryngology and/or allergy consultation (if symptoms have recurred).

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Inflammation of the nose and paranasal sinuses mucosal tissue is called rhinosinusitis. Symptoms lasting longer than three months are classified as chronic rhinosinusitis (CRS). The four significant signs/symptoms of CRS include anterior and/or posterior nasal mucopurulent drainage, nasal obstruction/congestion, facial pain/pressure/fullness, and reduction/loss of sense of smell. Although not all four symptoms may be present, higher number of classic symptoms increases the likelihood of CSR diagnosis. Acute and chronic sinusitis and nasal polyps may only be minimally symptomatic at ground level. However, changes in atmospheric pressure, as seen in the flying and diving operations, may cause barotraumatic sinusitis, sinus "block" or "squeeze," resulting in sudden, incapacitating pain. These symptoms in aviators normally occur on descent, but may also occur less frequently on ascent. According to Boyle's law, when there is an increase in pressure (descent), there is a decrease in volume of gas in a closed space such as the sinus cavity. When negative pressure occurs in an enclosed space such as an obstructed sinus-nasal cavity, there is an expansion of mucosal vasculature, with subsequent edema and hemorrhage as the mucosa is torn from the bony structure of the sinus. Should that event occur immediately prior to or during landing procedures, it could lead to sudden painful distraction and potential incapacitation leading to an aircraft mishap.

As temperature, humidity, particulate matter, and barometric pressures can significantly influence sinus mucosal tissue, the aviator should not fly until sinus symptoms have resolved. There is no quick test to ensure the osteomeatal complex is patent; being able to Valsalva does not ensure aeration of the sinus cavities. One method of ensuring patency after treatment is to expose the aviator to an altitude chamber profile of 8,000 -10,000 feet. Another option in operating locations without an altitude chamber would be visualizing the patent ostia of the affected sinuses or computed tomography (CT) imaging demonstrating patency. The Air Force SG Otolaryngology consultant recommends functional assessments with the altitude chamber evaluation for aircrew in high performance aircraft. For flyers and operators in non-high performance aircraft, a commercial or military pressurized flight without symptoms along with anatomical assessment (visualization or CT) is appropriate. A referral to a rhinologist may be indicated for complex or recalcitrant cases.

Medications used for management of chronic sinus disease must be carefully assessed for compatibility with aviation duties. Oral steroids can be used in the peri-operative period in setting of sinonasal polyposis while nasal steroids are acceptable for flying duties without waiver only for mild allergic rhinitis. Biologic agents/monoclonal antibodies (e.g. dupilumab), may be considered on a case-by-case basis for refractive disease when other therapies have failed. Intranasal and sinus saline rinses can be used for prevention and treatment without grounding, but the underlying need for their use must be considered before clearing the aviator to fly.

AIMWTS search from Jun 2018 to Jun 2022 revealed 311 cases with the diagnosis of nasal polyps, chronic sinusitis, and/or sinus surgeries. Breakdown of the number of waivers and number of total cases are tabulated below.

ICD 10 Codes for Sinusitis, Nasal Polyps, and Surgery		(# of waivers / total # of cases)				
		IFC I/IA	FC II	FC III	GBO	ATC
J32.9	Chronic sinusitis, unspecified	36/40	162/166	82/93	7/8	4/4
J33.9	Nasal polyp, unspecified					
09CP4ZZ	Extirpation of Matter from Accessory Sinus, Percutaneous Endoscopic Approach					

IV. Suggested Readings

1. Patel, Z., Acute sinusitis and rhinosinusitis in adults: Clinical Manifestations and diagnosis. UpToDate. July 2021. Accessed Aug 4, 2022. https://www.uptodate.com/contents/acute-sinusitis-and-rhinosinusitis-in-adults-clinical-manifestations-and-diagnosis

2. Hamilos, D., Chronic rhinosinusitis: Clinical manifestations, pathophysiology, and diagnosis. UpToDate. May 2022. Accessed Aug 4, 2022. https://www.uptodate.com/contents/chronic-rhinosinusitis-clinical-manifestations-pathophysiology-and-diagnosis

3. Rosenfeld, R., Clinical Practice Guideline: Adult Sinusitis. Entnet.org. April 2015. https://journals.sagepub.com/doi/full/10.1177/0194599815572097

4. Andrew G Boston, MC USAF, K Christopher McMains, MC FS USAR, Philip G Chen, MD, Erik K Weitzel, MC USAF, Algorithm for Management of the Refractive Aerosinusitis Patient, *Military Medicine*, Volume 183, Issue 7-8, July-August 2018, Pages e246–e250, https://doi.org/10.1093/milmed/usx222

5. Weitzel, E. K., McMains, K. C., Rajapaksa, S., & Wormald, P. J. (2008). Aerosinusitis: pathophysiology, prophylaxis, and management in passengers and aircrew. *Aviation, space, and environmental medicine*, *79*(1), 50–53. https://doi.org/10.3357/asem.2203.2008

Aerospace Medicine Waiver Guide

Salivary Gland Disorders

Revised: Sep 2022
Reviewed: Dr. Max Lee (ACS Waiver Guide Coordinator), Lt Col Brent Feldt (AF/SG Otolaryngology Consultant)

Significant Changes: Content and references updates, new format for previous waiver dispositions

I. Waiver Consideration

Recurrent obstructive calculi of the salivary glands or ducts and salivary fistulae are disqualifying for flying classes I/IA, II, and III duties. Other disorders of the head and neck should prompt line-item review of the latest MSD, as several conditions are also disqualifying for ATC, GBO, and SWA duty. Malignancies in the head and neck of any kind, except basal cell and squamous cell carcinomas without sequelae, are disqualifying for flying and special operational duties and for retention. Generally, benign tumors are considered disqualifying only if they interfere with the function or ability to wear required life support equipment or if they are likely to enlarge or be subjected to trauma during routine military service or have high malignant transformation potential. Benign tumors may require I-RILO if the condition is not remediable or ongoing specialty care is required more than annually.

Chronic systemic conditions, which may involve salivary gland structures or function, are addressed under the specific condition identified (e.g., Sjögren's Syndrome, Diabetes Mellitus, and Sarcoidosis Waiver Guides). If applicable, I-RILO should be processed with FL-4 reflecting return-to-duty status uploaded to AIMWTS prior to AMS submission. Due to the relative infrequency of salivary gland disorders in the flying population and wide variability, a case-by-case approach to waiver consideration is recommended.

Table 1. Waiver Considerations for Salivary Gland Disorders

Flying Class (FC)	Disqualifying Condition	Waiver Potential Waiver Authority	ACS Review/Eval
FC I/IA, and Initial II/III	Recurrent salivary stones	Maybe[1] AFRS/CMO	No
	Salivary fistula	Maybe[1] AFRS/CMO	No
	Impaired speech, mastication, or condition which precludes wear of life support equipment	Unlikely AFRS/CMO	No
	Benign tumor	Maybe[1] AFRS/CMO	Yes
	Malignant tumor	Maybe[2] AFRS/CMO	At the discretion of the waiver authority
FC II/III	Recurrent salivary stones	Yes MAJCOM	No
	Salivary fistula	Yes MAJCOM	No
	Impaired speech, mastication, or condition which precludes wear of life support equipment	Unlikely MAJCOM	No
	Benign tumor	Yes[1] MAJCOM	Yes
	Malignant tumor	Maybe[3] AFMRA	Yes
GBO/ATC OSF/SWA	Recurrent salivary stones	N/A	N/A
	Salivary fistula	N/A	N/A
	Impaired speech, mastication, or condition which precludes wear of life support equipment	Unlikely MAJCOM	No
	Benign tumor	Yes[1] MAJCOM	Yes
	Malignant tumor	Maybe[3] AFMRA	Yes

1.Consideration for waiver is dependent upon severity of presentation, any associated complications, and/or frequency of recurrence.
2.Waiver consideration requires at least 6 months waiting period from completion of treatment (3 months if excision only required) and is dependent on tumor type, staging, complications, and likelihood of recurrence.
3. May consider waiver for certain tumors that have a good prognosis on a case-by-case basis.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. The AMS for waiver of **recurrent salivary stones or fistula** should include:
1. History, physical (thorough head and neck examination), medical evaluation, and treatment for all episodes; to include complete description of presenting symptoms.
2. Reports of all laboratory and imaging studies obtained.
3. Otolaryngology/OMF consultation; with specific reference to likelihood of recurrence.
4. Statement regarding ability to speak clearly and to adequately fit aviator oxygen mask and other required life support equipment.
5. All operative and/or procedure notes related to the condition.

B. The AMS for waiver for **impaired speech or mastication or other condition which precludes wear of life support equipment** should include:

1. History, physical (thorough head and neck examination), medical evaluation, and treatment; to include complete description of presenting symptoms.
2. Reports of all laboratory and imaging studies obtained.
3. Otolaryngology/OMF consultation reports.
4. Statement regarding ability to speak clearly and to adequately fit aviator oxygen mask and other required life support equipment.
5. All operative and/or procedure notes related to the condition, if applicable.

C. The AMS for a waiver for a **benign salivary gland tumor** should include:
1. History, physical (thorough head and neck examination), medical evaluation, and treatment; to include complete description of presenting symptoms and any residual symptoms after treatment.
2. Reports of all laboratory and imaging studies obtained.
3. All operative and/or procedure notes related to the condition.
4. Histology report. (For rare cell types, Joint Pathology Center report required).
5. Otolaryngology/OMF consultation; with specific reference to likelihood of recurrence and/or malignant transformation and need for on-going surveillance.
6. Statement regarding ability to speak clearly and to adequately fit aviator oxygen mask and other required life support equipment.
7. MEB results, if applicable.

D. The AMS for a waiver for a **malignant salivary gland tumor** should include:
1. History, physical (thorough head and neck examination), medical evaluation and treatment; to include complete description of presenting symptoms any residual symptoms after treatment.
2. Reports of all laboratory and imaging studies obtained.
3. All operative and/or procedure notes related to the condition.
4. Histology report (Joint Pathology Center report required).

5. Otolaryngology/OMF and oncology consultation; with specific reference to likelihood of local recurrence or metastasis and detailed description of recommended surveillance regimen.
6. Statement regarding ability to speak clearly and to adequately fit aviator oxygen mask and other required life support equipment.
7. MEB results.
8. Tumor board results.

Note: For any of the above listed conditions, specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package

III. Aeromedical Concerns

Most salivary gland disorders would generally not be considered to pose an immediate risk to flight, at least relative to the risk for sudden incapacitation in flight from a known or yet to be diagnosed condition. Certainly, a salivary stone may cause pain during aviation and operational duties but this does not generally produce incapacitating levels of discomfort such as those associated with other stone migration events such as renal colic. As such, most aeromedical concerns relate to the identification of conditions that might interfere with clear speech, wear of the oxygen mask, or require acute medical intervention such as antibiotic or anti-inflammatory medication use.

A query of AIMWTS through July 2022 revealed a total of 12 aviator waiver requests for salivary gland disorders. All received an aeromedical waiver. The breakdown of the number of waivers and number of total cases are tabulated below.

ICD-10 Code **Salivary Gland Conditions and Neoplasms**		(# of waivers / total # of cases)			
		IFC I/IA	FC II	FC III	GBO
K11.5	Sialolithiasis	1/1	9/9	1/1	1/1
K11.6	Mucocele of salivary gland				
K11.7	Disturbance of salivary secretion				
K11.8	Other diseases of the salivary glands				
M35.00	Sicca syndrome, unspecified				
Q38.4	Congenital malformations of salivary glands and ducts				
C07	Malignant neoplasm of parotid gland				
C08.0	Malignant neoplasm of submandibular gland				
C08.1	Malignant neoplasms of sublingual gland				
C08.9	Malignant neoplasm of major salivary gland, unspecified				
D11.9	Benign neoplasm of major salivary gland, unspecified				
D00.0	Carcinoma in situ of lip, oral cavity, and pharynx				
235.0	Neoplasm of uncertain behavior of major salivary glands, unspecified				

IV. Suggested Readings

1. Wilson DF, Meier JD, and Ward PD. Salivary Gland Disorders. Am Fam Physician, 2014; 89(6): 882-88. https://www.aafp.org/pubs/afp/issues/2014/0601/p882.html

2. Fazio SB and Emerick K. Salivary gland stones. UpToDate. Apr 20, 2021. Accessed Jul 25, 2022. https://www.uptodate.com/contents/salivary-gland-stones

3. Laurie SA. Salivary gland tumors: Epidemiology, diagnosis, evaluation, and staging. UpToDate. Apr 14, 2022. Accessed Jul 25, 2022. https://www.uptodate.com/contents/salivary-gland-tumors-epidemiology-diagnosis-evaluation-and-staging

4. American Academy of Otolaryngology-Head and Neck Surgery. Clinical Practice Guideline: Evaluation of the Neck Mass in Adults. Sept 10, 2017. Accessed Jul 25 2022. https://www.entnet.org/quality-practice/quality-products/clinical-practice-guidelines/evaluation-of-the-neck-mass-in-adults/

Vestibular Schwannoma (Acoustic Neuroma) (Mar 2020)
Reviewed: Dr. Roger Hesselbrock (ACS Neurologist), Dr. Dan Van Syoc (ACS Waiver Guide Coordinator), Lt Col Wesley Abadie (AF/SG Otolaryngology Consultant) and Lt Col David Gregory (AFMSA Physical Standards Development Chief)

Significant Changes:
Updated Table 1 and References

I. Waiver Consideration

Vestibular Schwannoma (VS) is addressed in the USAF Medical Standards Directory (MSD) as "acoustic neuroma" and as "intracranial, meningeal, or other neurologic benign or malignant neoplasm". Newly-diagnosed VS is disqualifying for FC I/IA, II (as well as initial FC II), III, and for retention. VS are benign, slow-growing neoplasms that produce clinical symptoms primarily from local compression. Symptoms are often gradually progressive but may be insidious, with the potential for sudden development of symptoms. For aeromedical waiver consideration, the tumor must be unilateral, and there must be complete resolution of symptoms post-treatment. For aviators in high performance aircraft, in-flight or centrifuge testing should be strongly considered, to validate vestibular reserve is adequate to maintain awareness during maneuvers without sequelae. Any residual cranial nerve deficits should allow adequate communication, full ocular movements without tracking deficits or strabismus, and permit acceptable protective mask sealing. Confirmation of tumor pathology is needed with surgical cases, and surveillance MRI scanning is needed in cases treated non-invasively, to ensure stability and monitor for any growth. A history of previously-treated VS is not disqualifying for ATC, SWA and GBO personnel (except for initial RPA operators).

Table 1: Waiver potential for vestibular schwannoma

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	No	AETC	No
FC II/III	Yes[1]	MAJCOM	Yes
GBO/ATC/SWA	Yes[1,2]	MAJCOM	Yes[2]

1. If treated surgically or with radiation, minimum 6 month observation following definitive treatment, with no aeromedically-significant symptoms
2. History of VS is not disqualifying for GBO (except initial RPA operators), SWA, and ATC personnel.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed, all appropriate treatments have been initiated using best current clinical guidelines and recommendations, and the member is clinically stable.

A. Initial Waiver Request:

1. History – symptoms, hearing exams prior to treatment, treatment course, post-surgical vertigo symptoms, and confirmed resolution of vestibular symptoms.
2. Current Otolaryngology evaluation, ocular and neurologic examination findings.
3. Current audiogram results.

4. Vestibular function testing results, which may include electronystagmography (ENG, VNG and calorics), and computerized dynamic posturography (CDP) testing.
5. Reports of consultations, surgical procedures, pathology reports or radiation therapy treatment reports, as applicable. For complex or undiagnosed cases, strongly consider obtaining formal Neuro-Otology consultation through SAMMC, WRNMMC, or an academic medical center.
6. Reports and images from any imaging studies, pre- and post-treatment.
7. Tumor board report as applicable.
8. Medical Evaluation Board results as applicable.
9. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

B. Renewal Waiver Request:

1. Interval history and level of symptom resolution.
2. Copies of any applicable interim specialty reports, labs, imaging reports and images.
3. Copy of current audiogram.
4. Current physical, otolaryngology and neurologic examination findings.
5. If the local base cannot provide any of the above listed information, they should document why, explaining reasoning to waiver authority.

C. **Aeromedical Concerns**

Aeromedical concerns include the effects of any residual symptoms on operational safety and mission effectiveness, future risk of new symptom development, and future risk of recurrence. Symptoms associated with VS are typically attributed to compression of associated cranial nerves (VIII, VII, IV, IX, X), cerebellar compression, and ultimately restricted CSF flow and hydrocephalus or brainstem compression. Tumors are unilateral in over 90 percent of cases. Bilateral VS is pathognomonic of the autosomal dominant genetic disorder neurofibromatosis type 2 (NF-2). The acoustic portion of VIII is involved in almost all cases, with the vestibular, trigeminal and facial nerves involved less frequently. Any aviator with asymmetric hearing loss, especially if progressive, should be screened for VS, as many VS are discovered after observing changes in annual audiograms. Cochlear and vestibular symptoms are of obvious importance to the aviator. Hearing loss and tinnitus can adversely impact communications, while vertigo and disequilibrium can adversely affect the ability to safely control an aircraft. Observation is a reasonable option with small, intracanicular tumors. Surveillance by follow up MRI scanning at 6 months, and then annually is reasonable. However, due to the wide range of progressive and potentially abrupt symptomatology, conservative observational management may be incompatible with the safe performance of aviation-related duties in some cases. In surgically treated patients, complete tumor removal can be accomplished in most cases, with minimal recurrence risk. Worsening of vestibular symptoms is commonly seen following surgical removal, but typically resolves by neurologic compensation with time and rehabilitation. The risk of cerebrospinal fluid leak is variable depending on type of surgery, but is between 6-11% and may require revision surgery or lumbar drainage to resolve. As opposed to total removal of the tumor with conventional

surgery, stereotactic radiation treatment is intended to stop tumor growth. In such cases, post-radiotherapy surveillance is necessary to ensure continued control over time. Delayed and slow responses are typical with stereotactic radiosurgery. Some tumors fail to respond to radiation and continue to grow, or are controlled initially, but resume growth over time. All post-operative or post-radiation vestibular symptoms require sustained documentation of compensation over time (e.g. radiation effects may manifest 18-24 months after irradiation) prior to waiver consideration, and any hearing loss needs to be stabilized and well documented by competent audiology services. An in-flight hearing evaluation may be required prior to clearing an aviator for flying duties. A good online resource is the Acoustic Neuroma Association site at www.anausa.org which provides up-to-date information for patients and clinicians regarding this condition.

A review of AIMWTS through Mar 2019 revealed 35 cases. Breakdown of these cases revealed: 1 FC I/IA cases, 21 FC II cases, 1 RPA pilot case, and 12 FC III cases (4 disqualified)

ICD-9 Codes for Vestibular Schwannoma	
225.1	Benign Neoplasm of Cranial Nerves
388.5	Disorders of Acoustic Nerve

ICD-10 Codes for Vestibular Schwannoma	
D33.3 1, 2, 3, 9	Benign Neoplasm of Cranial Nerves
H93.3X 1, 2, 3, 9	Disorders of Acoustic Nerve

IV. Suggested Readings

1. Evans DG. Neurofibromatosis type 2. UpToDate, Feb 14, 2020.

2. Park JK, Vernick DM, Ramakrishna N. Vestibular schwannoma (acoustic neuroma). UpToDate, Mar 25, 2019.

3. Yohay K, Bergner A. Schwannomatosis. UpToDate, Feb 19, 2019.

4. Carlson ML et al. The changing landscape of vestibular schwannoma management in the United States – a shift toward conservatism. Otolaryngol Head Neck Surg 2015; 153(3):440-446.

5. Ropper AH, Samuels MA, Klein JP (Ed). Dizziness, deafness and disorders of equilibrium. *Adams and Victor's Principles of Neurology, Tenth Edition, McGraw-Hill Education*, 2014:290-316.

6. Ropper AH, Samuels MA, Klein JP (Ed). Intracranial neoplasms and paraneoplastic disorders. *Adams and Victor's Principles of Neurology, Tenth Edition, McGraw-Hill Education*, 2014:639-696.

7. Casto KL and Choo TH. In-flight speech intelligibility evaluation of a service member with sensorineural hearing loss: a case report. Military Med 2012; 17 (9):1114-1116.

8. Kondziolka D, Mousavi SH, Kano H, et al. The newly diagnosed vestibular schwannoma: radiosurgery, resection, or observation? Neurosurg Focus 2012; 33(3):E8.

9. Packer MD, Welling DB. Vestibular Schwannoma. Ch. 38 in *Surgery of the Ear*, 6th edition. B.C. Decker Inc., Editors Michael E. Glasscock, Julianna Gulya, Lloyd B. Minor and Dennis S. Poe, 2010.

10. Weber DC, Chan AW, Bussiere MR, et al. Proton beam radiosurgery for vestibular schwannoma: tumor control and cranial nerve toxicity. Neurosurgery 2003; 53:577-588.

Mental Health Waiver Guide Checklist

Revised: Dec 2024
Reviewed: Maj Henrik Close (ACS Neuropsychiatry Deputy Branch Chief), Col Kevin Heacock (FECA Branch Chief), Lt Col John Smith (AFMS Medical Standards Policy Chief), and ACS Neuropsychiatry Team

Significant Changes: Updated requirement that all flyers be evaluated by licensed psychologists or psychiatrists for waiver consideration.

I. Waiver Consideration

When assessing aviators facing mental health challenges, it is crucial to employ sound clinical judgment and discernment. In instances where flight safety is in doubt, immediate removal from flying duties is necessary until thorough evaluation and risk assessment are conducted. If further mental health assessment is needed, it should be carried out promptly and may be done without grounding the aviator if flight safety can be assured.

Collaborative decisions involving flight medicine and mental health professionals are essential. Based on 2024 mishap report recommendations, AFMED advises licensed psychologists and/or psychiatrists with aeromedical experience shall perform waiver evaluations. **Mental health evaluation and treatment are imperative for flyers with psychiatric symptoms.** Return to flying duties without waiver is possible if no Diagnostic and Statistical Manual of Mental Disorders (DSM) diagnosis with impairment or safety risk is identified. However, if a DSM F-Prefix mental health diagnosis is established, associated impairment is implied, leading to disqualification per the Medical Standards Directory (MSD). In such cases, the appropriate waiver guide should be followed.

For flyers recovering from a disqualifying DSM diagnosis, first line, evidence-based, well-established, and standard of care treatments should be prescribed. Such treatment with strong documentation and leadership support contributes to a swift return to full duties, often without an in-person ACS evaluation.

Like many other medical diagnoses, a **period of clinical stability** is required for waiver consideration of mental health diagnoses. **Clinical stability** is reached when the aviator's Mental Health Provider (MHP) determines the symptoms of the diagnosis are no longer causing clinically significant distress or impairment and the aviator demonstrates adequate function in social, occupational, and other important areas of life. Once **clinical stability** is reached, treatment adjustments can still be made, including medication changes, without restarting the **period of clinical stability** (please refer to associated waiver guide).

Per diagnosis, different **periods of clinical stability** are recommended prior to requesting a waiver (please see individual waiver guides for periods of stability needed for untrained assets):

- **Discretion of Flight Surgeon**—PTSD, Adjustment Disorders, and Other Conditions that May Be a Focus of Clinical Attention requiring waiver (these diagnoses represent the majority of cases)
- **6 Months**—Depressive Disorders, Anxiety Disorders, Obsessive-Compulsive Disorders (OCD), and Suicidal Behavior
- **12 Months**—Psychotic Disorders, Somatic Symptom and Related Disorders, and Eating Disorders
- For aviators with any other psychiatric disorder, please refer to DAFMAN 48-123, Medical Standards Directory (MSD) Section Q: Psychiatry and Mental Health, and relevant USAF Aerospace Medicine Waiver Guide chapters

Optimal Cases with Comprehensive Care and Results: Waivers may be considered with less than the recommended period of clinical stability in optimal cases where comprehensive mental health care has been provided, impairing symptoms are resolved, causative stressors are well understood and managed, treatment results are maintained through risk mitigation strategies, and close follow-up with flight medicine and mental health providers is ongoing. *Comprehensive mental health care is defined by:* management of the condition by a mental health provider, evidence of healthy lifestyle interventions, self-care, and resilience-building, psychotherapy, and/or psychotropic medications. Regular follow-up evaluations with flight medicine and mental health providers are crucial to ensure the flyer's recovery is progressing and stability is maintained over time. **Such optimal care can potentially lead to a waiver with less than the recommended period of clinical stability following an ACS review.**

II: Information Required for Waiver Submittal

- Submit waiver package **30 days BEFORE** the recommended p**eriod of clinical stability** (as outlined above) is reached to ensure the aviator is evaluated as close to their waiver eligibility as possible.
- Provide **complete documentation**. Waiver Package should include a PDF of all Mental Health notes in chronological order.
- If the aviator is **Guard** or **Reserve** and has difficulty accomplishing a required item, please note this in the AeroMedical Summary (AMS).
- A well-written and complete evaluation following the waiver guide's template for mental health evaluations improves the chance for an aeromedical disposition with no need for an in-person TDY to ACS for evaluation.
- All items are needed for both initial and renewal waiver requests.

1. Mental Health Evaluation (MHE) – within 1 month of submission – See MHE Template
- To be accomplished near the end of the period of clinical stability as above.
- Aviators shall be evaluated by a licensed psychologist or psychiatrist to meet criteria for waiver with preference for a **psychiatrist** if the aviator is on **psychotropic medication.**

2. Flight Surgeon's AeroMedical Summary (AMS) – See AMS Template
- Utilize the Mental Health Evaluation, and summarize the Flight Surgeon's interview of aviator, Commander's Endorsement Letter, and collateral information (supervisor, spouse, etc.).

3. ALL Past Mental Health (MH) and Pertinent Medical Records

- Military **AND** Civilian records are required (MH records behind "break glass" are needed).
- Records to submit: outpatient, inpatient, partial hospitalization, intensive outpatient, ADAPT, FAP, detox/rehab, pre-military if relevant (child mental health care).
- Flyers can request their own records from off base providers or authorize their release utilizing the **Authorization Form** below.

4. Commander's Endorsement Letter

- A memo from the aviator's commander supporting their request for waiver and providing insight into the aviator's ability to function effectively at work is very helpful. This should include any administrative discipline, especially if it involved operationally grounding the flyer. There is no template for this because the commander's own words are most valuable.

5. All Pertinent Labs

- Alcohol Use Disorder cases require at least 2 unannounced **Carbohydrate-Deficient Transferrin (CDT)** studies to demonstrate abstinence**. Phosphatidylethanol (PEth)** studies may be utilized **in conjunction with** CDT studies at flight surgeon's discretion.

6. Copy of Abstinence Letter - for Alcohol Use Disorder cases.

Please feel free to contact the ACS Neuropsychiatry Branch with questions:

ACS Aerospace Medicine Branch, USAFSAM/FECA
c/o Neuropsychiatry Branch
2510 Fifth Street Bldg 840
Wright Patterson AFB, OH 45433-7913
USAFSAM.FE.PsychiatryMailbox@us.af.mil

Phone: (937) 938-2768 DSN: 798-2768
Fax: (937) 904-8753 DSN: 674-8753

Mental Health Evaluation for Aeromedical Summary

- This is not just a summary of previous notes.
- This is an in-person evaluation performed by a licensed psychologist or psychiatrist to meet criteria for waiver with preference for a **psychiatrist** if the individual is taking a **psychotropic medication.**
- The Mental Health Evaluation should be documented in the medical record.

1. Date symptoms started. Why then? Comment on context and etiology.
2. Initial symptoms and symptoms at their worst.
3. How symptoms impacted military and/or flight duties.
4. Date and circumstances of presentation (self-referral, CDE, threatened divorce, etc.).
5. Type and length of treatment:
    a. **Healthy Lifestyle Interventions**
        i. Premorbid
        ii. Learned and utilized during treatment
        iii. Current utilization for coping and resilience
    b. **Psychotherapy**
        i. Name of Provider (psychologist, social worker)
        ii. Type of therapy (CBT, PE, EMDR, etc.), focus, and core issues
        iii. Total number of sessions from when to when
    c. **Medication**
        i. Name of Provider (psychiatrist, PCM, FS, PMHNP, PA)
        ii. Medication(s) prescribed, impact, compliance, side effects, and dates
        iii. Past and Current medications
6. Date individual returned to **clinical stability** – even if still receiving ongoing medication or psychotherapy. Comment on when patient's impairing symptoms resolved and need for ongoing treatment.
7. Changes in **screening measures** (PHQ-9, GAD-7, PCL-5, etc.) and psychological testing with RAW DATA and interpretation, if administered.
8. Review of systems, past medical history, past psychiatric history, family psychiatric history, appropriate developmental history, social history, and substance use (caffeine, smoking, alcohol, etc.).
9. Current mental status, level of function at work, in military environment, with family, in personal life, and ability to perform under stress and in occupational setting.
10. Comment on member's awareness, insight, new skills obtained and used, coping ability, and successes. Comment on how individual tolerated past and recent stressors (indications of resilience).
11. **Diagnosis(es)** supported by criteria in most recent addition of the Diagnostic and Statistical Manual of Mental Disorders (DSM). Unless the evaluator's opinion is the member has never had a mental health diagnosis the findings of **"No Current Diagnosis"** or **"No Diagnosis"** should not be utilized. A thoughtful risk assessment requires consideration and acknowledgment of **ALL** prior and current mental health diagnoses **PLUS** resolution/remission vs. ongoing symptoms.
12. Estimated **risk of recurrence**, based on diagnosis, patient's history, and evaluator's experience.
13. **Motivation** to return to operational duties.

Flight Surgeon's AMS Template for Mental Health Waiver

- Much of this can be transcribed from the Mental Health Evaluation but be sure to include your own thoughts from an aeromedical perspective that the MH Provider may not have.

1. Summary of presentation, course of illness, and treatment.
2. How did symptoms impact military and/or flight duties?
3. Date and circumstances of presentation (self-referral, command-directed, spouse threatened divorce, etc.), and initial mental health treatment.
4. Type and length of treatment.
5. Date individual returned to **clinical stability** – even if still receiving ongoing medication(s) or psychotherapy. Comment on when the impairing symptoms resolved and if there is a need for ongoing treatment.
6. Current mental status, level of function at work, in military environment, in family, in personal life, ability to perform under stress and **capacity to function in stressful occupational settings.** Comment on member's awareness, insight, new skills obtained and used, coping ability, and successes. Comment on how member tolerated past and recent stressors (indications of resilience).
7. **Diagnosis(es)** supported by criteria in most recent addition of the Diagnostic and Statistical Manual of Mental Disorders (DSM). Unless the evaluator's opinion is the member has never had a mental health diagnosis the findings of **"No Current Diagnosis"** or **"No Diagnosis"** should not be utilized. A thoughtful risk assessment requires consideration and acknowledgment of **ALL** prior and current mental health diagnoses **PLUS** resolution/remission vs. ongoing symptoms.
8. Estimated risk of recurrence, based on diagnosis, patient's history, and Flight Surgeon's experience. Comment on ability, stability, and motivation to fly (or special duty).
9. Discuss Command support.
10. Estimated aeromedical risk if individual is returned to full duty. Address the following:
    a. **Risk of sudden incapacitation**
    b. **Risk of subtle performance decrement**
    c. **Stability under stress (physiological or emotional)**
    d. **Possibility of progression or recurrence**
    e. **Need for exotic tests**
    f. **Compatibility to perform sustained flight operations in austere environments**
11. Flight Surgeon's **endorsement**, **consultative question(s)**, and **final recommendations**.

Aerospace Medicine Waiver Guide

Adjustment Disorder and Other Trauma or Stressor Related Disorder

Revised: Dec 2024

Reviewed: Maj Henrik Close (ACS Neuropsychiatry Deputy Branch Chief), Col Kevin F. Heacock (ACS Aerospace Medicine Branch Chief), and ACS Neuropsychiatry Team

Significant Changes: Updated format, some content updates including med management

I. Waiver Consideration

Adjustment Disorders that interfere with the safety of flight are disqualifying for all flying classes. If there are any functional limitations or the Adjustment Disorder lasts greater than 60 days after treatment initiation, a waiver is required. If the diagnostic criteria for Adjustment Disorder in the most recent edition of the DSM are met, then aviators should be placed on DNIF status until the disturbance is resolved. If the disorder resolves within 60 days, the aviator is placed back on flying status and no waiver is required. If the disorder persists beyond 60 days, or results in a level of care higher than weekly outpatient treatment (inpatient hospitalization, partial hospitalization (PHP), intensive outpatient program (IOP)), this signals a higher level of risk, disqualifying the aviator, and a waiver is required. An evaluation by a qualified mental health professional is required prior to waiver consideration. There is no mandated recovery period before waiver application, except a one-year period after resolution for FC I/IA applicants and other untrained aircrew applicants. The period of remission for trained aircrew should be of such length that the flight surgeon and mental health provider have confidence the aviator will not suffer a clinically significant recurrence.

Adjustment Disorders do not usually require medication and often improve with psychotherapy and the resolution of the life stressors that caused to the disorder. However, should they be used, the USAF began allowing waivers for flyers taking aeromedically approved antidepressants in 2013. The most recent list of aeromedically approved antidepressants can be found on the Official Air Force Aerospace Medicine Approved Medications list on the Flight Medicine/Medical Standards page on the Knowledge Exchange (Kx). At the time of this update, aeromedically-approved antidepressants include:

1. Sertraline (Zoloft®) up to 200 mg/day
2. Fluoxetine (Prozac®) up to 80 mg/day
3. Citalopram (Celexa®) up to 40 mg/day
4. Escitalopram (Lexapro®) up to 20 mg/day
5. Bupropion (Wellbutrin®) SR or XL up to 400 mg/day or 450 mg/day, respectively (NOTE: immediate release Wellbutrin® is NOT aeromedically-approved)

The period of **clinical stability** (i.e., symptoms of the diagnosis are no longer causing clinically significant distress or impairment, and the aviator demonstrates adequate function in social, occupational, and other important areas for functioning) needed before requesting a waiver for an Adjustment Disorder is at the discretion of the flight surgeon and/or mental health provider. If the aviator is prescribed an aeromedically-approved antidepressant, careful consideration should be taken to consider other diagnoses, such as Depressive Disorders or

Anxiety Disorders. These conditions would require the aviator be clinically asymptomatic for several months (per those diagnoses' waiver guides) before waiver would be considered. As long as the aviator's symptoms remain stable, the dose of the medication may be adjusted, or the antidepressant may be switched to maximize treatment and/or limit side effects without restarting this waiting period. If the antidepressant used to treat the aviator is ever adjusted in dose or discontinued, 2 weeks of observation should occur before resuming flight duties to assure no adverse/unexpected side effects or return of symptoms. If the antidepressant used to treat the aviator is changed to another aeromedically-approved antidepressant secondary to side effects or lackluster response, 4 weeks of observation should occur before resuming flight duties to assure no adverse/unexpected side effects or return of symptoms. If symptoms return at any time during treatment, it is recommended a thorough reassessment be conducted and enhancement of the overall treatment plan be considered, to possibly include psychotherapy, healthy lifestyle interventions, and/or antidepressant medication (multimodal treatment is more effective). If the symptoms are occupationally impairing, aviators should be placed on DNIF status, **clinical stability** will need to be restored, and the appropriate observational period will need to be established before returning to flight duties.

Waivers are not considered for FCI or other untrained personnel on antidepressants and are limited to trained FCII, FCIII, ATC, GBO, and SWA. MOD personnel may be permitted to perform their duty while on certain psychotropic medications listed on the Approved Space and Missile Operator Medications list, but a waiver is typically required.

Finally, certain psychiatric disorders render an individual unsuited for duty, rather than unfit, and are subject to **administrative separation** (IAW AFI 36-3208, para 3.16, Table 7.5). Adjustment disorders may fall under this provision if there is unsatisfactory duty performance and the member is failing to adjust effectively to the rigors of military service, especially if diagnosed within the first 12 months of a member's military service.

Table 1: Waiver potential for Adjustment Disorder > 60 days

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review
FC I/IA	Yes[1,2]	AFAC/AM	At discretion of AFAC
FC II/III	Yes[1,2]	MAJCOM	At discretion of MAJCOM
ATC/GBO/SWA	Yes[1,2,3]	MAJCOM	At discretion of MAJCOM

1. It is not recommended to consider a waiver until one year after resolution for FC I/IA and untrained aircrew.
2. Waiver is likely if the individual has demonstrated good clinical stability and the Adjustment Disorder has clearly resolved.
3. ATC/GBO/SWA personnel with Adjustment Disorder are evaluated based on how the condition affects their ability to continue performing their assigned duties.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines & recommendations.

A. Initial and Renewal Waiver Requests:

1. See Mental Health Waiver Guide Checklist in Psychiatry Waiver Guide Folder.
2. If the waiver package is referred to the ACS without required items (e.g., recent mental health evaluation, all records including off-base care, commander's support letter, etc.) the case will be returned to the local MTF to provide a complete package.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

Individuals with personal questions should work with their Flight Medicine Clinic.

Flight Surgeons and Mental Health Providers with waiverability questions, please feel free to contact the ACS Neuropsychiatry Branch:

ACS Aerospace Medicine Branch, USAFSAM/FECA
c/o Neuropsychiatry Branch
2510 Fifth Street Bldg 840
Wright Patterson AFB, OH 45433-7913
Fax: (937) 904-6296 DSN: 674-9296

USAFSAM.FE.PsychiatryMailbox@us.af.mil
Comm: 937-938-2768

III. Aeromedical Concerns

Adjustment Disorders are one of the most common psychiatric diagnoses among aviators. These disorders are commonly associated with functional impairment resulting from decreased concentration, depression, anxiety, inattention, decreased working/short-term memory, insomnia, fatigue, temporary changes in social relationships and problems with decision making. These impairments are all incompatible with aviation duties.

Adjustment Disorders occur following the development of clinically significant emotional or behavioral symptoms in response to identifiable psychosocial stressors. They are categorized by DSM-5-TR under Trauma- and Stressor-Related Disorders and likewise are found in the Medical Standards Directory (MSD) grouped with these disqualifying conditions. In Adjustment Disorders, the stressors typically involve financial struggles, medical illness, and/or relationship difficulties. These symptoms are diagnostically significant (distinguishing them from Occupational Problem, Partner Relational Problem, etc.) if the distress is in excess of what would normally be expected from exposure to the stressor or there is associated impairment in social or occupational functioning. Symptoms associated with bereavement following the death of a loved one are not, however, classified as an Adjustment Disorder unless the symptoms are very severe (socially/occupationally impairing) or last longer than expected.

Adjustment Disorder is used in psychiatry, but is more typically seen in primary care settings, often due to aviators avoiding the stigma of mental health care. Delay in adequate treatment can lead to progression of symptoms to a more severe mental health diagnosis. Early interventions with psychotherapy to strengthen coping mechanisms and short-term pharmacotherapy have been shown to promote recovery. Psychotherapeutic treatment of Adjustment Disorder enables reduction of the stressor, enhanced coping with the stressor that cannot be reduced or eliminated, and establishment of a support system to maximize

adaptation. The judicious use of medications to treat specific symptoms associated with Adjustment Disorders, typically antidepressants, may be helpful.

AIMWTS search in Jul 2024 of waivers adjudicated in the past five years (July 2019 – June 2024) revealed a total of 1136 members with an AMS containing the diagnosis of adjustment disorder.

Flying Class	Submitted	Granted	% Granted
FC I/IA	131	98	75%
FC II	286	268	94%
FC III	472	378	80%
ATC	72	49	68%
GBO	100	87	87%
SWA	75	57	76%
TOTAL	**1136**	**937**	**82%**

Please use only *these* ICD-10 codes for AIMWTS coding purposes	
F43.21	Adjustment disorder with depressed mood
F43.22	Adjustment disorder with anxiety
F43.34	Adjustment disorder with mixed anxiety and depressed mood
F43.24	Adjustment disorder with disturbance of conduct
F43.25	Adjustment disorder with mixed disturbance of emotions and conduct
F43.20	Adjustment disorder – unspecified
F43.89	Other reactions to severe stress
F43.9	Reaction to severe stress- unspecified

IV. Suggested Readings

1. Adjustment Disorders. In *Diagnostic and Statistical Manual of Mental Disorders,* Fifth edition, (DSM-5-TR). American Psychiatric Association, Washington, DC, 2013; pp. 319-322.

2. Casey P. Adjustment Disorder: Epidemiology Diagnosis and Treatment. *CNS Drugs*, 2009; 23: 927-938.

3. Gradus J.L. Prevalence and prognosis of stress disorders: A review of the epidemiologic literature. *Clin. Epidemiol.* 2017; **9**: 251.

4. Hameed U, Schwartz TL, Malhotra K, et al. Antidepressant Treatment in the Primary Care Office: Outcomes for Adjustment Disorder Versus Major Depression. *Ann Clin Psychiatry*, 2005; 17: 77-81.

5. Jones DR and Ireland RR. Aeromedical Regulation of Aviators Using Selective Serotonin Reuptake Inhibitors for Depressive Disorders. *Aviat Space Environ Med*, 2004; 75: 461-70.

6. Katzman JW and Tomori O. Adjustment disorders. Ch. 22 in *Kaplan and Sadock's Comprehensive textbook of Psychiatry*, 8th ed. Lippincott, Williams and Wilkins; Philadelphia, 2005.

7. O'Donnell ML, Agathos JA, Metcalf O, Gibson K, Lau W. Adjustment Disorder: Current Developments and Future Directions. *Int J Environ Res Public Health*. 2019 Jul 16;16(14):2537.

8. Stewart JW, Quitkin FM, and Klein DF. The Pharmacotherapy of Minor Depression. *Am J Psychotherapy*, 1992; 46: 23-36.

Aerospace Medicine Waiver Guide

Alcohol Use Disorders

Revised: May 2022

Reviewed: Dr. Terry Correll (Chief of Aerospace Psychiatric Consultation), Dr. Max Lee (Waiver Guide Coordinator), and Maj Paul Vu (AFMRA Medical Standards Policy Chief)

Significant Changes: Updates to aeromedical concerns and potential earlier waiver timelines for flyer/operators successfully engaged in (formerly completed) treatment with associated highly reliable surveillance

I. Waiver Consideration

Alcohol Use Disorders (AUD), whether mild, moderate, or severe, are disqualifying for all classes of flying and special duty in the Department of the Air Force. Only based on a tally of the established criteria, the severity designation does not necessarily correlate with prognosis or course of illness. Consequently, a "mild" AUD may have a worse prognosis/outcome than a "severe" AUD. These disorders have a very high rate of relapse and aeromedical dispositions should be made with great care. Close surveillance is required secondary to high relapse rates. Because of the significant risk of relapse, AUD waivers should be considered yearly to promote close observation for trained assets. Waiver should not exceed a period greater than three years. An "indefinite waiver" or "waiver retirement" is not recommended. Because of the very high number of cases, the majority of aviator waiver recommendations for alcohol-related diagnoses are managed through base and command level interaction. Aeromedical Consultation Service (ACS) review and in-person evaluation is not required, but is available for consultation for complicated cases at the discretion of the waiver authority.

Table 1: Waiver potential for Alcohol Use Disorders.

Flying Class (FC)	Waiver Potential[1]	Waiver Authority[2]	ACS Review or Evaluation
I/IA	Maybe[3]	AMWD	Maybe[4]
All Other Untrained Assets	Maybe[3]	DAFMAN 48-123 Attachment 2	Maybe[4]
MSD Section W AFSCs	Yes	MAJCOM	Maybe[4]
Non MSD Section W AFSCs	Yes	MAJCOM	Maybe[4]

1. All aviators with a history of alcohol use disorders must remain 100% abstinent, provide documentation of successful treatment and after-care follow-up, and must not take any medications for substance misuse.
2. If there are medical complications from substance use disorders (bleeding varices, cirrhosis, hallucinosis, etc.), then an IRILO is required IAW DoDI 6130.03 vol 2
3. There is no formal waiver provision for FC I/IA, initial FC II, and other Untrained Assets. The waiver authority considers waivers on a case-by-case basis.
4. ACS review/consultation is at the discretion of the waiver authority.

In order to be considered for waiver, three conditions must be met:

1) the individual must have successfully engaged in (formerly completed) treatment (defined below) as determined and documented by the MTF Alcohol & Drug Abuse Prevention & Treatment (ADAPT) program treatment team

2) the individual must be compliant (fully engaged) with post-treatment aftercare program requirements (also defined below), and
3) the individual must have a positive attitude and unqualified acknowledgement of his/her AUD.

Flight surgeon participation in both the ADAPT treatment team meetings and aftercare follow up is required.

Treatment Program Requirements: Individuals will have successfully completed treatment when the following conditions are met:

1) The flyer/operator meet the current Diagnostic and Statistical Manual of Mental Disorders (DSM) criteria for early remission of AUD (not meeting any AUD criteria for more than three months but less than 12 months, excluding craving. Sustained remission is defined as not meeting any AUD criteria for more than 12 months, excluding craving), and
2) The treatment team determines, based on DSM criteria, that the individual shows progress towards agreed-upon goals and/or issues as stated in the treatment plan, and
3) The flyer/operator remain 100% abstinent of alcohol without the need for AUD medication.

Post-treatment Aftercare Program Requirements: The individual must

1) Remain 100% abstinent of alcohol without the need for AUD medications, and
2) Documented participation in an organized alcohol use aftercare program [e.g., Alcoholics Anonymous (AA), or other program approved by the MTF ADAPT Program Manager], "Birds of a Feather" may be a helpful addition, and
3) Meet with the designated following professionals for the following specific timeframes:

Table 2: Post-treatment Aftercare MINIMUM Requirements:

Professional/Meetings	**First Year**	**Second/Third Year**	**Fourth Year**
Flight Surgeon[1]	Monthly	Quarterly	Annually
ADAPT	Monthly	Monthly	N/A
Psychiatrist, Psychologist, or Social Worker	Annually	Annually	N/A
Organized Alcohol Aftercare Program	3x weekly	1x weekly	Recommended (not required)

1. The flight surgeon has primary responsibility for collecting and submitting the required documentation for waiver submission. The ADAPT representative documents alcohol use aftercare program attendance. Temporary modification of aftercare program requirements because of operational demands must be approved of documented by the flight surgeon and ADAPT.

2. Important note: the post-treatment aftercare requirements listed are only the MINIMUM. Most people with AUD would benefit from ADDITIONAL treatments, especially in the organized alcohol aftercare program. For example, optimal Alcoholics Anonymous engagement includes securing and regularly connecting with a sponsor, working through the step handbooks, and attending 90 meetings in 90 days initially. Research has demonstrated ~85% effectiveness rate when all these interventions are committed to. Please specifically document these areas accordingly.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

An **INITIAL WAIVER** may be requested after:

1) Successful ADAPT treatment program initiation
2) Ongoing successful compliance in the post-treatment aftercare program (Please note that completion of post-treatment aftercare program is no longer a requirement), and
3) The individual must have a positive attitude and unqualified acknowledgement of his/her AUD, and
4) All possible risks for relapse are addressed/mitigated, including comorbid psychiatric illness, and
5) Unanimous treatment team opinion that the individual has returned to his/her "best baseline" of overall functioning, even if continuing in the post-treatment aftercare program, and
6) The service member is deemed to be at an acceptable aeromedical risk
    a. a unanimous decision to pursue a waiver must be rendered by the treatment team. Minority opinion(s) must be valued, discussed, and satisfactorily resolved before proceeding. Clinical wisdom, impartiality, and judgment are required to effectively manage the significant aeromedical risk of an AUD.

UNSATISFACTORY PROGRESS IN AFTERCARE PROGRAM:

Failure of a member to acknowledge his/her alcohol problem, to 100% abstain from alcohol during aftercare, or to comply with all aftercare requirements is medically disqualifying. The following pertain to any individual who fails to remain abstinent or otherwise not comply with all aftercare program requirements: if a relapse occurs during aftercare pending a first waiver, there must be 12 months sobriety/success in aftercare before waiver re-submission. If the member's condition has been waived previously, ground the member and arrange for re-evaluation by a flight surgeon and ADAPT provider to determine potential for retreatment. If the member is determined to have potential for retreatment, follow the initial waiver and aftercare program processes. A second waiver request for substance use disorder may be considered in accordance with initial waiver requirements, but requested no sooner than 12 months from the last date that noncompliance with the post-treatment aftercare program was documented. Second waiver requests are considered on a case-by-case basis only, and waiver authority for these individuals is AFMRA/SG3P. If the member is determined not to have potential for re-treatment, an AMS must be submitted for permanent disqualification.

As part of the waiver package, the individual states in writing that he/she understands the waiver is valid only if total abstinence from alcohol is maintained, and that a verifiable break in abstinence, once the waiver period has begun, is considered medically disqualifying. This written statement, kept in the medical records, must be accomplished at the initial waiver request, and re-accomplished each time a waiver renewal is requested. The abstinence memo must be dated, personally applicable, thoughtfully written, and signed by the member and commander.

ACS evaluation is not routinely requested in cases of AUDs, but such evaluation may be requested through the MAJCOM if an aviator's flight surgeon and/or commander desire it, particularly for a second opinion. In such cases, a summary of all evaluations (ADAPT Program, medical, and Mental Health) done during the initial workup, a report from a mental health evaluation done within three months of waiver package submission documenting the presence or absence of comorbid psychiatric pathology and cognitive impairment, an aeromedical summary containing salient laboratory values, and required aftercare documentation should be submitted. Please refer to the Mental Health Waiver Guide Checklist in the USAF Waiver Guide.

A. Initial Waiver Request:

1. Aeromedical summary containing a physical exam and 2 sets of laboratory values [blood alcohol test, urine drug test, CBC with MCV, GGT, AST, ALT, triglycerides, and carbohydrate-deficient transferrin (CDT). A phosphatidylethanol (PEth) test may be utilized as well, though more definitive research is needed].
2. Labs should be collected at treatment initiation and just before waiver submission.
    a. Unannounced lab tests are best because they provide important/necessary accountability and assurance of compliance.
3. The summary should also address work performance, peer relationships, family and marital relationships, psychosocial stressors, attitude toward recovery, abstinence, AA or other approved alcohol recovery program attendance, and mental status examination.
4. ADAPT statements/summary documenting aftercare and AA or other approved alcohol recovery program attendance.
5. Copy of annual psychiatrist/psychologist examination while in aftercare.
6. Letter of recommendation from individual's commanding officer.
7. Copy of signed abstinence letter (initial and renewal waiver requests must have a signed abstinence statement included as an AIMWTS attachment).
    a. In the abstinence letter, the individual states in writing that he or she understands that, if granted, the waiver is valid only if total abstinence from alcohol is maintained. A verifiable break in abstinence once the waiver period has begun is medically disqualifying.
    b. The abstinence memo must be dated, personally applicable, thoughtfully written, and signed by the member and commander.
8. Due to the potential for cognitive changes in those with AUD, cognitive function screening is recommended prior to waiver submission.
    a. A cognitive screening measure, such as the Montreal Cognitive Assessment (MoCA) or Mini-Mental State Exam (MMSE), can be completed during an evaluation by the Flight Surgeon or other provider.
    b. Low or abnormal scores on screening measures or any concerns regarding cognitive abilities despite normal scores, should prompt referral for comprehensive evaluation of cognitive functioning by neuropsychology.
9. Medical Evaluation Board report, if required.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Interval history – aeromedical summary since the last waiver.
2. Flight surgeon summary of any interim alcohol-related treatment to include ADAPT and repeat laboratory results as described above.
    a. Unannounced laboratory testing provides important accountability and assurance.
3. Consultation from any providers evaluating member for alcohol/mental health problems or assessing them for history of same.
4. Copy of signed abstinence letter (initial and renewal waiver requests must have a signed abstinence statement included as an AIMWTS attachment).
    a. In the abstinence letter, the individual states in writing that he or she understands that, if granted, the waiver is valid only if total abstinence from alcohol is maintained.
    b. A verifiable break in abstinence once the waiver period has begun is medically disqualifying.
    c. The abstinence memo must be dated, personally applicable, thoughtfully written, and signed by the member and commander.
5. Due to the potential for cognitive changes in those with AUD, cognitive function screening is recommended prior to waiver submission.
    a. A cognitive screening measure, such as the Montreal Cognitive Assessment (MoCA) or Mini-Mental State Exam (MMSE), can be completed during an evaluation by the Flight Surgeon or other provider.
    b. Low or abnormal score on screening measures or any concerns regarding cognitive abilities despite normal scores, should prompt referral for comprehensive evaluation of cognitive functioning by neuropsychology.

Note: Please specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Alcohol use disorders (AUDs) in the U.S. military are well-described public health problems being some of the most commonly seen psychiatric issues in aerospace medicine. Several studies demonstrate that military members are involved in heavy drinking (five or more beverages on occasion within the last two weeks) twice as often as compared to similarly matched civilian populations, and their alcohol use is commonly associated with comorbid psychiatric conditions. Operational effectiveness in the US Air Force can be seriously hampered as a result of AUDs, regardless of the severity (mild, moderate, severe AUD), or simply excessive or poorly timed consumption of alcohol (unhealthy drinking). Most flight surgeons would agree that alcohol problems are the “number one killer” of aviation careers.

A continuum exists ranging from normal social use of alcohol to full-blown AUDs. As an alcohol problem progresses, it often causes problems at home first, then in the social environment, with occupational performance typically being the last area to be affected. Aviators will typically do “anything necessary” to keep flying, including hiding their problematic drinking. One of the more vital roles the flight surgeon can serve is involvement with the squadron aircrew during their off-duty time and, in particular, participation in social and

recreational activities where the use of alcohol often occurs. If an aviator is willing to drink excessively in front of superiors, that should raise serious concerns (i.e., driving home after Friday afternoon squadron gathering with alcohol causes one to wonder about how much they are drinking in other scenarios).

AUDs can be difficult to detect. Secondary to expected minimizing and even frank denial of alcohol use, there is not one objective parameter that can be used to make the diagnosis. Therefore, a flight surgeon must be aware and watchful of circumstances which can signal their presence, [e.g., alcohol on the breath during duty hours, an alcohol-related incident, such as a DUI or domestic incident, an elevated blood alcohol level above 100 mg/dL (0.10%) in a person not appearing drunk, unexplained insomnia or hypertension, vague GI problems, frequent minor injuries, along with "broad spectrum" dysfunction in the member's life]. Laboratory abnormalities such as elevations of MCV, GGT, ALT, AST, uric acid, triglycerides, or increased carbohydrate-deficient transferrin (CDT) may also be present. An elevated CDT (above upper limit per laboratory report) indicates the regular intake of 4-5 standard alcoholic beverages for several weeks prior to the test, and is especially revealing in aviators who have signed 100% abstinence agreements. The CDT specificity is over 95% for excessive alcohol use with false positives found primarily in significant hepatic disease. Once a baseline CDT level is established after several unannounced tests, a 30% change indicates a modification in drinking behavior. A phosphatidylethanol (PEth) test may be utilized as well, though more definitive research is needed. PEth has potential in abstinence monitoring, since PEth could be detected for up to 12 days after a single drinking event.

Chronic depression, irritability, and anxiety may indicate the presence of an AUD, especially when they represent a change from a flyer's normal personality. Alcohol can cause reduced mood (be very "depressogenic") for up to two weeks after normal levels of consumption. Re-dosing commonly worsens mood symptoms with unawareness of this liability of alcohol. One third of all depressions are secondary to alcohol itself as the instigating agent requiring up to four weeks for depressive symptoms to abate after the last drink. Beyond that, alcohol worsens all other depressions and overwhelms the effect of antidepressants making it wise to abstain while treating depressive symptoms. Self-harm and suicide are much more common in people with alcohol problems. Alcohol often becomes a routine way to cope with stress and anxiety, causing "chemical coping," and allowing worsening anxiety symptoms and reduced overall resilience over time. Even normal alcohol use often causes light, broken sleep with associated daytime fatigue due to sympathetic arousals throughout the sleep cycles.

Screening questionnaires (CAGE, MAST, SASSI, AUDIT, and McAndrew) are available for use by the flight surgeon, ADAPT, or through the Mental Health Clinic. The National Institute of Alcohol Abuse and Alcoholism has developed a single-question test for primary care doctors to replace longer questionnaires. This question asks, "How many times in the past year have you had (for men) 5 or more drinks or (for women) 4 or more drinks in a single day?" Answering "1 or more days" in the past year should prompt further investigation. Screening assessments cannot make or confirm the diagnosis of AUD, but they can help inform the clinician to further evaluate for the presence, extent, and severity of alcohol use problems. Clinical correlation with focused interviews and reaching out to collateral contacts is helpful. Sound clinical judgment is required.

It is well-established that excessive and/or chronic use of alcohol can result in changes in cognitive functioning. While some alcohol-induced cognitive deficits are acute and subside with the cessation of alcohol use, others can persist for years into abstinence. Due to the potential for cognitive changes in those with AUD, screening of cognitive functioning is recommended prior to waiver submission. A cognitive screening measure, such as the Montreal Cognitive Assessment (MoCA) or Mini-Mental State Exam (MMSE), can be completed during an evaluation by the Flight Surgeon or other provider. Low or abnormal score on screening measures or any concerns regarding cognitive abilities despite normal scores, should prompt referral for comprehensive evaluation of cognitive functioning by neuropsychology.

Per AFI 44-121, it is the responsibility of the flight surgeon to inform the commander and notify the Alcohol and Drug Abuse Prevention and Treatment (ADAPT) program manager of an individual who has been admitted for alcohol detoxification, receives treatment for an injury or illness that may be the result of substance use, or is suspicious of having an alcohol problem. This is an absolute duty to protect and report in the US Air Force. Referral and enrollment in the ADAPT program is key to starting the member on the correct path. Along with the usual medical evaluation, the workup should include an assessment for other psychiatric disorders such as depressive disorders, anxiety disorders, and personality disorders, for which those with AUDs are at increased risk. After the flight surgeon's assessment, ADAPT evaluates/substantiates alcohol and substance use disorders and mental health evaluates/substantiates comorbid psychiatric conditions.

Potential relapse after problematic drinking is identified and treated is extremely high. One study showed that relapse rates among US Air Force personnel are as high as 35%. More definitive research is needed and hard to come by. Abstinence from alcohol is the preferred modality for preventing relapse in aviators since attempting to return to "controlled drinking" once someone has lost control of drinking has very high relapse rates. Abstinence in those with AUD is exceedingly more successful in preventing relapse as compared to those whose attempt to control their drinking during recovery. The FAA requires abstinence for civilian aircrew with AUD. "Near beers" are not recommended because they often contain a low percentage of alcohol and continue to cultivate the drinking behavior(s) and lifestyle. Definitive studies into the efficacies of abstinence versus controlled drinking (harm reduction) are difficult to find because results are often biased towards the approach which is endorsed by the researchers.

Alcohol misuse presents hazards to aviation because of both acute and chronic effects on cognitive and physical performance. Acute alcohol intoxication and hangover are obviously incompatible with flying. Similarly, alcohol withdrawal is a threat to flight safety due to anxiety, tremor, and the increased risk for dysrhythmia or seizure. The majority of adverse effects produced by alcohol relate to the brain, eyes, and inner ear which are three crucial organs to a flyer. Alcohol decreases the ability of the brain to make use of oxygen. This adverse effect can be magnified as a result of simultaneous exposure to altitude, characterized by a decreased partial pressure of oxygen. Further, subtle cognitive impairment, manifesting as slowed reaction time, inattentiveness, difficulty in monitoring multiple sensory inputs, and difficulty making rapid shifts of attention from one stimulus to another, can occur after low doses of alcohol even if it does not result in intoxication. Brain effects include impaired reaction time, reasoning, judgment, and memory. Visual symptoms include eye muscle imbalance, which leads to double

vision and difficulty focusing. Inner ear effects include dizziness, and decreased hearing perception. If such other variables are added as sleep deprivation, fatigue, medication use, altitude hypoxia, or flying at night or in bad weather, the negative effects are significantly magnified. Additionally, normal alcohol use often causes light, broken sleep due to sympathetic arousals throughout the sleep cycles causing daytime fatigue. After moderate alcohol consumption, impairments can persist for many hours after the blood alcohol level has returned to zero, well beyond the 12-hour "bottle-to-throttle" guidelines. Positional alcohol nystagmus and vertigo, indicating impairment in vestibular function, can occur under G-load up to 48 hours after alcohol consumption. Heavy drinkers are at risk for dysrhythmias such as "holiday heart" for several days after drinking. Even after complete elimination of all of the alcohol in the body, there are hangover effects that can last 48 to 72 hours following the last drink. A hangover effect, produced by alcoholic beverages after the acute intoxication has worn off, may be just as dangerous as the intoxication itself. Symptoms commonly associated with a hangover are headache, dizziness, dry mouth, stuffy nose, fatigue, upset stomach, irritability, impaired judgment, and increased sensitivity to bright light. A flyer with these symptoms would certainly not be fit to safely operate an aircraft.

AIR FORCE MANUAL 11-202 Volume 3 Flight Operations (10 Jan 2022) 2.4.2.2. states that "Aircrew will not fly or assume aircraft control if any alcohol was consumed within 12 hours prior to takeoff **or if impaired by alcohol** or any other intoxicating substance, **to include the effects or after-effects."** Cold showers, drinking black coffee, or breathing 100% oxygen cannot speed up the elimination of alcohol or its after-effects from the body. Excellent and clear-headed judgment is required to decide when it is safe to fly after alcohol consumption.

Individuals with personal questions should work with their Flight Medicine Clinic.

Flight Surgeons and Mental Health Providers with waiver questions,
Please feel free to contact the ACS Neuropsychiatry Branch:

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AIMWTS search From Jan 2017 – March 2022 revealed 649 aviators with a waiver disposition for an alcohol-related diagnosis. There were 24 FCI/IA cases (13 disqualified), 318 FCII cases (32 disqualified), 21 RPA pilot cases (6 disqualified), 392 FCIII cases (100 disqualified), 14 MOD cases (4 disqualified), and 124 cases for GBC/ATC/GBO (33 disqualified). 272 of the

aviators in the pool of 649 had multiple aeromedical summaries for alcohol-related diagnoses. There were a total of 1015 waiver submissions for this time period. There were some who were disqualified and later waived, some waived and later disqualified, and a few who were disqualified, waived and then disqualified again.

ICD-10 codes for Alcohol Use Disorders (AUDs)	
F10.10	Alcohol Abuse
F10.20	Alcohol Dependence
F10.9	Alcohol Use, Unspecified

IV. Suggested Readings

1. *Substance-Related and Addictive Disorders,* Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR). American Psychiatric Association Publishing. 2022. https://www.appi.org/dsm5tr

2. Air Force Instruction 44-121, Alcohol and Drug Abuse Prevention and Treatment (ADAPT) Program, 2018.

3. DAFMAN 48-123, Aerospace Medicine Medical Examination and Standards, 8 Dec 2020.

4. Jones DR. Aerospace Psychiatry. Ch. 17 in *Fundamentals of Aerospace Medicine*, 4th ed. Lippincott, Williams and Wilkins, 2008.

5. Yesavage B and Leier VO. Hangover Effects on Aircraft Pilots 14 Hours After Alcohol Ingestion: A Preliminary Report. Am J Psychiatry, 1986; 143: 1546-50.

6. Dawson DA, Goldstein RB, and Grant BF. Rates and Correlates of Relapse Among Individuals in Remission from DSM-IV Alcohol Dependence: A 3-year Follow-Up. Alcohol Clin Exp Res, 2007; 31: 2036-45.

7. Watson CG, Hancock M, Gearhart LP, et al. A Comparative Outcome Study of Frequent, Moderate, Occasional, and Nonattenders of Alcoholics Anonymous. J Clin Psychol, 1997; 53: 209-14.

8. Vaillant G and Hiller-Sturnhofel S. The Natural History of Alcoholism. Alcohol Health Res World, 1996; 20:152-161.

9. Henry PH, Davis TQ, Engelken EJ, et al. Alcohol-Induced Performance Decrements Assessed By Two Link Trainer Tasks Using Experienced Pilots. Aerospace Medicine, 1974; 45:1180-89.

10. Armed Forces Health Surveillance Center. Alcohol-related diagnoses, active component, U.S. Armed Forces, 2001-2010. MSMR, 2011 Oct; 18: 9-13.

11. Foran HM, Heyman RE, and Slep AMS. Hazardous Drinking and Military Community Functioning: Identifying Mediating Risk Factors. J Consult Clin Psychol, 2011; 79: 521-32.

12. Foran HM, Smith Slep AM, and Heyman RE. Hazardous Alcohol Use Among Active Duty Air Force Personnel: Identifying Unique Risk and Promotive Factors. Psychol Addict Behav. 2011;25: 28-40.

13. Schröck A, Thierauf-Emberger A, Schürch S, Weinmann W. Phosphatidylethanol (PEth) detected in blood for 3 to 12 days after single consumption of alcohol-a drinking study with 16 volunteers. Int J Legal Med. 2017 Jan;131(1):153-160. doi: 10.1007/s00414-016-1445-x. Epub 2016 Sep 5. PMID: 27596747.

14. Dubowski KM. Absorption, distribution and elimination of alcohol: highway safety aspects. J Stud Alcohol. 1985;10:98–108.

15. Alejandro Caro-Nuñez T, Chidester T. Literature Review and Recommendations Concerning Alcohol Tolerance Under Part 67. Washington, DC: Office of Aerospace Medicine; 2018. DOT/FAA/ AM-18/5.

16. AIR FORCE MANUAL 11-202 Volume 3 Flight Operations (10 Jan 2022) https://static.e-publishing.af.mil/production/1/af_a3/publication/afman11-202v3/afman11-202v3.pdf

Aerospace Medicine Waiver Guide

Anxiety Disorders and Obsessive-Compulsive Disorder

Revised: Dec 2024
Reviewed: Dr. Joe Wood (ACS Aerospace Clinical Psychologist), Col Kevin F. Heacock (ACS Aerospace Medicine Branch Chief), and ACS Neuropsychiatry Team

Significant Changes: Restructuring of Waiver Guide, enhanced antidepressant guidance, AIMWTS review

I. Waiver Consideration

Anxiety disorders and obsessive-compulsive disorder (OCD) are disqualifying for all flying classes. Untreated or undertreated anxiety disorders may have potentially disastrous consequences. Additionally, anxiety disorders tend to have a chronic clinical course with low rates of recovery and high likelihood of recurrence. If the diagnostic criteria are met for specific phobia, social anxiety disorder, panic disorder, agoraphobia, generalized anxiety disorder, substance/ medication-induced anxiety disorder, anxiety disorder due to another medical condition, other specified anxiety disorder, unspecified anxiety disorder, or OCD the aviator is disqualified.

To be considered for waiver a comprehensive mental health evaluation is the vital first step. USAF psychologists and/or psychiatrists familiar with aeromedical standards are the *preferred* choice for evaluation and potential development of the treatment plan. If the diagnosis of an anxiety disorder is established, then grounding the aviator is necessary to allow optimal treatment to be initiated. Psychotherapy and/or psychotropic medications may be utilized as treatment options until anxiety symptoms are fully resolved. Psychotherapy may be continued after symptom resolution to bolster resiliency and coping skills.

Antidepressants are usually the psychotropic agent of choice if psychotherapy and healthy lifestyle interventions have not achieved full resolution of symptoms. Clinical judgment is required for the duration of the antidepressant treatment (maintenance treatment phase), often dictated by the duration of anxious symptoms which prompted the treatment. The USAF began allowing waivers for flyers taking specific antidepressants in 2013. Since 2020, aeromedically-approved antidepressants have included:

1. Sertraline (Zoloft®) up to 200 mg/day
2. Fluoxetine (Prozac®) up to 80 mg/day
3. Citalopram (Celexa®) up to 40 mg/day

4. Escitalopram (Lexapro®) up to 20 mg/day
5. Bupropion (Wellbutrin®) SR or XL up to 400 mg/day or 450 mg/day, respectively (NOTE: immediate release Wellbutrin® is NOT aeromedically-approved)

Of these approved medications, Wellbutrin is known to be less effective in treating anxiety disorders. Also, the dosage of the antidepressant tends to require "higher than usual" amounts when treating anxiety as compared to treatment for depression. This often makes Zoloft and Prozac attractive choices in treating anxiety among these approved antidepressants.

The period of **clinical stability** (i.e., symptoms of the diagnosis are no longer causing clinically significant distress or impairment, and the aviator demonstrates adequate function in social, occupational, and other important areas for functioning) recommended before requesting a waiver for an anxiety disorder is **6 months**. As long as the aviator's symptoms remain stable, the dose of the medication may be adjusted, or the antidepressant may be switched to maximize treatment and/or limit side effects without restarting this waiting period. **If the antidepressant used to treat the aviator is ever adjusted in dose or discontinued, 2 weeks of observation should occur** before resuming flight duties to assure no adverse/unexpected side effects or return of symptoms occur. **If the antidepressant used to treat the aviator is changed to another aeromedically-approved antidepressant secondary to side effects or lackluster response, 4 weeks of observation should occur** before resuming flight duties to assure no adverse/unexpected side effects or return of symptoms occur. If symptoms return at any time during treatment, it is recommended a thorough reassessment be conducted and enhancement of the overall treatment plan be considered, to possibly include psychotherapy, healthy lifestyle interventions, and/or antidepressant medication (multimodal treatment is more effective). If the symptoms are occupationally impairing, clinical stability will need to be restored, and the appropriate observational period will need to be established before returning to full flight duties.

Table 1: Waiver potential for Anxiety Disorders/OCD

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	Maybe[1]	AFAC/AM	At discretion of AFAC
FC II/III, ATC, GBO, SWA, MOD	Maybe[1,2]	MAJCOM	At discretion of MAJCOM

1. For all UNTRAINED individuals in any flying class (FC I/IA, FC II/III, or ATC/GBO/SWA/MOD), a waiver is NOT considered if they are currently taking an antidepressant. A waiver for an untrained individual with a history of an anxiety disorder is unlikely, unless there are well-defined identifiable precipitating factors which are unlikely to reoccur. A waiver can be considered after the anxiety is completely resolved and medications and/or psychotherapy have been discontinued for a minimum of 2 years.
2. For trained personnel, a waiver is considered after symptoms are resolved and clinical stability, on or off medication, has been demonstrated for several months (6 months recommended).

II. Information Required for Waiver Submission

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial and Renewal Waiver Requests:

1. See Mental Health Waiver Guide Checklist in Psychiatry section of the Waiver Guide
2. If the waiver package is referred to the ACS without required items (e.g., recent mental health evaluation, all records including off-base care, commander's support letter, etc.) the case will be returned to the local MTF to provide a complete package.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

Individuals with personal questions should work with their Flight Medicine Clinic.

Flight Surgeons and Mental Health Providers with waiverability questions, please feel free to contact the ACS Neuropsychiatry Branch:

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III. Aeromedical Concerns

Many of the emotional and behavioral manifestations of anxiety disorders can interfere with flying safety and mission completion. Severe anxiety can markedly impair the ability to focus and concentrate on the task at hand. Trembling may diminish the ability to manipulate controls. Palpitations, shortness of breath, chest pain, nausea, and dizziness may be significantly distracting. Some of the more severe symptoms of anxiety, such as those seen in panic disorder (overwhelming anxiety, derealization, and fear of losing control) may be acutely incapacitating. Anxiety is often a factor in depression and psychosomatic complaints as well as being associated with substance misuse, particularly alcohol. Clinical levels of situational or chronic anxiety raise concerns regarding an aviator's emotional stamina and resilience needed to manage the inherent dangers and rigors associated with flying, especially during austere and deployed conditions. It should also be noted that anxiety stemming from a chronically high operational tempo, large workload, and accumulating life stressors may manifest itself as low motivation to fly. The aeromedical disposition of flight personnel diagnosed with an anxiety disorder depends on the specific category of the disorder and phase of the illness.

Anxiety disorders are generally characterized by fear/apprehension, obsessions, fear of loss of control, and physiological symptoms severe enough to interfere with social or occupational functioning. Anxiety is seen in many other psychiatric disorders, but in its benign form, is part of normal emotional experience. Symptomatic anxiety can be constant or nearly so, as in generalized anxiety disorder, or episodic. Episodic spells of anxiety can begin without warning or provocation, as in panic disorder, or predictably in certain situations, as in simple or social phobia. In the latter case, efforts to avoid the anxiety-provoking stimulus can drastically impact the aviator's lifestyle.

Obsessive-Compulsive Disorder is a very challenging condition to waive for aircrew. This disorder reoccurs often, and stability is much more challenging to maintain, even with gold-standard treatment. The distracting nature of the disorder causes impairment in the aeromedical arena that is more difficult for members to compartmentalize or ignore. Therefore, a higher index of risk should be applied to aircrew with OCD than other anxiety conditions.

Special Considerations- three terms that relate specifically to anxiety and flying are often used in aerospace medicine. These are: **manifestations of apprehension (MOA), fear of flying (FOF), and phobic fear of flying** (specific phobia in the DSM). MOA and FOF are used to denote a non-phobic fear based on uneasiness, lack of motivation, feelings of inadequacy, rational decision, life circumstance, etc.; MOA is used with student aviators and FOF for rated/trained aviators. **Both MOA and FOF are handled administratively by the commander** (often in the context of a flying evaluation board or the SUPT/UNT equivalent). A mental health consultation is helpful to clarify the issues in MOA and FOF, and to help rule out a true anxiety disorder. An increasingly recognized problem in the ATC/GBC community is fear of controlling. Like fear of flying, these cases are handled administratively.

Phobic fear of flying is a true phobia, often involving only flying, though the symptoms can broaden to other areas of life if not treated. **Phobic fear of flying is handled like the other anxiety disorders**: by medical disqualification, referral to mental health for evaluation and treatment, and then a return to flying when the disorder is resolved. Persistence of anxiety symptoms, despite adequate treatment or a reluctance to enter treatment, should raise questions about the aviator's motivation to fly.

AIMWTS review in Jul 2024 revealed 871 cases since 1 Jul 2019 with a diagnosis of an anxiety-related disorder. Of these, 590 (67.7%) received waivers. There were 38 cases of OCD. Of these, 22 (57.9%) received waivers.

	I/IA	II	III	ATC/ GBC	RPA Pilot	MOD	SWA
Anxiety Disorders	22/42 (52.4%)	159/197 (80.7%)	271/410 (66.1%)	41/69 (59.4%)	62/100 (62%)	8/12 (66.7%)	27/41 (65.9%)
OCD	2/5 (40%)	10/12* (83.3%)	10/17 (58.8%)	0/1 (0%)	0/2 (0%)	0/1 (0%)	None
* 5 unique aviators: 2 with 2 waivers, 1 with 4 waivers, 3 with 1 waiver							

Please use only *these* ICD-10 codes for AIMWTS coding purposes	
F41.0	Panic Disorder without Agoraphobia
F41.1	Generalized Anxiety Disorder
F40.01	Agoraphobia with Panic Disorder
F40.02	Agoraphobia without Panic Disorder
F40.10 F40.11	Social Phobia, Generalized
F41.9	Anxiety Disorder, Unspecified

F42	Obsessive-Compulsive Disorder
F06.4	Anxiety Disorder Due to Known Psychological Condition
F19.980	Other Psychoactive Substance Use, Unspecified with Psychoactive Substance-Induced Anxiety Disorder

IV. Suggested Readings

1. Szuhany KL, Simon NM. Anxiety Disorders: A Review. *JAMA.* 2022;328(24):2431–2445. doi:10.1001/jama.2022.22744

2. Garakani A, Murrough JW, Freire RC, Thom RP, Larkin K, Buono FD and Iosifescu DV (2020) Pharmacotherapy of Anxiety Disorders: Current and Emerging Treatment Options. Front. Psychiatry 11:595584. doi: 10.3389/fpsyt.2020.595584

3. American Psychiatric Association (Ed.). (2022). Diagnostic and statistical manual of mental disorders: DSM-5-TR (Fifth edition, text revision). American Psychiatric Association Publishing.

4. Fricchione G. Generalized anxiety disorder. N Engl J Med, 2004; 351(7): 675-82.

5. Ballenger, JC; Davidson, JR; Lecrubier, et al. Consensus Statement on Generalized Anxiety Disorder From the International Consensus Group on Depression and Anxiety. J ClinPsychiatry, 2001; 62 Suppl 11: 53–58.

6. Bruce SE, Yonkers KA, Otto MW, et al. Influence of Psychiatric Comorbidity on Recovery and Recurrence in Generalized Anxiety Disorder, Social Phobia, and Panic Disorder: A 12-Year Prospective Study. Am J Psychiatry, 2005: 162; 1179-87.

7. R A and Fonagy, P. Anxiety Disorders I. Ch. 6 in What Works for Whom?, 2nd ed., 2005.

8. Gillow S. Psychiatry. Ch. 12 in *Rayman'*s *Clinical Aviation Medicine*, 5th Edition, Castle Connolly Graduate Medical Publishing LTD, 2013; p. 314-15.

Neurodevelopmental Disorders: Attention-Deficit/Hyperactivity Disorder and Specific Learning Disorder

Revised: Dec 2024

Reviewed: Dr. Monica Malcein (ACS Aerospace Neuropsychologist), Col Kevin F. Heacock (ACS Aerospace Medicine Branch Chief) and ACS Neuropsychiatry Team

Significant Changes: Restructuring of Waiver Guide, Consistent with MSD, AIMWTS review

I. Waiver Consideration

Neurodevelopmental disorders are a group of conditions with onset in the developmental period. A confirmed diagnosis of a neurodevelopmental disorder, including Attention Deficit/Hyperactivity Disorder (ADHD) and Specific Learning Disorder (SLD) at any time in life, is disqualifying for all flying classes: FCI/IA, FCII, FCIII, ATC, GBO, and SWA positions, unless the individual has demonstrated adequate academic achievement and/or occupational performance without special accommodations/treatment for a period of four years or more. If there is a history of ADHD or SLD and the four years of academic or occupational achievement has been demonstrated, a candidate would be considered medically qualified and would not require a waiver. If there are current functional limitations associated with the Neurodevelopmental Disorder OR there has been treatment or accommodations in the academic or occupational setting in the preceding four years, a waiver is required.

Attention Deficit/Hyperactivity Disorder (ADHD): A waiver may be considered for flying if the candidate has established academic or occupational stability off medication for a period of at least 12 months. Any candidate who took medications purely for academic enhancement, without a true diagnosis of ADHD, will still need to show adequate academic or occupational stability off medication for a least 12 months before a waiver is considered. The use of psychostimulants solely to optimize cognitive performance is strictly prohibited.

Currently, no psychostimulant medication is aeromedically approved. Although bupropion is aeromedically approved for smoking cessation and other mental health diagnoses, its use in treating ADHD in the aviation community is unauthorized. To date, no waiver has been recommended by the Aeromedical Consultation Service (ACS) for ADHD controlled on stimulant or non-stimulant medication.

Table 1: Waiver Potential for ADHD

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation

I/IA	Maybe[1]	AFAC/AM	At discretion of AFAC
II/III/ATC/GBO SWA	Yes	MAJCOM	At discretion of MAJCOM

1. Individuals with adequate school and/or work performance with no medication use or special accommodation for 4 years do NOT require a waiver. No waiver has been recommended by ACS to date for ADHD controlled on medication.

Specific Learning Disorder (SLD): Specific learning disorders affect an individual's ability to receive and process information and are associated with potential life-long impacts on occupational, educational, and social performance. Even mild cognitive difficulties can present potential aeromedical safety of flight concerns and mission degradation in the dynamic operational military aviation environment. When considering waiver for a member with a history of a learning disorder, the severity and impact of the disorder needs to be addressed. Waivers for trained aircrew with specific learning disorders may be considered if symptoms are well-managed and there has been no degradation in duty performance.

Table 2: Waiver Potential for SLD

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
I/IA[1]	Yes	AFAC	At discretion of AFAC
II//III/ATC/GBO SWA	Yes	MAJCOM	At discretion of MAJCOM

1. Individuals with adequate school and/or work performance with no special accommodation for 4 years do NOT require a waiver.

II. Information Required for Waiver Submission

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines & recommendations.

A. Initial Waiver Request:

1. See Mental Health Waiver Guide Checklist chapter in Psychiatry section of the Waiver Guide.
2. The AMS should detail any social, occupational, administrative, or legal problems, including an analysis of the aeromedical implications of the particular case history.
3. Mental health evaluation summary, *specifically including* psychological and neuropsychological evaluation reports (with their raw data), and any pertinent past medical or mental health records. Assessments should include measures of intellectual functioning, academic achievement, attention, language, memory, and executive functioning.
4. Any pertinent current neurological or other medical consultation reports.
5. For FC I/IA, detailed history of academic achievement and use of any accommodations.
6. For trained FC II or III, ATC, GBO, OSF, or SWA a letter from the flyer's aviation supervisor or commander supporting a return to flying status.
7. School transcripts, and any accommodation or modified learning plans such as IEPs and/or 502s.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. See Mental Health Waiver Guide Checklist chapter in Psychiatry section of the Waiver Guide.
2. Interval history including any need for any new special accommodations or other work or social difficulties since last waiver.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

Individuals with questions should work with their Flight Medicine Clinic.

Flight Surgeons and Mental Health Providers with waiverability questions, please feel free to contact the ACS Neuropsychiatry Branch:

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III. Aeromedical Concerns

Attention-Deficit/Hyperactivity Disorder:

ADHD involves a persistent pattern since childhood of problems in such areas as attention, vigilance, organization, impulse control, set shifting, dual tasking, working memory, and memory. Symptoms of ADHD are incompatible with flying duty. Depending on the severity of the disorder and specific symptoms present, aeromedical concerns include safety of flight, mission completion, and crew coordination.

Use of either non-stimulant or stimulant medication to control ADHD symptoms remains incompatible with flying. Further, ADHD can put both aviation duties and military retention at risk if treatment with medication is required for adequate duty performance. If unable to perform without medication, or if unable to meet AFSC qualifications due to the need for medication, referral to the unit commander for determination of administrative disposition is appropriate and a 469 Mobility Restriction should be created stating the member will need a waiver for deployment consideration. If treatment with medication is not required for adequate duty performance, the member remains suited for continued military service. A waiver is required for all flying classes with a history of ADHD treated or requiring special accommodations within the last 4 years.

ADHD is a neurodevelopmental disorder, and as such, manifests during the developmental period. Diagnoses of ADHD made during childhood are occasionally found to be unsubstantiated with a careful, accurate history. This is particularly true in adults if the service member has had no symptoms since early childhood. The diagnosis of ADHD in adulthood should not be made without a history of symptoms beginning in childhood, usually before the age of twelve. At times, concerns for ADHD are first recognized in adults under increasing demands, such as military flight duties, that expose subtle learning and cognitive inefficiencies that degrade performance that were not previously detected or recognized in prior non-flying pursuits. It is unlikely that an initial flying applicant or rated aviator would self-identify as having symptoms suggestive of ADHD, although complaints may come to the attention of the flight surgeon through the reports of spouses, supervisors, colleagues, or other aircrew.

The flight surgeon or other clinician who suspects ADHD must attempt to establish a retrospective childhood diagnosis. A diagnosis of ADHD in an adult referred for poor performance when there is no prior history of cognitive or behavioral symptoms should warrant diagnostic skepticism. Since the diagnosis of ADHD is a clinical one, a comprehensive interview plus careful neuropsychological testing are important diagnostic procedures. A *confirmed* diagnosis of ADHD is disqualifying for flying duties.

AIMWTS search from Nov 2019 through Oct 2024 revealed:

Flying Class	**# Waived**	**# Requested**	**% Waived**
FC I/IA	6	16	38%
FC II	32	47	68%
RPA Pilot	10	23	43%
FC III	63	109	58%
ATC/GBO	8	26	31%
MOD	0	2	0%
SWA	29	51	57%
TOTAL	**148**	**274**	**54%**

Please use only *these* ICD-10 codes for AIMWTS coding purposes	
F90.2	Attention-Deficit/Hyperactivity Disorder, Combined presentation
F90.0	Attention-Deficit/Hyperactivity Disorder, Predominantly inattentive presentation
F90.1	Attention-Deficit/Hyperactivity Disorder, Predominantly hyperactive/impulsive presentation
F90.8	Other Specified Attention-Deficit/Hyperactivity Disorder
F90.9	Unspecified Attention-Deficit/Hyperactivity Disorder

Specific Learning Disorder:

Specific learning disorder (SLD) is a neurodevelopmental disorder that disrupts the normal pattern of learning academic skills, resulting in persistent difficulty or impairment in areas of academic functioning. SLDs are associated with a range of underlying cognitive difficulties. In addition to deficits in specific academic skills, weaknesses in cognitive abilities including linguistic processes, attention, working memory, visual-spatial processing, sequential processing, and processing speed have been documented in adults with SLDs, with the presence and severity varying across individuals. These weaknesses/deficits, when present, have the potential to interfere with flight duties secondary to decreased ability to focus and concentrate on the task at hand, quickly process information, and understand and quickly interpret auditory and visual information.

The different types of SLDs commonly co-occur with one another as well as other neurodevelopmental

disorders, mental health disorders, and behavioral problems. SLDs and comorbidities can result in various difficulties across different life stages, with limitations in the domains of communication, interpersonal interactions and social life, educational, and occupational functioning. Because limitations from specific learning disorders often influence career and social aspirations, the prevalence of distress, anxiety, somatic complaints, and poorer overall mental health are common in adults with SLDs and should factor into the aeromedical decision-making as well.

AIMWTS search from 2019 through 2024 revealed:

Flying Class	# Waived	# Requested	% Waived
FC I/IA	1	1	100%
FC II	3	3	100%
SWA	1	3	33%
TOTAL	**5**	**7**	**71%**

Please use only *these* ICD-10 codes for AIMWTS coding purposes	
F81.0	Specific learning disorder with impairment in reading
F81.81	Specific learning disorder with impairment in written expression
F81.2	Specific learning disorder with impairment in mathematics

IV. Suggested Readings

1. American Psychiatric Association (Ed.). (2022). Diagnostic and statistical manual of mental disorders: DSM5-TR (Fifth edition, text revision). American Psychiatric Association Publishing.
2. Fitzgerald D, Navathe P, and Drane A. Aeromedical decision making in Attention-Deficit/Hyperactivity Disorder. Aviation Space Environ Med, 2011; 82: 550-54.
3. Graver C, Armistead-Jehle P, and Fritch A. Neuropsychologist's Guide to Aeromedical Examinations in the Military. Military Behavioral Health, 2020; 9: 1-12.
4. Pizzigallo E, Cornoldi C, Bruno S, Citta S, Viola F, and Toffalini E, The intellectual Profile of Adults with Specific Learning Disabilities, J. Intell, 2023 Dec 9; 11(12); 223. Doi: 10.3390/jintelligence11120223.
5. Antolini, G, Colizzi, M. Where do neurodevelopmental disorders Go? Casting the Eye Away from Childhood towards Adulthood. Healthcare (Basel), 2023 Apr 2;11(7);1015. Doi:10.3390/healthcare11071015.

Aerospace Medicine Waiver Guide

Eating Disorders

Revised: April 2025

Reviewed: Dr. Ryan Peirson (ACS Neuropsychiatry Branch Psychiatrist) Col Kevin F. Heacock (ACS Aerospace Medicine Branch Chief), and ACS Neuropsychiatry Team

Significant Changes: Updated format, content updates including new tables, and eligibility information

I. Waiver Consideration

Eating Disorders that occur after age 12 are disqualifying for all flying classes and may be disqualifying for continued service. If a member was or is diagnosed with any eating disorder, including the diagnosis of Eating Disorder Not Otherwise Specified (former terminology), or Other Specified or Unspecified Feeding or Eating Disorder, a waiver is required.

An accurate mental health diagnosis, based on a thorough mental health evaluation and the current edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM), is essential for waiver consideration. USAF mental health specialists familiar with aeromedical standards are the preferred choice for evaluating flyers/operators and developing treatment plans. Psychiatrists familiar with aeromedical standards should be consulted when treatment includes medications. **Please have mental health involved in the care of ALL flyers/operators with mental health concerns.** Please refer to the Mental Health Waiver Guide Checklist in the Psychiatry section of the Waiver Guide for specific questions to address during this evaluation.

Due to the persistent nature of eating disorders, their risk for a wide array of health consequences, and the potential for mental health comorbidities, a long period of demonstrated stability is required for waiver eligibility. For all untrained individuals (FC I/IA, II/III, ATC/GBO/SWA) with a history of an eating disorder after age 12, a minimum of two years remission with successful treatment must be documented. For trained individuals (FC II, FC III, ATC/GBO/SWA), a minimum of one year remission with successful treatment must be documented.

When assessing aviators facing mental health challenges, it is crucial to employ sound clinical judgment and careful thought. In instances where flight safety is in doubt, immediate removal from flying duties is necessary until thorough evaluation and risk assessment are conducted. If further mental health assessment is needed, it should be carried out promptly and may be done without grounding the aviator if flight safety can be assured.

Collaborative decisions involving flight medicine and mental health professionals are essential. Doctoral-level mental health providers with aeromedical experience should be involved, particularly when prescribing psychotropic medications. **Mental health evaluation and treatment are imperative for flyers with psychiatric symptoms.** Return to flying duties without waiver is possible if no DSM diagnosis with impairment or safety risk is identified. However, if a DSM F-Prefix mental health diagnosis is established, associated impairment is implied, leading to disqualification per the Medical Standards Directory (MSD). In such cases, the appropriate waiver guide should be followed.

For those recovering from a disqualifying DSM diagnosis, first line, evidence-based, well-established, and standard of care treatments should be prescribed for flyers. Such treatment with strong documentation and leadership support contribute to a swift return to full duties, often without an in-person ACS evaluation.

Table 1: Waiver potential for feeding and eating disorders

Flying Class (FC)	**Condition**	**Waiver Potential**		**Waiver Authority**	**ACS Review or Evaluation**
I/IA		**< 2 years remission**	**≥ 2 years remission**		
	Any feeding or eating disorder (including Other Specified or Unspecified Feeding or Eating Disorder)	No	Maybe[1,2]	AFAC/ CMO	Highly encouraged[4]
II/III/ATC /GBO[3] SWA		**< 1 year remission**	**≥ 1 year remission**		
	Any feeding or eating disorder (including Other Specified or Unspecified Feeding or Eating Disorder)	No	Yes[1,2]	MAJCOM	Highly encouraged[4]

1. Must clearly demonstrate complete resolution of all symptoms before acceptance into initial flying and have complete documentation from mental health and other medical providers.
2. Must meet minimum aviation weight standards.
3. AFGSC is the waiver authority for GBO/missileer personnel who meet retention standards.
4. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial and Renewal Waiver Requests:

1. See Mental Health Waiver Guide Checklist in Psychiatry section of the Waiver Guide
2. In addition, particular attention should be given to submitting pertinent laboratory studies, cardiovascular and physiologic monitoring data, anthropometric data and weight history, and nutritional and behavioral history.
3. If the waiver package is referred to the ACS without required items (e.g., recent mental health evaluation, all records including off-base care, commander's support letter, etc.) the case will be returned to the local MTF in order to provide a complete package.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

Individuals with personal questions should work with their Flight Medicine Clinic.

Flight Surgeons and Mental Health Providers with waiverability questions, please feel free to contact the ACS Neuropsychiatry Branch:

ACS Aerospace Medicine Branch, USAFSAM/FECA
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III. Aeromedical Concerns

Physical and emotional challenges can significantly impair a pilot's ability to manage the intense stress associated with military flying, especially when they occur together. Eating disorders can cause life-threatening metabolic alkalosis, hypokalemia, seizures, dehydration, and hypotension which impact readiness, mission completion, and flying safety. Other mental disorders are frequently co-occurring with eating disorders. Anxiety and depression are of particular concern and providers should be mindful of an increased risk of suicide. Personality disorders are also often co-occurring and can make both diagnosis and treatment especially difficult. Problematic personality characteristics common in eating disorders, such as emotional reactivity and perfectionism, may interfere with crew resource management and other aspects of crew relations essential to successful flying.

Clinicians are encouraged to exercise good clinical judgment and consider the core features of feeding and eating disorders: clinically significant distress OR impairment in social, occupational, or other important areas of functioning. Several significant presentations that merit clinical attention and treatment are listed in the "Other Specified" section and are offered as suggestions for presentations in which symptoms are characteristic of an eating disorder but do not meet full criteria for any of the other disorders named in the diagnostic class. For example, Atypical Anorexia Nervosa, and Purging Disorder, are possibilities for the "Other Specified" category, and should not be overlooked when considering a person's symptoms when they cause distress or impact an area of functioning. The military's emphasis on tactical athleticism and leanness creates an environment where distinguishing between a purposeful approach to fitness and a pathological eating disorder can be challenging. While strict attention to diet and exercise is often a necessary component of mission readiness, these same behaviors can serve to obscure disordered eating patterns, making it easier for both individuals and clinicians to overlook or minimize symptoms.

The course and outcome of eating disorders is highly variable. Clinical studies show that relapse is most common in the early phases of recovery. For anorexia nervosa, an estimated 30% of patients will relapse after initially recovering, and relapse occurs mainly in the first year (and up to two years) post-treatment (9). For many people, recovery is marked by periods of remission interrupted by symptom re-occurrence. Several factors contribute to this high relapse risk. Residual psychological issues (e.g. persistent body-image disturbance, perfectionism, or unresolved trauma) can trigger a return of disordered eating behaviors under stress. Many patients also have persistent mood or anxiety disorders even after their eating disorder symptoms abate (10). The potential for relapse is a principal concern in calculating aeromedical risk. Given these risks, there is clear rationale for requiring full resolution of an eating disorder before an aviator can be returned to flying status. Prolonged stability ensures that the physical effects have been reversed, and cognitive function restored, allowing the aviator to perform at peak capacity without the dangerous symptoms of an active disorder (11). Requiring 12 months of stability for trained and 24 months for untrained personnel helps ensure that the individual has passed through this critical high-risk window and has developed robust coping mechanisms to maintain their health. It provides a buffer period for the aviator to consolidate healthy eating habits and psychological resilience outside of a treatment setting.

AIMWTS review in February 2025 for eating disorder diagnoses resulted in 37 cases since 1 Nov 2015. Of that total, 16 were disqualified. Breakdown of the review are tabulated below.

Please use only these ICD-10 codes for AIMWTS coding purposes		(#of waivers / total # of cases)					
		FC I/IA	FCII	FCIII	ATC/GBC	GBO	SWA
F50.01/.02	Anorexia Nervosa	1/2	0/0	0/2	0/0	0/0	0/0
F50.2	Bulimia Nervosa	1/4	0/1	1/4	3/3	0/0	0/0
F50.81	Binge Eating Disorder	0/0	0/0	0/0	0/0	0/0	0/0
F50.8	Other Specified Feeding or Eating Disorder	5/8	4/4	6/8	0/0	0/0	0/1

IV. Suggested Readings

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders: DSM-5-TR. 5th ed. Washington, DC: American Psychiatric Association; 2022.
2. Bergh C, Brodin U, Lindberg G, Södersten P. Randomized controlled trial of a treatment for anorexia and bulimia nervosa. Proc Natl Acad Sci U S A. 2002;99(14):9486-9491.
3. Berends T, Boonstra N, van Elburg A. Relapse in anorexia nervosa: a systematic review. Curr Opin Psychiatry. 2018;31(6):445-455. doi:10.1097/YCO.0000000000000453.
4. Castellini G, Lo Sauro C, Mannucci E, Ravaldi C, Rotella CM, Faravelli C, Ricca V. Diagnostic crossover and outcome predictors in eating disorders according to DSM-IV and DSM-V proposed criteria: a 6-year follow-up study. Psychosom Med. 2011;73(3):270-279. doi:10.1097/PSY.0b013e31820a1838. Epub 2011 Jan 21. PMID: 21257978.
5. de Rijk ESJ, Almirabi D, Robinson L, Schmidt U, van Furth EF, Slof-Op 't Landt MCT. An overview and investigation of relapse predictors in anorexia nervosa: a systematic review and meta-analysis. Int J Eat Disord. 2024;57(1):3-26. doi:10.1002/eat.24059. PMID: 37855175.
6. Grilo CM. Treatment of eating disorders: current status, challenges, and future directions. Annu Rev Clin Psychol. 2024;20:97-123. doi:10.1146/annurev-clinpsy-080822-043256. PMID: 38211625.
7. Guarda A. Eating disorders: overview of epidemiology, clinical features, and diagnosis. UpToDate. 2024.
8. Hoek HW, van Hoeken D. Review of the prevalence and incidence of eating disorders. Int J Eat Disord. 2003;34(3):383-396.
9. Herzog DB, Dorer DJ, Keel PK, Selwyn SE, Ekeblad ER, Flores AT, Greenwood DN, Burwell RA, Keller MB. Recovery and relapse in anorexia and bulimia nervosa: a 7.5-year follow-up study. J Am Acad Child Adolesc Psychiatry. 1999;38(7):829-837. doi:10.1097/00004583-199907000-00012.
10. Keel PK, Haedt-Matt AA. Consequences of making weight: a review of eating disorder symptoms and diagnoses in the U.S. military. Clin Psychol Sci Pract. 2014;21(4):398-409. doi:10.1111/cpsp.12081.
11. Touma DA, Quinn ME, Freeman VE, Meyer EG. Eating disorders in U.S. active duty military members and veterans: a systematic review. Mil Med. 2023;188(7-8):1637-1648. doi:10.1093/milmed/usac180. PMID: 35931108.
12. Walsh BT, Attia E, Glasofer DR, Cao L, Mayer LE. Time course of relapse following acute treatment for anorexia nervosa. Am J Psychiatry. 2021;178(5):484-491. doi:10.1176/appi.ajp.2020.20071062.

Aerospace Medicine Waiver Guide

Mood Disorders: Depressive, Bipolar, and Related Disorders

Revised: Apr 2024
Reviewed: Col Kevin Heacock (ACS Aerospace Medicine Branch Chief), Dr. Terry L. Correll (Chief of Aerospace Psychiatry), Col Richard Kipp (AFMA Medical Standards Policy Chief), and ACS Neuropsychiatry Team

Significant Changes: ACS review encouraged if waiver pursued before 6 months of clinical stability. Optimal Cases with Comprehensive Care and Results section. Provider's clinical judgement is emphasized. Mental health evaluation and treatment are imperative for flyers with psychiatric symptoms.

I. Waiver Consideration

Mood disorders are disqualifying for all flying classes: FCI/IA, FCII, FCIII, ATC, GBO, and SWA. Untreated or undertreated mood disorders may have potentially disastrous consequences. Bipolar Disorder (I, II, Other Specified, or Unspecified) and the treatments used to maintain stability are not compatible with flying duties and have never been recommended for waiver by the Aeromedical Consultation Service (ACS). Depressive disorders such as Major Depressive Disorder (MDD) and Persistent Depressive Disorder (PDD) can remit to the point of being eligible for waiver, especially when treated with antidepressants, psychotherapy, and/or healthy lifestyle interventions. The USAF began allowing waivers for flyers taking specific antidepressants in 2013. Since 2020, aeromedically-approved antidepressants include:

1. Sertraline (Zoloft®) up to 200 mg/day
2. Fluoxetine (Prozac®) up to 80 mg/day
3. Citalopram (Celexa®) up to 40 mg/day
4. Escitalopram (Lexapro®) up to 20 mg/day
5. Bupropion (Wellbutrin®) SR or XL up to 400 mg/day or 450 mg/day, respectively (NOTE: immediate release Wellbutrin® is NOT aeromedically-approved)

Use of only ONE aeromedically-approved antidepressant at a time is allowed (monotherapy). Dual therapy, for example adding Wellbutrin® to another antidepressant, is not aeromedically-approved. The need for multiple antidepressants suggests a level of severity or recurrence likelihood too high to consider for waiver. Treatment plans involving electroconvulsive therapy (ECT), transcranial magnetic stimulation (TMS), ketamine, psychedelics, or other non-first line treatments also do not support waiver. First line, evidence-based, well-established, and standard of care treatments should be emphasized and prescribed for flyers, if needed. Also, waivers are highly unlikely for untrained personnel currently taking antidepressants. This includes untrained pilots undergoing FCI evaluations to start UPT as well as untrained FCIII, ATC, GBO, and SWA. ACS review for all Mood Disorder cases is at the discretion of the Waiver Authority.

The ACS recommends a flyer or operator with a depressive disorder achieve **clinical stability** (i.e., symptoms of the diagnosis are no longer causing clinically significant distress or

impairment and the aviator demonstrates adequate function in social, occupational, and other important areas for functioning) for **6 months** before considering a waiver. However, in cases where a flyer receives optimal case and has an optimal response to treatment (See III. Aeromedical Concerns section below for explanation of optimal cases), **a waiver can be considered sooner than 6 months** if the treatment team (flight surgeon and MTF doctoral level mental health provider) determines clinical stability is sufficient to meet ALL of the following criteria:

1. Does not pose a risk of sudden incapacitation (e.g., suicidal ideation)
2. Has minimal potential for subtle performance decrement (e.g., sleepiness, low interest, guilt/worthlessness, fatigue, poor concentration, poor appetite, or psychomotor instability)
3. Expected to remain stable under the stress of aviation or operational environment
4. First signs or symptoms of recurrence are easily detectable and member reliably agrees to report such symptoms
5. Flyer and MTF doctoral level mental health provider agree to follow up appointments and collaborative observation to assure potential relapsing symptoms are appropriately addressed.

The dose of antidepressant medication can and SHOULD BE adjusted to maximize treatment and/or limit side effects. If the antidepressant dose is adjusted (increased, decreased, or discontinued), a 2-week DNIF for a ground trial observation should occur before resuming flight duties. If the antidepressant is changed to another aeromedically-approved antidepressant secondary to side effects or a desire for increased resolution of symptoms, a 4-week DNIF for a ground trial observation should occur before resuming flight duties. These ground trials are necessary to assess for adverse or unexpected side effects or symptom recurrence. If symptoms return after adjusting the dose, discontinuing treatment, or switching antidepressants, a return to or enhancement of psychotherapy, healthy lifestyle interventions, and/or antidepressant medication for maintenance treatment should be considered. **A clinical decision would need to be made by the treatment team as to what period of clinical stability would be most appropriate before resubmitting a waiver.**

To be considered for waiver, a mental health evaluation with accurate diagnosis per the most recent Diagnostic and Statistical Manual (DSM) is the vital first step. USAF mental health specialists familiar with aeromedical standards are the preferred choice for evaluation and development of the treatment plan. Psychiatrists familiar with aeromedical standards are the preferred choice when medications are part of the treatment plan in order to maximize the outcomes. **Please have mental health involved in the care of ALL flyers/operators with mental health concerns.** See the Mental Health Waiver Guide Checklist in the Psychiatry section of the Waiver Guide for a list of questions to be answered during this evaluation.

Table 1: Waiver potential for mood disorders

Flying Class (FC)	Condition	Waiver Potential		Waiver Authority	ACS Review or Evaluation
I/IA		**< 2 years stability**	**≥ 2 years stability**		
	Bipolar disorders	No	No	AFRS/CMO	N/A
	Recurrent major depressive episodes (MDD, PDD)	No	Unlikely	AFRS/CMO	No[5]
	Family history of bipolar disorder in both parents	Unlikely	Unlikely	AFRS/CMO	No[5]
	Depressive disorders (MDD, PDD, etc), single episode	Maybe[1]	Yes	AFRS/CMO	Encouraged
II/III/ATC SWA/ GBO[2]		**< 6 months stability**	**≥ 6 months stability**		
	Bipolar disorders	No	No	MAJCOM	N/A
	Recurrent major depressive episodes (MDD, PDD)	No	Unlikely	MAJCOM	No[5]
	Family history of bipolar disorder in both parents	Maybe[3]	Maybe[3]	MAJCOM	No[5]
	Depressive disorders (MDD, PDD, etc), single episode	Maybe[4]	Yes	MAJCOM	Encouraged, *highly* encouraged for FCII

1. For FCI/IA and other untrained flying classes, a waiver is highly unlikely if they are currently taking an antidepressant. A waiver may be considered after depression is completely resolved and medications and psychotherapy have been discontinued for a minimum of 2 years.
2. AFGSC is the waiver authority for GBO/missileer personnel who meet retention standards.
3. If a family history of bipolar disorder in both parents is discovered after completion of UPT, a waiver may be considered after thorough psychiatric evaluation.
4. Waiver may be considered for all trained flying classes after clinical stability is determined by an MTF doctoral level mental health provider. Clinical stability can be on or off medication, as long as they are NOT taking more than one aeromedically-approved antidepressant.
5. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submission

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial and Renewal Waiver Requests:

1. See Mental Health Waiver Guide Checklist in Psychiatry section of the Waiver Guide
2. If the waiver package is referred to the ACS without required items (e.g., recent mental health evaluation, all records including off-base care, commander's support letter, etc.) the case will be returned to the local MTF in order to provide a complete package.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

Individuals with personal questions should work with their Flight Medicine Clinic.

Flight Surgeons and Mental Health Providers with waiverability questions, please feel free to contact the ACS Neuropsychiatry Branch:

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USAFSAM.FE.PsychiatryMailbox@us.af.mil
Comm: 937-938-2768
DSN: 798-2768

III. Aeromedical Concerns

When assessing aviators facing mental health challenges, it is crucial to employ sound clinical judgment and discernment. In instances where flight safety is in doubt, immediate removal from flying duties is necessary until thorough evaluation and risk assessment are conducted. If further mental health assessment is needed, it should be carried out promptly and may be done without grounding the aviator if flight safety can be assured.

Collaborative decisions involving flight medicine and mental health professionals are essential. Doctoral-level mental health providers with aeromedical experience should be involved, particularly when prescribing psychotropic medications where psychiatric consultation is optimal. **Mental health evaluation and treatment are imperative for flyers with psychiatric symptoms.** Return to flying duties without waiver is possible if no DSM diagnosis with impairment or safety risk is identified. However, if a DSM F-Prefix mental health diagnosis is established, associated impairment is implied, leading to disqualification per the Medical Standards Directory (MSD). In such cases, the appropriate waiver guide should be followed.

For those recovering from a disqualifying DSM diagnosis, first line, evidence-based, well-established, and standard of care treatments should be prescribed for flyers. Such treatment with strong documentation and leadership support contribute to a swift return to full duties, often without an in-person ACS evaluation.

Optimal Cases with Comprehensive Care and Results: Waivers may be considered with less than the recommended period of clinical stability in optimal cases where comprehensive mental health care has been provided, impairing symptoms are resolved, causative stressors are well understood and managed, treatment results are maintained through risk mitigation strategies, and close follow-

up with flight medicine and mental health providers is ongoing. *Comprehensive mental health care is defined by:* management of the condition by a mental health provider, evidence of healthy lifestyle interventions, self-care, and resilience-building, psychotherapy, and/or psychotropic medications. Regular follow-up evaluations with flight medicine and mental health providers are crucial to ensure the flyer's recovery is progressing and stability is maintained over time. **Such optimal care can potentially lead to a waiver with less than the recommended period of clinical stability following an ACS review.**

Depressive Disorders

If the diagnostic criteria for Major Depressive Disorder (MDD), Persistent Depressive Disorder, or Unspecified Depressive Disorder are met, the aviator is disqualified for flying and operational duties. A history of two episodes of MDD increases the probability of recurrence to approximately 70%, even with mitigation strategies including medication management, psychotherapy, and healthy lifestyle interventions. After two episodes of MDD, the recurrence likelihood of a continually emerging pattern of depressive symptoms would be considered frequent or probable. The negative effect on overall performance and reliability would be considered critical or catastrophic. This indicates an unacceptably high aeromedical risk level. Therefore, in all flying classes, whether trained or untrained, recurrent major depressive episodes (Major Depressive Disorder, Persistent Depressive Disorder) are disqualifying and not recommended for waiver by the ACS.

If the diagnosis of a single episode of a depressive disorder is established, then the flyer must be grounded to allow for optimal treatment. Psychotherapy, healthy lifestyle interventions, and/or psychotropic medications may be utilized as treatment options to fully resolve the depressive symptoms. Only achieving partial resolution of symptoms may lead to long-term psychiatric morbidity. In time-limited use of an antidepressant, continued use at least 6-12 months beyond the full resolution of depressive symptoms is recommended. A slow taper should be used in order to prevent abrupt relapse after medication cessation. Psychotherapy may be continued even as symptoms resolve to bolster resiliency and coping mechanisms. A waiver may be considered after 6 months of demonstrated clinical stability (or sooner in optimal cases). Therefore, it is important for the mental health professional to designate and document the date of full resolution of symptoms or clinical stability. It is from that date that 6 months of stability should be measured for potential waiver, regardless of ongoing psychotropic medication and/or psychotherapy in pursuit of optimal therapeutic benefit.

Bipolar and Related Disorders

Once a diagnosis of any bipolar disorder is made, the recurrence likelihood of the symptoms of loss of insight, tenuous reality-testing, poor judgment, and poor treatment compliance would be considered frequent or probable. The negative affect on overall performance and reliability would be considered catastrophic. This indicates an unacceptably high aeromedical risk level. Therefore, in all flying classes, whether trained or untrained, **any bipolar disorder is disqualifying and not recommended for waiver by the ACS.** In such cases, a referral to the AMRO Board to consider a

medical evaluation board (MEB) should be made to determine fitness for general duty and retention.

If both parents are diagnosed with bipolar disorder, there is a 29-75% likelihood their child will develop bipolar disorder. This means an individual who has two parents with bipolar disorder has likelihood of bipolar disorder that is significantly higher than that of the general population. The impact of bipolar disorder on performance, mission, and safety is potentially catastrophic for all flying classes. Therefore, **a family history of a bipolar disorder in both parents is disqualifying for all flying classes.** This family history is **not likely to be waived in untrained flyers**, but trained flyers can be considered for waiver if the family history is discovered after they have completed training. Not disclosing this family history could be considered ARMA-unsatisfactory (a significant integrity violation) if it is discovered the information was withheld in order to enter training.

Mood disorders can be associated with a variety of cognitive, emotional, and behavioral symptoms, including depressed mood, impaired judgement, slowed information processing speed, impaired memory and/or attention and concentration, inflated self-esteem or grandiosity, disturbances in energy and sleep, significant weight loss or gain, psychomotor agitation or retardation, fatigue, distractibility, flight of ideas, inappropriate guilt, indecisiveness, suicidal ideation, and excessive involvement in pleasurable activities that have a high potential for undesirable consequences (e.g., spending sprees, promiscuity, and substance abuse). These cognitive, emotional, and behavioral difficulties can lead to observable as well as subtle changes in functioning that negatively affect performance under physically and psychological taxing conditions. As a result, mood disorders, as well as an elevated likelihood of recurrence for such conditions, are incompatible with aviation safety and flying duties.

Many flyers and operators struggle with depressive disorders. Numerous emotional and behavioral manifestations of depression can impair their cognitive abilities (e.g., ability to focus, sustain attention or concentration, working or general memory, psychomotor coordination, reasoning, spatial judgement, and reaction time) as well as social functioning (e.g., social isolation or withdrawal, increased irritability, and agitation). Some of the more severe symptoms of depression (suicidal ideation and impaired reality testing) may be acutely disabling. Furthermore, depression often coexists with anxiety and psychosomatic complaints, as well as substance abuse.

There are aeromedical concerns related to the antidepressants used for treatment as well. All psychotropic medications have potentially undesirable or dangerous side effects. Common side effects of antidepressants include nausea, vomiting, diarrhea, insomnia, jitteriness, tremor, agitation, restlessness, perspiration, dizziness, and headaches. The likelihood and severity of these side effects has been reviewed and found to be aeromedically-acceptable for the medications on the list of aeromedically approved antidepressants (listed in Section I). Other antidepressants [i.e., paroxetine (Paxil®), venlafaxine (Effexor®), duloxetine (Cymbalta®), etc.] have a more significant side effect profile and risk of discontinuation symptoms if even a single dose is missed. This makes them incompatible with the aviation environment as they represent an unacceptable aeromedical risk in all flying classes.

AIMWTS review in Apr 2023 for the diagnoses of major depression, bipolar and dysthymic/cyclothymic disease resulted in 160 cases since 1 Apr 2019. Of that total, 74 were disqualified. Breakdown of the review are tabulated below.

Please use only *these* ICD-10 codes for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	ATC	GBO	SWA
F32.9	Major depressive disorder, single episode, unspecified	3/7	8/11	22/32	4/8	5/7	3/3
F33.9	Major depressive disorder, recurrent, unspecified	0/3	2/5	6/20	1/3	0/1	0/0
F34.1	Dysthymic disorder	0/1	7/9	16/23	1/4	6/10	2/4
F31.9	Bipolar disorder, unspecified	0/1	0/1	0/0	0/0	0/0	0/1
F31.81	Bipolar II disorder	0/0	0/1	0/3	0/1	0/0	0/1
F34.0	Cyclothymic disorder	0/0	0/0	0/0	0/0	0/0	0/0

IV. Suggested Readings

1. American Psychiatric Association (Ed.). (2022). *Diagnostic and statistical manual of mental disorders: DSM-5-TR* (Fifth edition, text revision). American Psychiatric Association Publishing.

2. Keller MB, Lavori PW, Rice J, et al. The Persistent Risk of Chronicity in Recurrent Episodes of Nonbipolar Major Depressive Disorder: A Prospective Follow-up. Am J Psychiatry, 1986; 143: 24-28.

3. Stovall J. Bipolar disorder in adults: Epidemiology and pathogenesis. UpToDate. Sep 2014.

4. Ireland RR. Pharmacologic Considerations for Serotonin Reuptake Inhibitor Use by Aviators. Aviat Space Environ Med, 2002; 73: 421-29.

Aerospace Medicine Waiver Guide

Other Conditions That May Be a Focus of Clinical Attention (V and Z Codes) and Miscellaneous Disorders

Revised: Apr 2025
Reviewed: Dr. Justin Bunn (ACS Aerospace Clinical Psychologist), Col Kevin F. Heacock (ACS Aerospace Medicine Branch Chief) and ACS Neuropsychiatry Team

Significant Changes: Updated format, some content updates

I. Waiver Consideration

In the Medical Standards Directory (MSD) item Q5E reads, "Other Conditions that may be a focus of clinical attention" including Z or T-Prefix diagnoses where the condition is suspected or known to be detrimental to the safe performance of FLY/SOD. If DOWN for greater than 60 days after treatment initiation, a waiver will be required. Problems may arise such as worry, anxiety, anger, depression, guilt, somatization, and behavioral acting-out that lead to the need for grounding or disqualification. This waiver guide section covers many such conditions: "Any psychiatric condition, or history thereof, which would interfere with AFSC-specific aviation, controller or special duty performance." Additionally, there are numerous conditions not listed in the MSD Psychiatry and Mental Health section and do not have a corresponding waiver guide. This guidance applies to such conditions listed in this "Other Conditions" chapter.

To be considered for waiver, a mental health evaluation with accurate diagnosis per the most recent Diagnostic and Statistical Manual (DSM) is the vital first step. USAF mental health specialists familiar with aeromedical standards are the preferred choice for evaluation and development of the treatment plan. Psychiatrists familiar with aeromedical standards are the preferred choice when medications are part of the treatment plan in order to maximize outcomes. **Please have mental health involved in the care of ALL flyers/operators with mental health concerns.** See the Mental Health Waiver Guide Checklist in the Psychiatry section of the Waiver Guide for a list of questions to be answered during this evaluation.

When assessing aviators facing mental health challenges, it is crucial to employ sound clinical judgment and careful thought. In instances where flight safety is in doubt, immediate removal from flying duties is necessary until thorough evaluation and risk assessment are conducted. If further mental health assessment is needed, it should be carried out promptly and may be done without grounding the aviator if flight safety can be assured.

Collaborative decisions involving flight medicine and mental health professionals are essential. Doctoral-level mental health providers with aeromedical experience should be involved, particularly when prescribing psychotropic medications. **Mental health evaluation and treatment are imperative for flyers with psychiatric symptoms.** Return to flying duties without

waiver is possible if no DSM diagnosis with impairment or safety risk is identified. However, if a DSM F-Prefix mental health diagnosis or "Other Condition" is established, associated impairment is implied, leading to disqualification per the Medical Standards Directory (MSD). In such cases, the appropriate waiver guide should be followed.

For those recovering from a disqualifying DSM diagnosis, first line, evidence-based, well-established, and standard of care treatments should be prescribed for flyers. Such treatment with strong documentation and leadership support contribute to a swift return to full duties, often without an in-person ACS evaluation.

Table 1: Waiver potential for "Other Conditions" Diagnoses

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
I/IA	Yes	AFAC/AM	At discretion of AFAC
II/III/ATC/ GBO/SWA	Yes	MAJCOM	Encouraged, *highly* encouraged for FCII

II. Information Required for Waiver Submission

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial and Renewal Waiver Requests:

1. See Mental Health Waiver Guide Checklist in Psychiatry section of the Waiver Guide
2. If the waiver package is referred to the ACS without required items (e.g., recent mental health evaluation, all records including off-base care, commander's support letter, etc.) the case will be returned to the local MTF in order to provide a complete package.

Note: Please specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

Individuals with personal questions should work with their Flight Medicine Clinic.

Flight Surgeons and Mental Health Providers with waiverability questions, please feel free to contact the ACS Neuropsychiatry Branch:

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Other Conditions That May Be a Focus of Clinical Attention

III. Aeromedical Concerns

"Other Conditions" represent a psychiatric gray area in aerospace medicine. Many of the everyday problems faced by flyers - and therefore by flight surgeons - may be described by these conditions. These often involve the kinds of situations discussed in flying safety briefings given by flight surgeons, or in stress management lectures by aerospace psychologists, because they may interfere with safe or effective flying. Stressors could be in relation to difficulties adjusting to a new culture, aiding a child struggling with a medical diagnosis or behavioral issue, or marital discord leading to the potential ending of a long-term relationship could lead to aeromedical concerns. Whether they are grounds for administrative or medical removal from flying duties, or for establishing a psychiatric diagnosis, require clinical decision-making.

What becomes most relevant to aeromedical decision-making is the response of the aviator rather than the severity of the stressor. Numerous "small" stressors can produce as much fatigue, irritability, early task saturation, distraction, and cognitive inefficiency as a single major stressor. Aeromedically dangerous responses to stressors include those of worry, anxiety, anger, depression, guilt, somatization, and behavioral acting-out. These responses may occur during stable situations, or during such challenges as unexpected TDYs, deployments, or a PCS. Other aeromedically relevant issues include disruption of sleep, significant weight loss or gain, preoccupation, inability to relax, overall mood, affective changes, duty requirements, and flying performance as assessed by the flyer, peers, and/or supervisors. Because these conditions and their impact can be insidious, the flight surgeon should approach such problems in flyers carefully, using techniques that range from informal discussion, as the least intrusive intervention, all the way to a referral for full mental health workup/treatment. Each type of assessment or intervention should consider whether the aviator should continue to fly. In some cases, the aviator may be able to resolve the troubling issue without being placed in a DNIF status. If placed DNIF, once the flyer has engaged in treatment (medications/psychotherapy) and clinical stability from symptoms has been established, return to flying status is possible, and the need for waiver would be considered at that time.

If the concerning responses to the stressor persist or are severe, a formal mental health diagnosis may be warranted. The flight surgeon must always be vigilant for more severe pathology. Relationship distress is a good example of a stressor that may precipitate multiple DNIF periods due to loss of sleep and evolve into an "Other Condition" requiring evaluation and treatment. It may be that the relationship issue precipitates a Major Depressive Disorder that requires treatment and a waiver. The relationship problems may even be the result of a Major Depressive Disorder that began affecting the aviator's personal relationships. If a diagnosis seems warranted, establish it in accordance with current DSM criteria, and see that the flyer receives proper treatment. The length of demonstrated stability post-treatment prior to submission of a waiver is at the discretion of the flight surgeon. NOTE: Beware of delaying or withholding proper treatment solely in order to avoid DNIF or to "protect the aviator's career."

Many flyers with “Other Conditions and Miscellaneous Psychiatric Diagnoses” typically have other concurrent emotional or behavioral disturbances such as anxiety, depression, or a substance use problem that may be aeromedically significant. Others have personality issues or traits that are problematic. Flyers with these issues should be individually assessed with attention given to rule out a DSM diagnosis.

Some of the diagnoses (such as Other Specified Disruptive, Impulse-Control, and Conduct Disorder) tie in closely with reliability, integrity, and security concerns. Returning these aviators to flight status may cause subsequent issues in the squadron and morale problems among the flight crew. Many of these individuals also have unstable interpersonal relationships with family which can have a significantly negative impact on flying operations. Administrative, legal, or security clearance action may be required even if the primary problem is not medically disqualifying.

AIMWTS search from Dec 2019 - Dec 2024 revealed 192 cases with a Z-code diagnosis. Breakdown of the cases revealed: 8 FC I/IA case (7 disqualified), 45 FC II cases (5 disqualified), 88 FC III cases (29 disqualified), 22 GBO (RPA) cases (4 disqualified), 19 ATC/GBC cases (10 disqualified). The following codes were most often utilized: Z60.0 Phase of Life (30 cases), Z63.0 Relationship Distress (88 cases), and Z56.9 Other Problem Related to Employment (60 cases).

ICD-10 codes for Other Conditions and Miscellaneous Psychiatric Diagnoses	
Z55.9	Other Problems Related to Education and Literacy
Z60.3	Acculturation Difficulty
Z72.811	Adult Antisocial Behavior
V62.82	Uncomplicated Bereavement
Z63.5	Disruption of family by separation or divorce
Z65.5	Exposure to Disaster, War, or Other Hostilities
Z63.8	High Expressed Emotion Level Within Family
Z91.19	Nonadherence to medical treatment
Z56.9	Other Problem Related to Employment
F91.9	Other Specified Disruptive, Impulse-Control, and Conduct Disorder
E66.9	Overweight or Obesity
Z62.820	Parent-Child Relational Problem
Z62.812	Personal history (past history) of neglect in childhood
Z62.810	Personal history (past history) of sexual abuse in childhood
Z62.811	Personal history (past history) of psychological abuse in childhood
Z91.410	Personal history (past history) of spouse or partner violence, physical
Z91.410	Personal history (past history) of spouse or partner violence, sexual
Z91.411	Personal history (past history) of spouse or partner psychological abuse
Z91.412	Personal history (past history) of spouse or partner neglect
Z60.0	Phase of Life Problem
Z56.82	Problem Related to Current Military Deployment Status
F54	Psychological Factors Affecting Medical Conditions
Z63.0	Relationship Distress With Spouse or Intimate Partner
Z65.8	Religious or Spiritual Problem
F52.9	Unspecified Sexual Dysfunctions
Z60.4	Social Exclusion or Rejection
Z60.5	Target of (Perceived) Adverse Discrimination or Persecution
Z60.9	Other Problem Related to Social Environment
Z72.9	Problem Related to Lifestyle
Z91.49	Personal History of Psychological Trauma
Z91.82	Personal History of Military Deployment

IV: Suggested Readings

1. Ahmed SM, Lemkau JP, and Hershberger PJ. Psychosocial Influences on Health. Ch. 3 in Rakel: Textbook of Family Medicine, 8th ed., Saunders, 2011.

2. Alkov RA, Gaynor JA, and Borowsky MS. Pilot Error as a Symptom of Inadequate Stress Coping. Aviat Space Environ Med, 1985; 56: 244-47.

3. American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5-TR), Other Conditions That May Be a Focus of Clinical Attention. Arlington, VA, American Psychiatric Association, 2022: 821-836.

4. Boelen PA, van den Bout J, and de Keijser J. Traumatic Grief as a Disorder Distinct from Bereavement-Related Depression and Anxiety: A Replication Study with Bereaved Mental Health Care Patients. Am J Psychiatry, 2003; 160: 1339-41.

5. Green RG. Stress and Accidents. Aviat Space Environ Med, 1985; 56: 638-41.

6. Moriarty HJ, Carroll R, Cotroneo M. Differences in Bereavement Reactions Within Couples Following Death of a Child. Res Nurs Health, 1996; 19: 461-69.

7. Paradis AF, Reinherz HZ, Giaconia RM, et al. Long-Term Impact of Family Arguments and Physical Violence on Adult Functioning at Age 30 Years: Findings from the Simmons Longitudinal Study. J Am Acad Child Adolesc Psych, 2009; 48: 290-98.

8. Piper WE, Ogrodniczuk JS, Azim HF, and Weideman R. Prevalence of Loss and Complicated Grief Among Psychiatric Outpatients. Psych Serv, 2001; 52: 1069-74.

9. Powell AD. Grief, Bereavement, and Adjustment Disorders. Ch. 38 in Stern: Massachusetts General Hospital Comprehensive Clinical Psychiatry, 1st ed., Mosby, 2008.

10. Spruijt E and de Goede M. Transitions in Family Structure and Adolescent Well-Being. Adolescence, 1997; 32: 897-911.

11. Voge VM. Failing Aviator Syndrome: A Case History. Aviat Space Environ Med, 1989; 60: A89-91. 12. Weiss DS and DeWitt KN. V Codes for Conditions Not Attributable to Mental Disorder. From Ch. 23, Adjustment Disorder in Review of General Psychiatry, 5th edition, 2000, Howard Goldman, editor.

Aerospace Medicine Waiver Guide

Personality Disorders & ARMA

Revised: June 2024
Reviewed: Dr. Joe Wood (ACS Aerospace Clinical Psychologist), Col Kevin F. Heacock (ACS Aerospace Medicine Branch Chief), and ACS Neuropsychiatry Team
Significant Changes: Updated AIMWTS review and suggested readings. Mental health evaluation and treatment are imperative for flyers with psychiatric symptoms.

I. Waiver Consideration

A personality disorder that is severe enough to repeatedly manifest itself by significant interference with safety of flight, crew coordination, or mission completion is disqualifying for all flying classes and special duty positions. In addition, unsatisfactory duty performance due to personality disorder may cause the member to be unsuitable for military service, as opposed to unfit, and subject to administrative separation. If the member has personality traits but does not meet the criteria for personality disorder, they still may have an Adaptability Rating for Military Aviation (ARMA) that is unsatisfactory. It is strongly recommended that all cases being considered for a waiver be reviewed by the ACS.

To be considered for waiver, a mental health evaluation with accurate diagnosis per the most recent Diagnostic and Statistical Manual (DSM) is the vital first step. USAF mental health specialists familiar with aeromedical standards are the preferred choice for evaluation and development of the treatment plan. Psychiatrists familiar with aeromedical standards are the preferred choice when medications are part of the treatment plan in order to maximize the outcomes. **Please have mental health involved in the care of ALL flyers/operators with mental health concerns.** See the Mental Health Waiver Guide Checklist in the Psychiatry section of the Waiver Guide for a list of questions to be answered during this evaluation.

Table 1: Waiver potential for Personality Disorders[1]

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
I/IA	No[2]	AFRS/CMO	Only if requested by AFRS/CMO
II/III/ATC/GBO[2] SWA	Yes[3]	MAJCOM	Yes

1. Cases considered for waiver must have documented clinical stability with no functional impairment.
2. Waiver not recommended for any initial flying class for individuals with a history of personality disorder.
3. No indefinite waivers.

II. Information Required for Waiver Submission

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial and Renewal Waiver Requests:

1. See Mental Health Waiver Guide Checklist in Psychiatry section of the Waiver Guide
2. If the waiver package is referred to the ACS without required items (e.g., recent mental health evaluation, all records including off-base care, commander's support letter, etc.) the case will be returned to the local MTF in order to provide a complete package.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

Individuals with personal questions should work with their Flight Medicine Clinic.

Flight Surgeons and Mental Health Providers with waiverability questions, please feel free to contact the ACS Neuropsychiatry Branch:

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III. Aeromedical Concerns

Management of personality disorders is directed primarily toward the more predominant symptom characteristics. Initially, efforts are focused on maintaining and supporting the patient-clinician relationship and establishing a working alliance. The treating clinician needs to have a good understanding of the personality characteristics of these patients and work to adapt his or her style in order to optimize communication and the ultimate clinical outcome. Psychotropic medications are not a front-line approach to the care of most of patients. If a particular case lends itself to treatment with medications, it should not be attempted by a non-mental health professional.

Adaptability Rating for Military Aviation (ARMA) Unsatisfactory:

For all flying classes the question of suitability is important. Personality disorders and traits may impact performance of military duty and flight safety. However, full-blown personality disorders are rare in aviators. More common are problematic personality traits that will not be labeled as a personality disorder but may be grounds for an ARMA unsatisfactory designation. Characteristics such as immaturity, impulsivity, inflated self-esteem, high neuroticism, or recurrent dishonesty are particularly undesirable in aviators.

The term ARMA was originally used as a selection tool for pilots and can still be used most fruitfully in selecting out any applicant whose emotional disposition and/or behavior meets its definition. For example, any flying applicant whose history includes self-harm, chaotic relationships and suicidality should be carefully assessed for suitability to the aviation environment, even if they have not been diagnosed with a disqualifying psychiatric condition.

Personality Disorders & ARMA

ARMA unsatisfactory may also be applied to trained aviators. Preexisting maladaptive personality traits may have been previously hidden or can be triggered due to situational stressors or life events. Improvement in functioning can potentially occur in some of these cases, but the course of treatment can be lengthy with significant progress difficult due to the characterological nature of the traits. Consultation with a mental health provider with aviation experience and/or consultation with the ACS is recommended for potential ARMA cases.

AIMWTS review in May 2024 for the previous ten years produced 85 cases with the diagnosis of personality disorder and/or ARMA unsatisfactory; all but 10 resulted in a disposition of disqualified. Breakdown of the cases is shown in the table below. There were 7 individuals with multiple waivers. The vast majority of the cases had at least one other psychiatric diagnosis in addition to the diagnosis of personality disorder.

Please use only the ICD-10 codes below for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	ATC	GBO	SWA
All ICD-10 codes below	Personality Disorders and ARMA Unsat	1/5	2/14	6/40	1/12	0/12	0/2

ICD-10 Codes for Personality Disorders

F07.0	Personality Change Due to Another Medical Condition
F21	Schizotypal Personality Disorder
F60.0	Paranoid Personality Disorder
F60.1	Schizoid Personality Disorder
F60.2	Antisocial Personality Disorder
F60.3	Borderline Personality Disorder
F60.4	Histrionic Personality Disorder
F60.5	Obsessive-Compulsive Personality Disorder
F60.6	Avoidant Personality Disorder
F60.7	Dependent Personality Disorder
F60.81	Narcissistic Personality Disorder

IV. Suggested Readings

1. American Psychiatric Association (Ed.). (2022). Diagnostic and statistical manual of mental disorders: DSM-5-TR (Fifth edition, text revision). American Psychiatric Association Publishing.

2. Mills, J.G. & Jones, D.R. The Adaptability Rating for Military Aeronautics: An Historical Perspective of a Continuing Problem. *Aviation, Space and Environmental Medicine*, Jun 1984, 558-562.

3. Hubner, M., Pierson, R, Puchta, P., & McBride, T. (2017). A Reconceptualization of the Adaptability Rating for Military Aviation. (Technical Report AFRL-SA-WP-SR-2017-0002). OH: U.S. Air Force School of Aerospace Medicine: Wright-Patterson AFB.

4. Ekselius, L. (2018). Personality Disorder: A Disease in Disguise. *Upsala Journal of Medical Sciences*, 123, 194-204.

5. Rayman RB. *Clinical Aviation Medicine*, 4th Ed. New York, NY; Professional Publishing Group, Ltd; 2006, pp. 303-05.

Aerospace Medicine Waiver Guide

Posttraumatic Stress Disorder (PTSD)

Revised: Apr 2024
Reviewed: Col Kevin F. Heacock (ACS Aerospace Medicine Branch Chief), Dr. Justin Bunn (ACS Aerospace Clinical Psychologist), and ACS Neuropsychiatry Team
Significant Changes: Updated exposure therapy treatment options, antidepressant addition update, AIMWTS review. Mental health evaluation and treatment are imperative for flyers with psychiatric symptoms.

I. Waiver Consideration

Posttraumatic Stress Disorder (PTSD) is disqualifying for all flying classes: FCI/IA, FCII, FCIII, ATC, GBO, and SWA. Untreated or undertreated PTSD may have potentially disastrous consequences. A diagnosis of PTSD does NOT require a waiver if the member is able to return to full duty within 60 days after starting treatment (minor residual symptoms are acceptable). However, the condition is disqualifying and a waiver will be required before consideration of return to flight status if any of the following conditions are met: (a) DNIF lasts greater than 60 days after the start of treatment; (b) level of care higher than weekly outpatient treatment was needed; (c) member experiences a recurrence of debilitating symptoms upon return to the operational environment; or (d) original symptom severity was such that in the opinion of the flight surgeon, return to the operational environment would entail high risk to the member, the mission or flight safety should the symptoms recur. Flight surgeons caring for distressed aviators, especially in times of combat, need to be particularly sensitive to these issues and work closely with a psychiatrist or psychologist early in the evaluation, treatment and aeromedical disposition of these aviators whether or not their symptoms are caused by combat/operational stress or other traumatic incidents. PTSD can remit to the point of being eligible for a waiver, especially when treated with evidence-based exposure psychotherapy (the treatment of choice for flyers), healthy lifestyle interventions, and/or antidepressants. The USAF began allowing waivers for flyers taking specific antidepressants in 2013. Since 2020, aeromedically-approved antidepressants include:

1. Sertraline (Zoloft®) up to 200 mg/day
2. Fluoxetine (Prozac®) up to 80 mg/day
3. Citalopram (Celexa®) up to 40 mg/day
4. Escitalopram (Lexapro®) up to 20 mg/day
5. Bupropion (Wellbutrin®) SR or XL up to 400 mg/day or 450 mg/day, respectively (NOTE: immediate release Wellbutrin® is NOT aeromedically-approved)

Use of only ONE aeromedically-approved antidepressant at a time is allowed (monotherapy). Dual therapy, for example adding Wellbutrin® to Zoloft® or another antidepressant, is not aeromedically-approved. The need for multiple antidepressants suggests a level of severity or

recurrence likelihood too high to consider for waiver. Of these approved medications, Wellbutrin is known to be less effective in treating PTSD. Also, the dosage of the antidepressant tends to require "higher than usual" amounts when treating PTSD as compared to treatment for depression. This often makes Zoloft or Prozac an attractive choice in treating PTSD among these approved antidepressants. Treatment plans involving electroconvulsive therapy (ECT), transcranial magnetic stimulation (TMS), ketamine, psychedelics, or other non-first line treatments do not support waiver. First line, evidence-based, well-established, and standard of care treatments should be emphasized and prescribed for flyers, if needed. Also, waivers are highly unlikely for untrained personnel currently taking antidepressants. This includes untrained pilots undergoing FCI evaluations to start UPT as well as untrained FCIII, ATC, GBO, and SWA. ACS review for all PTSD cases is at the discretion of the Waiver Authority.

The ACS recommends a flyer or operator with PTSD achieve **clinical stability** (i.e., symptoms of the diagnosis are no longer causing clinically significant distress or impairment and the aviator demonstrates adequate function in social, occupational, and other important areas for functioning) with the period of stability at the discretion of the flight surgeon to pursue waiver. The ACS recommends determination of clinical stability include of the following criteria:

1. Does not pose a risk of sudden incapacitation (e.g., suicidal ideation)
2. Has minimal potential for subtle performance decrement (e.g., anxiety, distraction, cognitive problems (such as problems with sustained attention), inappropriate avoidance behaviors, negative distortions)
3. Expected to remain stable under the stress of aviation or operational environment
4. First signs or symptoms of recurrence are easily detectable and member reliably agrees to report such symptoms
5. Flyer and MTF doctoral level mental health provider agree to follow up appointments and collaborative observation to assure potential relapsing symptoms are appropriately addressed.

The dose of antidepressant medication can and SHOULD BE adjusted to maximize treatment and/or limit side effects. If the antidepressant dose is adjusted (increased, decreased, or discontinued), a 2-week DNIF for a ground trial observation should occur before resuming flight duties. If the antidepressant is changed to another aeromedically-approved antidepressant secondary to side effects or a desire for increased resolution of symptoms, a 4-week DNIF for a ground trial observation should occur before resuming flight duties. These ground trials are necessary to assess for adverse or unexpected side effects or symptom recurrence. If symptoms return after adjusting the dose, discontinuing treatment, or switching antidepressants, a return to or enhancement of psychotherapy, healthy lifestyle interventions, and/or antidepressant medication for maintenance treatment should be considered. **A clinical decision would need to be made by the treatment team as to what period of clinical stability would be most appropriate before resubmitting a waiver.**

To be considered for waiver, a mental health evaluation with accurate diagnosis per the most recent Diagnostic and Statistical Manual (DSM) is the vital first step. USAF mental health specialists familiar with aeromedical standards are the preferred choice for evaluation and development of the treatment plan. Psychiatrists familiar with aeromedical standards are the preferred choice when

medications are part of the treatment plan in order to maximize the outcomes. **Please have mental health involved in the care of ALL flyers/operators with mental health concerns.** See the Mental Health Waiver Guide Checklist in the Psychiatry section of the Waiver Guide for a list of questions to be answered during this evaluation.

Table 1: Waiver potential for PTSD

Flying Class (FC)	Condition	Waiver Potential	Waiver Authority	ACS Review or Evaluation
I/IA	Posttraumatic Stress Disorder (PTSD)	Maybe[1]	AFRS/CMO	Highly Encouraged
II/III/ATC/ GBO[2] SWA	Posttraumatic Stress Disorder (PTSD)	Yes	MAJCOM	Encouraged

1. Must clearly demonstrate complete resolution of all PTSD symptoms before acceptance into initial flying training and have complete documentation from mental health providers

II. Information Required for Waiver Submission

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial and Renewal Waiver Requests:

1. See Mental Health Waiver Guide Checklist in Psychiatry section of the Waiver Guide
2. If the waiver package is referred to the ACS without required items (e.g., recent mental health evaluation, all records including off-base care, commander's support letter, etc.) the case will be returned to the local MTF in order to provide a complete package.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

Individuals with personal questions should work with their Flight Medicine Clinic.

Flight Surgeons and Mental Health Providers with waiverability questions, please feel free to contact the ACS Neuropsychiatry Branch:

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III. Aeromedical Concerns

When assessing aviators facing mental health challenges, it is crucial to employ sound clinical judgment and discernment. In instances where flight safety is in doubt, immediate removal from flying duties is necessary until thorough evaluation and risk assessment are conducted. If further mental health assessment is needed, it should be carried out promptly and may be done without grounding the aviator if flight safety can be assured.

Collaborative decisions involving flight medicine and mental health professionals are essential. Doctoral-level mental health providers with aeromedical experience should be involved, particularly when prescribing psychotropic medications where psychiatric consultation is optimal. **Mental health evaluation and treatment are imperative for flyers with psychiatric symptoms.** Return to flying duties without waiver is possible if no DSM diagnosis with impairment or safety risk is identified. However, if a DSM F-Prefix mental health diagnosis is established, associated impairment is implied, leading to disqualification per the Medical Standards Directory (MSD). In such cases, the appropriate waiver guide should be followed.

For those recovering from a disqualifying DSM diagnosis, first line, evidence-based, well-established, and standard of care treatments should be prescribed for flyers. Such treatment with strong documentation and leadership support contribute to a swift return to full duties, often without an in-person ACS evaluation.

The diagnosis of PTSD, especially in the combat environment, is fraught with difficulty. Normal reactions to combat, operational stress, and emotional/stressful events can all be confused with and labeled as PTSD, especially when the member is routinely exposed to the stressful environment. While symptoms are similar, the course of treatment and aeromedical dispositions of the reactions are extremely different. Flight surgeons and mental health providers need to consider the length, severity, and functional impact of PTSD symptoms along with the situationally induced nature and accompanying stressors that triggered the condition.

There is a high prevalence of other psychiatric disorders in individuals diagnosed with PTSD, with both men and women reporting other comorbid psychiatric conditions. Major Depressive Disorder is among the most common comorbid conditions for both men and women, affecting nearly 50%. Alcohol Use Disorder is also highly comorbid in men (seen in over half of all cases). Additionally, there is a threefold to sevenfold increased risk for both men and women with PTSD for diagnosis of Anxiety Disorders, including Generalized Anxiety Disorder, Panic Disorder, and Specific Phobias. These diagnoses should be screened for to consider flying status, treatment, and waiver potential for them as well.

Early intervention and treatment may prevent chronic disease. Long-term multifaceted treatment has shown the greatest benefit to those afflicted, given the complex nature of PTSD. Various psychotherapeutic modalities have been shown to be effective in PTSD. Prolonged Exposure (PE), Cognitive Processing Therapy (CPT), Eye Movement Desensitization and Reprocessing Therapy (EMDR), and Written Exposure Therapy (WET) have been found effective in randomized control trials. Psychotherapy, along with healthy lifestyle modifications, are the treatment of choice for PTSD. It is advisable for primary care providers and flight surgeons to refer these patients to a therapist or treatment team with experience in such therapies.

Medications may play a role in treating some air crew. The therapeutic goals of psychopharmacologic therapy are to decrease intrusive thoughts and images, phobic avoidance, pathological hyperarousal, hypervigilance, impulsivity, and depression. Selective Serotonin Reuptake Inhibitors (SSRIs) were found to be effective as first-line drug therapy in a systematic review of 35 randomized trials and are recommended in treatment guidelines for PTSD from the American Psychiatric Association. SSRIs have been found to reduce flashbacks, arousal, and avoidance in patients with PTSD.

Prolonged severe operational stress can cause symptoms of PTSD. For operational stress reactions, the individual's symptoms typically clear shortly after removal/restriction from duty. Specific situational anxiety reactions that develop after traumatic incidents (e.g. claustrophobia, flying phobia), when symptoms do not interfere with duty, are best treated with occupational exposure with or without short term DNIF. In situations in which exposure-based therapies would facilitate resolution of symptoms, prolonged restriction from duty may actually delay recovery.

In some instances, a member's symptoms are more generalized, accompanied by a change in social or occupational functioning, and do not clear with time off, adequate sleep and initial treatment attempts. In these cases, consider the diagnosis of PTSD, other associated conditions, and the member's motivation. Many of the symptoms of PTSD can interfere with flying safety and mission completion. Severe anxiety symptoms markedly impair the ability to focus and concentrate on the task at hand. Some of the more severe symptoms, such as flashbacks, may be acutely incapacitating. Associated mental health conditions can also negatively affect the ability of the aviator to successfully complete the mission. DNIF and treat whenever symptoms interfere with safety of flight, the mission, or the member's safety, regardless of diagnosis.

Remotely Piloted Aircraft (RPA) operators and others involved in remote warfare have the potential to develop PTSD through their viewing of work-related video and other electronic media. Recent efforts

to investigate the prevalence of PTSD in the remote warfare community suggest rates of PTSD are similar to other USAF pilots.

AIMWTS review in Oct 2023 for the previous five years revealed 425 airmen with a diagnosis of PTSD, with 190 of the cases resulting in a disqualified disposition. Breakdown of the cases revealed: 15 FC I/IA cases (8 disqualified), 83 FC II cases (32 disqualified), 197 FC III cases (83 disqualified), 27 ATC cases (16 disqualified), 57 GBO cases (33 disqualified), 46 Special Warfare Airmen (SWA) (18 disqualified). The major factors resulting in a disqualification were persistent symptoms, chronic disease, other mental health diagnoses, and the need to treat with medications not approved for use in USAF aircrew.

Please use only *these* ICD-10 codes for AIMWTS coding purposes		(# of waivers / total # of cases)					
		IFC I/IA	FC II	FC III	ATC	GBO	SWA
F43.10	Post-traumatic stress disorder, Unspecified	7/12	45/72	90/151	9/21	19/35	23/38
F43.11	Post-traumatic stress disorder, Acute	0/0	0/1	1/2	0/0	0/0	0/0
F43.12	Post-traumatic stress disorder, Chronic	0/3	6/10	23/44	2/6	5/22	5/8

IV. Suggested Readings

1. Sireen J. Posttraumatic stress disorder in adults: Epidemiology, pathophysiology, clinical manifestations, and diagnosis. UpToDate. Dec 2015.

2. American Psychiatric Association (Ed.). (2022). Diagnostic and statistical manual of mental disorders: DSM-5-TR (Fifth edition, text revision). American Psychiatric Association Publishing.

3. Gitlow S. Psychiatry. Ch. 12 in Rayman's Clinical Aviation Medicine, 5th ed. New York; Castle Connolly Graduate Medical Publishing, LTD, 2013, pp. 314-15.

4. Watts BV, Schnurr PP, Mayo L, et al. Meta-Analysis of the Efficacy of Treatments of Posttraumatic Stress Disorder. J Clin Psychiatry, 2013; 74(6): 541-50.

5. McLean, C. P., Levy, H. C., Miller, M. L., & Tolin, D. F. (2022). Exposure therapy for PTSD in military populations: A systematic review and meta-analysis of randomized clinical trials. Journal of Anxiety Disorders, 90, 102607. https://doi.org/10.1016/j.janxdis.2022.102607

6. Sloan, D. M., Marx, B. P., Resick, P. A., Young-McCaughan, S., Dondanville, K. A, Straud, C. L. Mintz, J., Litz, B. T., & Peterson, A. L. for the STRONG STAR Consortium. (2022). Effect of Written Exposure Therapy vs Cognitive Processing Therapy on increasing treatment efficiency among military service members with posttraumatic stress disorder: A randomized noninferiority trial. JAMA Open Network, 5(1), e2140911. https://doi.org/10.1001/jamanetworkopen.2021.40911

7. Ursana RJ, Bell C, Eth S, et al. Practice Guideline for the Treatment of Patients with Acute Stress Disorder and Posttraumatic Stress Disorder. American Psychiatric Association, 2004.

8. Wood JD, Heaton J, Hubner M, and Rhodes N. Formation of the U.S. Air Force Aviator Post- Traumatic Stress Disorder Study Group. U.S. Air Force School of Aerospace Medicine: Wright- Patterson AFB, OH 2016; Technical Report AFRL-SA-WP-TR-2016-0017.

9. Wood J, Heaton JE. (2016 Mar) Aeromedical Consultation Service PTSD Study Group. Paper presented at the NATO Science and Technology Organization Technical Course, Ramstein AFB,

Schizophrenia Spectrum and Other Psychotic Disorders (including Delirium)

Revised: Dec 2024

Reviewed: Dr Ryan Peirson (ACS Neuropsychiatry Branch Psychiatrist), Lt Col David Smith (Resident of Aerospace Medicine) and Col Kevin Heacock (ACS Aerospace Medicine Branch Chief)

Significant Changes: Restructuring of Waiver Guide, AIMWTS review

I. Waiver Consideration

Psychotic Disorders, as well as delirium, which by their very nature interfere with safety of flight, are disqualifying for all flying classes. The primary symptoms of psychotic disorders, namely altered thought and/or perception, are not compatible with the complex and dangerous conditions of the aerospace environment. Waiver may only be considered for psychotic episodes with clear and reversible/avoidable triggers, such as those caused by a medical condition, or use of alcohol or other substances. Alcohol-Induced Psychotic Disorder in the context of Alcohol Use Disorder is considered for waiver in accordance with the requirements for Alcohol Use Disorder (see AMWG, Alcohol Use Disorders). Alcohol-Induced Psychotic Disorder without Alcohol Use Disorder is considered for waiver according to the guidance herein. Substance/ Medication-Induced Psychotic Disorder can only be waived when the diagnosis is supported by strong and persuasive evidence (such as collateral history, examination, laboratory evaluation, and timeline). When the inducing substance was used illegally, whether inherently illicit or a legal substance used inappropriately, a return to flying is unlikely. When the exposure is speculative and without confirmation, a return to flying is unlikely. Psychotic Disorder Due to Another Medical Condition may be considered for a waiver if the other medical condition is eligible, the psychosis and the other medical condition have completely resolved, and the likelihood of a recurrence of the other medical condition is remote.

Schizophrenia, Schizoaffective Disorder, Delusional Disorder, Brief Psychotic Disorder, and shared psychotic disorder are permanently disqualifying. Antipsychotic medications and close psychiatric monitoring are incompatible with flying duties. An MEB is required for any psychotic episode, including those with brief duration, good prognosis, and clearly identifiable and reversible cause.

Due to the medical differential, the advanced nature of the clinical question, and the need to consider risk factors and prognosis beyond advocacy, an evaluation with an Air Force **psychiatrist** is required prior to waiver consideration. In the limited situations where waiver is possible for trained aircrew, an asymptomatic period of no fewer than 12 months is required. Waivers are not considered for FCI or other untrained personnel with a history of psychosis.

Due to the high five-year recurrence rate and potentially catastrophic outcomes, aeromedical dispositions should be made with great care. Close surveillance is required, indefinite waivers are not recommended, and a waiver should not be retired. Aeromedical Consultation Service (ACS) review or evaluation is required.

It is tempting to minimize a psychotic episode in a high-performing population, especially if one develops after taking a prescription medication. Although general clinical optimism is appropriate, this is a dangerous approach aeromedically. Psychosis offers a good example of how literature-supported clinical outcomes in the most benign presentations still result in serious or high risk in the aeromedical environment when analyzed using a structured risk tool such as the Aeromedical Consultation Service Medical Risk Assessment & Airworthiness Matrix (AMRAAM).

Before submitting the case for waiver consideration, the base-level flight surgeon must first discern whether the condition is unsuiting vs. unfitting for service. If the Airman requires a fit/unfit determination, the case needs MEB action; if the Airman requires suited/unsuited determination, the case then needs consideration of an administrative separation or discharge via the chain of command.

Table 1: Waiver potential for *Psychotic Disorders with specific trigger*

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
I/IA	No	AFAC/AM	Only if requested by AFAC/AM
II/III/ATC/GBO/ SWA	Yes[1, 2, 3]	MAJCOM	Yes

1. Waivers are NOT considered for Schizophrenia, Schizoaffective Disorder, Schizophreniform Disorder, Delusional Disorder, Brief Psychotic Disorder Without Marked Stressor(s), and certain Other Specified Psychotic Disorders (e.g., Delusional symptoms in the context of relationship with an individual with prominent delusions).
2. For all UNTRAINED individuals, a waiver is NOT considered.
3. No indefinite waivers.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines & recommendations.

A. Initial and Renewal Waiver Request:

1. See Mental Health Waiver Guide Checklist in Psychiatry section of the Waiver Guide.
2. If the waiver package is referred to the ACS without required items (e.g., recent mental health evaluation by a **psychiatrist**, all records including off-base care, commander's support letter, etc.) the case will be returned to the local MTF in order to provide a complete package.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

Individuals with questions about their specific situations or the waiver process should contact their Flight Medicine Clinic.

Flight Surgeons and Mental Health Providers with waiverability questions, please feel free to contact the ACS Neuropsychiatry Branch:

ACS Aerospace Medicine Branch, USAFSAM/FECA
c/o Neuropsychiatry Branch
2510 Fifth Street Bldg 840
Wright Patterson AFB, OH 45433-7913
2768 Fax: (937) 904-6296 DSN: 674-9296

USAFSAM.FE.PsychiatryMailbox@us.af.mil
Comm: 937-938-2768
DSN: 798-

III. Aeromedical Concerns

Psychosis is disqualifying for aviation duties. Symptoms of aeromedical concern include poor reality testing, poor insight, eccentric and bizarre behavior, social withdrawal, hallucinations, delusions (sometimes of a persecutory or self-destructive nature), confusion, clouding of consciousness, illogical thought, and a risk of suicide. Because of concern about unpredictable recurrence (with potentially devastating effects upon flying safety, mission completion, and personal health), careful documentation, management, and monitoring are important to aeromedical prognosis. If and when psychosis occurs in an aviator, the flight surgeon must consider waiverable disorders. Potentially waiverable causes of psychosis include toxic (substance-induced psychotic disorder), metabolic, and/or infectious conditions (psychotic disorder due to a general medical condition).[3] Thorough documentation during the illness is vital to maximize the probability of an aviator's return to flying status after psychosis. Acute, stress-related psychoses in aviators often resolve quickly with hospitalization and stress relief and without antipsychotic medication.

AIMWTS review in Dec 2024 revealed 37 airmen with psychotic disorders. 12 of the individuals had multiple waiver attempts (range 2-7). All repeat waiver attempts were consistent in outcome, except for two. One airman was granted a waiver initially, then disqualified at renewal. The second airman was initially disqualified but subsequently granted two waivers upon renewal. Of all 61 waivers for a variation of a psychotic disorder 32 resulted in a disqualified disposition. Breakdown of the cases revealed: 2 FC I cases (2 disqualified), 41 FC II cases (20 disqualified), 12 FC III cases (5 disqualified), 5 ATC/GBC cases (5 disqualified), and 1 GBO cases (0 disqualified).

Please use only *these* ICD-10 codes for AIMWTS coding purposes		(# of waivers / total # of cases)					
		FC I/IA	FC II	FC III	ATC	GBO	SWA
F22	Delusional disorder	0/0	0/0	0/0	0/0	0/0	0/0
F23	Brief psychotic disorder	0/0	0/6	1/2	0/0	0/0	0/0
F29	Unspecified psychosis not due to a substance or known physiological condition	0/0	0/0	0/1	0/1	0/0	0/0
F06.2	Psychotic disorder with delusions due to a known physiological condition	0/0	0/0	0/0	0/0	0/0	0/0
F06.8	Other specified psychotic disorders due to known physiological condition	0/0	0/1	2/2	0/0	0/0	0/0

F10.951	Alcohol use, unspecified, with alcohol-induced psychotic disorder with hallucinations	0/0	0/0	0/0	0/0	0/0	0/0
F10.159	Alcohol abuse with alcohol-induced psychotic disorder, unspecified	0/0	0/0	0/0	0/0	0/0	0/0
F10.231	Alcohol dependence with withdrawal delirium	0/0	9/9	0/0	0/1	1/1	0/0

IV. Suggested Readings

1. American Psychiatric Association. (2022). Schizophrenia Spectrum and Other Psychotic Disorders. In *Diagnostic and statistical manual of mental disorders* (5th ed., text rev). https://doi.org/10.1176/appi.books.9780890425787.x02_Schizophrenia_Spectrum
2. Caton, C. L., Drake, R. E., Hasin, D. S., Dominguez, B., Shrout, P. E., Samet, S., & Schanzer, B. (2005). Differences between early-phase primary psychotic disorders with concurrent substance use and substance-induced psychoses. *Archives of general psychiatry*, *62*(2), 137–145. https://doi.org/10.1001/archpsyc.62.2.137
3. Davis, J.R., Stepanek, J., Fogarty, J.A., Blue, R.S. (2022). Aerospace behavioral health. *Fundamentals of Aerospace Medicine* (5th ed.) Wolters Kluwer.

Aerospace Medicine Waiver Guide

Somatic Symptom and Related Disorders

Revised: Dec 2024

Reviewed: Maj Henrik E. Close (ACS Neuropsychiatry Deputy Branch Chief), Col Kevin F. Heacock (ACS Aerospace Medicine Branch Chief) and ACS Neuropsychiatry Team

Significant Changes: Updated format, some content updates including med management

I. Waiver Consideration

Somatic Symptom Disorders are disqualifying for all flying classes: FC I/IA, FC II, FC III, ATC, GBO, and SWA. The ACS recommends a flyer or operator with a somatic symptom disorder achieve **clinical stability** (i.e., symptoms of the diagnosis are no longer causing clinically significant distress or impairment, and the aviator demonstrates adequate function in social, occupational, and other important areas for functioning) for **12 months** before considering a waiver. Somatic Symptom Disorders such as Illness Anxiety Disorder and Functional Neurological Symptom Disorder (Conversion Disorder) can remit to the point of being eligible for waiver, especially when treated with psychotherapy, and/or healthy lifestyle interventions. Antidepressants are generally only recommended in treatment-resistant Somatic Symptom Disorder cases but can be helpful particularly with co-morbid anxiety and/or depression.

To be considered for waiver, a mental health evaluation with accurate diagnosis per the most recent Diagnostic and Statistical Manual (DSM) is the vital first step. USAF psychologists and psychiatrists familiar with aeromedical standards are the preferred choice for evaluation and development of the treatment plan. Psychiatrists are the preferred choice when medications are part of the treatment plan in order to maximize the outcomes. **Please have mental health involved in the care of ALL flyers/operators with mental health concerns.** See the Mental Health Waiver Guide Checklist in the Psychiatry section of the Waiver Guide for a list of questions to be answered during this evaluation.

Please note, *Factitious disorder* (once called Munchausen syndrome) is disqualifying for all flying classes to include retention on active duty; however, for retention, factitious disorders are handled administratively as unsuiting conditions. *Malingering* is not considered a mental illness. In DSM-5-TR, malingering is a Z-code as one of several presenting problems that may become a focus of clinical attention or that may exacerbate or otherwise affect the diagnosis, course, prognosis, or treatment of a patient's mental disorder. As such, it too is considered unsuiting rather than unfitting for continued military service and any aviator exhibiting such behavior should be referred to the chain of command. As specified in Article 83 of the Uniformed Code of Military Justice (UCMJ), any person who for the purpose of avoiding work, duty, or service

feigns illness, physical disablement, mental lapse or derangement; or intentionally inflicts self-injury; shall be punished as a court-martial may direct. Thus, before submitting a case for waiver consideration, the base-level flight surgeon, ideally with the help of local mental health, must first discern whether the condition is unsuiting vs. unfitting for service. If the airman requires a fit/unfit determination, the case needs MEB action; if the airman requires a suited/unsuited determination, the case needs consideration of an administrative separation or discharge via the chain of command.

Table 1: Waiver potential for Somatic Symptoms and Related Disorders

Flying Class (FC)	Condition	Waiver Potential	Waiver Authority	ACS Review or Evaluation
I/IA	Somatic Symptoms and Related Disorders	Unlikely	AFAC/AM	At discretion of AFAC
II/III/ATC/ GBO/SWA	Somatic Symptoms and Related Disorders	Yes	MAJCOM	Encouraged, *highly* encouraged for FCII

II. Information Required for Waiver Submission

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial and Renewal Waiver Requests:

1. See Mental Health Waiver Guide Checklist in Psychiatry section of the Waiver Guide
2. If the waiver package is referred to the ACS without required items (e.g., recent mental health evaluation, all records including off-base care, commander's support letter, etc.) the case will be returned to the local MTF in order to provide a complete package.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

Individuals with personal questions should work with their Flight Medicine Clinic.

Flight Surgeons and Mental Health Providers with waiverability questions, please feel free to contact the ACS Neuropsychiatry Branch:

ACS Aerospace Medicine Branch, USAFSAM/FECA
c/o Neuropsychiatry Branch
2510 Fifth Street Bldg 840
Wright Patterson AFB, OH 45433-7913
Fax: (937) 904-6296 DSN: 674-9296

USAFSAM.FE.PsychiatryMailbox@us.af.mil
Comm: 937-938-2768
DSN: 798-2768

III. Aeromedical Concerns

Five diagnoses are grouped within the category of somatic symptom and related disorders: somatic symptom disorder, illness anxiety disorder, conversion disorder, psychological factors affecting other medical conditions, and factitious disorder. Although often similar to these disorders in presentation, malingering is not considered a mental illness even when it impacts the diagnosis, prognosis, or treatment of a medical condition. In general, somatic symptom disorders are more common among females, ethnic minorities, those with fewer years of education, and those of lower socioeconomic status. The 12-month prevalence rate for any somatic symptom or related disorder is about 6 percent of the general population. In women, these disorders have been associated with childhood neglect, sexual abuse and recent exposure to physical or sexual violence. These conditions are also strongly associated with other psychiatric disorders, especially anxiety and depression. The following discussion will focus on somatic symptom disorder, conversion disorder, and factitious disorder.

Somatic symptom disorder diagnosis requires the persistence of one or more somatic symptoms that are very distressing or significantly interfere with normal functioning. The condition is marked by excessive thoughts, feelings, or behaviors regarding the symptoms. The symptoms may or may not be medically explained. Conversion disorders are characterized by neurologic symptoms (e.g. weakness, paralysis, seizures, blindness) that are incompatible with recognized neurologic or medical conditions but still cause distress and/or psychosocial impairment. Diagnosis depends upon clinical findings that reveal a symptom to be incongruent with anatomy, physiology, known diseases, or inconsistent at different times. Conversion disorders seldom occur for the first time after the age of 35, and symptoms are markedly more common among women than men. Although the prognosis for conversion disorder is initially good with symptoms frequently resolving relatively quickly, up to 25% of patients relapse within one year. Cases with an acute onset, a clearly identifiable provoking stressor, and a short interval between onset and treatment tend to do best. Cases manifesting as blindness, aphonia, or paralysis tend to do better than those involving seizures or tremors.

In both somatic symptom disorder and conversion disorder, symptoms are not seen as intentional, voluntary, or consciously produced. In factitious disorders and malingering, on the other hand, an individual intentionally produces or feigns physical or psychological symptoms, presenting himself or herself to others as ill, impaired, or injured. In factitious disorders, the deceptive behavior is evident even in the absence of obvious external rewards. The factitious disorder patient's primary goals are to assume the sick role and to receive medical, surgical, or psychiatric care (i.e., to feel "cared for"). In malingering, symptoms are consciously produced or feigned because of a clear external incentive, e.g., to avoid an undesirable deployment, to be discharged from the military, or to obtain monetary compensation.

Factitious disorder may be suspected when a patient presents with a dramatic but inconsistent medical history. Symptoms may be unclear and changing and may become more severe after treatment has begun. New symptoms may appear following negative lab results and predictable relapses may follow improvements. The patient may display extensive knowledge of hospitals and medical jargon, as well as a textbook presentation of his or her illness. The patient may display an

unusual willingness or eagerness to undergo medical tests, operations, or other procedures and may have a history of seeking treatment from multiple providers. The patient may be reluctant to allow health care professionals to talk to family members, friends, and previous providers. Oftentimes, this will result in each member of the medical team having a different impression of the patient's condition, due to the patient's inconsistent reporting. Unusually strong diagnostic conflict is therefore another tell-tale sign of factitious disorder. A historically distinct and particularly severe and chronic form of factitious disorder is Münchausen syndrome which is marked by the following three components: recurrent hospitalizations, travel from hospital to hospital (peregrination), and pathological lying (pseudologia fantastica). While the majority of cases of factitious disorder involve physical symptoms, some patients primarily feign psychological symptoms. Psychological complaints (like physical ones) encompass a broad spectrum of symptoms, including depression, anxiety, psychosis, bereavement, dissociation, posttraumatic stress, and even homicidal ideation.

There are two significant negative consequences to somatic symptom and related disorders. First is the excess health care cost resulting from frequent medical visits, diagnostic testing, invasive procedures, and hospitalizations. Second is the adverse impact on the doctor-patient relationship that is common in this setting. Management of these disorders frequently requires that patients spend an extended time away from their duties. Even when present for duty, patients are often preoccupied with their physical symptoms and less devoted to mission-oriented tasks. Their symptoms may lead to medical recommendations for multiple duty limiting restrictions.

Among aviators, somatic symptom and related disorders may represent a difficult manifestation of apprehension or fear of flying. As detailed in Davis's *Fundamentals of Aerospace Medicine* fourth edition, "These are chronic physical or physiologic symptoms, presented by a professional aviator (sometimes preceded by the words, "I'd like to fly, but…") as incompatible with continuing to fly." This attitude presents a striking contrast to that of most fliers who insist on flying in spite of their symptoms. A reluctant flier's symptoms can arise from an unconscious conflict between anxiety about flying and a greater anxiety about giving up the role of the aviator. "Involuntary" grounding for physical reasons beyond the flier's conscious control offers an acceptable way out of the conflict. As an example, with an unconscious conflict presenting as a conversion disorder, the aviator has no conscious anxiety about flying and therefore responds to any question concerning apprehension in flight with denial because the question represents a challenge to their defense that the symptoms offer against the intolerable but unconscious underlying anxiety. The flier may have little concern about any disease the symptoms represent, concentrating instead on being removed from flying duties in order to avoid the distress. The entire presentation of the case differs from that of the usual aviator who does not want to be grounded. Three clinical observations may help identify the unconscious aspect of the conversion symptoms. First, the flier tends to describe the symptoms in terms of their effect on flying. Second, the flier may express no particular anxiety about being significantly ill and have little interest in specific treatment. Third, if asked, "Will you go back to flying when you are well?" the flier may equivocate or signal reluctance. Identifying the somatoform nature of the problem may allow the physician to avoid unnecessary, expensive, or invasive diagnostic procedures. Even if

the psychologic nature of the problem is established, the flier is unlikely to agree with the formulation or to cooperate in necessary psychotherapy. The nature of the symptoms (headaches, various pains, sensory deficits, autonomic disturbances of the gastrointestinal tract) may preclude safe return to flying duties.[10] All the somatic symptom and related disorders may be a defense against fear of flying so it is important to evaluate for recent stressors surrounding flying duty in any of the somatoform presentations.

There is no specific therapy for somatic symptom and related disorders. Management of these conditions requires a good clinician-patient relationship. Attempts should be made to limit a patient's routine care to a single primary clinician and hospital, although in all aeromedical cases, care should also be closely coordinated with psychiatric consultation. Cognitive Behavioral Therapy (CBT) has been found to be an effective treatment for these disorders in some settings. Any underlying medical illnesses must be fully evaluated and treated while also protecting patients from self-harm and harmful medical procedures. Excessive, repetitive, and unnecessary diagnostic testing should be avoided, especially invasive medical and surgical workups. The doctor needs to be supportive, yet realistic in his or her treatment course. Once firmly established, somatic presentations of fear of flying may be quite resistant to therapy.

AIMWTS search Jan 2016- Dec 2024 revealed 26 cases; 3 had the diagnosis of conversion disorder, 8 had the diagnosis of pain disorder, 1 had the diagnosis of hypochondriasis, 8 had the diagnosis of somatization disorder, and 6 had the diagnosis of undifferentiated somatoform disorder.

Flying Class	**# Waivers**	**# Requested**	**% Waived**
FC I/IA	1	1	100%
FC II	7	8	88%
FC III	5	11	46%
ATC/GBO	1	6	17%
Total	**14**	**26**	**54%**

Please use only *these* ICD-10 codes for AIMWTS coding purposes	
F44.4	Conversion disorder with motor symptoms or deficit
F44.6	Conversion disorder with sensory symptoms or deficit
F45.21	Hypochondriasis
F45.0	Somatization disorder
F45.1	Undifferentiated somatoform disorder
F68.11	Factitious disorder with predominantly psychological signs and symptoms
F68.8	Other specified disorders of adult personality behavior
F68.12	Factitious disorder with predominantly physical signs and symptoms
F45.42	Pain disorder with related psychological factors
Z76.5	Malingerer (conscious simulation)

IV. Suggested Readings

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 5th ed, Text Revision (DSM-5-TR), American Psychiatric Association, 2022.
2. Kleinstäuber M, Witthöft M, Steffanowski A, van Marwijk H, Hiller W, Lambert MJ. Pharmacological interventions for somatoform disorders in adults. Cochrane Database Syst Rev. 2014 Nov 7;2014(11):CD010628. doi: 10.1002/14651858.CD010628.pub2. PMID: 25379990; PMCID: PMC11023023.
3. UCMJ art. 83 (2023).
4. Levenson, J. Somatic symptom disorder: Epidemiology, clinical features, and course of illness. UpToDate . Oct 2024.
5. Hales RE, Yudofsky SC, and Talbott JA. American Psychiatric Press Textbook of Psychiatry, 2nd ed., 1994.
6. Cleveland Clinic. An Overview of Factitious Disorders. Accessed on 22 Oct 2024 from https://my.clevelandclinic.org/health/diseases/9832-an-overview-of-factitious-disorders.
7. Eisendrath SF and Guillermo GG. Factitious Disorders. Ch. 27 in *Review of General Psychiatry*, 5th ed., 2000.
8. Irwin, M and Bursch, B. Factitious disorder imposed on self (Munchausen syndrome). UpToDate. Mar 2023.
9. Smith FA. Factitious Disorders and Malingering. Ch. 25 in Stern: *Massachusetts General Hospital Comprehensive Clinical Psychiatry*, 1st ed., 2008.
10. Jones DR. Somatoform Disorders. Ch. 17, Aerospace Psychiatry in *Fundamentals of Aerospace Medicine*, 4th ed., 2008, pp. 418-19.
11. Oyama O, Paltoo C, and Greengold J. Somatoform Disorders. Am Fam Physicians, 2007; 76: 1333-38.

Suicide Attempt or Suicidal Behavior

Revised: Apr 2022

Reviewed: Lt Col Kevin F. Heacock (ACS Neuropsychiatry Branch Chief), Dr. Max Lee (Waiver Guide Coordinator), and Maj Paul Vu (AFMRA Medical Standards Policy Chief)

Significant Changes:

Updated definitions for suicide, suicide attempt, and suicidal ideation; updated suicide rates using DoD Annual Suicide Report CY 2020

I. Waiver Consideration

A history of Attempted Suicide or Suicidal Behavior is disqualifying for all classes of flyers, to include ATC/GBO and SWA personnel. To be eligible for waiver, it is recommended the member display a period of **clinical stability for 6 months** after reaching "Best Baseline" functioning. "Best Baseline" is reached when the flyer's Mental Health Provider (MHP) determines the symptoms of the diagnosis are no longer causing clinically significant distress or impairment and the flyer demonstrates adequate function in social, occupational, and other important areas for functioning. Once "Best Baseline" is reached, treatment adjustments can still be made, including medication changes, without restarting the period of clinical stability as long as the flyer's levels of distress, impairment, or functioning have not deteriorated to a point which the MHP determines is clinically significant.

Table 1: Waiver potential for flyers with history of Attempted Suicide or Suicidal Behavior

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	Maybe[1, 3]	AFRS/CMO	Yes[2]
FC II/III	Maybe[1, 3]	MAJCOM	Yes[2]
ATC/GBO/SWA	Maybe[1, 3]	MAJCOM	Yes[2]

1. Underlying conditions that exacerbated suicidal behavior must be treated successfully and the flyer or flyer candidate must not have a higher risk of suicidal behavior than does the general military population.
2. ACS review/evaluation if requested by Waiver Authority for initial FC I/IA, FC II, FC III, ATC, GBO, and SWA applicants.
3. No indefinite waivers.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after clinical disposition has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial/Renewal Waiver Request:

1. See Mental Health Waiver Guide Checklist
2. If the local base is unable to provide all required items, they should explain why, explaining reason to waiver authority.

III. Aeromedical Concerns

Suicidal behavior must always be taken seriously in any Airman, especially those who are required to meet enhanced medical standards. Not only is the individual flyer at risk, but the safety of others in the air and on the ground must be considered, as well as the conservation of valuable national assets, and the implications of access to nuclear and other weapons.

Especially concerning is the performance requirements of military flyers for readiness and mission completion. While suicide behavior may be a single act, it often represents a distinct, overt pattern of behavior in a long, debilitating process. By and large, flyers are known to demonstrate emotional composure and may deny, suppress, and/or otherwise defend against emotional turmoil. Because of this, the need for peers and flight surgeons to carefully monitor aircrew for early signs of emotional conflict, despair, and intimate relationship deterioration is essential.

A history of attempted suicide or suicidal behavior is disqualifying (referred to generally as suicidal behavior in the waiver guide). All suicidal ideation (thinking about, considering, or planning suicide), self-destructive actions, or overt suicidal attempts by flyers require immediate DNIF action and mental health evaluation, including voluntary or involuntary hospitalization if psychiatrically indicated. Such decisions are based on many factors besides the specific diagnosis, including the patient's intent to die, the lethality of the method chosen, availability of means, the energy put into the attempt, the role of possible substances, the circumstances of the rescue (i.e., found by accident vs. found after hints, phone call, presentation to the emergency department, etc.), and the emotional support systems available to the flyer. Of great concern in flyers with suicidal ideation is the possibility of suicide by aircraft, which is rare, but has occurred in civilian and military settings. Appropriate action should be taken in regard to the Personnel Reliability Assurance Program, if applicable. If the precipitating event involved acute or chronic alcohol misuse, an additional waiver will be managed IAW DAFMAN48-123 and AFI44-121, Alcohol and Drug Abuse Prevention and Treatment (ADAPT) Program.

Suicide is defined as "death caused by self-directed injurious behavior with any intent to die as a result of the behavior." Suicide often results from extreme emotional pain coupled with the belief that cessation of the mental suffering will only be achieved by no longer living. Suicidal ideation refers to thinking about, considering, or planning suicide; suicide plan refers to the identified method and preparation of ending one's life; and suicide attempt refers to a non-fatal, self-directed, potentially injurious behavior with intent to die as a result of the behavior. Another closely related behavior is non-suicidal self-injury which involves cutting, burning, severe scratching, and hitting. Severe cases of non-suicidal self-injury may involve bone breaking and ocular enucleation. The National Institute of Mental Health (NIMH) states that most suicide attempts are expressions of extreme distress, not attempts to garner attention. The NIMH emphasizes that a person who appears suicidal should not be left alone and requires immediate mental-health treatment.

The overall rate for suicide within the general U.S. population is 13.4 per 100,000 people and is the tenth leading cause for death. Those attempting suicide most often engage in medication overdose, while suicide completers most often die from self-inflicted gunshot wounds or strangulation. Demographic analyses of non-military populations indicate that women are three

times more likely to attempt suicide than men, but men are three times more likely to successfully complete suicide (largely associated with the method of suicide employed).

Suicides committed by members of the military has raised concerns among policymakers, military leaders, and the population at large. Historically, the suicide rates for military populations have been lower than those of the general population, but as suicide rates have risen in the military, the DoD Annual Suicide Report for 2020 found that in 2019, the rates were comparable to the U.S. population, after accounting for age and sex. The number of suicides among all active duty members was 145 in 2001 and began a steady increase until more than doubling to 321 in 2012, and rising further to 384 in 2020. The suicide rate among Active Components of the military statistically increased from 2015 to 2020 (i.e., 20.3 to 28.7 per 100,000 service members). The suicide rate among Reserve and Guard members was statistically unchanged over the same period, 21.7 and 27 per 100,000, respectively.

Suicide remains a major public health problem within the AF and the AF has continually tracked suicides of Airmen since the 1980s. From 1990-1994, rates of AF suicides increased from 10.0 to 16.4 per 100,000, accounting for 23% of all deaths among active duty personnel. In response to this observed rise, a population based program aimed at preventing and reducing stigma was implemented within the AF community and a 33% relative risk reduction was found in those exposed to the program. As part of the AF's 2002 initiative, the Air Force Guide for Managing Suicidal Behavior was established for use in outpatient behavioral healthcare settings. The Guide was most recently updated in 2014. Over the past decade, Active Duty AF suicide rates have risen from 15.5 per 100,000 in 2010 to 24.8 per 100,000 in 2019. Suicide rates per 100,000 among the services in 2020 were: Army 36.4, Marines 33.9, Air Force 24.3, and Navy 19.3.

Factors contributing to suicidal ideation include distressing life circumstances combined with feelings of hopelessness or helplessness, a recent significant emotional loss, a history of suicide in a family member or close associate, substance abuse, the presence of a psychiatric disorder, and chronic or terminal illness. Risk factors in the US military population have been found to include being on an SSRI, relationship problems, financial challenges, legal problems and substance misuse. In a study comparing suicide non-completers vs suicide completers in the AF, non-completers were likely to be single, never married, and younger (under 24 years old). Completers tended to be older, married and had relationship problems. Of the 384 Active Component service members to complete suicide in 2020, 359 (93.5%) were enlisted. The overall rate for officers has consistently been lower than that of enlisted members.

From the current known information about flyer suicide, the incidence is small, and probably much less than most other military or civilian occupational groups. Between 2003 and 2012 there were 2,758 fatal aviation accidents. The National Transpiration Safety Board (NTSB) determined that eight were aircraft assisted suicides. All pilots involved were male with a median age of 46 years. Four of the eight pilots were positive for disqualifying substances. Specifically, four pilots tested positive for alcohol, one for benzodiazepines, two positive for unapproved antidepressants, and two were positive for diphenhydramine. Six of the eight had reported thoughts of suicide, attempted suicide before, and/or left a note. Additionally, 88% had experienced domestic problems, 13 % had legal issues, and 25% suffered from depression.

Individuals with personal questions should work with their Flight Medicine Clinic.

Flight Surgeons and Mental Health Providers with waiver questions,
Please feel free to contact the ACS Neuropsychiatry Branch:

ACS Aerospace Medicine Branch, USAFSAM/FECA
c/o Neuropsychiatry Branch
2510 Fifth Street Bldg 840
Wright Patterson AFB, OH 45433-7913

USAFSAM.FE.PsychiatryMailbox@us.af.mil
Phone: (937) 938-2768 DSN: 798-2768
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AIMWTS review from Jan 2017 to Mar 2022 revealed 346 cases submitted with a diagnosis of suicide attempt/behavior/ideation. There was a disposition of disqualified in 135 of the cases. Breakdown of the cases revealed: 36 FC I/IA (26 disqualified), 66 FC II (12 disqualified), 14 RPA Pilot (7 disqualified), 147 FC III (49 disqualified), 57 ATC/GBC/GBO (33 disqualified), 1 MOD (1 disqualified), and 13 SWA (1 disqualified).

ICD-10 codes for Attempted Suicide or Suicidal Behavior	
T14.91	Suicide attempt
R45.851	Suicidal ideations
F48.9	Nonpsychotic mental disorder, unspecified
F99	Mental disorder, not otherwise specified

IV. Suggested Readings

1. Patterson JC, Jones DR, Marsh RW and Drummond FE. Aeromedical Management of U.S. Air Force Flyers Who Attempt Suicide. Aviation Space Environmental Medicine, 2001; 72(12): 1081-85.

2. Wu AC, Donnelly-McLay D, Weisskopf MG, et al. Airplane pilot mental health and suicidal thoughts: a cross-sectional descriptive study via anonymous web-based survey. Environ Health, 2016; 15(1): 121.

3. Vuorio A, Laukkala T, Navathe P, et al. Aircraft-Assisted Pilot Suicides: Lessons to be Learned. Aviat Space Environ Med, 2014; 85(8): 841-46.

4. Kenedi C, Friedman SH, Watson D, and Preitner C. Suicide and Murder-Suicide Involving Aircraft. Aerosp Med Hum Perform, 2016; 87(4): 388-96.

5. Nock MK, Borges G, Bromet EJ, et al. Suicide and Suicidal Behavior. Epidemiol Rev, 2008; 30(1): 133-54.

6. Kerr PL, Muehlenkamp JJ, and Turner JM. Nonsuicidal Self-Injury: A Review of Current Research for Family Medicine and Primary Care Physicians. J Am Board Fam Med, 2010; 23(2): 240-59.

7. Kochanek KD, Murphy SL, Su J, et al. Deaths: Final Data for 2014. National Vital Statistics Reports, 65(4), June 30, 2016.

8. Franklin K. Department of Defense Quarterly Suicide Report: Calendar Year 2016 2nd Quarter. https://www.dspo.mil/portals/113/documents/dod%20quarterly%20suicide%20report%20cy2016%20q2.pdf?ver=2016-10-12-090150-727

9. Lollis BD, Marsh RW, Sowin TW, and Thompson WT. Major Depressive Disorder in Military Flyers: A Retrospective Study of Prevalence. Aviat Space Environ Med, 2009; 80(8): 734-37.

10. Hyman J, Ireland R, Frost L, and Cottrell L. Suicide Incidence and Risk Factors in an Active Duty US Military Population. Am J Public Health, 2012; 102: S138-46.

11. Lewis RE, Forster J, Whinnery JE and Webster N. Aircraft-Assisted Pilot Suicides in the United States, 2003-2012. Civil Aviation Medical Institute, 2014. https://www.faa.gov/data_research/research/med_humanfacs/oamtechreports/2010s/media/201402.pdf

12. Department of Defense Annual Suicide Report: Calendar Year 2020, Generated on 2021 Sep 03. https://www.dspo.mil/Portals/113/Documents/CY20%20Suicide%20Report/CY%202020%20Annual%20Suicide%20Report.pdf?ver=0OwlvDd-PJuA-igow5fBFA%3D%3D

Aerospace Medicine Waiver Guide

Asthma

Revised: Apr 2024
Reviewed: Maj Adam Young (ACS Pulmonology), Dr. Luke Menner (ACS Internal Medicine) Col Kevin Heacock (ACS Aerospace Medicine Branch Chief), Lt Col Paul Vu (Chief, Medical Standards Policy)

Significant Changes:
Table 1 and Sections I, II, and III updated.

I. Waiver Consideration

Asthma, of any type, is disqualifying for all flying class, ATC, GBO, OSF, and SWA duties, as well as for retention. A history of remitted childhood asthma is also disqualifying for all initial flying class, ATC, and SWA applicants. A history of childhood asthma is not disqualifying for initial GBO and OSF applicants.

Untrained FC I/IA, III and SWA applicants with asthma are unlikely to be granted an initial waiver. Untrained FC I/IA/II/III/ATC/SWA applicants with a history of remitted childhood asthma are eligible for waiver on a case-by-case basis (see Table 1). Flight surgeons, ATC, and GBO applicants with well controlled[†] asthma may be eligible for waiver on case-by-case basis.

Waiver may be considered once the disease is well controlled[†]. Additional bronchoprovocation testing (exercise [ECT] or methacholine challenge [MCT]) may be requested to ensure efficacy of current treatment. Use of more than three metered-dose short acting beta-2 agonists (SABA) inhalers per year is suspicious for inadequate treatment and indicates need for therapy escalation.

The use of any medication not included on the applicable career field medication list is independently disqualifying. Newer monoclonal antibodies such as dupilumab (Dupixent®) are increasingly being used to treat moderate-to-severe asthma. In select cases, dupilumab for the treatment of asthma has been granted waiver for use in aircrew and special duty operators. Although there is no career field medication list for OSF or SWA personnel, the use of a prescription medication for the treatment of asthma in OSF and SWA personnel must be carefully evaluated for potential side effects that might impact individual health or mission safety.

High-performance pilots requesting waiver may be considered when symptoms are controlled, lung function (FEV1 greater than 80% predicted at a minimum) is acceptable, and there is no airway hyper-responsiveness on bronchoprovocation challenge testing (MCT and ECT). High-performance pilots requesting waiver for asthma will require an in-person ACS evaluation.

[†] ACT score >19 with no objective bronchodilator response on current (<60 day old) spirometry

Table 1: Waiver potential history of remitted childhood asthma and active asthma

Flying Class	Condition/Treatment	Waiver Potential/ Waiver Authority	ACS evaluation required
I/IA	Remitted childhood asthma and/or EIB with normal pulmonary function tests[1]	Yes AFRS/CMO	No
	Remitted childhood asthma and/or EIB with a positive BDR or bronchoprovocation test[1]	Unlikely AFRS/CMO	No[2]
	Remitted childhood asthma and/or EIB with abnormal spirometry other than positive BDR or bronchoprovocation test[1,3]	Yes AFRS/CMO	Yes
	Active asthma, any type, including EIB with prn SABA	Unlikely AFRS/CMO	No
II/III/ATC/SWA	Remitted childhood asthma and/or EIB with normal pulmonary function tests[1]	Yes MAJCOM[4]	No
	Remitted childhood asthma and/or EIB with a positive BDR or bronchoprovocation test[1]	Unlikely MAJCOM[4]	No[2]
	Remitted childhood asthma and/or EIB with abnormal spirometry other than positive BDR or bronchoprovocation test[1,3]	Yes MAJCOM[4]	Yes
	Active asthma, any type, including EIB with prn SABA	Yes[5] MAJCOM[4]	Yes[6]
GBO/OSF	Remitted childhood asthma	N/A	N/A
	Active asthma, any type, including EIB with prn SABA	Yes[5] MAJCOM[4]	No[6]

1. For remitted childhood asthma, diagnostic pulmonary tests should include full pulmonary function testing (pre-and post-bronchodilator spirometry, lung volumes, DLCO) and methacholine challenge test (MCT). If there is history of exercise-induced bronchospasm (EIB), exercise challenge testing (ECT) should also be included.
2. ACS review request is at the discretion of the AFRS/CMO as waiver is unlikely for a positive bronchodilator response (BDR), methacholine challenge, or exercise challenge.
3. Abnormal spirometry may include dysanaptic or supranomal values, abnormal flow volume loops, or other non-standard features as defined by the current ATS/ERS technical standards.
4. AFRS/CMO is the waiver authority for untrained assets.
5. Flight surgeons, ATC, and GBO applicants with well controlled active asthma are eligible for an initial waiver. Untrained FC III/SWA applicants are unlikely to be granted an initial waiver.
6. ACS review/evaluation is required for FC II (except flight surgeons)/III/SWA. Other special duty classes do not require ACS review unless requested by the waiver authority.

II. Information Required for Waiver Submission.

Submit the aeromedical summary (AMS) only after the clinical disposition is finalized and the service member is stable (Asthma Control Test score > 19) on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request for Remitted Childhood Asthma or Exercised-induced Bronchospasm:

1. Information to include in history[1]:
    a. Prior clinical symptoms, triggers, and date symptoms started and remitted.
    b. Treatment (i.e., daily maintenance therapy, as needed short-acting bronchodilators, nebulizer, etc.) include dates started and stopped.
    c. Any emergency department visits or hospitalizations for acute exacerbations.
    d. Any other atopic comorbidity (i.e., allergic rhinitis, eczema, food allergies).
    e. First-degree relatives with asthma.
    f. History of premature birth (< 36 weeks) or NICU/PICU admission.
2. MUST INCLUDE:
    a. Current (≤ 60 days old from date of waiver package submission) full pulmonary function testing (pre- and post-bronchodilator spirometry, lung volumes, DLCO) and methacholine challenge test (MCT). An exercise challenge test (ECT) must be obtained if there is a history of exercise-induced bronchospasm.

B. Initial Waiver Request for Active Asthma or Exercise-induced Bronchospasm:

1. Information to include in history[1]:
    a. Clinical symptoms (i.e., cough, shortness of breath, wheeze, chest tightness, etc.), frequency, duration, severity, and date symptoms started.
    b. Triggers (i.e., allergen exposure, exercise, smoke, viral infections, changes in weather, temperature, irritants such as smoke, fumes, or strong smells, etc.).
    c. Current treatment [i.e., daily maintenance therapy (ICS or ICS-LABA[2]), reliever therapy (SABA), or other treatment] include date started and dosage.
    d. Current Asthma Control Test score.[3]
    e. Any emergency department visits, hospitalizations, or corticosteroid prescriptions for acute exacerbations.
    f. Any other atopic comorbidity (i.e., allergic rhinitis, eczema, food allergies).
    g. First-degree relatives with asthma.
    h. History of premature birth (< 36 weeks) or NICU/PICU admission.
2. MUST INCLUDE:
    a. All prior diagnostic pulmonary function testing reports which may include full pulmonary function testing (pre- and post-bronchodilator spirometry, lung volumes, and DLCO), methacholine challenge test, or exercise challenge test.
    b. Current (≤ 60 days old from date of case submission) pre-and post-bronchodilator spirometry on full therapy and methacholine challenge test demonstrating member's symptoms are controlled, must also include ECT if exercise induced.[4,5]
3. All treating specialty consult notes (i.e., Internal Medicine, Pulmonology, or Allergy).
4. Form FL4 with return to duty and ALC status.
5. All high-performance pilots require in-person ACS evaluation for wavier review[5].

C. Renewal Waiver Request for Active Asthma or Exercise-induced Bronchospasm:

1. Updated AMS with interval history, including[1]:
    a. Symptom control during interval wavier period.
    b. Updated Asthma Control Test score.[3]
    c. Complete list of current medication with dates started and dosage.
    d. Any emergency department visits, hospitalizations, or corticosteroid prescriptions for acute exacerbations.
2. All relevant interval consultation reports from treating specialist.
3. Updated and current (≤ 60 days old from date of case submission) full pulmonary function test (pre-and post-bronchodilator spirometry, full lung volumes, and DLCO) and methacholine challenge test.[4,5]
4. Form FL4 with return to duty and ALC status.
5. All high-performance pilots require in-person ACS evaluation for wavier review[5].

1. Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.
2. Regardless of the ICS formulation, it is important to use the lowest effective dose.
3. The Asthma Control Test (ACT) is a quick, 5-question assessment tool that is meant to quantify the level of the patient's asthma control. It is scored on a scale of 5-25. The American Thoracic Society considers a score of > 19 to be indicative of well-controlled asthma. The questionnaire can be found at www.asthmacontroltest.com.
4. Methacholine challenge tests (MCT) performed while on full controller therapy should be submitted for SWA, renewal FC II (non-high performance) or FC III waiver requests. The ACS may request MCT for other AFSCs to complete a review/evaluation. Additionally, if there is a history of exercise induced-bronchospasm, member must also submit exercise challenge test (ECT) performed while on full controller therapy. Please note, all pulmonary function test and bronchial reactivity tests MUST include the full report with raw numbers and flow volume loops to be acceptable. A local physician interpretation of the test is not acceptable.
5. MCT and ECT testing can be deferred for high-performance pilots as they will undergo full testing at the ACS as part of their wavier assessment.

III. Aeromedical Concerns

Asthma is a heterogenous, chronic respiratory disease characterized by symptoms of shortness of breath, wheezing, chest tightness and/or cough and variable expiratory airflow limitation that varies over time and in intensity. Selection of aircrew for military aviation is complicated because many asthmatics who become free of symptoms in early adolescence will suffer relapse in their twenties or early thirties. Per the CDC, asthma prevalence in the U.S is currently 7.7% affecting 25 million people annually. There are multiple asthma phenotypes such as allergic asthma, non-allergic asthma, adult-onset asthma, and asthma with persistent airflow obstruction. Clinical manifestations and intensity may vary from mild distracting symptoms to severe disease exacerbations that may lead to incapacitation. Additionally, multiple triggers (i.e., allergens, viral infections, exercise, changes in weather, cool/dry air, or irritants such as fumes, smoke, or strong odors) are likely to be encountered in the aeromedical and operational environments. Ensuring aircrew and special duty operators are adequately treated mitigates aeromedical and operational risk of developing acute exacerbations during their duties and minimizes mission degradation.

Asthma management focuses on good symptom control and minimizing future risk of asthma related mortality, exacerbations, and persistent airflow limitation due to airway remodeling. The Global Initiative for Asthma (GINA) guidelines offers a comprehensive outline for diagnosing and treating asthma. Aircrew-approved medications for the treatment of asthma include all FDA-approved inhaled corticosteroids (ICS) or combination inhaled corticosteroids, long-acting beta-agonist (ICS/LABA) therapy, and oral leukotrienes such as montelukast. Although not specifically mentioned in the Aircrew Approved Medication list, short-acting beta-agonists have been recommended for waiver to be used pre-exercise.

Frequent use of short-acting beta-agonists (SABA) to control breakthrough symptoms should prompt evaluation to initiate controller (ICS or ICS-LABA) therapy. Both clinical experience and studies have shown that subjective reporting of symptoms does not always correlate with severity of obstruction. Patients tend to adapt to chronic airflow obstruction, so that symptoms correlate better with the rate of fall of FEV1 during an attack, rather than with the absolute degree of obstruction. Asthma education including an asthma action plan and routinely recording peak flow (objective measurement of current lung function) aids individuals in monitoring and effectively treating their asthma.

SABA treatment alone is no longer recommended, as it does not protect members from severe exacerbations. Regular or frequent use of SABAs indicates poor disease control and increased risk for exacerbations. The GINA guidelines now recommend that all adults and adolescents with asthma should receive either daily low dose inhaled corticosteroid (ICS) controller treatment or symptom-driven (in cases of mild intermittent asthma or exercise-induced bronchospasm) ICS-LABA combination therapy to reduce risk of serious exacerbations. GINA guidelines provide a symptom driven algorithm for escalating or de-escalating therapy.

Asthma medications which are not aircrew-approved due to side effect profile include long-acting muscarinic antagonists (LAMAs), which have traditionally been used to treat COPD and are used for asthma COPD overlap (ACO), and oral corticosteroids. These medications are unlikely to receive waiver. Newer monoclonal antibody therapies (i.e., dupilumab) may be considered for waiver on a case-by-case basis.

Cases reviewed by the ACS will typically need repeat objective testing to demonstrate adequate control on current therapy. Objective testing should be performed while on full controller therapy, and will typically include pre-and post-bronchodilator spirometry, methacholine challenge test, and an exercise-challenge test when exercise is a common trigger. ACS experience demonstrates that individuals who require rescue inhaler use typically fail the methacholine challenge test and are typically DNIF for treatment optimization. For this reason, it is paramount that the local flight surgeon ensure the patient's asthma control is optimized, prior to waiver submission. Evidence of bronchial hyper-reactivity is indicative of poor disease control and an increased risk for future exacerbation, especially since aviation and operational environments themselves may increase the risk for exposure to certain triggers (aeroallergens, cold or dry air, irritants such as smoke, fumes, and strong odors, etc.). Additionally, asthma

education is provided to all personnel evaluated at the ACS to develop an asthma action plan and to mitigate future disease exacerbation.

Spirometry utilizing the forced vital capacity maneuver is the standard method for measuring obstruction. Proper technique and adequate effort by the individual are crucial. Airway obstruction is defined as a FEV1/FVC ratio lower than the predicted range for the individual patient. The FEV1 is used to gauge the severity of the obstruction. Reversible airway obstruction is defined under the most recent ATS/ERS guidelines as an increase of greater than 10% in FEV1 or FVC from the *predicted value*, after administration of an inhaled bronchodilator. Refer to the ERS/ATS technical standard on interpretive strategies for routine lung function tests in Suggested Reading source 2 for additional details.

Bronchodilator response (BDR) calculation:
((post-value – pre-value) x 100) / predicted value = BDR

High-performance pilots and aircrew requiring routine use of mask who are diagnosed with asthma can now be considered for waiver and are monitored in a Management Group. To be eligible for unrestricted waiver, asthma symptoms must be controlled (ACT score > 19), have lung function with FEV1 greater than 80% predicted at a minimum, have no airway hyper-responsiveness on bronchoprovocation testing, and have no significant bronchodilator response on spirometry. They should also receive asthma education, an individualized action plan, and instructed how to monitor peak flow. Since inception of this management group in Nov 2018, the ACS has evaluated 11 high-performance pilots with asthma and ultimately 10 received unrestricted waiver. Of those who received unrestricted waivers, none reported in flight emergencies or adverse events during aviation duties. Initial waiver and renewals for high-performance pilots enrolled in the Management Group require an in-person ACS evaluation.

Review of the AIMWTS database from May 2022 through Apr 2023 revealed 448 cases with a diagnosis of asthma. The breakdown of the number of waivers and number of total cases are tabulated below. Use the ICD-10 codes below to differentiate active asthma from a history of childhood asthma as previous AIMWTS codes did not differentiate between active asthma and history of childhood asthma.

Please use *only* these ICD-10 code for AIMWTS coding purposes		(# of waivers / total # of cases)					
		FC I/IA	FC II	FC III	GBO	ATC	SWA
J45.9	Asthma, unspecified *(active asthma*)	104/129	92/92	101/107	34/36	26/28	46/56
Z87.0	Personal history of diseases of respiratory system (*remitted childhood asthma*)						

IV. Suggested Readings

1. 2022 Global Initiative for Asthma Report, Global Strategy for Asthma Management and Prevention. https://ginasthma.org/gina-reports/
2. ERS/ATS technical standard on interpretive strategies for routine lung function tests. Eur Respir J. 2022 Jul 13;60(1):2101499. doi: 10.1183/13993003.01499-2021. PMID: 34949706. https://pubmed.ncbi.nlm.nih.gov/34949706/
3. Price, O.J., Ansley, L., Menzies-Gow, A., Cullinan, P., and Hull, J.H. (2013). Airway dysfunction in elite athletes-an occupational lung disease? Allergy, 68(11), 1343-1352.
4. Carter, D., Pokroy, R., Azaria, B. Barenoboim, E., Swhartz, Y., & Goldstein, L. (2006) Asthma in military aviators: Safe flying is possible. Aviation, Space, and Environmental Medicine, 77(8), 838-841.
5. Brooks, Stuart. (2015) Occupational Medicine Model and Asthma Military Recruitment. Military Medicine, 180, 11:1140.

Pneumothorax (Jun 2020)
Reviewed: Lt Col Dara Regn (ACS Pulmonologist), Dr. Dan Van Syoc (ACS Waiver Guide coordinator), and Lt Col David Gregory (AFMRA Physical Standards Development Chief)

Significant Changes:
New format and updated policy

I. Waiver Consideration

As of the July 2016 MSD, Air Force policy regarding spontaneous pneumothoraces has been significantly revised effectively making spontaneous pneumothorax disqualifying for FCI/IA/FCII/FCIII/SWA/OSF aviation duties. This new guidance applies to all initial flying class exams regardless of the date of prior pneumothorax as well as fully trained FCII/FCIII/SWA/OSF aviators experiencing a primary pneumothorax after the date of this publication. A single episode of spontaneous pneumothorax in a fully trained aviator prior to publication of this new MSD guidance would not require a waiver as long as results of PA inspiratory and expiratory chest radiographs and CT chest imaging are clearly documented in the medical record, and show full expansion of the lung with no demonstrable pathology which would predispose to recurrence. If a fully trained FCII/FCIII/SWA/OSF aviator were to experience a recurrent pneumothorax, they would then require a waiver. Pneumothorax is not disqualifying for ATC or GBO personnel.

In summary, aeromedical waiver for spontaneous pneumothoraces may be considered only if PA inspiratory and expiratory chest radiograph and CT chest scan show full expansion of the lung and no demonstrable pathology which would predispose to recurrence, such as blebs or bullae, or after definitive surgery to prevent recurrence if CT demonstrates residual blebs. Any form of definitive surgical pleurodesis is acceptable for waiver, but thoracoscopic abrasive pleurodesis performed by a Thoracic or Cardiothoracic trained surgeon, appears to offer the best combination of efficacy and minimal morbidity. Chemical pleurodesis with talc slurry, tetracycline compounds, or other pleurodesing agents is generally not acceptable for waiver. If chemical pleurodesis has been completed prior to entry into the military service or an aviation career field, a waiver may be considered on a case-by-case basis after review by the ACS.

Table 1: Waiver potential for Pneumothorax

Flying Class (FC)	Condition	Waiver Potential Waiver Authority	ACS Review
I/IA	Primary pneumothorax	Yes[2] AETC	Yes
	Multiple pneumothoraces or pathology noted on chest CT	Yes[1, 2] AETC	Yes
II/III/SWA	Primary pneumothorax	Yes[2] MAJCOM	Yes
	Multiple pneumothoraces or pathology noted on chest CT	Yes[1, 2] MAJCOM	Yes

1. If definitive surgery has been performed with resolution of symptoms.
2. Indefinite waiver possible after ACS verification that CT imaging is without demonstrable pathology which would predispose to recurrence.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. A complete history of the event to include any possible predisposing factors.
2. Documentation of all treatments given.
3. Labs/Imaging: Reports of all imaging exams. CT chest imaging required with the actual images forwarded to the ACS for formal review.
4. Copies of all operative reports and a statement from treating physician.
5. Spirometry results including pre- and post-bronchodilator challenge, lung volume and DLCO studies by plethysmography.
6. If any of the above requested items cannot be provided, please provide an explanation to the waiver authority in the AMS why that could not be provided.

B. Renewal Waiver Request:

1 Interval history specifically noting any symptoms, changes in disease course and treatments since the last waiver submission.
2 Current CT chest imaging with actual images forwarded to the ACS for formal review.
3 Statement of patient condition from treating physician.
4 Spirometry results including pre- and post-bronchodilator challenge, lung volume and DLCO studies by plethysmography.
5 If any of the above requested items cannot be provided, please provide an explanation to the waiver authority in the AMS why that could not be provided.

III. Aeromedical Concerns

Spontaneous pneumothorax is best defined as "air in the pleural space of non-traumatic cause." Secondary spontaneous pneumothorax is one that occurs in the presence of known underlying parenchymal or airway disease. Primary spontaneous pneumothorax, by default, is one that occurs in the absence of such underlying disease. However, it would be incorrect in such cases to define the lung as normal, since the vast majority prove to have visceral subpleural blebs at thoracoscopy. Most cases of primary spontaneous pneumothorax occur at rest, and it is actually unusual to see cases in the athletic realm.

Primary spontaneous pneumothorax typically peaks in the 10 to 30 year age group, affecting males about 5 to 10 times more frequently than females. The age-adjusted incidence in males and females varies widely in the clinical literature with reported rates from 7.4 per 100,000 in United States to 37 per 100,000 in United Kingdom. It occurs primarily in tall, thin individuals and is rare in those over the age of 40. Smoking has been shown to increase the risk of primary spontaneous pneumothorax by a factor of 20 in a dose-dependent manner. More than 20,000 new cases of spontaneous pneumothorax occur each year in the United States at a cost of more than $130 million (2006 costs). Although the incidence in the general population is usually quoted as 9 per 100,000, the real incidence is probably higher. In most large series, 1% to 2% are incidentally found on chest film; since small pneumothoraces resolve themselves within a few days, the odds of identifying an asymptomatic pneumothorax in this way are slim, arguing that the disease is probably more common than thought. Fortunately, primary spontaneous pneumothorax has low mortality, with death rare in those cases occurring below age 50.

The classic presentation in a symptomatic patient with spontaneous pneumothorax is dyspnea and pleuritic chest pain. The chest pain is almost always ipsilateral and may radiate to the shoulder, neck, and into the back. Physical exam may demonstrate tachycardia, tachypnea, hyperresonance to percussion, diminished breath sounds, and asymmetrical chest wall expansion may be present. There are also a multitude of possible ECG changes that can be seen in the setting of a pneumothorax. The diagnosis is best confirmed with a standard chest film. Expiratory films are no more sensitive than inspiratory films in detecting pneumothoraces and are not recommended unless there is high clinical suspicion of pneumothorax and the inspiratory film is non-diagnostic. If present on the chest film, it will demonstrate a pleural line. A specific subcategory that deserves mention is catamenial pneumothorax. This is a spontaneous pneumothorax occurring in a female within 48 to 72 hours of the onset of menses. Although these are often ascribed to endometriosis, pleural endometrial implants have been identified in only a third of patients. It is important to question any female with a spontaneous pneumothorax about the timing in relationship to menses, since the initial treatment of catamenial pneumothorax is hormonal. Should the patient fail a trial of contraceptive steroids, this disorder responds well to the same prophylactic surgical treatments described below.

The major issue with spontaneous pneumothorax is recurrence. After an initial pneumothorax, the chance of recurrence in the absence of definitive treatment is 20 to 50%, a risk which probably rises after subsequent episodes. (some researchers have shown that after two pneumothoraces, the risk of a third is 62%; of those who have had three episodes, 83% will have a fourth). The clinical standard of care for a number of years has been to perform a definitive surgical procedure after the second

pneumothorax, but with the availability of thoracoscopic pleurodesis, there are many who feel that surgery is indicated after the first episode, particularly in those who are at high risk because of their occupation or because of travel to remote areas.

Depending on the size of the pneumothorax, acute treatment may consist of observation, usually combined with oxygen, which hastens resolution (rate of pleural air absorption in the absence of supplemental oxygen is 1.25%/day; this is increased 3-4X in the presence of supplemental oxygen); simple aspiration of the air, which is successful about 65% of the time; or catheter or tube thoracostomy. There has been discussion for many years as to the emergency management of spontaneous pneumothorax. For many years, the gold standard was insertion of a chest tube (tube thoracostomy). Recent evidence indicates that needle aspiration is at least as safe and effective as tube thoracostomy and also carries the benefit of fewer hospital admissions and shorter length of hospital stay. Some emergency departments have begun to adopt ambulatory care treatment in small uncomplicated cases of pneumothorax. This is accomplished through the use of a one way Heimlich valve. While data for this treatment is limited, it offers the obvious advantage of eliminating an admission, and provides improved patient comfort.

The definitive procedure until relatively recently was chemical pleurodesis which was accomplished via the chest tube by inserting a sclerosing substance into the pleural space causing the pleura to adhere to the chest wall thereby preventing recurrences. The most common substances used were tetracycline derivatives or talc slurry. The recurrence rate with each of these was not totally acceptable and also was potentially fraught with unacceptable side effects. Problems with talc range from pain and fever to respiratory failure and ARDS. The newer and more successful interventions are surgical and include video assisted thorascopic surgery (VATS) or open thoracotomy. These procedures can lead to recurrence prevention by either mechanical abrasion pleurodesis or pleurectomy.

The most likely symptoms are chest pain and dyspnea, either of which could be incapacitating in aircrew. There is also the concern with gas expansion at altitude in untreated pneumothorax in aviators, in accordance with Boyles Law. The level of expansion can be calculated using Boyles equation P1V1=P2V2. For example, assuming a total lung volume of 6 L and a one sided 20% pneumothorax traveling from sea level to 8000 ft: (760 mmHg)(600 mL)=V2(567 mmHg), then V2=804 mL, or approximately a 33% expansion. Given the above calculation, it is possible that the gas expansion may cause significant physiological deficit. In a review of 112 aviators with spontaneous pneumothorax, 37% admitted they could have been incapacitated had the episode occurred during flight. Overall, seventeen percent of the episodes occurred under operational conditions. Eleven percent actually occurred during flight, although it was unclear how many of these resulted in mission aborts. Of note, another 6% occurred in the altitude chamber, and all but one of those occurred after rapid decompression.

AIMWTS review in May 2020 for the previous five years revealed 49 members with a diagnosis of pneumothorax. Of those, six were disqualified. Breakdown of these cases demonstrated: 9 FC I/IA cases (one disqualified), 11 FC II cases, 18 FC III cases (three disqualified), 1 ATC case, 5 GBO cases, and 5 SWA cases (two disqualified).

ICD-9 codes for Pneumothorax	
512	Pneumothorax
512.0	Spontaneous tension pneumothorax
512.1	Iatrogenic pneumothorax
512.8	Other spontaneous pneumothorax
860	Traumatic pneumothorax and hemothorax
860.0	Traumatic pneumothorax without mention of open wound into thorax

ICD-10 codes for Pneumothorax	
J93.11	Primary spontaneous pneumothorax
J93.0	Spontaneous tension pneumothorax
J95.811	Postprocedural pneumothorax
J93.12	Secondary spontaneous pneumothorax
S27.2XXA	Traumatic hemopneumothorax
S27.0XXA	Traumatic pneumothorax

IV. Suggested Readings

1. Light RW and Lee YCG. Pneumothorax, Chylothorax, Hemothorax, and Fibrothorax. Ch. 74 in *Mason: Murray and Nadel's Textbook of Respiratory Medicine,* 5th ed., Saunders, 2010.

2. Voge VM and Anthracite R. Spontaneous Pneumothorax in the USAF Aircrew Population: A Retrospective Study. Aviat Space Environ Med, 1986; 57: 939-49.

3. Baumann MH. Management of Spontaneous Pneumothorax. Clin Chest Med, 2006; 27: 369-81.

4. Sahn SA and Heffner JE. Spontaneous Pneumothorax. N Engl J Med, 2000; 342: 868-74.

5. Szymanski TJ, Jaklitsch MT, Jacobson F, et al. Expansion of Postoperative Pneumothorax and Pneumomediastinum: Determining When it is Safe To Fly. Aviat Space Environ Med, 2010; 81: 423-26.

6. Brims FJH and Maskell NA. Ambulatory treatment in the management of pneumothorax: a systemic review of the literature. Thorax, 2013; 68: 664-69.

7. Zehtabchi S and Rios CL. Management of Emergency Department Patients With Primary Spontaneous Pneumothorax: Needle Aspiration or Tube Thoracostomy? Ann Emerg Med, 2008; 51: 91-100.

8. Pickard JS. Spontaneous Pneumothorax. Ch. 13 (Pulmonary Diseases) in *Rayman's Clinical Aviation Medicine*, 5th ed. Castle Connolly Graduate Medical Publishing, Ltd., New York, 2013.

Sarcoidosis (Jun 2020)
Reviewed: Lt Col Dara Regn (ACS Pulmonologist), Dr. Dan Van Syoc (ACS Waiver Guide Coordinator), and Lt Col David Gregory (AFMRA Physical Standards Development Chief)

Significant Changes:
New format and new MSD updates

I. Waiver Consideration

Sarcoidosis is disqualifying for all flying classes (FC I/IA, II, and III), ATC/GBO, and SWA personnel, as well as retention. Therefore, a waiver and MEB are necessary for these personnel.

History of cardiac or CNS involvement is typically not waiverable. Also sarcoidosis causing hypercalcemia is not compatible with a waiver. Please consult Uveitis Waiver Guide if ophthalmologic sarcoidosis is present.

Table 1: Waiver potential for sarcoidosis

Flying Class (FC)	Condition	Waiver Potential Waiver Authority	ACS review/evaluation
I/IA	History of sarcoidosis (asymptomatic or symptomatic) with disease resolution.	Maybe[1, 2] AETC	Yes
Trained II/III ATC/GBO	Sarcoidosis that is asymptomatic, stable, no treatment required, and no functional impairment.	Yes[1, 3] AFMRA	Yes, initial waiver or if relapse
	Sarcoidosis previously treated with steroids and now asymptomatic, stable and no functional impairment.[1]	Yes[1, 4] AFMRA	Yes, initial waiver or if relapse
Untrained II/III ATC/GBO	History of sarcoidosis (asymptomatic or symptomatic) with disease resolution.[4]	Maybe[1, 2] AFMRA	Yes

1. History of cardiac or CNS involvement is typically not waiverable.
2. Waiver considered only if asymptomatic, no functional impairment and remission without treatment for at least 3 years duration.
3. Waiver for trained aviators requires three-month follow-up to assure stability of newly diagnosed (histologically proven) disease prior to waiver submission.
4. If systemic corticosteroid therapy results in remission, then waiver may be submitted after six months off medication if asymptomatic, no evidence of recrudescence and pituitary-adrenal axis has returned to normal function (see Systemic Glucocorticoid (Steroid) Treatment Waiver Guide).

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. AMS for sarcoidosis for initial waiver or waiver for recurrent (relapsed) sarcoidosis should include the following:

1. History – occupational (silicates, beryllium) and environmental (moldy hay, birds, TB, coccidioidomycosis, histoplasmosis) exposures, signs, and symptoms (including negative, covering all organ systems), activity level, medications/treatment (if treated with corticosteroids within the year then Cosyntropin® stimulation test [see Systemic Glucocorticoid (Steroid) Treatment Waiver Guide]).
2. Complete physical with emphasis on lung, skin, eye, liver and heart, and *thorough* neurologic examination.
3. Internal medicine or pulmonologist consultation.
4. Testing - CXR, biopsy results, full pulmonary function testing with spirometry pre/post bronchodilator, lung volumes, and DLCO, 12-lead ECG and 24-hour Holter monitor test.
5. Laboratories – complete blood count (CBC), calcium, liver function tests, creatinine, blood urea nitrogen (BUN), urinalysis, 24-hour urine creatinine, and 24-hour urine calcium.
6. TB skin test.
7. Ophthalmology/optometry exam, to include slit lamp.
8. MRI with gadolinium. Neurology consultation if symptoms or signs indicate possible involvement.
9. MEB results.
10. If any of the above requested items cannot be provided, please provide an explanation to the waiver authority in the AMS why that could not be provided.

B. AMS for waiver renewal of individuals in continued remission should include the following:

1. History – brief summary of previous signs, symptoms, and treatment, current signs or symptoms (include negative), activity level, and medications.
2. Physical – complete physical, addressing lung, skin, eye, liver, heart, and CNS.
3. Testing - CXR, full pulmonary function testing with spirometry pre/post bronchodilator, lung volumes, and DLCO.
4. Laboratories – complete blood count (CBC), calcium, liver function tests, creatinine, blood urea nitrogen (BUN), and urinalysis. 24 hour urine calcium and creatinine should also be submitted if previous symptoms or current findings indicate systemic involvement.
5. Ophthalmology/optometry exam, to include slit lamp.
6. Neurologic or cardiac evaluation if current findings indicate involvement.
7. If any of the above requested items cannot be provided, please provide an explanation to the waiver authority in the AMS why that could not be provided.

III. Aeromedical Concerns

The most common aeromedical concerns are typically cardiac and pulmonary, though ophthalmologic and neurologic involvement may prove to be a hindrance to flight crew duties as well. Myocardial involvement may present as arrhythmias, conduction block, and syncope leading to sudden incapacitation during flight. Restrictive pulmonary disease is itself an aeromedical concern, particularly if blood gases are affected or airway hyper-reactivity is present. A crewmember with stage II or III sarcoidosis may have altered oxygen diffusion, thus exacerbating or accelerating symptoms of hypoxia and reduced decision-making abilities at altitude. Reductions in FVC and FEV1 may accompany sarcoidosis even with optimized medical management.[3]

CNS disease (e.g., cranial nerve palsies, encephalopathy, seizures), depression, ocular complications (e.g., uveitis, iritis, chorioretinitis), and renal calculi all have direct aeromedical implications. Neuromuscular involvement, especially of proximal muscle groups (and the predilection towards quadriceps muscle group involvement), have important implications for rudder control and anti G-straining maneuvers.

No individual should fly while undergoing treatment. Steroid treatment itself has a variety of metabolic, psychiatric, and CNS effects, which may make flying hazardous.

Sarcoidosis is a multisystem disorder characterized by the presence of discrete, compact, noncaseating epithelioid granulomata. The typical sarcoid granuloma is found in the lung, distributed along lymphatic chains, but can be found in virtually any organ. Though the precise etiology is unknown, recent evidence demonstrating T-cell lymphocytes layering around the granuloma suggests an immunological reaction in genetically susceptible individuals who are exposed to specific environmental agents. There is also newer evidence that there may be an infectious etiology to the condition.

Most commonly, sarcoidosis presents in one of three ways: as an asymptomatic finding on CXR; with nonspecific constitutional symptoms; or with organ-specific complaints. In various series, 30% to 60% of clinical presentations are asymptomatic and incidentally found, typically with radiographic findings of bilateral hilar adenopathy (BHA), with or without parenchymal opacities. Nonspecific symptoms may include fever, weight loss, fatigue, or muscle weakness. Organ-specific presentations are protean, and may manifest with dermatologic lesions, dyspnea on exertion, cough, vision changes or eye pain, cranial or peripheral nerve palsies, seizures, arthralgia, cardiac conduction blocks or even sudden cardiac death. Due to the variability of symptoms, delay in diagnosis is not uncommon.

Pulmonary involvement: Pulmonary sarcoidosis is a predominantly interstitial lung disease, with symptoms and radiographic findings similar to other fibrotic lung diseases. Prominent symptoms are dyspnea, dry persistent cough, and chest pain. Significant interstitial disease may lead to abnormal pulmonary function and oxygen diffusion capacity. However, in contrast with other interstitial lung diseases such as idiopathic pulmonary fibrosis, profuse radiographic changes are often associated with minimal physiologic alterations in lung function. The granulomatous inflammation, which favors the upper lung fields, tends toward a peribronchial distribution, which helps explain two additional clinical phenomena that are unusual with other interstitial lung diseases: transbronchial biopsy is usually successful in establishing a histologic diagnosis, and some

patients (roughly 15%) experience bronchospasm as a complication of the disease. Sarcoidosis has rarely presented with tracheal or laryngeal involvement, hemoptysis, unilateral involvement, pleural effusion, pneumothorax, pleural thickening, cavity formation, calcification of lymph nodes, or clubbing.

Even when patients initially present with extrapulmonary manifestations, over 90% have radiographically evident pulmonary involvement. Because pulmonary involvement is nearly ubiquitous, and is the most common cause of sarcoid-related morbidity, staging of sarcoidosis is based on radiological characteristics of the CXR. It is important to note that sarcoidosis normally does not progress though each of the 5 stages in a predictable fashion. Patients with sarcoidosis can present with any stage of disease; and while their disease may go on to progress to another stage, it may also remit or remain stable. The following are the various stages and remission rates:

- Stage 0 disease has a normal CXR (which implies extrapulmonary disease is the presenting manifestation or that the disease has remitted).
- Stage I disease is defined by the presence of BHA, which is often accompanied by right paratracheal node enlargement. 50% of affected patients exhibit BHA as the first expression of sarcoidosis. Regression of hilar nodes within one to three years occurs in 75% of such patients, while 10% develop chronic enlargement that can persist for 10 years or more. When BHA is associated with EN, migratory polyarthralgias, and fever, the diagnosis of Löfgren's syndrome is highly likely. Patients with stage 1 disease are most often asymptomatic.
- Stage II disease consists of BHA and reticular opacities (the latter occurring in the upper more than the lower lung zones). These findings are present at initial diagnosis in 25% of patients. Two-thirds of such patients undergo spontaneous resolution, while the remainder either have progressive disease or display little change over time. Patients with stage II disease usually have mild to moderate symptoms, most commonly cough, dyspnea, fever, and/or fatigue.
- Stage III disease consists of reticular opacities with shrinking or absent hilar nodes. Reticular opacities are predominantly distributed in the upper lung zones. This form typically remits in 10-20% of cases.
- Stage IV disease is characterized by fibrotic, reticular opacities with evidence of volume loss, predominantly distributed in the upper lung zones. Conglomerated masses with marked traction bronchiectasis may also occur. Extensive calcification and cavitation or cyst formation may also be seen. Remission occurs in 0-5% of individuals with this stage.

Cardiac involvement: Approximately 5% develop clinically evident cardiac involvement, though autopsy studies of sarcoid patients have reported granulomatous infiltration of the myocardium in 13 to 30% of patients. (It should be borne in mind that, with the exception of cardiac and severe pulmonary disease, sarcoidosis is rarely fatal, and thus myocardial sarcoidosis is almost certainly over-represented in autopsy series.) The left ventricle and interventricular septum are most often involved. Heart block is most likely due to disease of the AV node or the bundle of HIS. Since healed myocardial granulomata may become foci for abnormal automaticity leading to arrhythmias, patients in remission who have had myocardial involvement remain at risk for sudden death. Before the advent of implantable cardiac defibrillators, several studies of cardiac sarcoid reported a risk of sudden death of 33-67%. Routine ECG, Holter monitoring, and transthoracic

echocardiogram are routinely used to screen for cardiac sarcoidosis. However, if the diagnosis is suspected, cardiac MRI is the most sensitive imaging modality.

Dermatologic involvement: Cutaneous manifestations of sarcoidosis involve approximately one-third of patients, and can be variable. The classic panniculitis of EN is a common presentation of acute sarcoidosis in Caucasian, Puerto Rican, and Mexican patients and is the least beneficial lesion to biopsy. Other dermatologic lesions include small purplish papules, plaques, or subcutaneous nodules. While these are less distinctive on physical examination, biopsy will often yield a histologic diagnosis of noncaseating granulomata. Small, pink, maculopapular eruptions may wax and wane, may present as scarring sarcoidosis, and may cause alopecia. Sarcoid lesions may invade old scars. On blanching with a glass slide, dermal sarcoid lesions often reveal an "apple jelly" yellowish brown color. As a rule, sarcoid lesions do not itch, ulcerate, or cause pain.

Ocular involvement: In most series, ocular involvement occurs in 25-33% of individuals. As with other granulomatous disorders, sarcoidosis can affect any part of the eye and involvement may or may not be symptomatic. Anterior uveitis is the most common manifestation, often presenting with ocular pain, redness or changes in vision. Posterior chronic uveitis may be occult and may, over time, lead to secondary glaucoma, cataracts, or blindness. Other eye lesions include conjunctival follicles, dacryocystitis, and retinal vasculitis.[1]

Nervous system involvement: Neurological manifestations can occur in up to 5 to 10% of cases, though one series found neural involvement in 26% of sarcoid patients. Neurosarcoidosis favors the base of the brain, and may present as a cranial nerve palsy (especially facial nerve palsy), panhypopituitarism, fulminant delirium, hydrocephalus or chronic meningitis. Seizures have been reported in 5%-22% of neurosarcoidosis patients, but are rarely the presenting symptom. Granulomatous involvement of the hypothalamus may result in defective release of vasopressin, adrenocorticotropic hormone, and glucagon; in particular the defect in vasopressin may lead to diabetes insipidus. These lesions are typically early findings and respond well to treatment. On the other hand, space occupying lesions, seizures, peripheral nerve lesions, and neuromuscular involvement tend to occur as a late manifestation, and most likely indicate chronic disease.[2] MRI imaging often reveals the presence of leptomeningeal enhancement. Cerebrospinal fluid (CSF) findings are nonspecific, and may include lymphocytosis, increased protein, and/or elevated angiotensin-converting enzyme (ACE) levels, lysozymes, increased CD4/CD8 ratios and β-2 macroglobulins. The triad of facial nerve palsy, parotiditis, and anterior uveitis is called the Heerfordt syndrome and, unlike most neural involvement, suggests a favorable prognosis.

Musculoskeletal involvement: Joint pains occur in approximately 25-39% of sarcoid patients, although deforming arthritis is rare. Acute polyarthritis (especially in the ankles) usually occurs in the presence of anterior uveitis or EN. Chronic arthritis may mimic rheumatologic disease, even to the extent of causing a false positive test for rheumatoid factor. Muscular involvement may affect up to 10% of sarcoidosis patients. Proximal muscle weakness, muscle wasting, diaphragmatic weakness, and quadriceps weakness have been described in the literature. Respiratory muscle involvement has very rarely led to respiratory failure.

Lymphatic involvement: Extrathoracic lymphadenopathy is commonly found in the cervical, axillary, epitrochlear, and inguinal chains. Such nodes are typically non-tender and patients are usually unaware of them; their importance is primarily as an easy site for diagnostic biopsy. At the

time of autopsy, the spleen is involved in 40-80%, but clinically important manifestations of hypersplenism such as anemia or spontaneous rupture are rare.

Gastrointestinal involvement: Although liver biopsy will show sarcoid granulomata in 70% of cases, altered liver function due to granulomatous hepatitis or portal hypertension is rare. (Due to the lack of specificity of hepatic granulomata, the liver is not recommended as a biopsy site.) Clinically symptomatic gastrointestinal involvement, which may mimic infectious gastroenteritis, inflammatory bowel disease, tuberculosis, fungal infection or pancreatic neoplasm, affects less than 1% of patients.[1]

Osseous involvement: Lytic or sclerotic bone lesions are present in 10% of cases and are almost always accompanied by chronic skin findings. Bone resorption secondary to endocrine abnormalities with vitamin D, noted below, is integral to the pathogenesis of hypercalciuria.

Endocrine/renal involvement: Disordered calcium metabolism, due to conversion of vitamin D to the active form within granulomata, often results in hypercalciuria with the attendant risk of nephrolithiasis; hypercalcemia is much less common (2-10%).

Quality of life/Emotional implications: One study of 111 sarcoid individuals revealed up to 66% had experienced depression (worse while on steroid treatment) and 55% had increased stress when compared to the average study population without sarcoidosis. These levels are comparable to patients with symptomatic AIDS, end-stage renal disease, and moderate to severe COPD.

The pulmonary literature has vacillated about the need for histologic confirmation of sarcoidosis in the most typical presentation, that of an individual with asymptomatic BHA found on CXR. Since this is a relatively uncommon presentation for lymphoma, some have argued in favor of clinical follow-up rather than proceeding to biopsy. However, current consensus is that histologic confirmation is advisable to confirm sarcoidosis, and to rule out lymphoma and infections such as tuberculosis. For aviators, “watchful waiting” is even more problematic, since it would require grounding for up to twelve months. And regardless of flight status, most patients are anxious to have confirmation of the diagnosis. If physical examination demonstrates involvement of superficial lymph nodes, skin (except EN), conjunctivae, or salivary glands, then biopsy should be directed toward that site. CT scan may prove to be useful for extent of involvement, particularly to delineate mediastinal adenopathy. Transbronchial biopsy has a high yield in Stage 1 and higher disease; even when the disease process appears to be limited to hilar nodes, biopsy of lung tissue is usually positive for non-caseating granulomata. The use of endobronchial ultrasound allows direct sampling of enlarged hilar and mediastinal lymph nodes, further increasing the diagnostic yield of bronchoscopy. Bronchoalveolar lavage, on the other hand, is of limited prognostic value, other than to exclude alternative diagnoses. When flow cytometry analysis is done on the lavage fluid, an elevated CD4/CD8 ratio can suggest sarcoidosis. However, this finding is non-specific and is insufficient to make a definitive diagnosis. As noted earlier, liver biopsy is not recommended. The Kveim test and blind scalene lymph node or fat pad biopsies are obsolete. The ACE level is elevated in 40-90% of individuals with active sarcoidosis; however, a high ACE level is not specific for sarcoidosis, and the magnitude of an initial elevation has no prognostic significance. As cardiac involvement typically has a patchy distribution, cardiac biopsy has low sensitivity (about 20% in one study) and is not recommended, even when there is a high suspicion for myocardial involvement. In general, disease that is isolated to the heart, brain, or eye is not biopsied. The

diagnosis is normally based on clinical presentation and characteristic radiographic findings. In the first two cases, such involvement is rarely waiverable anyway. Idiopathic granulomatous uveitis must be evaluated at the ACS, and is generally waiverable only when quiescent (see Uveitis Waiver Guide.)

Only a minority of sarcoidosis patients will actually require therapy. When treatment is necessary, the standard regimen is a prolonged course of oral prednisone, but recommended dosages vary widely. Corticosteroids accelerate clearance of symptoms, physiologic disturbances, and x-ray changes, but it is not clear that long-term prognosis is altered by such therapy. Treatment is indicated for patients with progressive pulmonary disease, cardiac involvement, CNS disease, uveitis, or hypercalcemia. For the 10% who fail to respond to corticosteroids, chlorambucil, leflunomide, azathioprine, hydroxychloroquine, TNF-inhibitors and methotrexate are possible alternative medications.

More than 85% of remissions occur within the first two years. Failure to regress spontaneously within 2 years forebodes a chronic or persistent course. Only about 2-8% of those individuals who spontaneously remit or stabilize will relapse at a later date. Corticosteroid-induced remissions, on the other hand, have a high rate of relapse, ranging from 14-74%, although one study showed no relapses if individuals remained asymptomatic for three years after prednisone withdrawal.

A recent British study has developed a prognostic tool that utilizes a composite physiologic index (CPI) along with high-resolution CT (HRCT) staging system. This is an early tool that offers hope for more successful management decision making.

A search of AIMWTS in May 2020 revealed six members with an aeromedical disposition and a diagnosis of sarcoidosis. There were two FC II cases and four FC III cases. One of the FC III cases was disqualified due to multi-organ disease.

ICD-9 code for Sarcoidosis	
135	Sarcoidosis

ICD-10 code for Sarcoidosis	
D86.9	Sarcoidosis, unspecified
D86.0	Sarcoidosis, lung

IV. Suggested Readings

1. American Thoracic Society. Statement on sarcoidosis. Am J Respir Crit Care Med, 1999; 160: 736-55.

2. Costabel U. Sarcoidosis: clinical update. Eur Respir J, 2001; 18: suppl. 32: 56s-68s.

3. Milligan T. Sarcoidosis: Case Report. Federal Air Surgeon's Medical Bulletin. US Dept of Transportation, Federal Aviation Administration, 2007; 45(3): 10-11.

4. American Thoracic Society. American Thoracic Society/European Respiratory Society International Multidisciplinary Consensus Classification of the Idiopathic Interstitial Pneumonias. Am J Respir Crit Care Med, 2002; 165: 277-304.

5. Pickard JB. Pulmonary Diseases. Ch. 13 in *Rayman's Clinical Aviation Medicine*, 5th ed. New York; Castle Connolly Graduate Medical Publishing, LTD. 2013.

6. Hull DH. Sarcoidosis and the aviator. AGARD Lecture Series in Aerospace Medicine, Neuilly-Sur-Seine, France: NATO-AGARD, AGARD-LS-189, 1993; 12: 1-3.

7. Stern BJ. Neurological complications of sarcoidosis. Curr Opin Neurol, 2004; 17: 311-16.

8. Jeny F, Bouvry D, Freynet O, et al. Management of sarcoidosis in clinical practice. Eur Respir Rev, 2016; 25: 141-50.

Aerospace Medicine Waiver Guide

Obstructive Sleep Apnea

Revised: Dec 2024
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Significant Changes: This guide was significantly revised in Sep 2023 and should be read in its entirety before submitting. Waiver potential exists for FC I/IA with OSA. Other sleep disorders are in a separate chapter (Other Sleep Disorders). Clarifying language added.

I. Waiver Consideration

Obstructive sleep apnea (OSA) affects people of all body habitus and produces a myriad of symptoms incompatible with flying operations. The ACS recommends a high-quality sleep study for any aviator with complaints of non-restorative sleep, regardless of body habitus, if conservative measures such as sleep hygiene have failed. OSA is disqualifying for nearly all flying and operational classes (FC I/IA, II, III, ATC, GBO, and SWA). Duties not including flying or controlling (DNIF/DNIC) should be put in place at the time of diagnosis, or prior to diagnosis when symptoms hinder quality of life, driving, performance of ground duties and/or critical phases of flight.

Submit the waiver package once symptoms are resolved (pre-treatment hinderance to quality of life, driving, or performance of ground duties). Submission therefore can be before the minimum allowable number of days of PAP data is available, but a minimum of 30 days of PAP data is required at the time of ACS review for initial waivers and 90 days for renewals. See below for detailed information on compiling a successful waiver package.

Waiver recommendations may be accomplished by review (without an in-person evaluation at the ACS) in cases where the quality of the workup meets a high standard. Therefore, if possible, aviators should be referred to military treatment facilities (MTF) or civilian sleep laboratories known to use the American Academy of Sleep Medicine (AASM) “Recommended” scoring criteria for hypopneas (30% airflow drop and an arousal or 3% oxygen desaturation). In some cases, ACS may still require an in-person evaluation at Wright-Patterson Medical Center before authoring a waiver recommendation The MTF sleep labs able to provide the daytime and nighttime studies needed for flying waiver recommendations at the time of this writing include Wilford Hall Ambulatory Surgical Center (San Antonio, TX), Wright-Patterson Medical Center (Dayton, OH), Walter Reed National Military Medical Center (Washington, DC), Augusta Military Medical Center (Ft. Belvoir, VA), Madigan Army Medical Center (Tacoma, WA), Joint Base Elmendorf-Richardson Hospital (Anchorage, AK), Tripler Army Medical Center (Hawaii), and Landstuhl Regional Medical Center (Germany).

Sleep study respiratory events will be scored using the apnea hypopnea index (AHI) and the AASM "Recommended" scoring criteria and/or the respiratory disturbance index (RDI) as per the most recent AASM scoring manual. The greater of the two criteria will be used to determine OSA severity. In addition to any indicated confirmation of diagnosis and therapy testing, the ACS will facilitate clinical optimization during in-person evaluations.
Sleep studies done at community or MTF labs that use the AASM "Optional" hypopnea criteria (4% oxygen desaturation criteria) and Home Sleep Testing (HST) using either scoring criteria are specific for OSA but not sensitive enough to exclude OSA. These tests are known to underestimate the severity of sleep-disordered breathing or even provide false-negative results. They will not be accepted as proof of efficacy of treatment nor of resolution of OSA.

Regarding modalities of therapy and operational concerns:

The most expedient path to return to flying status (RTFS) for OSA is to procure an in-lab polysomnography (PSG) or Home sleep (apnea) test (HSAT or HST) from an MTF sleep lab or a local sleep lab that uses the AASM "Recommended" hypopnea scoring rule (hypopneas scored with 30% airflow drop and an arousal or 3% oxygen desaturation) and treat with auto-titrating continuous positive airway pressure (auto-PAP or APAP).

APAP offers out-of-lab titration and the ability to refine pressure settings without a formal PAP titration, but CPAP titration is clinically indicated for hypoxemia and other findings to demonstrate that PAP is effective. In general, APAP is the most expedient form of treatment and is associated with the shortest DNIF time. It can be ordered as soon as the sleep study results are available and wait times average 2-4 weeks. This can be expedited by contacting Referral Management and the supply vendors directly. There are military-friendly Durable Medical Equipment (DME) vendors, such as Optigen, JANZ, and CPAP Medical, which support deployments, ship to APO/FPO addresses, and cater specifically to the military population, following the patient as they PCS.

ResMed® machines are currently the most common due to the 2021 recall of Respironics® machines, and both AirView™ (ResMed®) and Care Orchestrator™ (Respironics ®) have options to access formal PAP data. Some machines have a removeable modem or airplane mode so that locations and patterns of use can be masked, however the modem would need to be replaced, or airplane mode disabled to allow a data download. An SD card could be used for a direct download except in the ResMed® AirMini™ travel machine, which does not have SD card functionality. Some machines also have a personal compliance tracking app, such as myAir™ (ResMed®) and Dream Mapper™ (Respironics®). However, personal app reports do not give details on mode of therapy, pressures used by the machine algorithm, detailed leak information, and other data that help establish whether the PAP therapy is adequate for the member's condition. Formal PAP data can be obtained by contacting the Sleep clinic, the DME vendors or via websites (such as AirView™ or Care Orchestrator™) that can be accessed on government information systems without installation of any new software. This offers flight surgeons and flyers/operators the complete documentation required for expeditious deployment and flying waiver adjudication.

For PAP use during deployments, bottled water may be used in the humidifier. A back-up battery should be issued with the PAP deployment kit that should be tested prior to leaving to ensure it will last at least 5 hours between charges. Military-friendly DME vendors known to have deployment kit capability and ability to ship to APO/FPO addresses can be sought out for those in deployable positions (see above).

While it is a first line therapy for appropriately selected patient with mild to moderate OSA, oral appliance therapy is not as reliable as PAP in resolving symptoms or in controlling OSA to an AHI and/ or RDI of <5/h on repeat in-lab testing. Electing this therapy can cause delays in return to flying or operational duties if PAP must be pursued after unsuccessful therapeutic trial of oral appliance therapy. HST will not be accepted as proof of efficacy for oral appliances, surgical interventions, positional therapy or other non-PAP treatment options. An in-lab sleep study using the AASM "Recommended" scoring criteria is required to show AHI/RDI is below 5/h (see above). Compliance monitoring for oral appliances and other non-PAP treatment options is becoming available, and the inclusion of this data is required, if available. Usage requirements are the same as with PAP.

Surgical interventions are most effective when used in combination with positional therapy, oral appliance, and/or PAP. They are not first line therapy and are recommended by ACS experts only as an adjunctive or salvage therapy for cases refractory to first line treatments (CPAP or dental appliances), as they are rarely curative. A post-operative in-lab, AASM "Recommended" scoring criteria sleep study is required to show AHI/RDI is below 5/h (see above).

Positional therapy is most often effective when used in conjunction with another therapy and when ensured with the use of a positional therapy device. Such devices can be purchased online and aim to enforce side sleeping by preventing supine sleep. Devices that vibrate to trigger a change in position could contribute to overall sleep fragmentation, which can worsen symptoms related to sleep deprivation. After initiation of positional therapy, an in-lab, AASM "Recommended" scoring criteria sleep study is required to show AHI/RDI is below 5/h (see above).

Implanted devices are not recommended unless the flyer has failed PAP, oral appliance, surgical intervention, and combination therapies. For refractive OSA and implanted devices, servicemembers must meet the criteria for retainability per the MSD. Similar to other non-PAP therapies, an in-lab, AASM "Recommended" scoring criteria sleep study is required to show AHI/RDI is below 5/h (see above).

When writing the aeromedical summary, note that PAP downloaded "AHI" is not a true AHI as appears on a PSG. If it is less than 10, the patient is likely benefitting per ATS guidelines, but a low residual "AHI" on a data download does not prove symptoms are resolved or that therapy is effective. The member's symptoms and experience with PAP are essential to place the data from the download into an aeromedical risk context (e.g. "excellent AHI" numbers on the download have been seen in cases of severe comorbid OSA and insomnia (COMISA) with significant residual daytime symptoms/sleepiness).

Lastly, at the ACS we have found 41% of OSA cases also have at least one concomitant sleep disorder such as insomnia, restless leg syndrome, or parasomnias. If those complaints are not resolved with treatment of OSA, refer to the Other Sleep Disorders waiver guide.

Table 1: Waiver potential for obstructive sleep apnea.

Flying Class	Waiver Potential	Waiver Authority	ACS review/evaluation
FC I/IA and all untrained assets	Yes[1, 2]	AFAC/CMO	Yes[4]
FC II (other than FS), RPA pilots	Yes[1, 2]	MAJCOM[3]	Yes[4]
Flight Surgeons, FC III, SWA	Yes[1, 2]	MAJCOM[3]	Maybe[5]
ATC/GBO (other than RPA pilots)	Yes[1, 2]	MAJCOM[3]	No[5]

1. OSA documented at ACS or MTF Sleep lab or civilian Sleep lab reporting AASM "Recommended" or "Optional" (CMS) scoring of hypopneas, by in-lab or HST, with resolved symptoms, and adequate compliance is waiverable. Maintenance of wakefulness testing (MWT) is required for some aircrew positions (see below). Demonstration of normal neuropsychiatric testing may be required in cases with concern for persistent sleep, cognitive, or mood symptoms.
2. Indefinite waivers will not be granted for OSA.
3. AFMEDCOM is the waiver authority for sleep disordered breathing and other associated sleep disorders when therapies beyond positive airway pressure or oral appliances are required (e.g., implanted devices, chronic use of medications for wakefulness or to fall asleep, etc.).
4. ACS Sleep evaluation (if required for any reason) includes MWT (for all pilots/navigators and case-by-case in other positions) at Wright-Patterson Medical Center Sleep Laboratory and may include polysomnography. Neuropsychologic testing may be required in cases with concern for persistent sleep, cognitive, or mood symptoms.
5. For Flight Surgeons/FC III/Sensor operators/SWA personnel, ACS review/evaluation is at the discretion of the waiver authority and may be requested when subtle decrement or executive dysfunction could have a catastrophic impact on the mission.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnosis has been made and symptoms are no longer hindering quality of life, performance of ground duties, or driving conditions. Those requiring MEB or IRILO must be adjudicated prior to waiver submission.

A. Initial Waiver Request:

1. History – presenting symptoms (including pertinent negatives), brief summary of testing results, modality of treatment and effectiveness (i.e.: Epworth Sleepiness Scale (ESS) Insomnia Severity Index (ISI), and Pittsburg Sleep Quality Index (PSQI) scores pre- and post-treatment), and documentation of resolution of symptoms. Comment on co-morbidities associated with undertreated OSA including insomnia, snoring, nightmares, anxiety/depression, PTSD, headaches, chronic pain, cognitive complaints, restless sleep, drowsy driving, elevated blood pressure, impaired fasting glucose, and excessive daytime sleepiness. Symptom questionnaires and sleep diary are located here: https://kx.health.mil/kj/kx5/AeromedicalConsultationSvc/Pages/Waiver%20Guide%20Links.aspx.
2. Clinical notes documenting office evaluation post-treatment by the Sleep Medicine provider within 3 months of waiver submission must be attached, detailing evidence of troubleshooting of any issues and response of symptoms to therapy.

3. Include the type of PAP mask interface (nasal, nasal pillows, full-face, or hybrid) and if they use a chinstrap, or the type of oral appliance (manufacturer and model and setting) or other therapy used.
4. Physical – height and weight, BMI, blood pressure. Also include a brief history of weights and blood pressures since reaching adulthood.
5. Include results of TSH since around the time of symptom onset/diagnosis to rule out thyroid-associated symptoms.
6. Complete sleep study reports must be attached:
    a. Complete diagnostic sleep study reports are required. In-lab polysomnography (PSG) or home sleep testing (HST) is acceptable.
    b. Maintenance of wakefulness testing (MWT) meeting the standard of a mean sleep latency of 40 min without use of any stimulants is required for pilots, navigators, CSOs/WSOs, and RPA pilots (and applicants) for all airframes and may be completed at the ACS if not available locally.
    c. In-lab CPAP titration is not required but can assist with treatment optimization. Complete titration reports must be included if performed.
    d. If treated with dental orthotic/appliance, surgery, positional therapy, implanted device or other non-PAP therapy, the full report of the repeat in-lab sleep study clearly stating it was performed with device/therapy in place is required, demonstrating AHI and/or RDI <5 events/h (whichever is greater). The repeat study must use the AASM "Recommended" hypopnea scoring criteria (see above). HST will not be accepted. If the AHI/RDI is not below 5/h, then adjustment of the oral appliance or change in therapy is required.
7. For treatment with a PAP device, a formal PAP data download via AirView™ or Care Orchestrator™ showing acceptable adherence to use (usage on ≥90% of nights for an average of at least 5 hours per night on nights used) is required. OSCAR™ reports are also acceptable. If a personal app report (such as myAir™ or DreamMapper™) is submitted, ACS will attempt to obtain a formal report. If this is not possible, the case may be returned for more data. The longest available timeframe must be submitted, and may be 15-, 30-, 90- or 365-day increments. 30 days of data are required for initial waivers by the time of final review, but 15 days may be submitted in operationally appropriate cases to expedite processing. The last day of the download period must be no earlier than 1 month prior to waiver package submission. If available, non-PAP therapy compliance is required and must meet the same standard.
    a. To ensure optimal PAP effectiveness, look for residual AHI less than 5, 95th leak and max leak less than 20 L/min (depending on the machine model and mask interface used), and periodic breathing less than 6%.
8. To facilitate waiver disposition, required items can often be accomplished during in-person evaluation at the ACS, along with clinical optimization.
    a. If seen at the ACS for in-person evaluation, initial waiver evaluations for pilots, navigators, combat systems officers (CSO), and RPA-pilot) may have repeat in-lab PSG for diagnostic confirmation or treatment optimization and MWT performed.
    b. If seen at the ACS for in-person evaluation, initial waiver evaluations for Flight Surgeon/FC III/SWA/ATC/GBO (non-pilots, non-CSOs), a repeat in-lab sleep study may be obtained for diagnostic confirmation or treatment optimization, and

MWT may be required on a case-by-case basis when there is concern for persistent excessive daytime sleepiness. These members are most likely to be recommended for an ACS in-person evaluation for clinical concerns of persistent symptoms or AHI/RDI >5 events/h despite therapy or in the setting of a comorbid condition requiring ACS evaluation and the visit will be coordinated whenever possible.

c. Neuropsychological testing is on a case-by-case basis and may be required based on severity, presenting symptoms, or residual symptoms.

Note: If any of the above requested items cannot be provided or accomplished locally, please provide an explanation to the waiver authority in the AMS and indicate that in-person evaluation at ACS is requested. If unavailable at the ACS, other acceptable options for testing will be provided.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including discussion of any recurrence of symptoms and current comorbidities. Complete discussion of symptoms is critical to avoid delays. Annual Sleep Medicine visits are required when possible, and telehealth is acceptable. In areas without access to Sleep Medicine, a thorough Flight Medicine or PCM visit may be acceptable, covering the topics listed in section II.A.1 and II.A.2. Timing of waiver package submission may be linked to that appointment for convenience.
2. Symptom questionnaires and sleep diary are located here: https://kx.health.mil/kj/kx5/AeromedicalConsultationSvc/Pages/Waiver%20Guide%20Links.aspx.
3. Current physical exam including height, weight, BMI, and blood pressure. Include interval history of blood pressures and BMIs since initial waiver or most recent renewal.
4. Consultation reports from all treating provider(s) or specialist(s), dated within 3 months of submission of the waiver package. Annual visits are required by insurance for supply reorders, so timing of waiver package may be linked to that appointment for convenience.
5. For treatment with a PAP device, a formal PAP data download via AirView™ or Care Orchestrator™ showing acceptable adherence to use (usage on ≥90% of nights for an average of at least 5 hours per night on nights used) is required. OSCAR™ reports are also acceptable. If a personal app report (such as myAir™ or DreamMapper™) is submitted, ACS will attempt to obtain a formal report. If this is not possible, the case may be returned for more data. If available, non-PAP therapy compliance is required and must meet the same standard.
   a. The longest available timeframe must be submitted, and may be 15-, 30-, 90- or 365-day increments.
   b. Renewal requires at least 90 days of data meeting adherence to use standards. Please submit all available reports generated since last waiver submission.
   c. The last day of the download period for the current renewal must be no earlier than 1 month prior to waiver package submission.
   d. To ensure optimal PAP effectiveness, look for residual AHI less than 5/h, 95th leak and max leak less than 20 L/min (depending on the machine model and mask interface used), and periodic breathing less than 6%. Consider referral back to the treating Sleep provider for values outside those ranges.
6. If treated with dental orthotic/appliance, surgery, positional therapy, implanted device or other non-PAP therapy, repeat in-lab sleep study with device/therapy use is required at

each waiver renewal demonstrating AHI (AASM "Recommended" scoring criteria) and/or RDI <5 events/hr (whichever is greater). If the AHI/RDI is not below 5/h, then adjustment of the oral appliance or change in therapy is required. MWT meeting a standard MSL of 40 min without use of any stimulants is also required at each waiver renewal for pilots, navigators, CSOs/WSOs, and RPA pilots, and on a case-by-case basis for other positions. If available, non-PAP therapy compliance is required and must meet the same standard as PAP.

7. Any other pertinent information.

Note: If any of the above requested items cannot be provided or accomplished locally, please provide an explanation to the waiver authority in the AMS. Alternate locations for testing may be recommended at the time of ACS review.

III. Aeromedical Concerns

The global war on terrorism resulted in over 20 years of high-tempo operations, an increase in short-notice alerts, and long-range missions. This has resulted in a culture where chronic sleep deprivation is the norm. The focus has since shifted to preparation for near-peer conflict, but chronic sleep deprivation has a significant adverse impact on overall health and flight safety. Although aviation accidents are rare, 80% are due to human error with pilot fatigue accounting for 15-20% of human errors in fatal accidents. Since 2003, the cost of fatigue-related accidents in the USAF has been over $2 billion (Gaines et al, 2020). Clinical sleep disorders commonly encountered in the military population include obstructive sleep apnea, insomnia, and insufficient sleep. Recent literature demonstrates an 30-fold increase in obstructive sleep apnea among U.S. service members from 2005 to 2019 with incidence rates of 33.3/1000 in 2019.

The common thread amongst most sleep disorders is insufficient quantity or quality of sleep, which leads to impaired higher executive function and lapses of attention (frank falling asleep or microsleeps). Friedeman and Miyake describe the executive functions as "interdependent cognitive processes related to the activation of the prefrontal cortex, which are fundamental for self-regulating and goal-directed behaviors." As higher-level cognitive processes, the executive functions exercise a top-down effect on behavior that allows for planning, strategizing, and working toward objectives, as well as inhibiting unwanted responses and ineffective strategies. Sleep disorders increase mortality, morbidity, performance problems, accidents, injuries, and health-care utilization. While pathologic sleep disorders command the greatest attention, the most common causes of excessive sleepiness are physiologic, such as poor sleep hygiene and sleep restriction, or occupational, such as circadian shifting related to shiftwork or crossing time zones.

Sleep deprivation can be divided in two subtypes: *total sleep deprivation*, characterized by episodes of vigilance equal or above 24 hours and absence of 90% of REM and non-REM; and *chronic sleep restriction*, characterized by a progressive reduction of the total sleep hours. Sleep deprivation has been discovered to negatively affect several cognitive processes, such as short-term memory, selective attention, and executive functioning, and each type is associated with different manifestations of cognitive impairment. Total sleep deprivation is associated with increased sleepiness, impaired memory consolidation, lapses of vigilant attention, and impaired decision making. Chronic sleep restriction is associated with slower processing speed, selective

attention lapses, and increased errors of omission. Even mild chronic sleep deprivation may cause as much dysfunction as an undertreated pathologic sleep disorder. The definition of sufficient sleep varies, but the consensus recommendation for adults is 7-9 hours of sleep per 24-hour period. Less than 7 hours of sleep is considered sleep deprivation. Fatigue experts caution that humans become habituated to the symptoms of sleep deprivation and therefore reset their personal performance baseline lower than 100%, despite many believing that 6 hours of sleep or less is sufficient. Careful attention must also be paid to alcohol, sedatives (including no-go pills), and stimulant use (including go pills, caffeine, nicotine, and bupropion), since their use may disrupt sleep patterns and may mimic symptoms of a sleep disorder even in those without a diagnosis or worsen sleep disorders despite adequate treatment in people with an underlying diagnosis. Cognitive function and neuromuscular coordination may both be affected by the sleep disorder and/or the treatment modalities used. Microsleeps are characterized by 10-30 seconds of intrusion of sleep into the waking state and are associated with sleep deprivation. Microsleeps feel like "lost time," "auto-pilot mode," or lapses of attention, not like falling asleep. After 24 hours of total sleep deprivation, subjects begin to experience microsleeps, during which the individual is unable to respond to new stimuli. These are uncontrollable and the individual may not be aware of them. After 10 days of sleeping 6 hours a night (chronic mild sleep deprivation), the number of microsleeps per hour is equivalent to that seen after 24 hours of total sleep deprivation. This is extremely dangerous during high vigilance activities, as 10-30 seconds of inability to respond to new stimuli can have catastrophic consequences as well as more subtle judgment errors during critical phases of flight.

Untreated or undertreated OSA may result in degradation of higher executive functioning, excessive daytime sleepiness, and increased risk of microsleeps resulting in an inability to maintain the alertness necessary for safe flying. There are several phenotypes of OSA, and presentation can include problems associated with falling asleep, staying asleep, waking too early, waking with headaches, migraines, cognitive dysfunction, mood symptoms (anxiety, depression, recalcitrant stress-related disorders, nightmares, or nighttime panic episodes), elevated blood pressure and blood sugars, increasing weight, chronic pain, brain fog or other cognitive complaints, snoring, gasping arousals, and witnessed apneas. At present, there is no single screening questionnaire that casts a sufficiently broad net to identify all OSA phenotypes, so careful clinical interview along with a high-quality in-lab sleep study (polysomnography (PSG) using the AASM "Recommended" hypopnea criteria (see above) is the only way to rule out OSA. Home Sleep (Apnea) Testing (HST or HSAT) is a limited study that can only rule-in OSA but cannot rule-out OSA. Even if the HST is "negative," it must be followed up by a high-quality in-lab PSG to rule-out OSA or other sleep disorders. Some states require HST for clinically-appropriate patients, so civilian Sleep medicine practice can vary by region.

Untreated or undertreated obstructive sleep apnea is also known to affect mood, learning, and memory. Mechanisms of cognitive impairment in OSA include intermittent hypoxemia, sleep deprivation and fragmentation, disruption of the hypothalamic-pituitary-adrenal-axis, and hypercapnia. In the aeromedical context, the increased risk of judgment errors and accidents is paramount. Continuous positive airway pressure (CPAP) is known to ameliorate some of the cognitive deficits associated with obstructive sleep apnea, but more data are needed to determine the effectiveness of other therapies. Therefore, ACS strongly recommends PAP therapy for all

flying and operational classes. However, it is important to note that studies have shown nearly all the improvement seen with PAP use can be lost after just one night without therapy.

During high operational tempo or combat situations, inadequate sleep may be an operational necessity, resulting in those with undertreated or untreated OSA suffering more profound effects of sleep deprivation. When faced with sleep deprivation, individuals without sleep disorders typically respond by adapting sleep architecture, e.g., longer periods of slow-wave or REM sleep. This is likely a physiologic response and serves to increase sleep efficiency in normal individuals. However, OSA can be most severe in REM, as in the REM-predominant OSA phenotype, in which the number of events per hour during REM sleep is more than twice that of the number per hour averaged over the whole night. Thus, individuals with undertreated or untreated REM-predominant OSA may have more difficulty adjusting to sleep deprivation, shift changes, or circadian rhythm disruptions. This presents an additional hazard to operators deploying across multiple time zones and often performing mission taskings immediately upon arrival.

Positive airway pressure (PAP) is the gold-standard therapy for obstructive sleep apnea. Dental appliances can be first-line in appropriately selected mild to moderate cases, while surgery and positional therapy are second-line or third-line therapies, and best used in combination (such as oral appliance plus positional therapy). Implanted devices such as hypoglossal nerve stimulators are considered salvage therapies and require MEB any time they are used. Auto-titrating PAP (APAP) is well-tolerated and highly recommended by ACS sleep experts. See above for operational concerns.

In summary, conceptualization of aeromedical risk with sleep disorders requires a thorough understanding of an individual's symptoms prior to the onset of treatment as these are the conditions that are likely to recur with interruptions in treatment. Sleep disorder treatments require nightly adherence during a physiologically-sound duration of sleep for maximal effectiveness. Therefore, despite the published minimum CPAP compliance metric, for optimal operational impact, 7-9 hours of use per night is essential. With consistent optimal adherence, operational tradeoffs such as occasional sleep restrictions from alerts or longer-duration missions will be better tolerated. Epworth Sleepiness Scale (ESS) Insomnia Severity Index (ISI), and Pittsburg Sleep Quality Index (PSQI) scores pre- and post-treatment, clinical assessment of the other symptoms associated with undertreated sleep disorders, demonstration of adherence to therapy, and excellent sleep hygiene practices are the best tools to mitigate aeromedical risk. Despite true post-treatment assessment not being fully accurate until the service member has been optimally treated for 3-4 months, high-quality workups in motivated individuals are eligible for waiver consideration after 30 days or less of verified treatment in most cases. Local flight medicine monitoring or shorter-term waiver duration in these cases can mitigate the increased aeromedical risk.

AIMWTS review revealed 3,703 unique aviators with a diagnosis of OSA from 2002 to 2023. This data is comprehensive of all OSA diagnosis in AIMWTS at time of this waiver guide revision. OSA was not the primary or sole disqualifying condition in 14.1% of cases.

Please use *only* these ICD-10 OSA codes for AIMWTS coding purposes		(# of waivers approved / total # of cases)					
		FC I/IA	FC II	FC III	ATC	GBO	SWA
G47.33	Obstructive sleep apnea (adult)	17/39	1116/1252	1259/ 1485	243/269	362/423	114/152
G47.30	Sleep apnea, unspecified						

IV. Suggested Readings

1. Greenburg H, Scharf MT, West S, Rajan P, & Scharf S. Obstructive Sleep Apnea: Clinical Features, Evaluation, and Principles of Management. Ch. 131 in *Principles and Practice of Sleep Medicine*, 7th ed. Edited by Kryger MH, Roth T, Goldstein CA. Elsevier, 2021. https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20201045178

2. Goldstein CA & Chervin RD. Clinical Tools and Tests in Sleep Medicine. Ch. 68 in *Principles and Practice of Sleep Medicine*, 7th ed. Edited by Kryger MH, Roth T, Goldstein CA. Elsevier, 2021. https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20201045178

3. Sagaspe P, Taillard J, Guillaume C, et al. Maintenance of Wakefulness Test as a Predictor of Driving Performance in Patients with Untreated Obstructive Sleep Apnea. *Sleep*, 2007; 30(3): 327-30.

4. Pizza, F., Contardi, S., Mondini, S., Trentin, L., & Cirignotta, F. (2009). Daytime sleepiness and driving performance in patients with obstructive sleep apnea: comparison of the MSLT, the MWT, and a simulated driving task. Sleep, 32(3), 382–391. https://doi.org/10.1093/sleep/32.3.382

5. Sateia MJ & Thorpy MJ. Classification of Sleep Disorders. Ch. 69 in *Principles and Practice of Sleep Medicine*, 7th ed. Edited by Kryger MH, Roth T, Goldstein CA. Elsevier, 2021. https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20201045178

6. Findley, L. J., Barth, J. T., Powers, D. C., Wilhoit, S. C., Boyd, D. G., & Suratt, P. M. (1986). Cognitive impairment in patients with obstructive sleep apnea and associated hypoxemia. Chest, 90(5), 686–690. https://doi.org/10.1378/chest.90.5.686

7. Kribbs, N. B., Pack, A. I., Kline, L. R., Getsy, J. E., Schuett, J. S., Henry, J. N., Maislin, G., & Dinges, D. F. (1993). Effects of one night without nasal CPAP treatment on sleep and sleepiness in patients with obstructive sleep apnea. The American review of respiratory disease, 147(5), 1162–1168. https://doi.org/10.1164/ajrccm/147.5.1162

8. Berry RB, Brooks R, Gamaldo CE, Harding SM, Lloyd RM, Marcus CL and Vaughn BV for the American Academy of Sleep Medicine. The AASM Manual for the Scoring of Sleep and Associated Events: Rules, Terminology and Technical Specifications, Version 2.3. www.aasmnet.org. Darien, Illinois: American Academy of Sleep Medicine, 2016.

9. Troxel, W. M., Shih, R. A., Pedersen, E. R., Geyer, L., Fisher, M. P., Griffin, B. A., Haas, A. C., Kurz, J., & Steinberg, P. S. (2015). Sleep in the Military: Promoting Healthy Sleep Among U.S. Servicemembers. Rand health quarterly, 5(2), 19.

10. Walker, Matthew. Why we sleep: Unlocking the power of sleep and dreams. Simon and Schuster, 2015.

11. Korotinsky, A., Assefa, S. Z., Diaz-Abad, M., Wickwire, E. M., & Scharf, S. M. (2016). Comparison of American Academy of Sleep Medicine (AASM) versus Center for Medicare and Medicaid Services (CMS) polysomnography (PSG) scoring rules on AHI and eligibility for continuous positive airway pressure (CPAP) treatment. Sleep & breathing = Schlaf & Atmung, 20(4), 1169–1174. https://doi.org/10.1007/s11325-016-1327-y

12. Ponsaing, L. B., Iversen, H. K., & Jennum, P. (2016). Sleep apnea diagnosis varies with the hypopnea criteria applied. Sleep & breathing = Schlaf & Atmung, 20(1), 219–226. https://doi.org/10.1007/s11325-015-1210-2

13. O'Reilly, B. M., Wang, Q., Collen, J., Matsangas, P., Colombo, C. J., & Mysliwiec, V. (2022). Performance comparison of peripheral arterial tonometry-based testing and polysomnography to diagnose obstructive sleep apnea in military personnel. Journal of clinical sleep medicine : JCSM : official publication of the American Academy of Sleep Medicine, 18(6), 1523–1530. https://doi.org/10.5664/jcsm.9894

14. Moore, B. A., Tison, L. M., Palacios, J. G., Peterson, A. L., & Mysliwiec, V. (2021). Incidence of insomnia and obstructive sleep apnea in active duty United States military service members. Sleep, 44(7), zsab024. https://doi.org/10.1093/sleep/zsab024

15. Thomas, C. L., Vattikuti, S., Shaha, D., Werner, J. K., Hansen, S., Collen, J., Capaldi, V. F., & Williams, S. (2022). Central disorders of hypersomnolence: diagnostic discrepancies between military and civilian sleep centers. Journal of clinical sleep medicine : JCSM : official publication of the American Academy of Sleep Medicine, 18(10), 2433–2441. https://doi.org/10.5664/jcsm.10144
https://jcsm.aasm.org/doi/10.5664/jcsm.10144

16. Howard, M. E., Desai, A. V., Grunstein, R. R., Hukins, C., Armstrong, J. G., Joffe, D., Swann, P., Campbell, D. A., & Pierce, R. J. (2004). Sleepiness, sleep-disordered breathing, and accident risk factors in commercial vehicle drivers. American journal of respiratory and critical care medicine, 170(9), 1014–1021. https://doi.org/10.1164/rccm.200312-1782OC

17. Young, T., Blustein, J., Finn, L., & Palta, M. (1997). Sleep-disordered breathing and motor vehicle accidents in a population-based sample of employed adults. Sleep, 20(8), 608–613. https://doi.org/10.1093/sleep/20.8.608

18. U.S. Department of Transportation, Federal Highway Administration, Office of Motor Carriers. *Conference on Respiratory/Pulmonary Disorders and Commercial Drivers. Publication No. FHWA-MC-91-004.* Washington: USDOT; 1991http://http/www.fmcsa.dot.gov/documents/pulmonary1.pdf.

19. Gaines, A. R., Morris, M. B., & Gunzelmann, G. (2020). Fatigue-Related Aviation Mishaps. Aerospace medicine and human performance, 91(5), 440–447. https://doi.org/10.3357/AMHP.5515.2020

20. Mysliwiec, V., Brock, M. S., Pruiksma, K. E., Straud, C. L., Taylor, D. J., Hansen, S., Foster, S. N., Mithani, S., Zwetzig, S., Gerwell, K., Young-McCaughan, S., Powell, T., Blue Star, J. A., Cassidy, D. G., Mintz, J., & Peterson, A. L. (2022). A comprehensive evaluation of insomnia, obstructive sleep apnea and comorbid insomnia and obstructive sleep apnea in US military personnel. Sleep, 45(12), zsac203. https://doi.org/10.1093/sleep/zsac203

Aerospace Medicine Waiver Guide

Other Sleep Disorders

Revised: Dec 2024

Reviewed: Lt Col Caelan Ford, Dr. Dara Regn (ACS Sleep Medicine); Lt Col Clifford Nolt, Lt Col William Smith (RAM 2024); Dr. Christopher Keirns, Dr. Luke Menner (ACS Internal Medicine); Lt Col Aven Ford (ACS Neurology); Col Kevin Heacock (ACS Aerospace Medicine Branch Chief)

Significant Changes:
This guide is new and should be read in its entirety before waiver submission. For Obstructive Sleep Apnea (OSA), reference the new OSA Waiver Guide. Clarifying language added.

I. Waiver Consideration

Sleep disorders including primary insomnia, restless legs syndrome, sleepwalking (somnambulism), narcolepsy, idiopathic hypersomnia, and other sleep disorders are disqualifying for all flying and operational classes (FC I/IA, FC II, FC III, ATC, GBO, SWA). ACS recommends a high-quality diagnostic sleep study for any aviator with complaints of non-restorative sleep, regardless of body habitus, if conservative measures such as sleep hygiene have failed. Duties not including flying or controlling (DNIF/DNIC) should be put in place at the time of diagnosis, or prior to diagnosis when symptoms hinder quality of life at home, driving, performance of ground duties and/or critical phases of flight. In all cases where required, MEB/IRILO should be completed prior to aeromedical waiver submission. For aeromedical waiver consideration, the servicemember must be using a waiverable form of therapy that has been documented to be effective on high-quality in-lab polysomnography testing, have resolution of sleep-related symptoms, and excellent compliance must be demonstrated for all treatment modalities.

When possible, the initial sleep evaluation and polysomnogram should be performed at a military treatment facility or civilian sleep laboratory using the American Academy of Sleep Medicine (AASM) “Recommended” scoring criteria for hypopneas (30% airflow drop and an arousal or 3% oxygen desaturation). The MTF Sleep labs able to provide the daytime and nighttime studies needed for flying waiver recommendations at the time of this writing include Wilford Hall Ambulatory Surgical Center (San Antonio, TX), Wright-Patterson Medical Center (Dayton, OH), Walter Reed National Military Medical Center (Washington, DC), Augusta Military Medical Center (Ft. Belvoir, VA), Madigan Army Medical Center (Tacoma, WA), Joint Base Elmendorf-Richardson Hospital (Anchorage, AK), Tripler Army Medical Center (Hawaii), and Landstuhl Regional Medical Center (Germany).

Any pilots, navigators/COSs/WSOs with a documented sleep disorder other than obstructive sleep apnea will require ACS review and likely in-person evaluation prior to returning to flying status. FC III individuals and flight surgeons will be reviewed on a case-by-case basis at the ACS at the request of the waiver authority, particularly when subtle decrement of executive dysfunction could have a catastrophic impact on the mission.

If selected to be evaluated in-person at the ACS, maintenance of wakefulness testing (MWT) may be required if not adequately completed locally. Neuropsychological testing will be performed in cases with concern for persistent sleep, cognitive, or mood symptoms. Neither test must be completed locally prior to waiver submission, as they can be accomplished at the ACS more easily in many cases.

Narcolepsy and idiopathic hypersomnia are incompatible with flying and operational duties. If narcolepsy, idiopathic hypersomnia, sleepwalking, REM sleep behavior disorder (RBD), or another MSD-related sleep disorder is diagnosed by a community sleep laboratory, the aviator should be referred to an AASM-accredited MTF Sleep lab for confirmation, in accordance with MSD guidance (line L23). If confirmed, these diagnoses will most likely result in permanent disqualification, however recent published studies and ACS experience confirms that many non-MTF Sleep labs inaccurately diagnose narcolepsy and idiopathic hypersomnia.

Table 1: Waiver potential for confirmed narcolepsy and idiopathic hypersomnia.

Flying Class	Waiver Potential	Waiver Authority	ACS review/evaluation
FC I/IA	Highly unlikely	AFMEDCOM	No
FC II (other than FS)/RPA pilots	Highly unlikely	AFMEDCOM	No[1,2,3]
Flight Surgeons, FC III, SWA	Highly unlikely	AFMEDCOM	No[1,2,3]
ATC/GBO (non-pilots)	Highly unlikely	AFMEDCOM	No

1. Local clinical evaluation for all other sleep disorders, to include parasomnias and disorders of central hypersomnolence, must be completed per the latest MSD guidance prior to waiver consideration.
2. AFMEDCOM retains waiver authority for any sleep disorder that requires an IRILO and is returned to duty such as cases of central causes of hypersomnolence, chronic medication use for wakefulness or to fall asleep, etc.
3. For complex cases or clinical uncertainty despite appropriate IRILO/MEB adjudication, the waiver authority can request ACS review on a case-by-case basis.

Table 2: Waiver potential for all other sleep disorders (e.g. sleepwalking, restless leg syndrome, primary insomnia, etc.).

Flying Class	Waiver Potential	Waiver Authority	ACS review/evaluation
FC I/IA	Highly unlikely	AFAC/CMO	No
FC II (other than FS)/RPA pilots	Maybe	MAJCOM[1]	Yes[2]
Flight Surgeons, FC III, SWA	Maybe	MAJCOM[1]	Yes[2]
ATC/GBO (non-pilots)	Maybe	MAJCOM[1]	No

1. AFMEDCOM retains waiver authority for any sleep disorder that requires an IRILO and is returned to duty such as cases of disruptive parasomnias, chronic medication use for wakefulness or to fall asleep, etc.
2. ACS Sleep evaluation (if required for any reason) includes MWT (for all applicants and trained pilots/navigators and case-by-case in other positions) at Wright-Patterson Medical Center Sleep Laboratory and may include polysomnography. Neuropsychologic testing may be required in cases with concern for persistent sleep, cognitive, or mood symptoms.

II. Information Required for Waiver Submittal

A. Initial Waiver Request:

1. Summary of presentation, course, and treatment.

2. History - presenting symptoms (including pertinent negatives), brief summary of testing results, modality of treatment and effectiveness (Epworth Sleepiness Scale (ESS), Insomnia Severity Index (ISI), and Pittsburg Sleep Quality Index (PSQI) scores pre- and post-treatment), and documentation of resolution of symptoms, if applicable. Co-morbidities that exacerbate excessive daytime somnolence including depression, elevated BMI, and/or sleep duration (bedtime/wake time) should be included. For rapid eye movement (REM) sleep behavior disorder (RBD) and sleepwalking include age of onset, frequency, last episode, activities during episodes, injuries incurred during episodes, and family history. Symptom questionnaires and sleep diary are located here: https://kx.health.mil/kj/kx5/AeromedicalConsultationSvc/Pages/Waiver%20Guide%20Links.aspx.
3. Consultation reports from all treating Sleep and other specialists within 3 months of waiver submission must be attached, detailing evidence of troubleshooting of any issues and response of symptoms to therapy. For primary insomnia, nightmare disorder, and trauma-associated sleep disorder, psychiatry/psychology and/or sleep medicine consult may be requested. For rapid eye movement (REM) sleep behavior disorder (RBD) or sleepwalking, neurology and/or sleep medicine consult may be requested.
   a. Discussion of presentation, etiology, and treatment.
   b. Documentation of adherence and tolerance to a waiverable form of pharmacologic therapy, if indicated.
   c. Plan for monitoring return of symptoms.
4. Physical - height and weight, BMI, blood pressure, neck circumference, and ear, nose and throat, cardiovascular, thorough neurologic, and pulmonary exams.
5. Sleep study results, to include:
   a. Complete diagnostic polysomnogram (PSG) reports are required from an MTF or civilian sleep lab using the AASM "Recommended" scoring criteria. Home sleep testing (HST) may be acceptable, but negative/nondiagnostic HST requires confirmatory in-lab PSG using the AASM "Recommended" scoring criteria. HST is not acceptable to rule out OSA as the cause of symptoms associated with other sleep disorders.
   b. Maintenance of wakefulness testing (MWT) meeting the standard of a mean sleep latency of 40 min without use of any stimulants is required for pilots and navigators (and applicants) for all airframes (including FCI/IA, FC II, and RPA pilots) and can be completed at the ACS if not included in the local sleep evaluation. Repeat in-lab AASM "Recommended" scoring PSG may be required as part of the ACS evaluation.
   c. FC III/SWA/Flight Surgeon/ATC/GBO may require in person evaluation or repeat in lab sleep studies to include MWT at ACS, at the request of the waiver authority.
6. Consultation reports from all treating provider(s) or specialist(s), dated within 3 months of the application.
7. FL4 with RTD and ALC status.
8. Any other pertinent information.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:
1. Updated AMS with interval history, including discussion of any recurrence of symptoms and current comorbidities. Symptom questionnaires and sleep diary are located here:

https://kx.health.mil/kj/kx5/AeromedicalConsultationSvc/Pages/Waiver%20Guide%20Links.aspx.

2. Consultation reports from all treating provider(s) or specialist(s), dated within 3 months of the application. Annual Sleep Medicine visits are required when possible, and telehealth is acceptable. In areas without access to Sleep Medicine, a thorough Flight Medicine or PCM visit may be acceptable, covering the topics listed in section II.A.1 and II.A.2. Timing of waiver package submission may be linked to that appointment for convenience.
   a. For FC II and GBO (RPA pilots), waiver evaluations performed at the ACS may have repeat in-lab AASM "Recommended" scoring criteria PSG. MWT meeting the standard of a mean sleep latency of 40 min without use of any stimulants is required and can be performed as part of an ACS evaluation when not available locally.
   b. FC III/SWA/Flight Surgeon/ATC/GBO (non-pilots) may require in person evaluation or repeat in lab sleep studies at ACS, to include MWT meeting the standard of a mean sleep latency of 40 min without use of any stimulants.
3. Current physical examination findings.
4. Any other pertinent information.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

For general discussion on sleep disorder demographics, sleep architecture, sleep disorder pathophysiology, and events of aeromedical concern, additional details can be found in the *Obstructive Sleep Apnea Waiver Guide*. It is outside the scope of this waiver guide to address all other non-obstructive sleep apnea sleep disorders, however some of the sleep disorders encountered in the ACS, impact of the condition, and potential complications of pharmacologic treatment are discussed below.

Restless legs syndrome (RLS) is a sleep disorder characterized by unpleasant sensations in the evening or the beginning of the usual sleep period, typically in lower extremities, that interfere with one's ability to fall asleep or fall back to sleep once awakened. They may be described in various ways, such as "creepy-crawlies," "burning," or "itching" sensations, but must be associated with a need to move the legs, which should (at least temporarily) improve the discomfort. The diagnosis of RLS is made by interview/history, and laboratory analysis and formal sleep study are used to exclude mimics (such as radiculopathy or neuropathy) or other exacerbating conditions like sleep apnea or iron deficiency. Treatment is indicated for RLS in patients who have frequent and/or intense symptoms two or more days per week. Treatments include repletion of iron stores if serum ferritin is less than 75 ng/ml to a goal of at least 100-300 ng/ml, and behavioral interventions. Behavioral interventions include education, balancing activity across four days per week (such as exercising 40 minutes on four to five days a week instead of two hours on two to three days per week), discontinuation of exacerbating medications (antihistamines such as doxylamine, diphenhydramine, and hydroxyzine, serotonin-norepinephrine reuptake inhibitors (SNRIs), and tricyclic antidepressants (TCAs)), smoking cessation, caffeine reduction, compression stockings, heating pads, cooling pads, TENS units,

muscle/foam rollers, vibrating/massage pillows, shower head onto legs, walking, stationary bikes, sequential compression devices, or treadmill desks/tables. Pharmacologic agents can be used if the preceding options are unsuccessful, but only iron therapy has waiver potential.

First-line pharmacologic treatment includes iron therapy (intravenous or oral), alpha-2 delta ligands (gabapentin, pregabalin, and gabapentin enacarbil), while dopamine agonists (pramipexole, ropinirole, and rotigotine) are no longer first-line due to their increased risk of augmentation (the increase in symptoms to earlier in the day or more rostral in the body), impulse control disorders, and other significant adverse side effects. Additional options include benzodiazepines and low-dose opioids. Only iron therapy is aeromedically approved.

Periodic limb movements in sleep (PLMS) consist of rhythmic dorsiflexion of the big toe and ankle with occasional flexions of the knee and hip that tend to occur during the first part of the night. A PLMS index of greater than 15 movements per hour of sleep is considered elevated in adults. PLMS often extinguish with PAP therapy when they are respiratory related in those with sleep apnea. When PLMS are associated with complaints of insomnia or excessive daytime sleepiness/fatigue and no other sleep disorder is present, they are characteristic of Periodic limb movement disorder (PLMD). Patients with PLMD and associated RLS are treated like any other patient with RLS, and the endpoint of treatment is control of RLS symptoms. Mimics must be excluded, as in RLS.

In flight medicine, the major obstacle in treatment of RLS is that except for iron therapy, none of the first-, second- or third-line pharmacologic agents for RLS are aeromedically approved medications due to their side-effects as well as described withdrawal syndromes, so that interruption in dosing, such as in an austere environment or on a prolonged mission, would cause additional adverse effects, ranging from physical/autonomic/hyperexcitable behaviors to frank psychiatric disturbance. Withdrawal syndromes can be unpredictable and are often self-limited but can be very distressing in the moment. The withdrawal symptoms would be experienced in addition to the symptoms of the condition the medication is intended to control, as well, unless the weaning of the medications is done in a careful manner, rather than due to abrupt discontinuation related to lack of access. Therefore, the focus of RLS treatment in the aeromedical context must primarily rely on behavioral strategies and repletion of iron stores when clinically appropriate.

Lastly, individuals with history of somnambulism/sleepwalking, cataplexy, or Rapid eye movement (REM) sleep behavior disorder (RBD) can injure themselves during symptomatic episodes. Neurological consultation is requested in addition to Sleep Medicine. Complex and inappropriate behaviors can occur, including driving, going outside, and even walking out of windows. Therefore, those with somnambulism in a combat environment are considered a hazard to themselves and others. Sudden weakness or loss of muscle control triggered by emotions (such as cataplexy) can suggest narcolepsy but is also associated with certain psychological disorders. The most effective evidence-base treatment for nightmare disorder, trauma-associated sleep disorder, and primary insomnia is through mental health (Clinical Health Psychology, at many facilities). For somnambulism, cataplexy, nightmare disorders, and post-trauma related sleep disorders, Mental Health consultation is required in addition to Sleep Medicine. In some cases, parasomnias can be triggered or exacerbated by untreated OSA. Referral to an AASM-

accredited MTF Sleep lab must be considered to confirm the diagnosis in several of the above diagnoses, and to ensure no other exacerbating factors remain, as per MSD guidance.

AIMWTS review for all cases related to ICD 9 and 10 codes for Other (non-OSA) Sleep Disorders revealed 296 aviators with a diagnosis of a sleep disorder other than OSA from 2002 to 2023. Waiver dispositions are tabulated below. Overall, the Other Sleep Disorders waiver approval rating overall is 34.4% at time of this review.

ICD-10 codes for sleep disorders (not all-inclusive) for AIMWTS coding purposes		(# of waivers approves / total # of cases)					
		FC I/IA	FC II	FC III	ATC	GBO	SWA
F51.01	Primary insomnia	13/19	33/61	27/116	3/19	16/45	4/15
F51.11	Primary hypersomnia						
F51.3	Sleepwalking (somnambulism)						
F51.09	Other insomnia not due to a substance or known physiologic condition, unspecified						
G47.50	Parasomnia, unspecified						
G47.61	Periodic limb movement disorder						
G47.52	REM sleep behavior disorder						
G47.411	Narcolepsy (with cataplexy)						
G47.419	Narcolepsy (without cataplexy)						
G47.9	Sleep disorder, unspecified						
G25.8	Restless leg syndrome						
G47.00	Insomnia, unspecified						
G47.10	Hypersomnia, unspecified						
G47.12	Idiopathic hypersomnia without long sleep time						
G47.11	Idiopathic hypersomnia with long sleep time						

IV. Suggested Readings

1. Guilleminault C & Maski K. Narcolepsy: Diagnosis and Management. Ch. 112 in *Principles and Practice of Sleep Medicine*, 7th ed. Edited by Kryger MH, Roth T, Goldstein CA. Elsevier, 2021. https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20201045178

2. Goldstein CA & Chervin RD. Clinical Tools and Tests in Sleep Medicine. Ch. 68 in *Principles and Practice of Sleep Medicine*, 7th ed. Edited by Kryger MH, Roth T, Goldstein CA. Elsevier, 2021. https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20201045178

3. Parasomnias. *Diagnostic and Statistical Manual of Mental Disorders,* Fifth ed., American Psychiatric Association, Washington, DC. 2013: 399-404.

4. Sateia MJ & Thorpy MJ. Classification of Sleep Disorders. Ch. 69 in *Principles and Practice of Sleep Medicine*, 7th ed. Edited by Kryger MH, Roth T, Dement WC. Goldstein CA. Elsevier, 2021. https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20201045178

5. Troxel, W. M., Shih, R. A., Pedersen, E. R., Geyer, L., Fisher, M. P., Griffin, B. A., Haas, A. C., Kurz, J., & Steinberg, P. S. (2015). Sleep in the Military: Promoting Healthy Sleep Among U.S. Servicemembers. Rand health quarterly, 5(2), 19.

6. Walker, Matthew. *Why we sleep: Unlocking the power of sleep and dreams*. Simon and Schuster, 2015.

7. Techera, U., Hallowell, M., Stambaugh, N., & Littlejohn, R. (2016). Causes and Consequences of Occupational Fatigue: Meta-Analysis and Systems Model. Journal of occupational and environmental medicine, 58(10), 961–973. https://doi.org/10.1097/JOM.0000000000000837

8. Dawson, D., & McCulloch, K. (2005). Managing fatigue: it's about sleep. Sleep medicine reviews, 9(5), 365–380. https://doi.org/10.1016/j.smrv.2005.03.002

9. Lamond, N., & Dawson, D. (1999). Quantifying the performance impairment associated with fatigue. Journal of sleep research, 8(4), 255–262. https://doi.org/10.1046/j.1365-2869.1999.00167.x

10. Roehrs, T., Burduvali, E., Bonahoom, A., Drake, C., & Roth, T. (2003). Ethanol and sleep loss: a "dose" comparison of impairing effects. Sleep, 26(8), 981–985. https://doi.org/10.1093/sleep/26.8.981

11. Marquié, J. C., Tucker, P., Folkard, S., Gentil, C., & Ansiau, D. (2015). Chronic effects of shift work on cognition: findings from the VISAT longitudinal study. Occupational and environmental medicine, 72(4), 258–264. https://doi.org/10.1136/oemed-2013-101993

12. Scammel, T. Clinical features and diagnosis of narcolepsy in adults. UpToDate, Jul 12, 2022. Link: https://www.uptodate.com/contents/clinical-features-and-diagnosis-of-narcolepsy-in-adults?search=narcolepsy&source=search_result&selectedTitle=1~118&usage_type=default&display_rank=1

13. Vaughn, B. Approach to abnormal movements and behaviors during sleep. UpToDate, Sept 19, 2022. Link: https://www.uptodate.com/contents/approach-to-abnormal-movements-and-behaviors-during-sleep?search=parasomnias&source=search_result&selectedTitle=1~147&usage_type=default&display_rank=1

14. Mysliwiec, V., Brock, M. S., Pruiksma, K. E., Straud, C. L., Taylor, D. J., Hansen, S., Foster, S. N., Mithani, S., Zwetzig, S., Gerwell, K., Young-McCaughan, S., Powell, T., Blue Star, J. A., Cassidy, D. G., Mintz, J., & Peterson, A. L. (2022). A comprehensive evaluation of insomnia, obstructive sleep apnea and comorbid insomnia and obstructive sleep apnea in US military personnel. Sleep, 45(12), zsac203. https://doi.org/10.1093/sleep/zsac203

15. Gaines, A. R., Morris, M. B., & Gunzelmann, G. (2020). Fatigue-Related Aviation Mishaps. Aerospace medicine and human performance, 91(5), 440–447. https://doi.org/10.3357/AMHP.5515.2020

16. CONTINUUM (MINNEAP MINN) 2020 ;26(4, SLEEP NEUROLOGY): 963–987.

17. Winkelman, J, et. al. Treatment of restless legs syndrome and periodic limb movement disorder: an American Academy of Sleep Medicine clinical practice guideline. Published online September 26, 2024. https://doi.org/10.5664/jcsm.11390

Aerospace Medicine Waiver Guide

Benign Prostatic Hyperplasia

Revised: Jun 2023
Reviewed: Col Steven Nordeen (RAM 23), Dr. Max Lee (ACS Waiver Guide Coordinator); Col Christopher Allam (Urology Consultant to the Air Force Surgeon General).

Significant Changes: Updated Table 1 to include ATC, GBO, and OSF as per Medical Standards Directory. Include International Prostate Symptom Score (IPSS) in waiver request. Prostate Specific Antigen and serum creatinine are no longer recommended.

I. Waiver Consideration

Symptomatic benign prostatic hyperplasia (BPH) with urinary retention is disqualifying for FC I/IA, FC II, FC III, and SWA duties. Asymptomatic BPH, and history of invasive surgical therapy such as transurethral resection of the prostate (TURP), are not disqualifying, and do not require waiver submission if the obstructive symptoms are relieved, urinary continence is maintained, and healing is complete. In addition, any complications from surgery would be disqualifying. Of note, it is recommended that after invasive surgery, the aviator remain DNIF for a minimum of 3 weeks to heal due to the risk for acute bleeding and post-operative urgency. Furthermore, DNIF is required if the patient's symptoms remain operationally significant, regardless of the treatment course. BPH is not disqualifying for retention or for ATC, GBO or OSF personnel, but certain medications used to treat symptomatic BPH may require waiver.

Table 1: Waiver potential for Benign Prostatic Hyperplasia

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation[7]
I/IA	Maybe[1,2]	AFRS/CMO	No
II/III	Yes[1,3,4,6]	MAJCOM	No
ATC	Yes[5,6]	MAJCOM	No
GBO	Yes[5,6]	MAJCOM	No
OSF	Yes[5,6]	MAJCOM	No
SWA	Yes[1,3,4,6]	MAJCOM	No

1. No indefinite waivers
2. This problem is very unlikely in the predominately young population contemplating flying training. Such a case will need to be worked up very carefully to rule out other sources of GU pathology.
3. No waiver required if symptoms are mild (less than seven on the International Prostate Symptom Score) without evidence of urinary retention and watchful waiting is the "treatment".
4. If treated with an approved alpha-blocker, waiver should be restricted to non-high performance aircraft. Pilots on alfuzosin and tamsulosin should also be restricted to flying with another qualified pilot, e.g., FC IIC (non-high performance, with another qualified pilot). Pilots on silodosin are eligible for FC IIA (non-high performance) waiver (see Section III, "Aeromedical Concerns").
5. BPH is not disqualifying for ATC, GBO, or OSF personnel, but certain medications used to treat symptomatic BPH may require waiver.
6. IRILO and waiver only required if symptoms persist despite appropriate treatment and function impaired to preclude satisfactory performance of required duties.
7. ACS review may be requested at the discretion of the waiver authority.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. Summary of presentation, course, and treatment. Include history of lower urinary tract symptoms (LUTS) and current International Prostate Symptoms Score (IPSS). Discuss all attempted treatments/medications to include results and side effects.
2. Current Physical Exam. Include a current genitourinary exam to include a digital rectal exam.
3. Reports of pertinent laboratory studies to include a urinalysis and any other relevant studies that were performed on individuals with LUTS. Of note, the American Urological Association's 2021 guidelines on management of BPH no longer recommend prostate-specific antigen (PSA) and serum creatinine in all male patients with LUTS.
4. Reports of specific diagnostic tests if performed. This may include urine flow rate, post-void residual, or ultrasound studies. Additionally, include cystoscopy report if completed as part of surgical planning.
5. Consultation reports. Urology evaluation if surgery performed or severe symptoms; surgical report (or surgeon's follow up notes clearly delineating the procedure performed) and pathology if surgery performed.
6. FL4 with RTD and ALC status, if member did not meet retention status and IRILO was completed.
7. Any other pertinent information.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Interim history to include change in symptoms, medication usage, and side effects.
2. International Prostate Symptoms Score (IPSS). Score with prior year(s) comparison.
3. Exam: digital rectal exam and any other pertinent exam findings.
4. Include any labs done as part of the workup.
5. Current treatment dose(s) and documentation of therapeutic benefit for medication management.
6. Urology consultation reports if required/obtained.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

The aeromedical concerns of benign prostatic hyperplasia/benign prostatic obstruction (BPH/BPO) include the risk of acute urinary retention, distracting lower urinary tract symptoms, and adverse effects from treatment of the condition. Acute urinary retention can cause severe abdominal discomfort that can be distracting at the least and functionally incapacitating at the worst. The risk for acute incapacitation secondary to BPH in asymptomatic individuals is low; therefore, BPH identified in the absence of symptoms *(e.g.* secondary to screening prostate exam completed after shared-decision making with patients) is not disqualifying. Those with symptomatic BPH have varying risk of acute urinary retention based on post void residual and, in some cases, medical treatment (anticholinergic medications or Beta-3 adrenergic medication).

Aviators and special duty operators with LUTS, particularly when increased urinary frequency and urgency are present, may be distracted to a sufficient degree to impair operational duties. Similarly, frequent nocturia can disrupt sleep and contribute to aeromedically relevant fatigue. Many individuals with BPH have only mild symptoms (IPSS less than 7) which is not necessarily disqualifying. In the absence of a history of acute urinary retention, the USAF flight surgeon must judge the severity of symptoms to determine the impact on aviation duties and the need for waiver. Use of tools such as the International Prostate Symptoms Score (IPSS) (previously known as the American Urological Association Symptom Index or AUA-SI) may help determine the severity of symptoms (1-7 is mild, 8-19 is moderate, 20-35 is severe).

Medical therapy for BPH can create aeromedically significant adverse effects. Approved medications for use in aviators and special duty operators with waiver include 5-alpha-reductase inhibitors (finasteride and dutasteride) and three alpha-1-adrenergic antagonists (alfuzosin, silodosin, and tamsulosin). Regarding the 5-alpha-reductase inhibitors, specifically finasteride, a detailed aeromedical medication review in Sep 2004 concluded it to be both effective and safe in the aerospace environment. However, it is important to recognize that treatment with 5-alpha-reductase inhibitors improves LUTS by reducing the size of the prostate and may take 6 months to become effective and up to two years to reach maximum efficacy. Therefore, aeromedically relevant urinary symptoms may persist for a substantial period-of-time after starting the medication. Still, some studies have shown reduced rates of urinary retention in those on 5-alpha-reductase inhibitors. Alpha-1-adrenergic antagonists may cause orthostasis, hypotension, and dizziness. As a result, these medications may impair aviation safety, particularly in aviators exposed to sustained acceleration and increased $+G_z$s. These risks are more prominent in the less uroselective agents (terazosin and doxazosin) than in the more uroselective, aeromedically approved, agents (alfuzosin, silodosin, and tamsulosin). Of note, the alpha-1-adrenergic antagonists have maximum approved dosing limits in the Aircrew Approved Medication list.

Other unapproved medications are commonly used for treatment of LUTS associated with BPH. Anticholinergic medications, such as tolterodine and oxybutynin, are used to treat overactive bladder. These medications increase the risk of urinary retention in those with elevated post-void residuals, and, like other anticholinergics, may cause cognitive impairment, visual blurriness, drowsiness, and other aeromedically relevant adverse effects. Beta-3 Adrenoceptor Agonists, such as mirabegron, represent a newer class of medications for the treatment of irritative LUTS (frequency, urgency, and nocturia). Reported adverse effects of these

medications are hypertension and urinary retention. While the cited adverse effects likely have a lower potential for significant deleterious aeromedical effect, there is a dearth of evidence to confirm their safety in the aviation environment. Phosphodiesterase-5 (PDE-5) inhibitors are used for those with BPH and concomitant erectile dysfunction. Tadalafil, a long acting PDE-5 inhibitor, is approved by the FDA for use in BPH with or without erectile dysfunction. These medications increase the risk for hypotension, visual changes (including impaired color vision), and dizziness. While there are several studies demonstrating efficacy similar to alpha blockers, long-term data on aeromedical safety is lacking.

Many surgical options exist for the treatment of BPH. Transurethral resection of the prostate (TURP) remains the most common procedure performed but there are newer treatment options which may be performed with increasing frequency in the younger patient population. This includes such procedures as Prostatic Urethral lift (UroLift®) or Water Vapor Thermal Therapy (Rezum®). Surgical treatment for BPH is unlikely to result in long-term adverse effects of aeromedical significance. However, in the near post-operative period, bleeding from the procedural site can occur or a temporary worsening of irritative symptoms. As a result, aviators who undergo TURP or other surgical treatments of BPH should anticipate a DNIF for at least 3-4 weeks and should not return to flying until cleared by the urologist. Some surgical treatment options may require a foley catheter following the procedure for a few days to a week. Prostatic Urethral lift and other procedures using implants are generally well tolerated, even in high $+G_z$ environments.

AIMWTS review from May 2020 to May 2023 revealed 86 aviators with a disposition containing the diagnosis of BPH. Of the 86 cases, three were disqualified for conditions not related to BPH or treatment medications and were not included below. The breakdown of the results are tabulated below using the remaining 83 cases.

Please use only *these* ICD-10 codes for AIMWTS coding purposes		(# waived / total # of cases)						
		FC I/IA	FC II	FC III	ATC	GBO	OSF	SWA
N40.0	BPH w/o LUTS		9/9	6/6	1/1	2/2		
N40.1	BPH w/LUTS		30/30	24/24	5/5	4/4		2/2

IV. Suggested Readings

1. Lerner, L. B., et al (2021, August). *Management of Lower Urinary Tract Symptoms Attributed to Benign Prostatic Hyperplasia: AUA GUIDELINE*. Benign prostatic hyperplasia (BPH) guideline - American Urological Association. https://www.auanet.org/guidelines-and-quality/guidelines/benign-prostatic-hyperplasia-(bph)-guideline
2. Unnikrishnan, R., Almassi, N., & Fareed, K. (2017). *Benign prostatic hyperplasia: Evaluation and Medical Management in Primary Care*. Cleveland Clinic Journal of Medicine. https://www.ccjm.org/content/84/1/53.long#sec-3
3. Griswold CA, Vento KA, Blacker KJ. Voluntary Urinary Retention Effects on Cognitive Performance. Aerosp Med Hum Perform. 2023 Feb 1;94(2):79-85. doi: 10.3357/AMHP.6067.2023. PMID: 36754996.
4. Cornu, J. N., et.al. (2023). *EAU guidelines on the management of non-neurogenic male luts - introduction.* Uroweb. https://uroweb.org/guidelines/management-of-non-neurogenic-male-luts
5. Just J, Osgun F, Knight C. Lower urinary tract symptoms and prostate cancer: is PSA testing in men with symptoms wise? Br J Gen Pract. 2018 Nov;68(676):541-542. doi: 10.3399/bjgp18X699689. PMID: 30361318; PMCID: PMC6193782. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6193782/

Aerospace Medicine Waiver Guide

Congenital Urinary Anomalies

Revised: Aug 2022

Reviewed: Dr. Max Lee (ACS Waive Guide coordinator), Lt Col Christopher Allam (AF/SG Urology consultant), and Lt Col Paul Vu (AFMSA Physical Standards Development Chief)

Significant Changes:

Updated suggested readings, new format for previous waiver dispositions

I. Waiver Consideration

In general, any congenital renal or urinary system anomaly that results in impaired renal drainage, systemic hypertension, pain, functional impairment of either kidney, or require specialty care more than annually are disqualifying for all flying and special mission duties. Additionally, congenital disorders of the urinary tract or genitalia of sufficient severity to cause distracting symptoms, frequent infections, or interfere with normal functioning are disqualifying for all flying and operational duties. Polycystic kidney disease (PCKD, even with normal renal function), absence of a kidney, or a horseshoe kidney are disqualifying for IFC I/IA, FC II/III, and SWA duties but are not disqualifying for ATC, GBO, and operational support duties.

With careful evaluation and appropriate treatment, many of the above listed conditions can be considered for aeromedical waiver. However, waiver recommendations will depend on the status of the underlying disease, interventions performed, and functional outcomes.

Table 1: Waiver potential for Disease/Condition

Flying Class (FC)	Disease/Condition	Waiver Authority Waiver Potential	ACS Review/ Evaluation
IFC I/IA/II/III/SWA (initial)	PCKD[1], absence of a kidney, horseshoe kidney, congenital disorders of the urinary tract, hydronephrosis, renal ptosis[2]	AFRS/CMO Yes[3]	Maybe
FC II/III/SWA (trained)	PCKD[1], absence of a kidney, horseshoe kidney, congenital disorders of the urinary tract, hydronephrosis, renal ptosis[2]	MAJCOM Yes[3]	Maybe
ATC, GBO	Congenital disorders of the urinary tract, hydronephrosis, renal ptosis[2]	MAJCOM Yes	No

1. PCKD with normal renal function.
2. Applies to renal ptosis with impaired renal drainage, hypertension, or pain.
3. Waiver for initial certifications must be considered very carefully. Waiver considerations will depend on the probability of stone formation and deterioration of renal function.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. Summary of presentation, course, and treatment.
2. Reports of any pertinent laboratory studies, imaging studies, copies of images (as indicated).
    a. Laboratory studies at a minimum should include a urinalysis, BUN, and creatinine.
    b. The AMS should include a careful assessment of renal function and mention of presence or absence of stone disease.
3. Urology and/or Nephrology consultation reports, including follow-up notes with examination findings after disease resolution.
4. Any specific diagnostic tests performed, before and after treatment (as indicated).
5. Documentation of return to full physical activity, including specific comments regarding any activity limitations.
6. Current physical examination findings, including a GU exam and any pertinent ancillary studies.
7. FL4 with RTD and ALC status, if member did not meet retention status

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Interim history and exam to include change in symptoms (particularly renal function), medication usage, and side effects.
2. Result of all interim imaging, laboratory, and ancillary studies.
3. Current treatment doses and documentation of therapeutic benefit.
4. Reports from treating Urology and/or Nephrology consultant.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Depending on the underlying condition, a number of symptoms may occur which could impair flying performance and mission completion. These include flank pain, renal stones, urinary urgency, urinary frequency, urinary obstruction, and dysuria; all of which have the potential of sudden incapacitation or significant distraction. Recurrent infections and ongoing renal damage may lead to cortical scarring, hypertension, and compromised renal function. With these and other complications, close specialty follow-up may be required.

While many or most presentations of congenital urinary anomalies are asymptomatic, some have distinct features that warrant attention. Medullary sponge kidney (MSK) can present with renal colic, urinary tract infections, or hematuria. It is commonly found in patients with kidney stones and approximately 70% of patients with medullary sponge kidney will develop stones at some point. MSK itself is largely a benign process otherwise with little aeromedical impact

Horseshoe kidney is associated with hydronephrosis in approximately 80% of patients, kidney stones in 20%, and other genitourinary anomalies in about one-third. There is also an increased risk of urinary tract infection with horseshoe kidney. This condition itself poses minimal acute risk during flight provided the member does not have obstruction or stones.

Polycystic kidney disease (PCKD) is associated an increased risk of kidney stones, anemia, urinary tract infections, and hypertension. It is typically diagnosed during age 30-50 with presenting symptoms of hematuria in 50%, renal colic, and gastrointestinal symptoms. PCKD may be associated with intracranial aneurisms, especially in those who have PCKD and family history of cerebral aneurisms. Flank pain from enlarged kidneys or ruptured cysts can be significant. PCKD is associated with other abnormalities including liver cysts, pancreatic cysts, and cardiac valvular abnormalities that may be incompatible with safe flying operations. Elevated blood pressure or a decline in renal function indicates disease progression with a significant percentage of PCKD patients progressing to renal failure requiring dialysis. Therefore, close attention should be paid in PCKD patients regarding renal function, blood pressure, and history of flank pain.

Unilateral renal agenesis may be complicated by other genitourinary malformations and is associated with vesicoureteral reflux, increasing the risk of significant urinary tract infections. If the remaining kidney is functioning normally, there is usually little risk to flying. Congenital obstructions of the ureteropelvic junction often present with intermittent flank pain especially when the person is well-hydrated (Dietl's crisis). Obstructions can also present with abdominal pain, nausea, vomiting, worsening renal function, or hematuria. Obstructions are also associated with other anomalies listed above, particularly horseshoe kidney. A review of recently submitted waivers for frank urinary obstruction revealed that all members had the condition surgically or procedurally corrected and were therefore no longer symptomatic demonstrating excellent outcomes after surgical treatment. However, these servicemembers also presented with other significant symptoms apart from their obstruction and warrants careful individual aeromedical risk assessments.

Renal ptosis, also known as floating kidney or nephroptosis, is characterized by a kidney that changes in position by more than 2 vertebral bodies between supine and upright positions. While commonly asymptomatic, the positional movement of the kidney can cause vomiting, abdominal pain from obstruction, or ischemia. Severe flank pain (Dietl's crisis) with sitting up in a thin female member that resolves upon lying down should raise the clinical suspicion for renal ptosis. Many patients will also have fibromuscular dysplasia of the renal artery leading to concurrent problems with hypertension. Nephropexy, or surgical fixation of the kidney, normally resolves symptomatic cases. Given the seated position of most aircrew, symptomatic nephroptosis is not normally compatible with flying duties.

Renal ectopy occurs when one or both kidneys do not ascend to the retroperitoneal fossa, even sometimes failing to ascend out of the pelvis itself. Unilateral renal ectopy is often asymptomatic and would not pose a risk to aviation itself. Symptomatic renal ectopy can present with obstruction and recurrent urinary tract infections, particularly if associated with vesicoureteral reflux. It may also present as urinary incontinence due to pressure from safety restraints on the lower abdomen. These sequelae, along with a potential decline in renal function, may impact operational duties.

Some of these conditions, such as medullary sponge kidney and horseshoe kidney, are associated with nephrolithiasis and therefore the Renal Stone waiver guide should be referenced in patients with renal stones. If renal function is affected or hypertension develops, as can happen particularly with PCKD, reference the Chronic Kidney Disease and Hypertension waiver guides respectively.

AIMWTS search in July 2022 for the prior 5 years revealed a total of 51 cases submitted with a diagnosis of unilateral renal agenesis, polycystic kidney, medullary sponge kidney, obstructive defects of renal pelvis and ureter, and horseshoe kidney. The breakdown of the number of waivers and number of total cases are tabulated below.

Please use only *these* ICD-10 codes for AIMWTS coding purposes	(# of waivers / total # of cases)					
	IFC I/IA	FC II	FC III	ATC	GBO	SWA
N28.83 (Renal Agenesis, unilateral), Q60.0, Q60.2 (Renal Agenesis, unilateral)	0	7/7	1/1	1/1	1/1	0
Q61.2 (Polycystic Kidney, adult type)	0	9/9	1/1	0/0	3/3	0
Q61.5 (Medullary Sponge Kidney)	0	2/2	0	0	0	0
Q61.8 (Other cystic kidney diseases)	0	0	0	0	0	0
Q61.9 (Cystic kidney disease, unspecified)	0	0	0	0	0	0
Q62.39 (Obstructive defects of renal pelvis, ureter)	1/1	2/2	3/3	0	2/2	0
Q60.3, Q60.5 (Renal hypoplasia, unspecified)	0	0	0	0	0	0
Q63.1 (Lobulated, fused, and horseshoe kidney)	1/1	15/15	3/3	1/1	0	0
Q63.2 (Ectopic kidney)	0	0	0	0	0	0

IV. Suggested Readings

1. Reynard J, Brewster S, Biers SF, and Neal NL. Chapter 8: Miscellaneous urological disease of the kidney. In *Oxford Handbook of Urology*. 4th ed., Oxford University Press; Feb 2019.

2. Simms RJ. Autosomal dominant polycystic kidney disease. BMJ, 2016; 352(8044): 243-47. https://www.bmj.com/content/352/bmj.i679.long

3. Goldfarb DS et al. Medullary sponge kidney. UpToDate. Updated Feb 1, 2022. Accessed Jul 28, 2022. https://www.uptodate.com/contents/medullary-sponge-kidney

4. Rosenblum ND. Renal ectopic and fusion abnormalities. UpToDate. Updated Dec 8, 2021. Accessed Jul 28, 2022. https://www.uptodate.com/contents/renal-ectopic-and-fusion-anomalies

5. Krajewski W, Wojciechowska J, et al. Hydronephrosis in the course of ureteropelvic junction obstruction: An underestimated problem? Current opinions on the pathogenesis, diagnosis and treatment. Adv Clin Exp Med. 2017 Aug;26(5):857-864. doi: 10.17219/acem/59509. PMID: 29068584. https://advances.umw.edu.pl/pdf/2017/26/5/857.pdf

Aerospace Medicine Waiver Guide

Hematuria

Reviewed: May 2023
Authors/Reviewers: Dr. Christopher Keirns, Maj Luke Menner, Capt Cody Hedrick, and Lt Col Laura Bridge (ACS Internal Medicine); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Waiver guide restructured. Updated to reflect current MSD.

I. Waiver Consideration

Hematuria is not independently disqualifying for any flying class, ATC, GBO, OSF, or SWA duties, nor is it disqualifying for retention. However, hematuria is never considered a benign finding until a thorough evaluation is completed to exclude potentially serious medical conditions, even when the hematuria is incidental, asymptomatic, or intermittent. Although the underlying etiology may ultimately be clinically, aeromedically, and operationally inconsequential, the differential diagnosis for hematuria includes renal calculi, malignancy, glomerulopathies, nephropathies, polycystic kidney disease, sickle cell disease, and benign prostatic hyperplasia. Other causes include trauma and infection. The finding of hematuria may also accompany a diagnosis of chronic kidney disease (CKD). Many of these conditions may be associated with significant aeromedical and operational risks. Therefore, the finding of hematuria always necessitates a complete diagnostic evaluation to determine the underlying etiology. The cause may be independently disqualifying for aviation or operational duties. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for all potentially disqualifying conditions.

II. Information Required for Waiver Submission

Not applicable. Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for specific waiver submission requirements.

III. Aeromedical Concerns

Gross hematuria and asymptomatic microscopic hematuria are both common findings. Screening urinalyses in otherwise asymptomatic individuals is not advised and is not part of a standard preventive health evaluation. Gross hematuria is identified based on visible red or brown discoloration of the urine but is only confirmed when a urinalysis identifies the presence of blood or red blood cells (RBCs), because other mechanisms may result in red/brown urine discoloration. Microscopic hematuria is generally defined by the presence of at least three RBCs per high powered field (hpf) on analysis of a urine sediment. However, there is no lower limit of normal RBCs on microscopic urinalysis, and the presence of any blood could potentially signify serious disease.

Particularly in younger, otherwise healthy individuals, the cause of hematuria is often benign. Unfortunately, even young and healthy persons may develop serious and even life-threatening conditions of the kidneys or collecting system, and hematuria may be the only presenting sign. Therefore, an appropriate clinical evaluation is essential in all cases of hematuria. The

aeromedical and operational risks will vary depending on the underlying condition. Hematuria associated with acute conditions such as simple, uncomplicated cystitis is not disqualifying, and a servicemember may be reasonably expected to return to full duties after appropriate treatment and symptom resolution. Likewise, exercise-induced hematuria is not expected to convey any particular operational or aeromedical risk, but it is a diagnosis of exclusion and requires extensive evaluation to rule out other potential sources of hematuria.

Conditions associated with hematuria of serious aeromedical and operations concern include, but are not limited to, the following: renal calculi, malignancy, glomerulopathies, nephropathies, polycystic kidney disease, sickle cell disease, and benign prostatic hyperplasia. Many of these conditions fall under the umbrella of chronic kidney disease, which is a heterogeneous diagnostic category that may be independently disqualifying. Until a diagnostic evaluation is completed, it is appropriate to consider hematuria to be a marker of a potential acute or chronic medical condition with possible serious aeromedical and operational implications. It is essential that the etiology of the hematuria be elucidated to properly assess aeromedical and operational risk.

Please cross-reference the Medical Standards Directory and Air Force Waiver Guide for additional information and for all potentially disqualifying conditions.

Please use *only* these ICD-10 code for AIMWTS coding purposes	
R31.9	Hematuria, unspecified
R31.2	Other microscopic hematuria

IV. Suggested Readings

1. Barocas DA, Boorjian SA, Alvarez RD, et al. Microhematuria: AUA/SUFU Guideline. J Urol 2020; 204:778-786. Available at https://www.auanet.org/documents/Guidelines/PDF/Microhematuria-JU.pdf. Accessed 12 May 2023.
2. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO clinical practice guideline for the evaluation and management of chronic kidney disease. Kidney Int Suppl 2013; 3:v-150. Available at https://kdigo.org/wp-content/uploads/2017/02/KDIGO_2012_CKD_GL.pdf. Accessed 12 May 2023.
3. Rovin BH, Adler SG, Barratt J, et al. Executive summary of the KDIGO 2021 Guideline for the Management of Glomerular Diseases. Kidney Int 2021; 100:753-779. Available at https://www.kidney-international.org/article/S0085-2538(21)00553-6/fulltext. Accessed 12 May 2023.

Aerospace Medicine Waiver Guide

Prostatitis

Revised: April 2025

Reviewed: Lt Col Ryan Bogart (RAM 26), Col Christopher Allam (Urology Consultant to the Air Force Surgeon General), and Dr. David Miller (ACS Waiver Guide Coordinator).

Significant Changes: Updated Table 1 to include OSF as per Medical Standards Directory. Updated suggested readings. Include National Institutes of Health Chronic Prostatitis Symptom Index (NIH/CPSI) in waiver request for NIH III. Added IgG4-related prostatitis.

I. Waiver Consideration

Acute prostatitis, as classified by the National Institutes of Health Classification I (NIH I), and IgG4-related prostatitis are not compatible with flying or special mission duties and require DNIF until symptom resolution. Chronic prostatitis (NIH II – IV) and abscess of the prostate are disqualifying for all flying and special mission duties.

Table 1: Waiver potential for Prostatitis

Flying Class (FC)	Condition	Waiver Potential / Authority	ACS Review/ Evaluation
FC I/IA, II, III, ATC, GBO, OSF, SWA (initial)	NIH I	N/A	No
	NIH II	Unlikely[1] / AFAC[2]	
	NIH III	Unlikely[3] / AFAC[2]	
	NIH IV	Unlikely[4] / AFAC[2]	
FC II, III, ATC, GBO, OSF, SWA (trained)	NIH I	N/A	No
	NIH II	Yes / MAJCOM	
	NIH III	Maybe[3] / MAJCOM	
	NIH IV	Maybe[4] / MAJCOM	

1. Risk of recurrent and prolonged infections limits waiver potential for untrained.
2. Air Force Accessions Center (AFAC) includes the Air Force Recruiting Service (AFRS), as listed in DAFMAN48-123.
3. Treatment of chronic pain is usually with alpha-blockers, which are incompatible with FCI/IA or II duties and are rarely allowable for FC III duties due to alpha blockers' aeromedically significant side effects, including postural hypotension, dizziness, vertigo, and syncope.
4. Chronic prostatitis secondary to conditions, like prostate cancer, that are responsive to treatment may be waived for trained FC II or III after treatment completion and six-month waiting period. See prostate cancer waiver guide.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed and all appropriate treatments have been initiated using best current clinical guidelines and recommendations.

A. Initial Waiver Request:

1. Summary of presentation, course, and treatment.
    a. Document current absence of symptoms and any medication side effects.
    b. Document return to full physical activity or specify activity limitations.
2. Current Physical Exam. Include temperature, genitourinary exam, and a digital rectal exam.
3. Urinalysis, cultures, and labs such as PSA and CBC if required.
4. Urologist's consultation, diagnosis, and study results to rule out other abnormalities, including follow-up notes after acute resolution (scanned into AIMWTS).
5. For NIH III/CPPS cases, consider the psychological status of the flyer. Also include the NIH Chronic Prostatitis Symptom Index (NIH/CPSI).
6. FL4 with RTD and ALC status, if member did not meet retention status.
7. Any other pertinent information.
8. If any of the above requested items cannot be provided, please provide an explanation to the waiver authority in the AMS why that could not be provided.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

B. Renewal Waiver Request:

1. Summary of recurrence frequency, symptoms, treatment with any side effects, and activity levels.
2. For NIH III/CPPS cases, also include the NIH Chronic Prostatitis Symptom Index (NIH/CPSI).
3. External urologic exam and digital rectal exam.
4. All interim urology consultation notes (scanned into AIMWTS).
5. Any other pertinent information.

Note: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

III. Aeromedical Concerns

Prostatitis, or increased inflammatory cells within the prostatic parenchyma, is classified into four categories by the National Institutes of Health (NIH), as discussed below. Initial diagnosis is made by history, physical, urinalysis, and cultures. Urinalysis and cultures may be obtained before and after prostatic massage in NIH categories II – IV. However, prostatic massage should be avoided in acute prostatitis or during acute illness due to the presumed risk of inducing bacteremia. The recurrent infections or inflammations seen in NIH II – IV require urology consultation, but acute prostatitis is usually treated by the aeromedical provider unless associated with abscess, urinary retention, or other complications. Primary aeromedical concerns of

prostatitis involve recurrent distracting symptoms, medication side effects, and vibration/G-load forces that may exacerbate symptoms. It is estimated that 5% of men 20-50 years old have a history of prostatitis.

1. Acute bacterial prostatitis (NIH I). Symptoms include fever, genitourinary pain (suprapubic, perineal, or rectal), obstructive voiding symptoms, dysuria, urgency, frequency, malaise, nausea, and vomiting, and can progress to frank septicemia. 50-80% of documented bacterial infections are E.coli. 10-15% are additional gram negative species (Pseudomonas aeruginosa, Klebsiella, Serratia and Enterobacter.) Gram positive (typically Enterococci) account for only 5-10%. Up to 10% of patients will progress to a type of chronic prostatitis. Distracting symptoms are incompatible with flying duties and require DNIF until asymptomatic. Treatment with appropriate antibiotic choice and duration can be highly successful. Although not specifically classified as NIH I disease, IgG4-related prostatitis, which is responsive to steroids, is also incompatible with flying duties and requires DNIF until asymptomatic.

2. Chronic bacterial prostatitis (NIH II). Typically affects men aged 40-70 years with history of recurrent UTIs, often predisposed by an inadequately treated initial acute infection or functional voiding abnormalities. Members are often asymptomatic between recurrences, but bacteriuria persists. Identifiable uropathogens are present in less than 5% of these patients. The likelihood of recurrent rapid onset of distracting symptoms makes this condition incompatible with flying duties unless cured or suppressed with antibiotics.

3. Chronic pelvic pain syndrome (CPPS) (NIH III). Most cases of prostatitis in the general population involve this category of chronic genitourinary pain without uropathogenic bacteria. Members have many symptoms of traditional prostatitis but also report pain in the perineum, suprapubic area, penis, groin or lower back, and may report pain during or after ejaculation. Over 50% of patients may experience painful ejaculation. There are two subtypes distinguished by the degree of white blood cells (WBC) in prostatic secretions, urine, or semen. However, the clinical usefulness of differentiating nonbacterial prostatitis (inflammatory CPPS, NIH IIIA) from prostatodynia (noninflammatory CPPS, NIH IIIB) remains uncertain. Treatment is related to the cause of symptoms, involving use of alpha blockers, 5-alpha reductase inhibitors, NSAIDs, pelvic floor exercises, neurologic therapy such as posterior tibial nerve stimulation and/or acupuncture and often used in combination.

4. Asymptomatic inflammatory prostatitis (NIH IV). WBCs are seen in prostatic secretions, post-prostatic massage urine, semen, or histological sections of the prostate but the patient is completely asymptomatic. No infection is present, and cultures are negative. These patients may have elevated PSA, benign prostatic hypertrophy, or prostate cancer. Full urological workup is required for waiver consideration in order to better assess the aeromedical risk.

AIMWTS search performed spanning the period of Mar 2020 to Mar 2025 showed waiver submissions for 21 cases of prostatitis. The breakdown of the number of waivers and number of

total cases is tabulated below. All received waivers. Of note, members placed on alpha blocker for treatment tend to be given FC IIA or FC IIC categorical waiver.

Please use only *these* ICD-10 codes for AIMWTS coding purposes		(# of waivers / total # of cases)			
		IFC I/IA	FC II	FC III	GBO
N41.0	Acute prostatitis	0/0	17/17	2/2	2/2
N41.1	Chronic prostatitis				
N41.3	Prostatocystitis				
N41.4	Granulomatous prostatitis				
N41.8	Other inflammatory diseases of prostate				
N41.9	Inflammatory disease of prostate, unspecified				
A54.22	Gonococcal prostatitis (acute or chronic)				
A59.02	Trichomonal prostatitis				

IV. Suggested Readings

Franco, J. V., Turk, T., Jung, J. H., Xiao, Y., Iakhno, S., Tirapegui, F. I., Garrote, V., & Vietto, V. (2019). Pharmacological interventions for treating chronic prostatitis/chronic pelvic pain syndrome. *Cochrane Database of Systematic Reviews*, *2019*(10), CD012552-. https://doi.org/10.1002/14651858.CD012552.pub2

Lipsky, BA, Byren I, Hoey CT. Treatment of Bacterial Prostatitis. Clin Infect Dis. 2010; 50:1641-1652

Meyrier, A. & Fekete, T. Chronic Bacterial Prostatitis. UpToDate. Jan 5, 2023. Accessed Mar 17, 2025. https://www.uptodate.com/contents/chronic-bacterial-prostatitis

Meyrier, A., Trautner, B., & Kulkarni, P. Acute Bacterial Prostatitis. UpToDate. Feb 17, 2025. Accessed Mar 17, 2025. https://www.uptodate.com/contents/acute-bacterial-prostatitis

Moon, TD: Questionnaire survey of Urologists and Primary care physicians' diagnostic and treatment practices for prostatitis. Urology, 50:543, 1997

Pontari. M. (2020). Inflammatory and Pain Conditions of the Male Genitourinary Tract: Prostatitis and Related Pain Conditions, Orchitis, and Epididymitis. In Campbell Walsh Wein, *Urology* (12th Ed., pp. 1202-1218). Elsevier.

Wazir J, Ullah R, Li S, et al., Efficacy of acupuncture in the treatment of chronic prostatitis-chronic pelvic pain syndrome: a review of the literature. Int Urol Nephrol. 2019; 51(12): 2093-2106.

Renal and Ureteral Stones (Nephrolithiasis)

Revised: Jun 2021
Authors/Reviewers: Dr. Christopher Keirns and Maj Luke Menner; Lt Col Christopher Allam (AF/SG Consultant for Urology); Dr. Max Lee (ACS Waiver Guide Coordinator)

Significant Changes: Information required for waiver submittal updated to clarify the type of 24-hour urinary studies (i.e., UroRisk® Diagnostic Profile) that are needed for risk stratification.

I. Waiver Consideration

A history of recurrent renal colic or a single episode of renal colic with retained renal stone(s) is disqualifying for all flying classes, ATC, GBO, and SWA duties. A single episode of renal colic without retained stones is not disqualifying, but all metabolic risk factors for stone formation must be mitigated. Incidentally discovered renal stones without a history of renal colic is disqualifying for FC I/A, FC II, FC III and SWA duties; however, it is not disqualifying for ATC or GBO duties. Symptomatic renal stones that are not amendable to treatment, recurrent in frequency that precludes satisfactory duty performance, or requires specialty care follow-up more than annually is disqualifying for all flying classes, ATC, GBO and SWA duties as well as for retention. Untrained personnel are unlikely to receive waiver for any history of renal colic or presence of retained renal stone(s). In all cases, a thorough metabolic evaluation is required and any metabolic risk factors predisposing to stone formation must be mitigated prior to waiver consideration. Individuals with retained renal stones must have a documented surveillance plan to monitor for stone progression.

A restricted waiver to a multi-place aircraft with another qualified pilot maybe indicated for manned aviation pilots with either retained renal stones or greater than three documented renal colic episodes due to the heightened annual risk of developing renal colic or other stone-related complications. On a case-by-case basis, pilots with retained asymptomatic renal stones may be considered for an unrestricted waiver. In such cases, ACS/SG Urology Consultant review of each case and local imaging studies is highly encouraged (but not required) in order to provide the waiver authority an individualized estimate of the annual risk of stone related events. Individuals with retained stone(s) ≥3-mm located in the upper or mid renal pole(s) and individuals with greater than three documented renal colic episodes (regardless of the presence or location of retained renal stones) are felt to be at heightened aeromedical risk.

Table 1: Waiver potential for SINGLE EPISODE of renal colic WITH retained stone(s)[1]

Flying Class (FC)	Waiver Potential	Waiver Authority[2]	ACS Review or Evaluation
FC I/IA	No	AETC	No
FC II/III/SWA	Yes[3,4]	MAJCOM	Maybe[5]
ATC/GBO	Yes[3]	MAJCOM	No

1. Single episode of renal colic without retained stone(s) is not disqualifying, but all metabolic risk factors for stone formation must be mitigated.
2. Untrained personnel of any class are unlikely to receive aeromedical waiver and waiver authority is AETC.
3. All metabolic risk factors for stone formation must be mitigated.
4. In general, individuals with retained stone(s) ≥3-mm located in the upper or mid renal pole(s) are felt to be at heightened aeromedical risk.
5. ACS/SG Urology consultant review of case and local imaging studies in order to provide individualized risk estimates of future stone related events is encouraged IF an unrestricted waiver is being considered in select pilots with higher risk retained stone(s). ACS/SG Urology consultant review of cases involving FC III/SWA personnel typically not required.

Table 2: Waiver potential for RECURRENT EPISODES of renal colic with or without retained stone(s)

Flying Class (FC)	Waiver Potential	Waiver Authority[6]	ACS Review or Evaluation
FC I/IA	No	AETC	No
FC II/III/SWA	Yes[7,8]	MAJCOM	Maybe[9]
ATC/GBO	Yes[7]	MAJCOM	No

6. Untrained personnel of any class are unlikely to receive aeromedical waiver and waiver authority is AETC.
7. All metabolic risk factors for stone formation must be mitigated.
8. In general, individuals with retained stone(s) ≥3-mm located in the upper or mid renal pole(s) and individuals with >3 renal colic episodes (regardless of the presence or location of retained renal stones) are felt to be at heightened aeromedical risk.
9. ACS/SG Urology consultant review of case and local imaging studies in order to provide individualized risk estimates of future stone related events is encouraged IF an unrestricted waiver is being considered in select pilots with higher risk retained stone(s). ACS/SG Urology consultant review of cases involving FC III/SWA personnel typically not required.

Table 3: Waiver potential for INCIDENTALLY DISCOVERED retained renal stone(s) (i.e., no history of renal colic)

Flying Class (FC)	Waiver Potential	Waiver Authority[10]	ACS Review or Evaluation
FC I/IA	No	AETC	No
FC II/III/SWA	Yes[11,12]	MAJCOM	Maybe[13]
ATC/GBO	N/A	N/A	N/A

10. Untrained personnel of any class are unlikely to receive aeromedical waiver and waiver authority is AETC.
11. All metabolic risk factors for stone formation must be mitigated.
12. In general, individuals with retained stone(s) ≥3-mm located in the upper or mid renal pole(s) are felt to be at heightened aeromedical risk.
13. ACS/SG Urology consultant review of case and local imaging studies in order to provide individualized risk estimates of future stone related events is encouraged IF an unrestricted waiver is being considered in select pilots with higher risk retained stone(s). ACS/SG Urology consultant review of cases involving FC III/SWA personnel typically not required.

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after the clinical disposition is complete and the service member is stable on all appropriate treatments, following the best current clinical guidelines and practice recommendations.

A. Initial Waiver Request:

1. Summary of presentation, course, and treatment.
2. Consultation reports from all treating providers or specialists, which should include:
    a. Discussion of presentation, etiology, and treatment
    b. Discussion of metabolic and dietary risk factors predisposing to stone recurrence
    c. Plan for mitigating risk of stone recurrence
    d. Documentation of adherence and tolerance to pharmacologic therapy if indicated
    e. Plan for monitoring stone progression if retained stones are present
3. Laboratory studies required:
    a. Metabolic evaluation to include 24-hour urinary studies (i.e., UroRisk® Diagnostic Profile), urinalysis, stone analysis, serum uric acid, serum parathyroid hormone, and renal panel including calcium. Repeat the 24-hour urinary studies (i.e., UroRisk® Diagnostic Profile) if initial test was abnormal or treated with pharmacologic therapy.
    b. All other laboratory and imaging studies ordered by treating provider(s) or consulting specialist(s).
4. Imaging studies required:
    a. Submit all diagnostic and follow-up imaging reports.
    b. If unrestricted waiver is being considered in select pilots with retained stones, and ACS is being consulted, submit all diagnostic and follow-up imaging reports and images to the ACS for review.
5. Current physical examination findings.
6. FL4 with RTD and ALC status, if applicable.
7. Any other pertinent information.
8. If the local base cannot provide any of the above listed information, they should document why, explaining the reason to the waiver authority.

B. Renewal Waiver Request:

1. Updated AMS with interval history, including:
    a. Discussion of any recurrence of renal colic or evidence of stone progression
    b. Current plan to mitigate risk of recurrent renal colic or stone progression
2. Consultation reports from all treating provider(s) or specialist(s).
3. Updated laboratory and imaging studies:
    a. Updated 24-hour urinary studies (i.e., UroRisk® Diagnostic Profile) if previously abnormal or on preventive therapy
    b. KUB to assess kidney stone burden (new stone(s) and/or stone progression). A CT abdomen/pelvis (preferably low dose) may be required if history of radiolucent stone(s) or if KUB previously did not identify retained stone(s).

c. If unrestricted waiver is again being considered in select pilots with retained stones, and ACS is being consulted, submit all diagnostic and follow-up imaging reports and images to the ACS for review. For image submission process, refer to page 2.

4. Current physical examination findings.
5. Any other pertinent information.
6. If the local base cannot provide any of the above listed information, they should document why, explaining the reason to the waiver authority.

III. Aeromedical Concerns

The development of renal or ureteral stones is a relatively common condition affecting USAF aviators and special duty operators. Migration of stones through the renal collecting system and ureter may result in aeromedically significant renal colic and/or complications from stone impaction (i.e. hydroureteronephrosis, acute kidney injury, infection, etc.). The presenting symptoms of renal colic range widely from pain resulting in distracting symptoms to overt incapacitation. Treatment may range from conservative management with symptomatic care to potentially invasive urologic procedures depending on the symptoms, stone size, and/or presence of complications. The challenge presented to the flight medicine community is identifying those individuals that have an unacceptably high risk of developing future stone-related events (i.e. renal colic, complications, stone progression, and urologic intervention). Multiple factors influence the risk of developing future stone-related colic with a history of symptomatic stones being the single most important predictor. Retained stone(s) in the kidney collecting system and ureters also increases the risk of future stone-related events and potentially serves as a nidus for further stone formation especially if modifiable risk factors are not corrected. Stone size, location, and number are also factors contributing to an individual's overall future risk.

Metabolic factors increasing risk of future stone events include hyperoxaluria, hypercalciuria, hypocitraturia, elevated urine uric acid levels, persistently acidic urine (pH less than 5), persistently alkaline urine (pH greater than 7), and low 24-hour urinary volume. Dietary factors leading to increased risk of stone formation include diets high in sugar/sweeteners, sodium, oxalate, animal protein, and low in calcium. Environmental factors such as dehydration, hot climates, and sedentary work increase risk of kidney stone formation and are commonly experienced by aircrew members. All USAF aircrew and special duty operators with a history of renal colic or incidentally discovered retained renal stone(s) are required to be evaluated for any underlying modifiable risk factors, which must be corrected to mitigate aeromedical risk of developing renal colic prior to returning them to operational duties or granting them an aeromedical wavier. In addition, studies have shown a significant risk reduction in recurrent renal colic and future stone events when preventative pharmacologic therapy is used in appropriate individuals. It is not recommended to undergo any urologic procedures for the purpose of obtaining a waiver.

The primary aeromedical goal in all individuals with a history of renal or ureteral stones is to limit the flying/operational impact of future stone-related events. Despite historically strict waiver tolerances put in place for aviators with a history of nephrolithiasis and renal colic, in-flight stone events have on occasion been reported in USAF aircrew. It is for this reason that USAF pilots may on occasion be restricted to multi-place aircraft with another qualified pilot in

an effort to mitigate aeromedical risk. Instructor pilots and single seat high-performance pilots do have the potential to be considered for an unrestricted waiver on a case-by-case basis, but each determination is individualized and review by the ACS/SG Urology Consultant is available to provide the waiver authority with the most accurate risk estimate possible.

Review of AIMWTS data in Mar 2020 revealed a total of 589 waiver packages containing the diagnosis of nephrolithiasis since Jan 2010. Of that total, 19 were FC I/IA (13 disqualified), 240 were FC II (13 disqualified), 231 were FC III (40 disqualified), 26 were ATC (2 disqualified), 60 were GBO (10 disqualified) and 13 were SWA (1 disqualified). Rationale for disqualifications included frequency, severity of symptoms, size and location of retained stones. In addition, disqualification decisions were made on the basis of the presence of other serious comorbidities that when taken together with the history of nephrolithiasis, would render the aeromedical risk to be unacceptable.

Common ICD-9 codes used for Nephrolithiasis	
592.0	Calculus of the kidney
592.1	Calculus of the Ureter
592.9	Urinary calculus, unspecified
788.0	Unspecified renal colic

Common ICD-10 codes used for Nephrolithiasis	
N20.0	Calculus of the kidney
N20.1	Calculus of the Ureter
N20.9	Urinary calculus, unspecified
N23	Unspecified renal colic

IV. Suggested Readings

1. Assimos D, Krambeck A, et al. Surgical Management of Stones: AUA/Endourology Society Guideline. *Journal of Urology*. 2016; 196(4):1153-1160. Last accessed March 2020: https://www.auanet.org/guidelines/kidney-stones-surgical-management-guideline

2. Pearl MS, Goldfarb DS, et al. Medical Management of Kidney Stones: American Urologic Association Guideline. *Journal of Urology*. 2014; 192(2):316-324. Last accessed March 2020: https://www.auanet.org/guidelines/kidney-stones-medical-mangement-guideline

3. Recurrence of Kidney Stone (ROKS) Calculator 2018. https://qxmd.com/calculate/calculator_438/roks-recurrence-of-kidney-stone-2018

4. Qaseem A, et al. "Dietary and Pharmacologic Management to Prevent Recurrent Nephrolithiasis in Adults: A Clinical Practice Guideline From the American College of Physicians." *Annals of Internal Medicine*. 2014; 161(9):659-667. Last accessed March 2020: https://annals.org/aim/fullarticle/1920506/dietary-pharmacologic-management-prevent-recurrent-nephrolithiasis-adults-clinical-practice-guideline

5. Vaughan LE, Enders FT, et al. Predictors of Symptomatic Kidney Stone Recurrence After First and Second Episodes. *Mayo Clinic Proceedings*. 2019; 94(2):202-210.

6. Zisman AL. Effectiveness of Treatment Modalities on Kidney Stone Recurrent. *Clinical Journal of the American Society of Nephrology*. 2017; 12(10):1699-1708. Last accessed March 2020: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5628726/

Aerospace Medicine Waiver Guide

Anthropometrics (Short Stature, Excessive Height, Weight, and Other Body Measurements)

Revised: Sep 2024
Authors/Reviewers: Col Kevin Heacock (ACS Aerospace Medicine)

Significant Changes: Removed Anthropometrics chapter from the waiver guide as waivers for these conditions are not medical waivers managed by the typical MAJCOM waiver authorities. Instead, waivers are categorical in nature based on functional fit and safe-escape as described below. All questions regarding Anthropometrics waivers should go to AETC/A2/3/10 who has been delegated the waiver authority by AETC/CC.

I. Waiver Consideration

Individuals who do not meet DAFMAN 48-123 and the Medical Standards Directory anthropometric standards may apply for a categorical waiver to enter flight training. AETC/CC, in coordination with AETC/SG, is the waiver authority for all anthropometric waivers. AETC/CC has delegated this waiver authority to the AETC/A2/3/10 (Director of Intelligence, Operations, and Nuclear Integration). Standing height, sitting height, buttock-to-knee length, and nude body weight are the screening measurements required for all initial Flying Class (FC) I, IA, II, and III physicals to determine the need for further anthropometric clearance. Categorical waivers would be limited to those aircraft in which the candidate meets "functional fit" and "safe-escape" standards. The criteria for "functional fit" is based on Air Force Research Lab (AFRL) cockpit anthropometric surveys of USAF aircraft. The criteria for "safe-escape" would be based on ejection-seat design criteria.

Aerospace Medicine Waiver Guide

Decompression Sickness and Arterial Gas Embolism

Revised: Sep 2023

Reviewed: Col Joseph Connolly (ACS Neurologist), Col Antonio Delgado (AF/SG Hyperbaric Medicine Consultant), Lt Col Aven Ford (ACS Neurologist), Dr. Max Lee (Waiver Guide Coordinator), Lt Col Paul Vu (Chief, Medical Standards Policy)

Significant Changes:

Updated Waiver Considerations and References

I. Waiver Consideration

Decompression sickness (DCS) arises from the presence of bubbles from inert gases (mainly nitrogen) in tissues/blood that were previously in solution following a decompression stress, though the presence of bubbles alone may not cause DCS, it is generally categorized as type I or II: Type I DCS type is a more benign presentation (pain only) due to musculoskeletal or mild skin involvement, and type II DCS is a more serious presentation due to either neurological, inner ear or cardiopulmonary presentation. Air gas embolism (AGE) describes the phenomenon of gas entering the arterial vascular system, usually secondary to pulmonary barotrauma or (more rarely) shunting phenomenon: unlike DCS, it is generally unrelated to the amount of gas dissolved in the tissues. Type II DCS or AGE by history, physical examination, or evidence of structural damage on imaging studies is disqualifying for FC I/IA, FC II, FC III, Operational Support Flying (OSF) and Special Warfare Airman (SWA). Current literature suggests it is rare for DCS symptoms to begin more than 24 hours following decompression exposure. However, DCS should still be considered in the differential diagnosis for individuals presenting with DCS symptoms, when they cannot be explained otherwise beyond this period of time if there is history of exposure to significant change in pressure (i.e. at or above 18,000 ft, SCUBA diving, or hyperbaric exposure). Current medical knowledge does not permit clear delineation of susceptibility to repeat DCS, nor does it allow precise definition of risk of sudden incapacitation or neurocognitive impairment. A minimum 72-hour DNIF period is required for type I DCS and if the symptoms are fully resolved with appropriate treatment, no waiver is required. Isolated peripheral neurological symptoms may be managed in the same manner as type I DCS. For type II DCS or AGE fully resolved with the initial course of hyperbaric treatment, a minimum of 1-month DNIF and a waiver is required. Lastly for type II DCS or AGE with persistent or recurrent symptoms after the initial course of hyperbaric treatment, a minimum of 3-month DNIF period should be observed before waiver submission. DCS is not disqualifying for ATC and GBO duties unless any persistent symptoms preclude safe performance of duties. Reference Table 2 for additional details.

Table 1: Waiver potential for DCS and AGE

Flying Class (FC)	Waiver Potential	Waiver Authority	ACS Review or Evaluation
FC I/IA	Yes[1]	AFRS/CMO	Yes
FC II/III/GBO/ ATC/SWA	Yes[1]	MAJCOM	Yes

1. If symptoms completely resolved, with initial course of hyperbaric treatment, or any residual symptoms are not functionally limiting, aeromedical waiver recommendation is likely

Table 2: DCS/AGE Considerations for Return To Flying Status (RTFS)

	Type I DCS	AGE or type II DCS[1]
Symptoms fully resolved with initial course of HBO treatment	**Consultation Required** After consultation with base SGP, BAMC Hyperbaric Medicine, and MAJCOM/SGP with a minimum of 72-hour DNIF following resolution of all symptoms, RTFS may be considered without waiver.	**Waiver Required** Requires a minimum 1-month DNIF following resolution of all symptoms. ACS review required.
Symptoms persist/recur after initial course of HBO treatment	**Waiver Required** Requires a 3-month DNIF. ACS review at the discretion of MAJCOM/SGP.	**Waiver Required** Requires a minimum 3-month DNIF. ACS review with evaluation as listed below and review by the ACS.

1. Isolated peripheral neurological symptoms may be managed in the same manner as type I DCS

II. Information Required for Waiver Submittal

The aeromedical summary (AMS) should only be submitted after diagnostic evaluation has been completed, all appropriate treatments have been initiated using best current clinical guidelines and recommendations, and the member is clinically stable. Recompression by hyperbaric oxygen therapy is the definitive treatment for DCS and AGE.

A. Initial Waiver Request:

1. Complete history of event detailing risk factors, exposures, initial symptoms, treatment, any residual symptoms, signs, and functional limitations.
2. Current physical, mental status and neurologic examinations performed by a Neurologist or Hyperbaric Medicine specialist.
3. Copies of relevant clinical notes (consultation reports from Neurology, Pulmonary, and Hyperbaric Medicine), and diagnostic studies reports.
4. For any DCS or AGE with neurologic injury:
    a. Neurocognitive testing at one month, to include the Multidimensional Aptitude Battery (MAB) and MicroCog tests, with results sent to ACS.
    b. Non-contrast MRI studies focused on brain or spine as appropriate (on minimum 1.5T MRI unit), within one month of episode, with report(s) and images. If images are sent to ACS on CD, please ensure that the images can be viewed on a standard AF desktop system without needing administrative privileges.
5. TTE bubble study with provocative maneuvers for CNS, inner ear, spinal, skin DCS (cutis marmorata), or AGE without pulmonary barotrauma, particularly with unprovoked (diving tables, safety stops observed) diving DCS.
6. Documentation of any consultation with USAF Hyperbaric Medicine physician.
7. Current chest x-ray (PA/lateral) and/or high-resolution CT scan, to rule out lung parenchymal pathology in cases of AGE or pulmonary DCS.

Note 1: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

Note 2: All studies should be submitted electronically to the ECG Library. See page 2 of the waiver guide compendium for additional details. If this is not possible, items can be mailed via FedEx. If mailed, include patient's name, SSN, and POC at the base. State in AMS when studies were sent to ACS.

B. Renewal Waiver Request:

1. Interval history, including any residual symptoms, signs, and current functional status.
2. Copies of any applicable interim specialty reports, labs, imaging reports and images. If images are sent to ACS on CD, please ensure that the images can be viewed on a standard AF desktop system without needing administrative privileges.
3. Current physical, mental status and neurologic exam findings.

Note 1: Specify in the aeromedical summary any reasoning/justification for not including items listed above with the submitted waiver package.

Note 2: All studies should be submitted electronically to the ECG Library. See page 2 of the waiver guide compendium for additional details. If this is not possible, items can be mailed via FedEx. If mailed, include patient's name, SSN, and POC at the base. State in AMS when studies were sent to ACS.

III. Aeromedical Concerns

Aeromedical concerns include the effects of any residual neurologic or cognitive symptoms on operational safety and mission effectiveness, and future risk of recurrence. The pathophysiology of decompression sickness is not entirely understood but is currently widely accepted by the hyperbaric community that initially the mechanical effect of gas bubbles, causes pain and ischemia, followed by the inflammatory/oxidative cascade response, explaining the symptoms/signs extending 24 hours, when gas excess and bubbles are long gone. The risk of recurrent injury or increased susceptibility to subsequent injury following an initial episode of DCS is unknown, as is the short and long-term risk of permanent neurocognitive impairment following repeated episodes of neurologic DCS. Permanent subcortical dementia following a single episode of neurologic DCS in an aviator has been documented in at least one ACS-assessed case. The risk of seizures from structural brain abnormalities following DCS is unknown but deemed low by most Hyperbaric Medicine experts. Large-vessel occlusion from AGE in the aviation environment is rare. If it does occur, the pulmonary rupture that caused the AGE or pneumomediastinum must completely heal and properly evaluated and cleared by a pulmonologist before consideration of returning to flying duties.
Furthermore, any pulmonary pathologic conditions that could predispose to recurrence should be excluded via radiographic studies.

AIMWTS search in Feb 2023 showed 60 cases of decompression sickness. The breakdown of the number of waiver and number of total cases are tabulated below. Of the 13 disqualifications, 7 were for diagnoses not related to DCS or AGE.

Please use only *these* ICD-10 codes for AIMWTS coding purposes	(# of waivers / total # of cases)				
Decompression Sickness Aeroembolism	FC I/IA	FC II	FC III	OSF	SWA
T70.3 (generic) T70.3XXA (initial encounter) T70.3XXD (subsequent encounter) T70.3XXS (sequelae)	1/3	30/31	12/17	1/6	3/3

IV. Suggested Readings

1. The diving medical advisory committee (DMAC). Fitness to return to diving after decompression illness, 13 Rev 3- Dec 2022

2. National Oceanographic and Atmospheric Agency (NOAA) Diving Medical Standards and Procedures Manual 2010

3. The Navy Bureau of Medicine & Surgery (BUMED). Manual of the Medical Department (MANMED) Chapter 15-102 diving duty Sept 2021 Medical Examinations

4. Diving Alert Network (DAN) fitness to dive, link: www.dan.org

5. E. Sundal, S.H. Lygre, K. Troland. Long-term neurological sequelae after decompression sickness in retired professional divers. Journal of Neurological Sciences 2022; 434: 120181

6. Neal. W. Pollock, Dominique Buteau. Updates in decompression illness. Emergency Medicine Clinics 2017 Vol 35, Issue 2 P301-19

7. Connolly DM, Lee VM, Hodkinson PD. White matter status of participants in altitude chamber research and training. Aerosp Med Hum Perform 2018; 89(9):777-786.

8. Cooper JS, Hanson KC. Aerospace, Decompression Illness. StatPearls, Mar 21, 2019. Link: https://www.ncbi.nlm.nih.gov/books/NBK537264/

9. Savica R. Environmental neurologic injuries. Continuum (Minneap Minn) 2017; 23(3):862- 871.

10. Pollock NW, Buteau D. Updates in decompression illness. Emergency Medicine Clinics 2017; 35(2):301-319.

11. Hossack M, Sladky J, McGuire SA. A proposed mechanism of neuronal injury in pilots and aircrew personnel with hypobaric exposure. Neurology 2017; 88(16, Suppl):S53.005

12. McGuire SA et al. White matter hyperintensities and hypobaric exposure. Ann Neurol 2014; 76(5):719-726.

13. McGuire SA et al. Hyperintense White Matter Lesions in 50 High-Altitude Pilots With Neurologic Decompression Sickness. Aviat Space Environ Med 2012; 83:1117-1122.

14. Webb J, Pilmanis A. Fifty Years of Decompression Sickness Research at Brooks AFB, TX: 1960-2010. Aviat Space Environ Med 2011; 82(5, Suppl.):A1-A25.