

USCG Aeromedical Policy Letters

Index:

Cardiovascular:

[Hyperlipidemia](#)

[Hypertension](#)

Dermatology

[Psoriasis](#)

Endocrinology

[Diabetes Mellitus](#)

[Hypothyroidism](#)

[Metabolic Syndrome](#)

Gastroenterology

[Gastroesophageal Reflux](#)

Hematology

Infectious Disease

Malignancy

[Medications](#) (revised April 2013)

Miscellaneous

Neurology

Obstetrics and Gynecology

[Pregnancy in Aviation](#)

Ophthalmology (revised March 2013)

[Corneal Refractive Surgery](#)

[Depth Perception Defect](#)

[Excessive Phorias](#)

[Laser Ocular Strike \(ICD9 E926.4\)](#)

Orthopedics

[Backache](#)

[Intervertebral Disc Disease](#)

[Knee Injuries](#)

Otorhinolaryngology

[Allergic Rhinitis](#)

[Hearing Loss](#)

Psychiatric

[Alcohol Abuse or Dependence](#)

Pulmonary

[Asthma and Reactive Airway Disease](#)

[Obstructive Sleep Apnea](#)

Urology

[Benign Prostatic Hypertrophy](#)

[Renal Stones](#)

HYPERLIPIDEMIA/HYPERCHOLESTEROLEMIA (ICD9 272.0)

AEROMEDICAL CONCERNS: An increase in CAD risk occurs with elevated plasma cholesterol, increased low-density lipoprotein (LDL), and reduced high-density lipoprotein (HDL). In an effort to reduce the risk of CAD, reduction of the identified risk factors is essential. Optimizing lifestyle behaviors is the first line. With the availability of highly efficacious statin drugs, and with clinical trials demonstrating the profound effect of these drugs in primary and secondary prevention of coronary artery disease, there is now widespread agreement that primary treatment of hyperlipidemia is indicated.

WAIVERS: Hypercholesterolemia controlled by either diet or by those drugs listed below is not disqualifying for aircrew members and may be annotated on the flight physical as ***information only***.

Initial applicants (all classes): Waiver is required for initial aviation candidates with the following requirements:

- Normal cholesterol levels achieved by either diet or by those drugs listed below.
- No side effects related to treatment.
- No evidence for end organ disease (based on PMH and CVSP screening).

Rated and Non-rated (all classes): Waiver submission is reserved for those rare cases when side effects or aeromedical issues inhibit safe use of the below listed medications or when permanent medical complications result from their use.

INFORMATION REQUIRED: For an accurate lipid profile result the patient should fast for 9-12 hours, with only water or fat-free fluids allowed. The aircrew member should:

- Be on a normal diet for the previous 2 weeks
- Have no illnesses, operations or injuries for the previous 4 weeks
- No minor febrile episode for 1 week

Causes of secondary hyperlipidemia such as hypothyroidism, diabetes, obstructive liver disease (cholestasis), alcohol abuse, gout, renal failure, nephrotic syndrome, myeloma, systemic lupus erythematosus and use of drugs that may increase LDL cholesterol or decrease HDL cholesterol (progestins, anabolic steroids, and corticosteroids) should be excluded via history and appropriate laboratory testing. Based on CVSP assessment, a GXT may be requested. Aircrew members of any age with serum cholesterol values greater than or equal to 240 mg/dl (High risk for CAD based on NCEP) should be evaluated for drug therapy. Drug therapy requires monitoring and annual submission of additional information such as hepatic function test results with creatine kinase (CPK). Submitted physicals without required laboratory values annotated (or at least a comment such as "LFTs/CPK normal") will be returned **DISQUALIFIED, INCOMPLETE (DI)**.

TREATMENT: The first line of treatment for mild cases is Therapeutic Lifestyle Changes (TLC) including dietary control, weight loss, and increased aerobic exercise. Use of medication should be determined by current standards of care as proposed by the Adult Treatment Panel III (ATP III) of the National Cholesterol Education Program (NCEP). The first drug class of choice is the statins (possibly in concert with ezetimibe), followed by bile acid binding resins and then

nicotinic acid. Use of ferric acids is generally reserved for cases with significant hypertriglyceridemia. Recommended laboratory follow-up is as listed below for each medication class. Report a current (within 90 days) set of values as specified for medication class on annual FDME.

HMG CoA Reductase Inhibitors (Statins): LOVASTATIN, PRAVASTATIN, SIMVASTATIN, ATORVASTATIN, and FLUVASTATIN, ROSUVASTATIN

- Initial Grounding Period 24 hours after first dose.
- A lipid profile 3-6 months after initial therapy to determine efficacy and annually thereafter.
- Liver Function tests (LFTs) and CPK prior to initiating treatment and 6-12 weeks after the start of therapy, annually thereafter.

Ferric Acids: GEMFIBROZIL, FENOFIBRATE, CLOFIBRATE

- LFTs to include bilirubin and LDH, CPK, CBC and complete Lipid Profile prior to initiating treatment and at 3, 6, and 9 months, then annually.

Bile-Acid Binding Resins: CHOLESTYRAMINE, COLESTIPOL

- Lipid profile prior to initiation. Recheck Lipid profile at 2-4 weeks for efficacy.
- Prothrombin time and serum calcium annually. (These drugs cause constipation and interact with such drugs as hydrochlorothiazide, penicillin and tetracycline. Additionally, they may cause deficiency of Vitamin A, D, E, K, folic acid, magnesium, iron & zinc)

Cholesterol Absorption Inhibitors: EZETIMIBE

- LFT's prior to initiating treatment and Lipid Profile 6-12 weeks after initiation, annually thereafter.
- Evaluate for muscle ache/myalgias at follow up visits. Use with statin therapy is aeromedically acceptable as long as providers follow the information requirement for both medications.

Nicotinic Acid: NIACIN, NIASPAN. **Use of these agents is grounding and considered disqualifying.** Waivers will be considered after maximum therapeutic effect has been achieved. Conditions for waiver submission must include:

- Stable dose for at least three months
- No or minimal side effects
- Normal serum glucose and uric acid levels while on the therapeutic dose.
- Serum glucose and uric acid 6 months after initiation.
- LFTs every 6-12 weeks for the first year and then every 6 months thereafter. (<1% incidence of elevated LFT's, possibility of fulminate hepatic necrosis)

DISCUSSION: The treatment of mild/moderate cases of hyperlipidemia is becoming increasingly recommended as a preventive strategy for CAD. The primary target for therapy is the LDL with an optimal goal of <100 mg/dl. In determining which patients to treat, LDL concentrations should be below 160 mg/dl in patients with less than two CHD risk factors. A lower value of 130 mg/dl is recommended in patients with two or more CHD risk factors. Major CHD risk factors, other than increased LDL, include: tobacco use, hypertension (>140/90), low

HDL Cholesterol (<40 mg/dl), family history of premature CAD (first degree relative male < 55 y/o and female <65 y/o) and age (male> 45 y/o and female > 55 y/o). The underlying goal is to improve aircrew knowledge and health through lifestyle changes and education, and through lipid-lowering agents. If during the performance of flight physicals, one sees repeated comments annually about TLC with continually elevated lipid profiles, make the clinical call to initiate and monitor therapy.

REFERENCE:

1. *Third Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III)*. NIH: National Heart Lung and Blood Institute, NIH 01-3670, May 2001. <http://www.nhlbi.gov/guideline/cholesterol/profmats.htm>
2. *Implications of Recent Clinical Trials for the National Cholesterol Education Program Adult Treatment Panel III Guidelines*. *Circulation*. 2004; 110:227-239. US

Hypertension ICD9 401.9)

AEROMEDICAL CONCERNS: Hypertension is called a silent killer because it's not symptomatically easy to recognize. Untreated hypertension is a major risk factor for the development of cardiovascular disease including coronary artery disease, congestive heart failure, cerebrovascular accidents, peripheral vascular disease, and renal disease. The relative risk of developing coronary artery disease is compounded when untreated hypertension co-exists with hyperlipidemia, cigarette smoking, increasing age, or diabetes. Hypertension is relatively common, easily diagnosed, and treatable with diet/exercise and/or approved medications. Hypertension increases the risk for developing diabetes.

WAIVERS: A documented history of hypertension, regardless of whether treated with diet or medication, is disqualifying for all classes of flight and requires a waiver.

Initial applicants (all classes): Waiver for initial aviation candidates is routinely recommended when treatment has achieved a normotensive state (less than 140/90 mm Hg) and evaluation reveals no underlying pathology. Individuals controlled with lifestyle modifications alone will also require a waiver even though control is achieved without medication.

Rated and Non-rated (all classes): Waivers are considered when treatment has achieved a normotensive state (less than 140/90 mm Hg) and evaluation reveals no underlying pathology. Individuals controlled with lifestyle modifications alone will also require a waiver even though control is achieved without medication.

INFORMATION REQUIRED:

Verify the diagnosis with a 3-day b.i.d. BP reading in each arm. Report readings on AERO Form 2808, page 4 in blocks provided. If average is less than 139/89, counsel for appropriate lifestyle changes and return to flight duties.

Submit a waiver if the average of these readings is greater than 139/89, further evaluation must be done to exclude underlying pathology/secondary causes. Initial evaluation should include:

- Documentation of aircrew member and family history with regard to CAD, Hypertension, Cerebrovascular accidents, Diabetes mellitus, Hyperlipidemia, and Renal Disease.
- Documentation of lifestyle and habits with regard to recent weight gain, physical activity, diet, tobacco, and alcohol use.
- Documentation of all medications currently in use to include OTC, herbal preparations, and prescription medications.
- CBC
- CHEM. 7 (serum electrolytes, glucose, BUN, and creatinine),
- Uric acid
- Lipid Profile (total serum cholesterol, HDL cholesterol, triglycerides),
- ECG
- Routine urinalysis
- Direct ophthalmoscopic examination

- If these studies are negative, nothing further is required. Abnormalities however, must be evaluated by internal medicine, cardiology, nephrology, or ophthalmology, as appropriate.

Report results of treatment(s) used to achieve normotensive status (see treatment below), to include successful post-treatment 3-day b.i.d. BP results and average within standards as well as CHEM 7 while on medication, if utilized to treat.

FOLLOW-UP:

FOR DIET/EXERCISE ONLY WAIVERS: Annual submission of 3-day BID BP determinations is required.

FOR MEDICATION USAGE: Annual submission of a CHEM 7, ECG, Urinalysis, and 3-day b.i.d. BP determination. Certain medications will require unique annual submissions - see below.

TREATMENT: The JNC VII report contains detailed guidance and evaluation and therapy for hypertension, introducing the issue of pre-hypertension and still endorsing first line therapy with diuretics. Hypertension is an established risk factor for diabetes, and patients warrant testing for impaired fasting glucose and impaired glucose tolerance. Lifestyle modifications lead therapeutic options but are often inadequate to maintain a normotensive state. These have included a proper diet, exercise, weight loss, salt restriction, alcohol abstinence, smoking cessation, and reduction in caffeine consumption. If medication is required, the aircrew member must be grounded for a sufficient period (1-4 weeks) to observe for side effects and can resume flight when assessed locally, stable on medications, and blood pressure is trending appropriately. The AMS for waiver should be requested when on a stable dosage with adequate BP control (3-day average <140/<90), and with normal lab evaluation on the medication. Waivers are granted for class of medication use; therefore, if local pharmacy policy or clinical judgment requires a change to a medication within the same class, no additional waiver action is required. A current (within 90 days) set of laboratory results, 3-day BP average, EKG, fundoscopic examination and urinalysis are required for annual waiver requirements.

ACE Inhibitors: CAPTOPRIL (Capoten), ENALAPRIL (Vasotec), LISINOPRIL (Zestril), BENAZEPRIL (Lotensin), FOSINOPRIL (Monopril), QUINAPRIL (Accupril), RAMIPRIL (Altace), TRANDOLOPRIL (Mavik), MOEXIPRIL (Univasc).

- Required labs: Chem7 (basic metabolic panel) in first 7-10 days after initiating therapy to evaluate effect on BUN, creatinine and potassium levels, insuring stability. This should be repeated at 3 months of therapy and then annually, with documentation on FDMEs.

Angiotensin II Receptor Blockers: LOSARTAN (Cozaar), VALSARTAN (Diovan), IRBESARTAN (Avapro), CANDASARTAN (Atacand), and similar ARBs with FDA approval.

- ACE and ARB II in combination with approved diuretics may be used with the same reporting requirements as ACE inhibitors.

Alpha Blockers: PRAZOSIN (Minipress), DOXAZOSIN (Cardura), TERAZOSIN (Hytrin).

- Annual Chem-7.

Beta Blockers: ATENOLOL (Tenormin), METOPROLOL (Lopressor, Toprol), PROPRANOLOL (Inderal).

- CD for all aviation personnel classes/Class 4 medications. Aviation personnel using Beta-blockers should be transitioned to a waiverable anti-hypertensive.

Calcium Channel Blockers:

AMLODIPINE (Norvasc), FELODIPINE (Plendil), NISOLDIPINE (Sular)

- Can be used with waiver in any aircrew member.

VERAPAMIL (Calan), NIFEDIPINE (Procardia), DILTIAZEM (Cardiazem)

- CD for all aviation personnel classes when required for cardiac care. Class 4 medication

Clonidine: CD for all aviation personnel/Class 4 medication.

Diuretics:

THIAZIDES, TRIAMTERENE (Dyrenium), and combinations of these can be used.

- Thiazide use requires annual serum glucose, BUN, creatinine, and serum uric acid. Monitor lipid profile after 6 months of therapy and then annually.
- Potassium sparing diuretics requires serum potassium level, platelet count and CBC with differential every 6 months.

LOOP DIURETICS (e.g. Lasix®) are CD and will not be waived.

DISCUSSION: Primary prevention is essential. A significant portion of cardiovascular disease occurs in people whose blood pressures are above the optimal level (120/80 mm Hg) but not so high as to be diagnosed or treated as hypertension. Hypertension as well as pre-hypertension is one of the criteria for metabolic syndrome. Flight surgeons need to aggressively work on primary prevention with aircrew members. The timely diagnosis and treatment of hypertension prevents long-term sequelae. In the Framingham study, the mortality of individuals with hypertension was more than double that of the normotensive population, with most of the deaths occurring suddenly. The risk of cardiovascular events increases with age, smoking, male gender, positive family history, excess alcohol intake, and high blood lipid levels. Several studies have demonstrated a reduction in mortality and morbidity resulting from the treatment of hypertensive patients.

REFERENCE: *The Seventh Report of the Joint Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.* NIH: National Heart, Lung, and Blood Institute 04-5230, Aug 2004 <http://www.nhlbi.nih.gov/guidelines/hypertension/jnc7full.htm>

PSORIASIS (ICD9 696.1)

AEROMEDICAL CONCERNS: Psoriasis is a chronic, proliferative epidermal disease affecting an estimated 2-8 million people in the United States. Its most common course is one of discreet, localized plaques that respond well to treatment. However, extensive or generalized involvement may be incompatible with the aviation environment. In addition, some forms of therapy have side effects that may interfere with aviation duties.

WAIVERS:

Initial Applicants (All Classes):

A history of or an active case of psoriasis is considered disqualifying for initial flight applicants. Waivers may be considered on a case-by-case basis with information below especially for remote histories with no evidence for current or recent disease.

Rated Aviation Personnel (All Classes):

A mild case of psoriasis localized to an area not affecting the aircrew member's ability to wear or operate safety garments, mask, or helmet and controllable with occasional use of topical steroids and/or vitamin D analogs is usually recommended for waiver. More severe cases are considered on an individual basis.

INFORMATION REQUIRED:

Aeromedical Summary (AMS),
Dermatology Consultation; and,
If requested photographs of affected areas.

FOLLOW-UP: Annual dermatology consultation.

TREATMENT:

Ultraviolet light may provide substantial benefit.

Approved Medications:

- Topical steroids applied once or twice daily to focal lesions are quite useful, especially in reducing scaling and thickness. Overnight or 24-hour occlusive therapy with these medications will initiate involution in most lesions. Caution: Prolonged use of fluorinated corticosteroids leads to skin atrophy, striae, and telangiectasia.
- CALCIPOTRIENE (Dovonex) and other topical vitamin D analogs are a useful adjunctive treatment to topical corticosteroids. They are useful in reducing the total amount of topical corticosteroids needed.
- TAZARATENE (Tazorac) and other topical retinoids. Special precautions in females of child bearing age must be taken with use of these agents.

Prohibited (Class 4) Medications:

- Tar products and dithranol produce staining and are not considered compatible with flight status.
- Antimitotic drugs such as methotrexate (can cause ataxia or hallucinations) and retinoic acid (can cause liver toxicity, dry mouth, sore lips, and conjunctivitis) and

cyclosporine (hypertension, hematologic abnormalities, and neurologic abnormalities – tremor) are incompatible with flying duties and non-waiverable.

DISCUSSION: Psoriasis typically does not manifest itself until the 3rd decade of life, though it may develop at any time. A family history of psoriasis is found in 30 percent of patients. It is less common in sunny climates and in those with darker skins. Psoriasis patients have fluctuating courses of spontaneous remissions and relapses making estimations of a cure totally unpredictable and unreliable. Complications include psoriatic arthritis and psoriatic trachonychia (nail involvement).

REFERENCE: US Army Aeromedical Policy Letter, March 2008

DIABETES MELLITUS/GLUCOSE INTOLERANCE (ICD9 250.0)

AEROMEDICAL CONCERNS: The primary concern in any diabetic is the possibility of unexpected hypoglycemia and the associated risk of sudden loss of consciousness. This risk is greatest among those with Type I (insulin dependent) diabetes mellitus, but may also occur in diabetics controlled with oral hypoglycemics. Also of concern is the risk of renal, cardiovascular, neurological, and visual complications associated with any form of diabetes.

WAIVERS:

Diabetes Mellitus:

Initial Applicants (All Classes): Waivers are not considered.

Rated and Non-Rated Aviation Personnel (All Classes): Waivers will be considered when treatment results in a normal fasting blood glucose (<126 mg/dl), a glycosylated hemoglobin (HbA1c) less than 7%, and there are no medical sequelae. When control cannot be achieved with life style modifications (diet and exercise), the use of medications (listed below) is authorized.

Impaired Glucose Tolerance (IGT):

Uncomplicated asymptomatic cases of IGT as well as a history of IGT to include gestational diabetes that has completely resolved are considered fully qualified and will be filed as ***Information Only***.

INFORMATION REQUIRED:

DIAGNOSTIC CRITERIA:

Category	Fasting Blood Sugar	2-Hour Post Prandial
Normal	< 110	< 140
Impaired Glucose Tolerance	110 < FBS < 126	140 < 2HPP < 200
Diabetes Mellitus	>126	>200
Gestational Diabetes	>105	>165

All individuals with a fasting plasma glucose of >110mg/dl must have one of three tests meeting criteria and a second confirmatory test by any of the three methods done on a subsequent day.

Methods:

1. FBS (Fasting Blood Sugar) >126 mg/dl,
2. OGTT 75 gm glucose load with 2-hour postprandial value > 200 mg/dl,
3. A random plasma glucose > 200 mg/dl.

Fasting is defined as no caloric intake for at least 8 hours.

Random is defined as any time of day without regard to time since last meal.

TREATMENT:

Diabetes Mellitus: The following are approved methods of treatment:

Diet and exercise that result in weight loss (to approach ideal body weight/BMI) are essential for control of diabetes.

Approved Medication: In the absence of adequate weight maintenance from appropriate diet and exercise, medication will almost never satisfactorily control diabetes.

METFORMIN (Glucophage): Since the use of this medication does not increase the risk of hypoglycemia, it is authorized for use.

Required Labs:

- Renal (Chem 7) and liver (LFTs) function studies before starting therapy and every three months for the first year, then annually.

Non-Approved Medications: Due to the increased risk for hypoglycemia and/or the complexity for using parenteral (injection) therapies, no other medications (oral or parenteral) are authorized. This includes Insulin, Sulfonylureas, Meglitinides, Alpha-glucosidase inhibitors, and Thiazolidinediones.

Impaired Glucose Tolerance: Diet, exercise, and weight reduction are primary therapies.

FOLLOW-UP: Continuation of waiver requires semiannual evaluations demonstrating fasting plasma glucose less than 126mg/dl, and glycosylated Hb-A1c of less than 7%. On the annual FDME, the following laboratory values **MUST** be reported and should be assessed within 90 days of the date of the FDME: CBC, Chem 7, Urinalysis, LFTs, Lipid Profile, HbA1c, and Fasting Blood Sugar.

Routine follow-up should be every 3-4 months with visits including the following:

- a. Interval history,
- b. Blood pressure and weight,
- c. Longitudinal evaluation of plasma glucose (patient log/diary)
- d. Every 3-6 month evaluation of HbA1c.

Annual follow-up should include:

- a. Interval history
- b. Exam to include cardiovascular, fundoscopic, peripheral, pulses/vascular, neurologic to include sensory and deep tendon reflexes to include ankle jerk and skin inspection (especially of the feet).
- c. Ophthalmologic examination by ophthalmologist
- d. EKG and labs as above.

DISCUSSION: Compared to healthy aviators, diabetic aviators are twice as likely to have a stroke, 2 to 10 times more likely to suffer a myocardial infarction and 5 to 10 times more likely to suffer peripheral vascular disease. Diabetics are 25 times more likely to suffer partial or complete loss of vision compared to non-diabetics. The risk of cataracts is 4 to 6 times greater. Up to 20% of diet controlled diabetics have retinopathy at the time of diagnosis and all are at risk for maculopathy which can seriously affect visual acuity. Type II has an 8% chance of polyneuropathy being present at diagnosis and risk of neuropathy is 4% by 5 years and 15% by

20 years. Tight control of blood glucose levels has been demonstrated to delay the onset and reduce the risk of complications. Screening fasting blood glucose is strongly recommended annually for all individuals at a higher risk for developing diabetes. These include: (1) Individuals with a parent, sibling, or child with diabetes mellitus; (2) A history of gestational diabetes mellitus or impaired glucose tolerance; (3) A history of previous abnormality of glucose tolerance associated with the metabolic stresses of obesity, trauma, surgery, infection, or alcohol intoxication; (4) A history of hypertension; (5) Cholesterol abnormalities with HDL <35 mg/dl and/or triglyceride level >250 mg/dl, and (6) members of high risk ethnic populations (See Reference).

REFERENCE: American Diabetes Association, *Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus*, Diabetes 25(S1) S5-20, January 2002.
American Diabetes Association: www.diabetes.org

HYPOTHYROIDISM (ICD9 244)

AEROMEDICAL CONCERNS: Hypothyroidism most often presents with slowly progressing symptoms of fatigue, lethargy, muscle weakness, decreased cognitive function, delayed reflexes, bradycardia, first degree heart block, cardiomegaly, pericardial effusion, menstrual irregularities, depression, sensorineural hearing loss, and anemia. These symptoms may slowly degrade flight performance and be totally unrecognized by the aviator until significant degradation is present.

WAIVERS:

Applicants (All Classes):

Waivers are considered once the individual is clinically and chemically euthyroid and on approved medication with no demonstrated side effects.

Rated Aviation Personnel (All Classes):

Waivers are commonly recommended once the individual is clinically and chemically euthyroid and on approved medication with no demonstrated side effects.

INFORMATION REQUIRED: Laboratory: Thyroid panel (to include TSH and Free T4 as a minimum) completed within 90 days of submission, and these laboratory results should be in the euthyroid range prior to submission for waiver.

FOLLOW-UP: A thyroid panel should be drawn at least annually and results included on all FDMEs.

TREATMENT: LEVOTHYROXINE (such as Synthroid, Unithyroid, Levoxyl) is an acceptable treatment.

DISCUSSION: Three main reasons exist for thyroid hormone deficiency: 1) primary hypothyroidism: permanent atrophy of the thyroid tissue, 2) goitrous hypothyroidism: hypothyroidism with compensatory thyroid enlargement, or 3) insufficient stimulation of a normal gland as a result of hypothalamic or pituitary disease. The first two reasons account for 95% of the cases of hypothyroidism. In hypothyroidism, tiredness and lethargy are the two most common early symptoms. In over 90% of cases, patients will manifest these as well as dry, coarse skin, slowed speech, and eyelid edema. The severity of symptoms depends on the degree of hormone deficiency. The onset of hypothyroidism is usually so insidious that the typical manifestations may take months or years to appear and may go unnoticed by family and friends. The ratio of females to males is 5:1; no age group is immune. Indefinite follow-up is advised, mainly to confirm patient compliance. In cases where hypothyroidism is a result of pituitary failure, a complete evaluation of pituitary function should be completed.

REFERENCE: Journal of the American Medical Association, Treatment guidelines for patients with hyperthyroidism and hypothyroidism. 1995, 273: 808-12.
National Guidelines Clearinghouse: www.guideline.gov, AACE clinical practice guidelines for the evaluation and treatment of hyperthyroidism and hypothyroidism.

METABOLIC SYNDROME (ICD9 277.7)

AEROMEDICAL CONCERNS: Coronary artery disease is silent and evolves over a lengthy period of time and may ultimately result in sudden life-threatening symptoms. Numerous risk factors have been identified and are part of the current overall Cardiovascular Screening Program (CVSP) APL. The goal of the program is to identify those at risk for silent disease and mitigate reversible factors before the presence of disease becomes significant and disqualifying/life-threatening. Metabolic syndrome is a clustering of cardiovascular risk factors including abdominal obesity, hypertriglyceridemia, low levels of high-density lipoprotein (HDL), high-normal blood pressure to hypertension, and impaired glucose tolerance to diabetes. APL's currently exist for each of these individual factors, but none include an assessment of cardiovascular health unless these factors also cause a failure in the CAD Screening via failing one of the CVSP criteria. However, not every case of metabolic syndrome will cause a failure of the CVSP. These missed individuals, while having numerous factors, might not otherwise be assessed and provided preventive advice and care. Research has shown that synergy of these factors in metabolic syndrome (even with an aeromedically acceptable blood pressure) markedly increases the risk for development of cardiovascular disease and type 2 diabetes mellitus. Early identification and management of metabolic syndrome is necessary to reduce the risk of development of potentially disqualifying conditions and improve the health and well-being of aviation personnel.

Criteria for diagnosis (3 or more of the 5 listed below) are as follows:

Criteria	Male	Female
Abdominal obesity, measured as waist circumference	> 40 inches	> 35 inches
Plasma triglycerides		>150 mg/dl
Plasma HDL	< 40 mg/dl	<50 mg/dl
Blood pressure	Systolic >130 or Diastolic >85 mm Hg	
Fasting Blood Sugar		>110 mg/dl

WAIVERS: Metabolic syndrome is disqualifying for initial flight applicants. This parallels the disposition of the individual components. For rated aircrew, metabolic syndrome constitutes a failure of Level 1 in the Cardiovascular Screening Program (CVSP), follows the protocol outlined in that APL, and is annotated as INFORMATION ONLY. No specific waiver is required for metabolic syndrome. However, the individual components may warrant the need for an AMS and waiver request.

INFORMATION REQUIRED:

- Thorough assessment of all of the underlying factors and components, to include documentation of treatment plan IAW with each of the APL's involved.
- Hypertensive patients warrant screening for type 2 diabetes mellitus.
- Abdominal circumference.
- Annotation of the height, weight, and Body Mass Index (BMI).

FOLLOW-UP: Annual follow-up is required to review the overall health and progress of treatment. The CVSP APL should be followed for those with a diagnosis of metabolic syndrome. Further follow-up guidelines are specified in the appropriate APL for each of the components of concern.

TREATMENT:

1. *Lifestyle changes*—Lifestyle changes should be the FIRST therapy prescribed unless individual components below warrant therapy as 7-10% weight loss may obviate the need for additional medications initially. Weight loss through exercise (30minutes/day, 5 days/week) and dietary changes are recommended. Lifestyle modification is the best method for reducing the risk of CAD and progression towards type 2 diabetes. Reducing abdominal obesity decreases insulin resistance and the hyperinsulinemic state, which improves free fatty acid, carbohydrate, and lipoprotein metabolism.

2. *Hypertension/Borderline (JNC VII)*—use of ACE-inhibitor or ARB to reduce BP below 130/85 is recommended. See [Hypertension APL](#).

3. *Hyperlipidemia*—use of Statins, to reduce LDL to < 100 mg/dl and improve HDL and lower triglycerides. Additional use of fibrates (Tricor is preferred over Lopid due to increased risk of side effects) and/or niacin may be needed, but these come with increased concern of side effects. See [Hyperlipidemia APL](#).

4. *Type 2 Diabetes/Impaired Glucose Tolerance*—use of Metformin helps with insulin utilization, reducing hepatic release, and weight reduction. In patients without type 2 diabetes mellitus, this medication does not reduce the risk of development of Coronary Artery Disease. See [Diabetes APL](#)—medication use requires AMS and waiver recommendation.

5. *Aspirin*—unless contraindicated, use of enteric-coated aspirin (81 to 325 mg) daily is recommended for all those over 35 years of age.

DISCUSSION: Metabolic syndrome was first described in 1988 and termed Syndrome X. It has been also referred to as dyslipidemic hypertension, atherogenic lipoprotein pattern, and dysmetabolic syndrome X. The formal definition of metabolic syndrome, as published in 2001 from the National Cholesterol Education Program Adult Treatment Panel III guidelines requires three or more positives of the five listed criteria above. Being on hypertensive OR glucose therapy meets criteria, and being on hyperlipidemic therapy may meet one or both of the lipoprotein criteria. Metabolic syndrome is thought to be a product of complex pathophysiology involving progressive resistance of peripheral tissues to the effects of plasma insulin with disruption of normal metabolism with free fatty acids (FFA), carbohydrates, and lipoprotein. A synergy occurs with the factors above their independent contribution to accelerate coronary artery disease (CAD). Age, inactivity, and excessive calories worsen this. NHANES III data

(1988-1994) found the prevalence of metabolic syndrome to be 24%, or 47 million, of Americans, with 44% of Americans having 2 or more of the traits. These numbers are increasing with the continued societal problem of obesity and physical inactivity. Metabolic syndrome prevalence increases with age (1 in 16 ages 20-29 versus 1 in 3 ages 50- 59 to 4 in 9 ages 60-69) and is seen more in minority populations. While related to insulin resistance syndrome, metabolic syndrome is distinct entity often appearing later on in the process. Observational data from the Framingham study showed that metabolic syndrome accounted for almost 25% of all new-onset CAD. Although at one time felt to be a better predictor of CAD than the Framingham Risk Score, the additional components of metabolic syndrome have added little to the predictability of CAD risk to date. However, numerous studies have demonstrated the increased risk of CAD, cardiovascular death (CVD), and development of type 2 diabetes mellitus coming from the constellation of factors comprising the metabolic syndrome. Individual studies have shown a 3 to 5-fold increased risk of CAD or CVD and a 7 to 34-fold increased risk of developing type 2 diabetes mellitus. While the ADA and other organizations are currently evaluating metabolic syndrome's role in CAD and diabetes, the clustering is easily identified and warrants regimented follow-up in aviation personnel to improve overall health and well-being.

REFERENCES:

Third Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). NIH: National Heart Lung and Blood Institute, NIH 01-3670, May 2001.

Garber AJ. The metabolic syndrome. *The Medical Clinics of North America*.2004; 88: 837-846.

REFLUX ESOPHAGITIS (GERD)/HIATUS HERNIA (ICD9 530.1)

AEROMEDICAL CONCERNS: Retrosternal pain associated with either GERD or hiatus hernia can be a significant distracter in the aviation environment. Acid regurgitation can lead to attacks of bronchoconstriction in susceptible individuals. Exposure to -Gz may exacerbate the symptoms of both GERD and hiatus hernia.

WAIVERS:

Initial Applicants (All Classes):

GERD or HH which is asymptomatic or minimally symptomatic requiring chronic therapy or occasional treatment with the medications listed below will be listed as ***Information Only***.

Waivers are only required for cases of GERD or symptomatic HH demonstrating one or more of the five warning symptoms:

- a. Dysphasia or odynophagia.
- b. Symptoms that are persistent or progressive on therapy.
- c. Bleeding or iron deficiency.
- d. Unexplained weight loss.
- e. Extra-esophageal symptoms (e.g. cough, choking, chest pain, asthma).

INFORMATION REQUIRED: Symptoms of uncomplicated GERD may undergo an initial trial of empiric therapy without endoscopic evaluation as long as symptom relief along with medication regimen is documented in the annual FDME. Complicated GERD or HH (involving any of the five warning signs listed below) requires endoscopy to exclude gastric or duodenal ulceration and malignancy. After complete work up and stability is achieved, a waiver must be submitted. Cultures for H. pylori may be indicated depending on endoscopic findings. The aeromedical summary must include documentation regarding the presence or absence of the five warning symptoms.

FOLLOW-UP: Follow-up examination by a gastroenterology specialist is only required if there is evidence of progressive disease, poor maintenance control, or recurrent symptomatology.

TREATMENT: Individuals with typical gastroesophageal reflux symptoms should initially be managed by lifestyle modifications. Often, control of mild symptoms may be achieved through conservative mechanisms. These include weight loss, elevating the head of the bed, judicious use of antacids, restriction of alcohol use, elimination of smoking, avoidance of meals before bedtime, avoidance of carminatives, and avoidance of tight fitting clothing. Refractory disease may require surgery for cure. Successful surgical repair of HH is compatible with return to full flight status. Provided the repair is without complication and 60 days have elapsed since surgery a waiver will be favorably considered.

The following medications may be used. Once the treated patient demonstrates no idiosyncratic reactions to treatment and the medications are effective in providing relief of symptoms, the diagnosis and treatment are documented in the annual FDME as ***Information Only***.

- **Antacids** - Check electrolytes when used chronically.
- **H2 Blocker** - CIMETIDINE (Tagamet), RANITIDINE (Zantac), FAMOTIDINE (Pepcid), NIZATIDINE (Axid): Occasional drowsiness is associated with these medications. When treatment is first initiated, a 72-hour observation (while the aviator has Duties Not Including Flying (DNIF)) is required to ensure the absence of any significant side effect.
- **Proton Pump Inhibitor** - Omeprazole (Prilosec), Lansoprazole (Prevacid), Pantoprazole (Protonix), Rabeprazole (Aciphex), and Esomeprazole (Nexium).
- **Sucralfate** - (Carafate)

DISCUSSION: GERD is a chronic, relapsing condition with associated morbidity and mortality and an adverse impact on quality of life. The disease is common with an estimated lifetime prevalence of 25-35 percent in the U.S. population. GERD can usually be diagnosed on clinical presentation alone. With careful scrutiny, HH can be demonstrated in most people over the age of 40. The majority of these cases are asymptomatic, but 15 percent of cases will have frequent symptoms of reflux. Classic symptoms include heartburn (pyrosis) and regurgitation.

The major complication of GERD/HH is esophagitis which can lead to stricture formation (8-20 percent), Barrett's epithelium (8-20 percent), and hemorrhage (less than 2 percent). In esophagitis, 90 percent of patients lose their symptoms on reaching their recommended weight. Most patients gain adequate symptom control and esophageal healing through a combination of lifestyle modifications and drug therapy and do not require surgery. Lifestyle modification and antacids provide relief in 20 percent of patients. H2 Blockers should be used and dosage maximized prior to PPI use. PPI should be used in the event of treatment failure with H2 blockers and in those with erosive esophagitis by endoscopy. Recovery from surgery for HH will depend on whether an abdominal, thoracic, or laparoscopic (most common) approach was used.

REFERENCE: Scott M, and Gelhot A. Gastroesophageal Reflux Disease: Diagnosis and Management. American Family Physician 1999. 59:5.

MEDICATIONS

AEROMEDICAL CONCERNS: With their rapid evolution in dosages, indications and complications, medications make for an extremely dynamic topic in aviation medicine. Guidance in this area must be scrutinized on a far more regular basis than other Aeromedical Policy Letters (APLs). Readers/users of this information are strongly urged to contact the ATC Mobile Aviation Medicine Standardization Officer or CG-1121 for questions, concerns or recommendations on this topic.

Aircrew-members should be evaluated for restriction from flying duties when initiating any medication and also be advised of potential side effects. When using a medication, the following should be considered: (1) is the medication and/or the underlying medical condition compatible with aviation duty, (2) is the medication effective and essential to treatment, and (3) is the aircrew member free of aeromedically significant side effects after a reasonable observation period.

WAIVERS: CG-11 has reviewed and classified a wide range of medications for use in the aviation environment. Medications are designated Class 1, 2A, 2B, 3 and 4. Medications not on this list are currently incompatible with the aviation environment or little information regarding its safe use in the aviation environment exists. New medications are reviewed regularly and waiver requests are considered on a case- by-case basis. Flight surgeons are encouraged to use the medications on this list to avoid delays in the waiver action process.

Class 1: Over-the-counter medications which may be used without a waiver. Occasional and infrequent use of these over-the-counter medications does not pose a risk to aviation safety, they are approved for acute non-disqualifying conditions, and do not require a waiver. They must be used as intended and in accordance with standard prescribing practices. For example, pseudoephedrine is intended for the treatment of mild nasal congestion and should not be taken in an effort to combat fatigue.

Class 2A: These medications require a prescription and may be used short term under the supervision of a flight surgeon without a waiver. **CAUTION:** The underlying medical condition may be disqualifying and require a waiver.

Class 2B: These medications require a prescription and may be used for short-term or chronic use under the supervision of a flight surgeon without a waiver. **CAUTION:** The underlying condition may require a waiver. These medications must be noted annually on the FDME as 'Information Only' and the flight surgeon must comment on usage and dosage. First time use requires an initial 24-hour grounding period to ensure the aircrew member is free of significant side effects. Subsequent use does not require grounding.

Class 3: These medications require a prescription and may receive favorable waiver recommendation on an individual basis for treatment or control of certain chronic conditions. The underlying disease process may also require a waiver.

Class 4: Use of these medications necessitates grounding the aviator and is not waiverable for flying duty. The majority of herbal preparations/supplements are prohibited for aviation duty and considered class 4. However, some of these preparations may be used under the guidance of a flight surgeon.

INFORMATION REQUIRED:

Aeromedical Summary (AMS) must list:

1. Dosage
2. Frequency of use
3. Any side effects
4. Complete summary of the aircrew-member's medical condition.
5. If a drug not currently authorized (or prohibited) is being recommended, forward a complete justification of the medication, i.e., rationale for use, safety considerations, availability of the drug during mobilization of the unit, and any studies supporting its use in the aviation environment.

FOLLOW-UP: Appropriate follow-up is predicated upon the specific medication and the underlying medical condition. These requirements are given under specific reference to the applicable medication or medical condition.

TREATMENT: N/A

DISCUSSION: Medication side effects are very hard to predict. They occur with irregularity and often differently in any given population group. The side effects relating to central nervous, cardiogenic, ophthalmologic, and labyrinthine systems are understandably the most troubling in the aircrew member. One must also consider the unique environmental considerations present in the aviation environment, i.e., G-forces, hypoxia, pressure changes, noise, heat, cold, acute and chronic fatigue; and how these effect the medication or the underlying medical condition.

Class 1: Over-the-counter medications which may be used without a waiver.

AEROMEDICAL CONCERNS: Self-medication in anyone on flight status is prohibited. Over-the-counter (OTC) medications frequently are combination medications, with one or more components contra-indicated for safety of flight. Many OTC medications do not provide a listing of ingredients on the package and frequently provide limited information about side effects. While use of the OTC medication may not require grounding, the underlying condition being treated should also warrant consideration for possible Duties Not Including Flight (DNIF).

WAIVER: The OTC medications listed below are Class 1 medications. If a flight surgeon is not immediately available, the below listed medications can be used on a short term basis until a flight surgeon can be seen for appropriate evaluation and treatment. Medication taken for relief of any symptom is only authorized when used occasionally or infrequently, complete relief is achieved without side effects, and use is not intended as a means to remain in flight status unless authorized by a flight surgeon (as the underlying condition being treated may pose risk to safe flight). Combination medications are acceptable only when each component in the combination is separately acceptable. Any prohibited component makes the combination a prohibited medication.

- **ANTACIDS:** (*Tums, Roloids, Mylanta, Maalox, Gaviscon, etc.*) Chronic use is Class 3.
- **ANTI-HISTAMINES:** *Loratidine (Claritin)/Fexofenadine (Allegra)*-Short term use by individual aircrew is authorized, but the aircrew member must report use of this medication to the FS/APA as soon as possible. FS/APA should be concerned not only

with the use of this medication but also the underlying problem that the individual is self-treating (e.g. allergic rhinitis) and any aeromedical implications of the diagnosis.

- **ARTIFICIAL TEARS:** Saline or other lubricating solution only. Visine or other vasoconstrictor agents are prohibited for aviation duty.
- **ASPIRIN/ACETOMINOPHEN/IBUPROFEN:** When used infrequently or in low dosage.
- **COUGH SYRUP/LOZENGES:** [*Guaiifenesin only (Robitussin plain)*]. Many OTC cough syrups contain sedating antihistamines or *Dextromethorphan (DM)* and are prohibited for aviation duty.
- **ORAL DECONGESTANTS:** *Pseudoephedrine (Sudafed)*, *Phenylephrine*, . When used for mild nasal congestion in the presence of normal ventilation of the sinuses, and middle ears (normal valsalva). Should not be combined with decongestant nasal spray(s). Does not include pre-flight use to relieve ear or sinus block, thereby enabling flight..
- **PEPTO BISMOL:** If used for minor diarrhea (without dehydration) conditions and free of side effects for 24 hours.
- **MULTIVITAMINS:** When used in normal supplemental doses. Mega-dose prescriptions or individual vitamin preparations are excluded and addressed in Class 4.
- **NASAL SPRAYS:** Saline nasal sprays are acceptable without restriction. *Phenylephrine HCL (Neosynephrine)* and *oxymetazoline (Afrin)* are restricted to no more than 3 days. Use of phenylephrine or oxymetazoline for longer than the above time must be validated and approved by a flight surgeon. Recurrent need for nasal sprays must be evaluated by the flight surgeon.
- **PSYLLIUM MUCILLIOD:** (*Metamucil*). When used to treat occasional constipation or as a fiber source for dietary reasons. Long term use (over 1 week) must be coordinated with the flight surgeon due to possible side effects such as esophageal/bowel obstructions.
- **THROAT LOZENGES:** Acceptable provided the lozenge contains no prohibited medication. *Benzocaine* (or similar analgesic) containing throat spray or lozenge is acceptable. Long term use (more than 3 days) must be approved by the local flight surgeon.

DISCUSSION: The aviator requires constant alertness with full use of all of his senses and reasoning powers. OTC Medications may interact negatively with prescribed medications, resulting in impairment of the aviator. Many OTC medications as well as most prescribed medications cause sedation, blurred vision, disruptions of vestibular function, etc. Often the condition for which the medication is used is mild; however, it can produce very subtle effects which may also be detrimental in the flight environment. Just like the subtle deterioration of cognitive ability that occurs with hypoxia and alcohol intoxication, medication effects may not be appreciated by the individual taking the medicine. These effects may have disastrous results in situations requiring full alertness and rapid reflexes.

Class 2A: Require a prescription and may be used without a waiver for short periods under the supervision of a flight surgeon.

AEROMEDICAL CONCERNS: Certain medications, available by prescription only, have proven to be quite safe in the aviation environment. When dispensed and their usage monitored

by flight surgeons, these medications have been quite effective in returning aviators more rapidly to their respective flying positions. While generally safe, one still must take into consideration the underlying medical condition and the ever present possibility of side effects.

WAIVERS: No waiver is required, especially if the medications are used on a short term basis. Occasionally the underlying health condition requires a waiver; and if the medication is required on a frequent or maintenance basis, a waiver may also be needed.

- **ANTI-HISTAMINES:**
DESLORATIDINE (Clarinet) - Class 2A Authorized for seasonal/allergic rhinitis

- **ANTIMICROBIALS:**
AUGMENTIN (Amoxicillin/Clavulanate), BACTRIM/SEPTRA, CEPHALOSPORINS, CHLOROQUINE (Aralen) or CHLOROQUINE/PRIMAQUINE, CLINDAMYCIN (caution: Pseudomembranous colitis), ERYTHROMYCINS to include Azithromycin and Clarithromycin, ETHAMBUTOL HYDROCHLORIDE (Myambutol) (monitor serum uric acid during treatment), METRONIDAZOLE (Flagyl), NITROFURANTOIN (Macro-dantin/Macrobid) (watch for pneumonitis or peripheral neuropathy), PENICILLINS, QUINOLONES (many potential drug interactions), RIFAMPIN (Rifadin), TETRACYCLINES, DOXYCYCLINE (Vibramycin) for prophylaxis - includes malaria or leptospirosis)

- **ANTIFUNGALS:**
FLUCONAZOLE (Diflucan)

- **ANTIVIRALS:**
ACYCLOVIR (Zovirax), VALACYCLOVIR (Valtrex), and FAMCYCLOVIR (Famvir)

- **GI MEDICATIONS:**
CALCIUM POLYCARBOPHIL (FiberCon), LOPERAMIDE (Imodium) (when medical condition is not a factor and free of side effects for 24 hours), SUCRALFATE (Carafate) (providing underlying condition does not require waiver.) Other medications are Class 1 or Class 3.

- **PROPHYLAXIS AGENTS:** Class 2A when used for prophylaxis. These medications must be prescribed by a flight surgeon or under a protocol reviewed by the flight surgeon.

Diarrheal Prophylaxis: In general (especially when periods of risk exceed 3 weeks) early treatment is preferable to prophylaxis. CIPROFLOXACIN (Cipro) 500 mg q.d., or BISMUTH SUBSALICYLATE 2 tablets q.i.d., or TRIMETHOPRIM/SULFAMETHOXAZONE DS (Bactrim DS) 1 tablet q.d. are acceptable forms of prophylaxis. Geographic microbial resistance to specific drug regimens may limit the effectiveness of antibiotic prophylaxis.

Leptospirosis Prophylaxis: DOXYCYCLINE 200 mg weekly during and one week following exposure.

Malarial Prophylaxis: CHLOROQUINE PHOSPHATE 500 mg weekly or DOXYCYCLINE (Vibramycin) 100 mg daily (including pre- and post-exposure periods, as indicated). PRIMAQUINE PHOSPHATE 26.3 mg daily for 14 days is required for terminal prophylaxis after leaving areas where P.Vivax and/or P.Ovale are present. SULFADOXINE/PYRIMETHAMINE is a treatment medication, not prophylaxis, and cannot be used without temporarily grounding the aviator. MEFLOQUINE 250 mg weekly may be used ONLY when CHLOROQUINE resistance is known and DOXYCYCLINE is contraindicated due to allergy and only when monitored closely by a flight surgeon. (Note: Recommendations for malarial prophylaxis change frequently due to the variability of susceptibility of the organism to treatment. Prior to deployment to an endemic area the latest recommendations should be obtained using such sources as the Armed Forces Medical Intelligence Center (AFMIC), Fort Detrick at 1-301-619-7574 (DSN 343) or <http://mic.afmic.detrick.army.mil> ; or the Center for Disease Control (CDC) at Traveler's Hotline 1-877-394-8747; or at www.cdc.gov or at the US Army Center for Health Promotion and Preventive Medicine at <http://chppm-www.apgea.army.mil> . Consult with CG-1121 Preventive Medicine Officer when unclear or if guidance sources conflict.

Subacute Bacterial Endocarditis Prophylaxis: Penicillin, Amoxicillin, Ampicillin, Clindamycin, Azithromycin, Clarithromycin, or Cephalosporins may be used in appropriate doses and when indicated. (See *Prevention of Bacterial Endocarditis. Recommendations by the American Heart Association. JAMA* 1997; 277 (22): 1794-801.)

Tuberculosis Prophylaxis: After documentation of skin test conversion, a course of PYRIDOXINE (Vitamin B6) 50 mg daily accompanying a CDC-recommended ISONIAZID (INH) course of therapy is an acceptable prophylaxis, unless INH resistance is likely. The treated aviator must also be followed in a Tuberculosis Surveillance Program. See Class 2B Antimicrobials, Antifungals and Antivirals for documentation of use of ISONIAZID.

- **TOPICAL PREPARATIONS:**

Topical preparations are generally Class 2A due to the minimal systemic absorption of most. Remember that the underlying condition may require a waiver. Use of any topical preparation does require evaluation for systemic effects. Topical MINOXIDIL 2% & 5% for use in male pattern hair loss is Class 2A.

Class 2B: Require a prescription and may be used for short-term or chronic use under the supervision of a flight surgeon without a waiver

AEROMEDICAL CONCERNS: This classification of drugs still requires a prescription and is used under the supervision of the flight surgeon. Unlike Class 2A, they are often employed for

chronic, long term use and more likely to be used for underlying medical conditions which require a waiver. They also have greater potential for side effects, so all must have a non-flying period of observation of at least 24 hours.

WAIVERS: Use of these drugs requires they be coded as Information Only. No medication waiver is required, though a medical condition waiver may be necessary.

INFORMATION REQUIRED: All drugs in this Class require comment on dosage and usage. They may also require other periodic follow-up specifically indicated for each drug (see below).

ALLERGIC RHINITIS AGENTS: (See [Allergic/Non-allergic Rhinitis APL](#))

- **Antihistamines:** Fexofenadine (Allegra), and Loratadine (Claritin), Desloratidine (Clarinex). All other antihistamines are Class 4 [nonwaiverable], including Cetirizine (Zyrtec).
- **Intranasal Steroids:** Dexamethasone (Dexacort), Flunisolide (Nasarel or Nasalide), Beclomethasone (Beconase, Beconase AQ, Vancenase, Vancenase AQ DS), Budesonide (Rhinocort), and Triamcinolone (Nasacort or Nasacort AQ), Fluticasone (Flonase), and Mometasone (Nasonex). This is the recommended first line treatment for moderate disease.
- **Intranasal Anticholinergics:** Ipratropium bromide (Atrovent) 0.03% nasal spray is effective when rhinorrhea is the predominant symptom. It is not very helpful for relieving congestion, itchy watery eyes or sneezing.
- **Mast Cell stabilizers:** Cromolyn sodium (Nasal crom) is effective, but requires frequent (qid) dosing.

ANTI-HYPERLIPIDEMICS: (See [Hyperlipidemia/Hypercholesterolemia APL](#))

- **HMG CoA Reductase Inhibitors (Statins):** LOVASTATIN, PRAVASTATIN, SIMVASTATIN, ATORVASTATIN, FLUVASTATIN, and ROSUVASTATIN. Prior to treatment initiation, check hepatic enzymes and thereafter when clinically indicated.
- **Ferric Acids:** GEMFIBROZIL, FENOFIBRATE. Prior to initiating treatment and at 3, 6, and 9 months, then annually, do LFTs to include bilirubin and LDH, CPK, CBC and complete Lipid Profile. (Hypersensitivity, hepatic dysfunction, dizziness, depression and blurred vision have been reported).
- **Bile-Acid Binding Resins:** CHOLESTYRAMINE, COLESTIPOL. Submit prothrombin time and serum calcium annually. (These drugs cause constipation and interact with such drugs as hydrochlorothiazide, penicillin and tetracycline. Additionally, they may cause Vitamin K deficiency and subsequent hypoprothrombinemia).

ANTIMICROBIALS, ANTIFUNGALS, AND ANTIVIRALS:

Chronic use of all antibiotics fit within this classification. Use of Antifungals or Antivirals (Amantadine) require annual reporting of AST (SGOT), ALT (SGPT), Alkaline Phosphatase, Total Bilirubin, BUN, Creatine, and CBC on FDME. Abnormal values require flight surgeon

comments. Pulse antifungal therapy for onychomycosis requires baseline LFTs and a recheck 6 weeks after start of therapy.

GI MEDICATIONS:

- **Antacids** - Check electrolytes when used chronically.
- **H2 Blocker** - CIMETIDINE (Tagamet), RANITIDINE (Zantac), FAMOTIDINE (Pepcid), NIZATIDINE (Axid): Occasional drowsiness is associated with these medications. When treatment is first initiated, a 72-hour non-flying observation is required to ensure the absence of any significant side effect.
- **Proton Pump Inhibitor** - Omeprazole (Prilosec), Lansoprazole (Prevacid), Pantoprazole (Protonix), Rabeprazole (Aciphex), and Esomeprazole (Nexium).
- **Sucralfate** - (Carafate)

HORMONAL PREPARATIONS:

ESTROGEN/PROGESTERONE preparations when used solely for contraception or replacement therapy following menopause or hysterectomy. Other hormonal drugs are Class 3.

NON-STEROIDAL ANTI-INFLAMMATORY AGENTS:

Chronic use of any NSAID requires a measurement of BUN and Creatinine every 6 months (with a single set completed within the previous 90 days) submitted with each annual FDME.

Additionally, stool for occult blood must be completed annually and documented on the annual FDME/FDHS. Persistent upper GI complaints necessitate grounding and upper GI evaluation for possible GI toxicity.

- **Acetic acids:** Diclofenac (Voltaren), Indomethacin (Indocin), Sulindac (Clinoril), Tolmetin (Tolectin)
- **Fenamates:** Meclofenamate, Mefenamic acid (Ponstel)
- **Naphthylalkanones:** Nambumetone (Relafen)
- **Oxicams:** Piroxicam (Feldene), Meloxicam (Mobic)
- **Propionic acids:** Fenoprofen (Nalfon), Flurbiprofen (Ansaid), Ibuprofen (Motrin), Ketoprofen (Orudis; Oruvail), Naproxen (Naprosyn; Anaprox), Oxaprozin (Daypro)
- **Pyranocarboxylic acid:** Etodolac (Lodine)
- **Pyrrolizine carboxylic acid:** Ketorolac (Toradol)

OTHER:

- **Finasteride (Propecia):** when used for hair loss; other usage is categorized as Class 3 medication.
- **Sildenafil (Viagra):** Individuals using this preparation are restricted from flying duties for 12 hours after use. As with all medications in this class, there is a risk for side effects so a 24 hour period of grounding and observation is required with the first dose. After this observation period, the aircrew may be returned to full flying duties. The FS/APA should be aware of the short-term visual disturbances that can occur in up to 5% of those using this medication. These visual disturbances include blue/green discrepancy, increased brightness of lights, and halos. Visual disturbances tend to occur at peak levels (1.5 hrs after use) and are not usually persistent. Individuals should be questioned about

visual changes and referred to an eye care specialist for persistent abnormalities. An information only note must be included in the FDME/FDHS detailing the reason for use and the completion of an evaluation for causes of erectile dysfunction. (e.g. after therapy for prostate cancer, medication side effects, drug or alcohol abuse, diabetes mellitus, hypertension, psychogenic factors, or hormonal problems including hypo/hyperthyroidism, hypogonadism and hyperprolactinemia, etc.).

Class 3: These medications require a prescription and may receive favorable waiver recommendation on an individual basis for treatment or control of certain chronic conditions

AEROMEDICAL CONCERNS: These medications are generally given for treatment of underlying conditions which require a waiver, may have significant side effects, or require significant evaluations as follow-up for safe use.

WAIVERS: May receive favorable waiver recommendation only on an individual basis for treatment or control of certain chronic conditions. The underlying disease process may also require a waiver. Other medications may be waivable upon complete presentation but often require extensive evaluation before approval.

INFORMATION REQUIRED: Complete AMS with full details of drug use and underlying condition is required. Specific requirements are given under each drug or drug category listed below. Other requirements as dictated by the underlying medical condition may also be added at the discretion of CG PSC-psd-med.

ANTI-HYPERLIPIDEMICS: (See [Hyperlipidemia/Hypercholesterolemia APL](#))

- **Nicotinic Acid:** NIACIN, NIASPAN. **Use of these agents is grounding and considered disqualifying.** Waivers will be considered after maximum therapeutic effect has been achieved. Conditions for waiver submission must include:
 1. Stable dose for at least three months
 2. No or minimal side effects
 3. Normal serum glucose and uric acid levels while on the therapeutic dose
 4. Serum glucose and uric acid 6 months after initiation
 5. LFTs every 6-12 weeks for the first year and then every 6 months thereafter (<1% incidence of elevated LFTs, possibility of fulminant hepatic necrosis)

ANTIHYPERTENSIVES: (See [Hypertension APL](#)) Waivers are recommended for medication class, not individual medications. Use of any of these drugs requires a 3 day (6 readings) blood pressure check and laboratory values as indicated for each medication class. A current (within 90 days) set of laboratory results is required on the annual FDME/FDHS.

- **Ace Inhibitors :** CAPTOPRIL (Capoten), ENALAPRIL (Vasotec), LISINOPRIL (Zestril), BENAZEPRIL (Lotensin), FOSINOPRIL (Monopril), QUINAPRIL (Accupril), RAMIPRIL (Altace), TRANDOLOPRIL (Mavik), MOEXIPRIL (Univasc). Required labs: Chem-7 in first 7 to 10 days of therapy to evaluate effect on BUN, creatinine and

Potassium levels and then this will be required every 3 months for the first year of therapy, followed by annual reporting of these levels on FDME/FDHS.

- **Angiotensin II Receptor Blockers:** LOSARTAN (Cozaar), VALSARTAN (Diovan), IRBESATAN (Avapro), CANDARSARTAN (Atacand). ACE-I and ARB in combination with approved diuretics may be used.
- **Alpha Blockers:** PRAZOSIN (Minipress), DOXAZOSIN (Cardura), TERAZOSIN (Hytrin).
- **Calcium Channel Blockers:** AMLODIPINE (Norvasc) can be waived. All other medications in this class are considered Class 4.
- **Diuretics:** Thiazide, Potassium-sparing, and combinations. Required labs: Thiazide use requires annual serum glucose, BUN, creatinine, and serum uric acid. Thiazides may alter serum cholesterol and triglycerides; therefore, monitor lipid profile after 6 months of therapy and then annually. Use of any potassium sparing diuretic requires serum potassium level every 6 months. TRIAMTERENE (Dyrenium) requires platelet count and CBC with differential every 6 months.

ANTI-INTRAOCULAR HYPERTENSION/GLAUCOMA AGENTS:

ACETAZOLAMIDE (Diamox): Must be free of side effects for 48 hours before resuming flying duties. Check for alterations in potassium and uric acid early in the treatment program. Must submit CBC, platelet count, and serum electrolytes with annual FDME.

BETAXOLOL (Kerlone), DIPIVERIN (Propine), LEVOBUNOLOL (Betagan), TIMOLOL (Timoptic), DORZOLAMIDE (Trusopt), LATANOPROST (Xalatan).

HORMONAL PREPARATIONS: Class 3 medications unless specified otherwise below.

Chronic use of any systemic steroid (i.e. PREDNISONE) requires monitoring of liver functions every 6 months for the first year and annually thereafter. Lipid profile required annually for systemic steroids. Report on annual FDME.

- **Clomiphene Citrate (Clomid):** Documentation of infertility evaluation required. Must be free of side effects for 24 hours before resuming any aviation duties. See systemic steroid requirement.
- **Estrogen/Progestin Preparations:** Class 2A medication when used solely for contraception or hormonal replacement following menopause or hysterectomy. Class 3 when used for any other condition. See systemic steroid requirements above.
- **Finasteride (Proscar):** See systemic steroid requirements above. Document improvement in both objective and subjective signs for prostate hyperplasia on annual FDME. Document annual digital rectal exam on FDME.
- **Intranasal Steroid Preparations:** (See [Class 2A Agents APL](#))
- **Orally Inhaled Steroid Preparations:** BECLOMETHASONE (Vanceril, QVAR), FLUNISOLIDE (AeroBid, AeroBid-M), FLUTICASONE (Flovent), TRIAMCINOLONE (Azmacort), and BUDESONIDE (Rhinocort) inhalers may be approved. Full aeromedical summary with justification for use required.
- **Testosterone:** DITATE, TESTAVAL have been approved. See systemic steroids for requirements. Full aeromedical summary with justification for use is required.
- **Thyroid Preparations:** LEVOTHYROXINE (Synthroid, Unithyroid, Levoxyl) is an acceptable treatment. Requires annual submission of complete thyroid function and ophthalmology evaluation.

MISCELLANEOUS AGENTS/TREATMENTS: Class 3 medications unless otherwise indicated. Appropriate medical evaluation is required. Waivers have been granted for each of the following agents under the appropriate circumstances and conditions.

- **Allopurinol:** Annual CBC, BUN, creatinine, serum calcium and uric acid required with FDME.
- **B12 Injections:** Annual CBC with indices, serum folic acid, and reticulocyte count required with FDME.
- **Botulinum Toxin**
- **Desensitization Therapy/Injections:** must be grounded for 12 hours.
- **Folic Acid:** Annual CBC with indices.
- **Hydroxychloroquine sulfate:** CBC, complete neuromuscular examination, and complete ophthalmologic exam are required on annual FDME.
- **Iron Supplements:** Monitor and report serum ferritin and serum iron concentrations. Also report reticulocyte count and total iron binding capacity with annual FDME.
- **KCL Supplements:** Annual ECG, serum potassium, BUN, creatinine, and serum magnesium required with FDME.
- **Metformin (Glucophage):** (See [Diabetes APL](#))
- **Mesalamine (Rowasa, Asacol, Pentasa):** BUN, creatinine, and urinalysis required annually with FDME. Proctoscopy and/or sigmoidoscopy as indicated.
- **Beta 2 Agonists:** METAPROTERENOL (Alupent), TERBUTALINE (Brethaire), ALBUTEROL (Proventil;Ventolin), SALMETEROL (Serevent), BITOLTEROL (Tornalate), PIBUTEROL (Maxair), ISOPROTERENOL (Isuprel), and FORMOTEROL (Foradil). Inhaled use only. Waivered only on a case-by-case basis. Monitor PFTs.
- **Olsalazine (Dipentum):** CBC required every 6 months. BUN, serum creatinine, and urinalysis required annually with FDME. Proctoscopy and/or sigmoidoscopy as medically indicated.
- **Pentoxifylline (Trental)**
- **Probenecid (Benemid):** Serum uric acid, 24-hour urinary uric acid, BUN, and creatinine clearance are required with annual FDME.
- **Prophylthiouracil (Propyl-Thyracil):** CBC and thyroid function test (TFT) are required annually.
- **Sulfasalazine (Azulfidine):** CBC required every 6 months. Proctoscopy and/or sigmoidoscopy as medically indicated.

Class 4: Use of these medications necessitates grounding the aviator and is not waivable for flying duty.

AEROMEDICAL CONCERNS: Use of certain medications is strictly contraindicated in the aviation environment due to significant side effects. The underlying cause or need for use of these medications may result in a permanent disqualification or require a waiver for return to flying duty.

WAIVERS: A period of continuous grounding is mandatory from the initiation of therapy through cessation of these drugs plus a specified time period to rid the drug completely from the

body (usually at least three half lives). Continuous use of these medications is incompatible with continuation of aviation status. Waiver is not recommended.

- **ALCOHOL:** Requires 12 hours of flight restriction following termination of use with no residual effects.
- **NON-ALCOHOLIC BEER:** Require 12 hours of flight restriction following termination of use with no residual effects.
- **ANABOLIC STEROIDS (other than medically indicated Testosterone treatment of an appropriately defined deficiency, see Class 3):** Waiver is not recommended.
- **ANTI-ARRHYTHMICS:** Waiver is not recommended.
- **ANTI-DEPRESSANTS:** Waiver is not recommended.
- **ANTI-MIGRAINE AGENTS:** Waiver is not recommended.
- **ANTI-PSYCHOTICS:** Waiver is not recommended.
- **ANTI-VERTIGO AGENTS:** Waiver is not recommended.
- **ANTI-CONVULSIVES:** Waiver is not recommended.
- **ANTI-HISTAMINES (sedating and semi-sedating, including Cetirizine (Zyrtec)).** Waiver is not recommended for this medication; see other medication policy letters and Allergic/Nonallergic Rhinitis APL for acceptable medications.
- **BETA BLOCKERS:** ATENOLOL (Tenormin), METOPROLOL (Lopressor, Toprol), PROPRANOLOL (Inderal). CD for all aviation personnel classes. Aviation personnel using Beta-blockers should be transitioned to a waiverable anti-hypertensive. Waiver is not recommended.
- **BARBITURATES, MOOD AMELIORATING, TRANQUILIZING, OR ATARAXIC DRUGS:** Requires 72 hour flight restriction following termination of treatment. The half-life of Phenobarbital is 2-5 days. Waiver is not recommended.
- **CALCIUM CHANNEL BLOCKERS:** VERAPAMIL (Calan), NIFEDIPINE (Procardia), and DILTIAZEM (Catapres) are prohibited. Waiver is not recommended with the exception of AMLODIPINE (Norvasc), which may be approved.
- **CLONIDINE:** Waiver is not recommended.
- **COUGH PREPARATIONS WITH DEXTROMETHORAPHAN, CODEINE, OR OTHER CODEINE-RELATED ANALOGS:** Require 24 hours of flight restriction following termination of treatment.
- **DEA SCHEDULED MEDICATIONS:** Waiver is not recommended.
- **DIET AIDS:** Waiver is not recommended.
- **HYPOGLYCEMIC AGENTS:** CHLORPROPAMIDE (Diabinese), GLIPIZIDE (Glucotrol, Glucotrol XL), GLYBURIDE (Micronase, Diabeta, Glynase), TOLBUTAMIDE (Orinase), TOLAZIMIDE (Tolinase), ACETOHEXAMIDE (Dymelor), GLIMEPIRIDE (Amaryl).
- **HYPNOTICS:** Waiver is not recommended.
- **INSULIN:** Waiver is not recommended.
- **ISOTRETINOIN:** (Accutane) Waiver is not recommended.
- **LOOP DIURETICS:** Waiver is not recommended.
- **MINOCYCLINE:** (Minocin) Waiver is not recommended.
- **MOTILITY ENHANCING AGENTS:** Metoclopramide (Reglan), Waiver is not recommended.

- **NARCOTICS:** Waiver is not recommended.
- **QUININE, BITTERS, TONIC WATER:** Requires 72 hour flight restriction following termination of treatment when these formulations are used for medical conditions. Ingestion of tonic water or bitters on an infrequent basis does not require flight restriction.
- **SLEEPING AIDS:** Requires 24 hours of restriction after use. (See Predeployment drugs).
- **TOBACCO CESSATION** – Varenicline: (Chantix) Waiver is not recommended.
- **ANTI-MIGRAINE SEROTONIN (5HT) RECEPTOR AGONISTS:** SUMATRIPTAN (Imitrex), NARATRIPTAN (Amerge), RIZATRIPTAN (Maxalt; Maxalt-MLT), ZOMITRIPTAN (Zomig; Zomig ZMT), Almotriptan (Axert). Requires 12 hours of flight restriction following termination of treatment.
- **TRANQUILIZERS:** Waiver is not recommended

Herbal Products, Dietary Supplements and Other OTC Agents

AEROMEDICAL CONCERNS: Most people in the United States use some form of complementary or alternative medicine (herbal remedies, homeopathic agents, supplements). Some of these agents may have benefits, most have uncertain benefits, and others are unsafe especially if taken in combination with medication or in certain work environments. The short term effects of some of these preparations are dangerous and use can result in sudden incapacitation in flight. The long term effects of many of these unregulated preparations are unclear and have not been studied to any degree in the aeromedical environment. Ascertaining the use of dietary supplements is an important aircrew safety issue. Aeromedical health care providers (FS/APA) need to research and provide information and education on dietary supplements to all aircrew. This aeromedical policy is to outline those products which may be viewed as non-harmful in limited doses and can be used in the aeromedical environment with the knowledge and monitoring of the FS/APA. Any preparation not clearly permitted for use per this policy is not authorized for flight.

WAIVERS: The majority of herbal and dietary preparations are prohibited for aviation duty as many are used in cases of self-diagnosis and self-treatment. In many cases, studies do not reveal significant clinical efficacy. Any herbal and dietary supplements being used will be entered on the FDME/FDHS. Herbal and dietary supplements are designated Class 1, 2, or 3.

Class 1: Individual aircrew may use the following supplements without prior approval of a flight surgeon. Any use, whether periodic or regular, must be reported on the annual FDME/FDHS:

- Single multivitamin/mineral tablet per day
- Vitamins C, E, B5, B6, B12 (oral)
- Calcium
- Folate
- Protein supplementation to include shakes, capsules, and nutritional bars, but they may only contain additives specifically approved as Class 1.
- Sports drinks which contain a mixture of carbohydrates, vitamins, and minerals and without creatine, ephedra, or other herbal supplements

Class 2: Individual aircrew may use the following supplements with prior approval of a flight surgeon. Any use, whether periodic or regular, or as part of beverages or other supplement combinations must be reported on the annual FDME/FDHS: (NOTE: With use of these supplements by aircrew, the FS/APA needs to be concerned not only with the use and potential side effects of the supplement, but also with the underlying medical condition that the individual is treating.)

- Vitamins A, K, D, Niacin, Riboflavin, Thiamine
- Magnesium, Zinc, Chromium, Selenium, Copper
- Glucosamine with or without Chondroitin
- Echinacea for short term (less than two weeks) use
- Saw Palmetto
- Creatine monohydrate (without loading doses, max 5g/day intake)
- Ginseng- may be used but is prohibited 24 hours before flight

Class 3: All other preparations not specifically listed above are currently disqualifying for flight duties without review by the FS/APA and concurrence with AAMA. Again, it may not be the actual herbal or supplement, but the underlying condition that is of aeromedical concern. Waivers may be applied for on a case-by-case basis with an accompanying AMS discussing the underlying condition of concern and aspects of herbal/supplemental therapy.

INFORMATION REQUIRED: All aircrew and those applying for any form of aviation or aeromedical training will report the use of any form of dietary supplement to their FS/APA. The presence or absence of side effects should be noted.

FOLLOW-UP: Use of any form of dietary supplement will be addressed at each visit with the FS/APA to include the annual FDME/FDHS. Any side effects of use must be documented.

TREATMENT: The individual aircrew may be using these preparations for self-medication and should be carefully screened with regard to underlying medical problems. FS/APAs must educate themselves on the indications, use, and side effects of the preparations used by their aircrew. Use the references below to obtain information to assist in monitoring aircrew health.

REFERENCE: In this rapidly evolving area, check with your medical librarian for current references. Available internet references on this topic:

<http://dietary-supplements.info.nih.gov/>

Office of Dietary Supplements, National Institutes of Health at 1-301-435-2920.

<http://hprc-online.org/dietary-supplements>

PREGNANCY (ICD9 V222)

(March 2011)

AEROMEDICAL CONCERNS: Important physiologic changes occur during pregnancy that can place an aviator at risk for certain medical problems. Although rare, some of these problems may cause sudden incapacitation and compromise flight safety. Therefore, pregnancy is considered disqualifying for aviation duties. In addition, while the effects on pregnancy from the aviation environment are not fully understood it is possible that flying while pregnant could endanger the health of the aviator or her developing fetus. It is believed that the cumulative increased risk is small but there is no question that a pregnant aviator has a higher risk for medical complications than if she were not pregnant. This increase in risk is dependent upon the health of the aviator and the stage of pregnancy. Specific conditions that may occur during pregnancy that could complicate operating in the aviation environment include:

- Hemorrhage due to ectopic pregnancy, miscarriage or placental abruption
- Deep vein thrombosis and pulmonary embolus
- Dizziness/Transient loss of consciousness due to hypotension, dehydration and diminished vasomotor tone
- Heat intolerance and the heat related risks of neural tube defects and preterm labor
- Pregnancy induced vision changes
- Distraction/ loss of mental alertness from morning sickness, sleep disturbance, contractions, lower abdominal discomfort, increased urinary frequency and gastro esophageal reflux
- Physical limitations due to back pain, changes in abdominal girth and altered center of gravity
- Edema related musculoskeletal conditions such as carpal tunnel syndrome
- Severe hypertensive states including eclampsia and pre-eclampsia
- Gestational diabetes
- Abnormal fetal development due to noise and vibration exposure

WAIVERS:

Initial applicants (all classes): Initial flight applicants are considered disqualified until fully recovered (6 weeks postpartum). While pregnant, waivers will not be considered. Upon completion of the pregnancy and appropriate convalescence, no waiver is required.

Rated Aviators (all classes):

Until there is ultrasound verification of a healthy pregnancy, aviators should be restricted from aerial flights but may continue to perform ground run-up duties and to fly flight simulation trainers. An aviator may not be aware that they are pregnant for some early portion of their pregnancy but they should report to their flight surgeon for evaluation as soon as possible. According to the USCG Personnel Manual COMDTINST M1000.6 (series) Chapter 9.A.1.a, "A servicewoman who suspects that she may be pregnant is responsible for promptly confirming her pregnancy through testing by an appropriate medical provider and informing her commanding officer or officer in charge as soon as possible, but no later than two weeks after diagnosis of pregnancy."

Once there is verification of a healthy, single fetus within the uterus, pregnant aviators may be authorized to participate in aerial flights through 27 weeks gestation provided the following conditions are met:

- Aerial flights are restricted to dual pilot aircraft with ambient or pressurized cabin pressures that remain below 10,000' ASL.
- The other pilot must be fully qualified to operate the aircraft.
- Aviation physiology training is current and will not lapse during the waiver interval.
- The pregnant aviator has no pre-existing medical conditions which might affect the pregnancy.
- The aviator has indicated a desire to resume aerial flights after having read, signed the 'Request to Continue Flying While Pregnant' form (see below).

- The aviator has read and signed the 'Obstetrical Recommendation for Resuming Aviation Duty While Pregnant' form (see below).
- The aviator's obstetrician has signed the 'Obstetrical Recommendation for Resuming Aviation Duty While Pregnant' form recommending continued aerial flights.
- The aviator's flight surgeon recommends resumption of aerial flights through the 27th week and signs the Pregnancy in Aviation Aeromedical Summary PAAMS (see below).
- The aviator's commanding officer has approved the waiver recommendation.

Aircrew

The waiver policy and process for aircrew is the same as it is for pilots with the following exceptions:

- Aviation Survival Technicians shall not perform airborne Rescue Swimmer duties at anytime during their pregnancy nor shall they participate in water survival related training (swim, SWET, dunker, etc.). They may be authorized to fly as basic aircrew.
- While it is believed that exposure to solvents and fuels during aircraft refueling, washing and maintenance does not represent a hazard, the issue has not been carefully addressed. Since we don't know, it is not recommended that pregnant aircrew participate in these activities.

INFORMATION REQUIRED:

Once completed, the PAAMS must be submitted with an Aeromedical Summary (AMS) to the USCG Personnel Service Center (PSC). Pending formal approval of the waiver request from PSC, an aviator's commanding officer may approve her request to resume aerial flights.

FOLLOW-UP: While in a flight status the aviator will meet with her flight surgeon a minimum of every two weeks. These visits will confirm:

- Obstetrical care is ongoing and meeting the aviator's needs.
- There are no problems or pregnancy complications.
- Blood pressure, serum glucose and urinalysis are all normal.
- Visual acuity remains at the pre-pregnancy baseline. Any change in visual acuity from baseline will be cause for grounding for the duration of the pregnancy.
- The pregnancy is not compromising the ability to safely fly and perform emergency egress.
- The aviator desires to continue in a flight status.

TREATMENT: Prenatal vitamins, FeSO₄, and folic acid are permissible. Medications for morning sickness are not permitted due to secondary sedative side effects.

DISCUSSION: Pregnancy results in various important maternal physiologic changes. These rapid and profound changes accommodate the developing fetus and prepare for delivery. The collective impact of these changes is often unpredictable and varies widely between different patients and different pregnancies in the same patient. Even the normal physiologic changes of pregnancy can create potential risks in the aviation environment. In addition, pregnancy can exacerbate pre-existing medical conditions and certain pregnancy specific disorders can result in sudden incapacitation or life-threatening emergencies. No study has demonstrated adverse effects on a developing human fetus in the aviation environment but there is a theoretical possibility and some cautionary data from other environments that may be transferable. In aggregate, all of these concerns make the decision to continue to fly while pregnant a complex risk management process.

Avoid the Risk:

Complicated Pregnancy: A pregnancy may be considered complicated by problems intrinsic to the pregnancy such as multiple gestation, placenta previa, poly/oligohydramnios, gestational thrombocytopenia/anemia, pre-eclampsia/eclampsia and gestational diabetes. Extrinsic problems such as clotting disorders, high blood pressure, and orthopedic conditions may also complicate pregnancy. If the obstetrician or the flight surgeon has concerns that there are any complications of pregnancy, the aviator should not be recommended for aerial flights.

First Trimester: The risk from ectopic pregnancy and miscarriage in the first trimester requires that pregnant aviators avoid aerial flights until an ultrasound can confirm a healthy pregnancy.

Last Trimester: After 28 weeks, decreased mobility can interfere with the ability to carry out required tasks and impede emergency egress. The onset of labor increases throughout the third trimester. Therefore, the initial waiver period authorizing aerial flights shall terminate at 28 weeks gestation.

Reduce the Risk:

Solo flights, flights in ejection seat aircraft and flights with risk for hypoxia or excessive G-force exposures shall be avoided during pregnancy. In the unlikely event of sudden incapacitation, there should be another fully qualified pilot able to safely land the aircraft.

Accept the Risk

It is essential that the pregnant aviator, the attending obstetrician, the unit flight surgeon and the commanding officer are all aware of the risks associated with aerial flights during pregnancy. Specific risks include:

Hemorrhage due to ectopic pregnancy, miscarriage or placental abruption: Bleeding during pregnancy can be sudden and profound. It is frequently associated with severe abdominal pain and may result in sudden incapacitation.

Ectopic Pregnancy: Restricting aerial flights in the first trimester until an ultrasound confirms a healthy fetus in the uterus effectively screens for ectopic pregnancy.

Miscarriage: Between twenty and thirty percent of all pregnancies result in miscarriage. Eighty percent of these occur in the first trimester.

Placental Abruption: The risk for placental abruption is 6.5/1,000 births (.65%). The risk is highest between 24 and 26 weeks gestation^{1,2}.

Deep vein thrombosis (DVT) and pulmonary embolus (PE): Pregnancy results in the presence of all three components of Virchow's triad: venous stasis, endothelial injury and a hypercoagulable state. Contributing factors include dehydration and periods of inactivity (both associated with the aviation environment). DVT can lead to PE which may cause sudden incapacitation or death. In pooled data from the Center for Disease Control's National Pregnancy Mortality Surveillance System from 1991 to 1999, pulmonary embolism was the most common cause of pregnancy-related death when both live births and all pregnancy outcomes were considered. Pulmonary embolism accounted for 20 percent of the maternal mortality, higher than both maternal hemorrhage (17 percent) and pregnancy-associated hypertension (16 percent). In the literature, these two conditions are frequently termed venous thromboembolism (VTE) collectively. The incidence for VTE in the general population under the age of 40 is about 25 per 100,000 and roughly 50 per 100,000 in pregnant women.^{3,4,5}

Dizziness/Transient loss of consciousness due to hypotension, dehydration and diminished vasomotor reflex tone: Pregnancy produces an increase in urine production. Morning sickness

¹ **Placental Abruption and Perinatal Mortality in the United States;** Ananth, Cande V., Wilcox, Allen J.; American Journal of Epidemiology, Volume 153, Issue,4 Pp. 332-337

² **Placental Abruption in Term and Preterm Gestations: Evidence for Heterogeneity in Clinical Pathways.** Ananth CV, Getahun D, Peltier MR, Smulian JC; Obstet Gynecol. 2006;107(4):785-92.

³ **The Epidemiology of Venous Thromboembolism;** White, Richard H.; *Circulation*. 2003;107:1-4.

⁴ **Incidence of Diagnosed Deep Vein Thrombosis in the General Population: Systematic Review; F. J. I. Fowkes, J. F. Price and F. G. R. Fowkes;** European Journal of Vascular and Endovascular Surgery Volume 25, Issue 1, January 2003, Pages 1-5.

⁵ **Trends in the Incidence of Venous Thromboembolism During Pregnancy or Postpartum: a 30-year Population-Based Study.** Heit JA, Kobbervig CE, James AH, Petterson TM, Bailey KR, Melton; Ann Intern Med. 2005; 143(10):697-706.

and a desire to reduce urinary frequency commonly lead to dehydration. Dehydration results in low blood pressure which may compromise blood flow to maternal and fetal tissue. In addition, beginning in the second trimester, compression on the pelvic veins and a reduction in vasomotor tone also lower maternal blood pressure. In the mother, this reduction in blood flow may lead to reduced G-tolerance, lightheadedness, dizziness, visual disturbances, and loss of consciousness. Adverse consequences for the fetus include oligohydramnios, developmental delay, and preterm labor. Pregnant aviators should be vigilant in maintaining good hydration but this may lead to urinary distention and consequent mental distraction during aerial flights.

Heat intolerance and the heat related risks of neural tube defects and preterm labor: Pregnancy associated increase in BMI coupled with increased heat production from the developing fetus result in a loss of heat tolerance in the pregnant aviator. Safety equipment such as dry suits and operating in hot environments may pose risks to both the aviator and the fetus. There is evidence that even brief elevation in core body temperature more than doubles the risk for neural tube defects in the developing fetus⁶. In addition, exposing pregnant women to high ambient heat environments significantly increases the risk for preterm labor⁷. Pregnant aviators who would be required to wear dry suits and/or operate in hot environments should refrain from aerial flights.

Pregnancy induced vision changes: There are common physiologic changes in the eye of pregnant women that may cause unpredictable, transient changes in visual acuity^{8,9,10}. Pending further study, pregnant aviators should be sensitive to any subjective changes in their vision and report immediately to their flight surgeon. While medical clearance to perform aerial flights is in effect, pregnant aviators shall have their visual acuity checked at least every two weeks.

Distraction/ loss of mental alertness from morning sickness, sleep disturbance, contractions, lower abdominal discomfort, increased urinary frequency and gastro esophageal reflux: Alone or in combination, these conditions might lead to distraction and a loss of situational awareness. For this reason, pregnant aviators who have been medically cleared to fly should feel comfortable and empowered to self ground. This is one important reason for frequent follow up with the flight surgeon and every effort should be made by the flight surgeon and the command to cultivate an environment that would facilitate this process.

Abnormal fetal development due to noise and vibration exposure: While definitive research in humans is limited, there is some evidence suggesting exposure to high levels of noise and vibration may adversely impact the developing fetus. The organs responsible for hearing in humans develop by 24 weeks gestation, and research has shown noise and vibration may damage these developing organs¹¹. Furthermore, other studies have suggested noise exposure may contribute to growth restriction¹² and preterm labor¹³.

⁶ **Maternal Heat Exposure and Neural Tube Defects.** Aubrey Milunsky, et al; *JAMA*. 1992;268:882-8

⁷ **An association between the heat-humidity index and preterm labor and delivery: a preliminary analysis.** S Lajinian, et al. *Am J Public Health*. 1997 July; 87(7): 1205-1207.

⁸ **Ocular complications of pregnancy.** Bhavna P., et al. *Current Opinion in Ophthalmology* 2001, 12:455-463

⁹ **The Pregnant Woman's Eye.** Sunness, J. *Survey of Ophthalmology* Volume 32, Number 4, Jan-Feb 1988

¹⁰ **Refractive changes in pregnancy.** Pizzarello, L. *Graefe's Arch Clin Exp Ophth* 2003 241:484-488

¹¹ **Noise: A Hazard for the Fetus and Newborn.** Committee on Environmental Health, *Pediatrics* Vol. 100 No. 4 October 1997, pp. 724-727

¹² **Environmental noise and human prenatal growth.** Schell LM *Am J Phys Anthropol*. 1981; 56:63-70

¹³ **The association between occupational factors and preterm birth: a United States nurses' study.** Luke B, Mamelle N, Keith L, *Am J Obstet Gynecol*. 1995; 173:849-862

Request to Continue Flying While Pregnant

Pregnancy is a normal female condition resulting in various important physiologic changes. These dynamic changes accommodate the developing fetus and prepare for delivery. The overall impact of these changes is unpredictable and varies between different patients and pregnancies. Many of the normal physiologic changes of pregnancy create potential risks in the USCG aviation environment. In addition to the risks from a normal pregnancy, there are certain specific disorders that can cause sudden incapacitation or life-threatening emergencies. Furthermore, pregnancy can exacerbate other chronic medical problems. These issues present unique risks to the pregnant aviator who continues to fly.

Aviators with complicated pregnancies, or certain pre-existing medical conditions (other medical waivers), should not fly while pregnant. Pregnant aviators should not fly during high risk times in the pregnancy, such as the first and third trimester. Solo flights, flights in ejection seat aircraft, and flights with risk for hypoxia or excessive G-force exposures should be avoided during pregnancy.

It is essential for the pregnant aviator to discuss potential adverse consequences of the aviation environment with her flight surgeon and obstetrical care provider. Only after careful consideration should she request a waiver to continue flying during her pregnancy. Some of the common physiologic changes in pregnancy and potential hazards are described below.

Changes in Blood:

Blood volume in a pregnant patient increases in order to adequately perfuse the growing uterus and fetal tissues. The increased blood volume is a result of an increase in plasma, the watery portion of the blood. This dilutes the oxygen carrying red cells, causing a physiologic anemia. Increased iron requirements in pregnancy may further complicate anemia. Maternal iron stores are transferred to the fetus, requiring iron replacement during pregnancy. Physiologic and/or iron deficiency anemia can impair an aviator's performance and adversely impact flight safety. Therefore, prior to returning to flight status, a blood test is required to assess blood levels and rule out anemia.

Dehydration:

It is important for aviators to remain well hydrated. Pregnancy produces an increase in urine production, commonly contributes to dehydration that may be challenging to correct. Dehydration results in lower blood pressure, which may cause reduced G-tolerance, lightheadedness, dizziness, visual disturbances, loss of consciousness, or adverse consequences for the fetus. Lower blood pressure compromises blood flow to maternal and fetal tissue. This is a dynamic process requiring an aviator's constant vigilance to maintain a well hydrated status.

Blood Sugar:

Pregnancy hormones affect a pregnant woman's blood sugar control, resulting in higher blood sugar levels than in non-pregnant women. Elevated blood sugar can be harmful to both the pregnant woman and her fetus, and can increase flight-related risks for dehydration, spatial disorientation, and G-force intolerance. The changes and impacts of blood sugar metabolism in pregnancy vary considerably. Therefore, blood sugar measurements should be performed regularly (at least every two weeks) in aviators who continue to fly while pregnant.

Hypotension (low blood pressure) & Syncope (loss of consciousness):

Pregnant women generally experience lower blood pressures. This is due in part to dehydration, but mainly as a result of hormonal effects on blood vessel relaxation. The general relaxation of smooth muscles in blood vessel walls lowers the baseline blood pressure and reduces the vascular system's ability to compensate for G-forces that "pull" blood from the brain. In addition, about 25% of blood flow is directed to the uterus and placenta, which is a very low pressure system assuring constant blood flow to the fetus. The diversion of blood into the low pressure system further decreases systemic blood pressure, decreases G-tolerance, and increases the risk of grey-out, black-out, and syncope. Syncope is a transient loss of consciousness due to decreased blood flow to the brain, and usually resolves without lasting effects once blood flow is restored. It is important for the pregnant aviator to understand these changes may vary throughout pregnancy and modify her ability to anticipate, recognize, and counter G-induced grey-out, black-out, or syncope.

Lungs:

Changes occurring in the lungs during pregnancy are aeromedically relevant. More fluid collects in the lungs of a pregnant woman resulting in functional changes. The most significant change results in a dramatic reduction in the residual lung volume, which functions as the lung's emergency oxygen reserve and greatly reduces the time a woman can tolerate 'breath holding'. This can result in an impaired tolerance to any exposure to hypoxia such as underwater egress training or emergency.

Hypoxia:

As mentioned above, a pregnant aviator will have an impaired tolerance to hypoxia. Hypoxia may potentially cause fetal malformation, spontaneous abortion or developmental disorders. The hemoglobin in the fetal blood, however, has a much higher affinity for oxygen than the mother's hemoglobin. This preferentially oxygenates the fetal blood providing some level of protection. It is unclear how susceptible the fetus may be during transient hypoxia exposures. It is widely believed adequate fetal oxygenation occurs at altitudes below 10,000 feet. For this reason, pregnant aviators are restricted to flights with cabin pressures less than 10,000 feet.

Vision Changes:

Good vision is critical to safe flight. Studies have shown variable and temporary changes in visual acuity during pregnancy. To mitigate any risk related to vision changes during pregnancy, an aviator should have a visual acuity examination prior to returning to flight status, and her vision should be rechecked regularly during the pregnancy (at least every two weeks). A common eye change in pregnancy is corneal edema, which causes a thickening of the cornea by about 3%. This may result in visual changes and intolerance to contact lens use. Pregnant aviators who wear contact lenses may need to switch to glasses.

Vaginal Bleeding:

Vaginal bleeding can present in all stages of pregnancy, and occurs in up to 25% of all first trimester pregnancies. It can range from minimal to excessive and life-threatening. It can be gradual and painless, or sudden and associated with incapacitating pain. In most cases, small amounts of vaginal bleeding are not associated with dangerous conditions. However, vaginal bleeding can indicate more serious conditions such as miscarriage, placenta previa, vasa previa, or placental abruption, and must always be immediately evaluated. Miscarriages are common events, occurring in 20 to 30% of all recognized pregnancies. Nearly 80% of miscarriages occur in the first trimester. Many miscarriages

occur unpredictably without identifiable cause. Placenta previa, vasa previa, and placental abruption occur later in pregnancy and can result in sudden life-threatening bleeding. The risk of placenta previa and vasa previa can be mitigated with an ultrasound exam, which is frequently performed in the second trimester. Because vaginal bleeding occurs frequently in the first trimester, and can lead to unpredictable sudden incapacitation, pregnant aviators are frequently restricted from flight in the first trimester.

Ectopic Pregnancy:

An ectopic pregnancy occurs when the pregnancy implants and grows in a location outside of its normal position in the uterine cavity. Most ectopic pregnancies occur in the fallopian tube ("tubal pregnancy"). Unlike the uterus, which can expand with the growing fetus, the fallopian tube will stretch, rupture, and result in life-threatening internal bleeding. An ectopic pregnancy occurs in about 2% of all first trimester pregnancies, and is the most common cause of maternal death in the first trimester. Ectopic pregnancies are difficult to predict and diagnose, frequently presenting with an abrupt onset of incapacitating pain and life-threatening bleeding. Because of the ectopic pregnancy risk, pregnant aviators should be grounded, and defer any consideration for returning to flight status until a formal ultrasound confirms the pregnancy is located within the uterus.

Blood Clots:

Pregnancy is considered a hypercoagulable state, a condition promoting blood clot formation. The normal chemicals that induce clot formation are hyperactive during pregnancy. The normal physiologic changes in pregnancy include the relaxation of blood vessels, dehydration, and low blood pressure. These changes increase the likelihood that blood will pool, particularly in the lower extremities. Blood pooling promotes blood clot formation. A growing uterus can compress the veins that drain the legs, further increasing the likelihood for blood clots in the lower extremities. Due to these circumstances, blood clots occur four times more frequently in pregnancy. Sitting for prolonged periods of time can also lead to blood clots in the legs. These clots may break off and travel through veins to the lungs (pulmonary embolism) and become trapped in the vessels within the lungs. This results in severe chest pain and shortness of breath which may be life-threatening and requires immediate treatment. Pulmonary embolism during pregnancy is the leading cause of maternal death in the developed world. Understanding these risks, the pregnant aviator must limit prolonged sitting in a fixed position, and seek immediate medical attention if experiencing chest pain or shortness of breath.

Preeclampsia, High Blood Pressure and Seizure:

Preeclampsia is an abnormal condition in pregnancy resulting in very high blood pressure, excessive swelling, abnormal kidney function, severe headaches, vision changes, neurological impairment, and occasionally seizures (eclampsia). Preeclampsia occurs in 3-5% of pregnancies. It generally occurs after the 20th week of pregnancy, and rarely occurs earlier. The evaluation for its presence is a common part of routine pregnancy care. Any signs or symptoms of this condition must result in immediate grounding and prompt evaluation by the obstetric care provider.

Hearing:

While definitive research in humans is limited, there is some evidence suggesting exposure to high levels of noise and vibration may adversely impact the developing fetus. The organs responsible for hearing in humans develop by 24 weeks gestation, and research has shown noise and vibration may damage these developing organs. Furthermore, other studies have suggested noise exposure may contribute to growth restriction and preterm labor. The pregnant aviator must understand excessive noise in the aviation environment represents an uncertain risk to her developing fetus.

Chemical Exposure:

Although somewhat protected by the uterine environment, the fetus is susceptible to the harmful effects of toxic exposures. This risk is greatest in the first 12 weeks of the pregnancy. Animal studies suggest a number of chemicals can cause birth defects and miscarriage, but definitive studies in humans do not exist. Because a number of potentially toxic chemicals are present in the aviation environment, the pregnant aviator must consider and minimize this uncertain risk.

Physiology Training:

Per COMDTINST M3710.1 (series), Coast Guard Air Operations Manual, required physiology training is not authorized during pregnancy. If any qualification expires, then the member must be grounded for the duration of the pregnancy. Under special circumstances, CG-711 may waive the expired physiology qualification.

Aviation Training:

Initial Aviation training as a Student Naval Aviator at Flight School is not authorized during pregnancy.

Many women have continued to fly during pregnancy without evidence of adverse effects. Because of this, it is believed most uncomplicated pregnancies will tolerate the aviation environment when appropriate restrictions and risk management strategies are employed. The pregnant aviator must educate herself with regard to potential hazards and prevention when flying while pregnant.

I have read and understand the contents of this document. I have discussed this information with my obstetrician and my flight surgeon. My questions have been answered to my satisfaction. I request permission to continue flying through the 27th week of my pregnancy. I understand I am not required to continue to fly while pregnant and I may voluntarily suspend my participation in aerial flights at any time. I will comply with all waiver requirements including appointments with my flight surgeon every two weeks for the duration of the waiver.

Signature / Date

Printed Name

*This form is designed for Coast Guard aviators and aircrew. This form considers risks related to aircrew flying in military environments. It is not intended for use by passengers on commercial or military flights.

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Obstetrical Recommendation for Resuming Aviation Duty While Pregnant

Dear Doctor,

Your patient regularly flies on USCG aircraft. In order to make a determination as to whether or not she should continue to fly while pregnant, the USCG needs an opinion from you.

It is generally accepted that continuing to fly USCG aircraft through the 27th week of gestation is safe. However, there is potential for exposure to certain adverse conditions and some of the physiologic and pathologic states associated with pregnancy may interfere with the patient's ability to perform their job safely. We ask that you discuss these issues with your patient.

While every effort is made to mitigate the risk, there are some adverse conditions that the patient may be exposed to during flight operations which include:

- Restricted movement for extended periods (3 to 6 hours seated in a helicopter).
- Unavailable toilet facilities (on USCG helicopters).
- High heat and humidity exposure from wearing personal protective equipment (dry suits) and high ambient temperatures in the aircraft.
- Sleep disruption/deprivation from watch-standing duties and protracted missions.

A pregnant aviator may be recommended to continue flying through the 27th week of gestation provided the following conditions are met:

- The aviator expresses a desire to remain in a flight status while pregnant.
 - The USCG does not require pregnant aviators to continue to fly.
 - Any hesitancy demonstrated by the aviator should result in suspension of flight duties.
- There are no suspected or anticipated pregnancy related complications such as:
 - Any condition which might result in pre-term labor/miscarriage such as multiple gestation
 - Pregnancy induced hypertension, eclampsia/pre-eclampsia
 - Gestational diabetes or glucose intolerance
 - Hyperemesis gravidarum
 - Placenta previa, vasa previa, or incompetent cervix
 - Known or suspected clotting disorders

For the Patient:

I have discussed the risks and uncertainties relative to flying while pregnant with my obstetrician. My questions have been answered to my satisfaction. I request permission to continue flying through the 27th week of my pregnancy. I understand I am not required to continue to fly while pregnant and I may voluntarily suspend my participation in aerial flights at any time.

Patient Signature / Date

Printed Name

For the Obstetrician:

There are no known mental or physical conditions related to pregnancy that would pose a significant risk from continued participation in aerial flights. I support this patient's request to continue participation in aerial flights through the 27th week of gestation.

There are complications with this pregnancy that make continued participation in aerial flights ill-advised and I do not recommend it.

Obstetrician Signature / Date

Printed Name

Pregnancy in Aviation Aeromedical Summary (PAAMS)

A waiver request for pregnancy requires completion of this form. Upon completion, submit an aeromedical summary through AERO. This form should be submitted with the AMS as an electronic enclosure.

Gravida: _____ **Parity:** _____ **SAb:** _____

Previous Pregnancy Complications: _____

Other Medical Conditions/Waivers: _____

Expiration Date of Aviation Physiology –
 *Performing aviation physiology qualifications during pregnancy is prohibited.

Meds:			Allergies:		
ROS:	Y	N		Y	N
Headache	<input type="checkbox"/>	<input type="checkbox"/>	Nausea	<input type="checkbox"/>	<input type="checkbox"/>
Vision Changes	<input type="checkbox"/>	<input type="checkbox"/>	Vomiting	<input type="checkbox"/>	<input type="checkbox"/>
Lightheadedness	<input type="checkbox"/>	<input type="checkbox"/>	Vaginal Bleeding	<input type="checkbox"/>	<input type="checkbox"/>
Chest Pain	<input type="checkbox"/>	<input type="checkbox"/>	Diarrhea	<input type="checkbox"/>	<input type="checkbox"/>
Dyspnea	<input type="checkbox"/>	<input type="checkbox"/>	Dysuria	<input type="checkbox"/>	<input type="checkbox"/>
Abdominal Pain	<input type="checkbox"/>	<input type="checkbox"/>	Flank Pain	<input type="checkbox"/>	<input type="checkbox"/>

VS: Date: _____ Temp: _____ HR: _____ BP: _____

Visual Acuity:

	Y	N	
Is/Corrects to 20/20 OD	<input type="checkbox"/>	<input type="checkbox"/>	If vision does not correct to 20/20, waiver will not be considered and optometry referral is needed.
Is/Corrects to 20/20 OS	<input type="checkbox"/>	<input type="checkbox"/>	
Is/Corrects to 20/20 OU	<input type="checkbox"/>	<input type="checkbox"/>	

US#1: Date: _____; US EDC _____; Intrauterine: Y N

Comments: _____

Other US: Date: _____; US EDC _____; Normal: Y N

Comments: _____

<u>Test</u>	<u>Value</u>	<u>Test</u>	<u>Value</u>
WBC		UA Nitrate	
Hgb		UA Leuk Est.	
Platelets		UA Blood	
FBS		UA Protein	

Any abnormal labs must be discussed in comments section

Date pregnancy reaches 28 weeks: _____
Estimated Delivery Date (EDC): _____
Estimated Return to Full Duty: _____

Summary/Disposition:

- WAIVER NOT REQUESTED BY AVIATOR.
- Member has been educated on the potential risks of continued flying during pregnancy and has signed the Request to Continue Flying While Pregnant and the Obstetrical Recommendation for Resuming Aviation Duty While Pregnant forms indicating a desire to remain in a flight status.
- The member's obstetrician has recommended participation in aerial flights and has signed the Obstetrical Recommendation for Resuming Aviation Duty While Pregnant form.

Waiver Recommendation: (Waiver must be IAW USCG flying while pregnant restrictions.)

- WAIVER NOT REQUESTED BY AVIATOR AND THEREFORE NOT RECOMMENDED
- WAIVER REQUESTED BY AVIATOR
 - PREGNANCY, UNCOMPLICATED (V22)
 - WAIVER NOT RECOMMENDED (explain)
 - WAIVER RECOMMENDED UNTIL 28 WEEKS GESTATION
 - PREGNANCY UNCOMPLICATED WITH OTHER MEDICAL CONDITIONS (V22)
 - OTHER CONDITIONS: _____(describe)
 - WAIVER NOT RECOMMENDED (explain)
 - WAIVER RECOMMENDED UNTIL 28 WEEKS GESTATION
 - PREGNANCY COMPLICATED (V630-650); _____(describe)
 - WAIVER NOT RECOMMENDED
 - WAIVER RECOMMENDED UNTIL 28 WEEKS GESTATION - Aviator shall not receive clearance to fly until the waiver request is approved by PSC.
- Member understands she must follow-up with her flight surgeon every two weeks or sooner should any symptoms develop.
- 90-day upchit issued with CO Concurrence (up to 28th week)

Unit Flight Surgeon's Signature _____ Date _____

Commanding Officer: Member may may not participate in aerial flights.

Commanding Officer's Signature _____ Date _____

CORNEAL REFRACTIVE SURGERY (ICD9 V802A/V802B)

AEROMEDICAL CONCERNS: Corneal refractive surgery (CRS) is indicated for the correction of refractive error (myopia, hyperopia or astigmatism). Only **LASIK** (laser in-situ keratomileusis), **LASEK** (Laser Subepithelial Keratomileusis), **PHOTO REFRACTIVE KERATECTOMY** (PRK) and **WAVE-FRONT GUIDED PRK** (WFG-PRK) are currently acceptable CRS methods for all classes, including applicants.

Uncomplicated, successful completion of LASIK, LASEK, or PRK resulting in visual acuity within standards and a satisfactory pre/post-surgical assessment (as outlined below) will be qualified as ***Information Only***. However, an Aeromedical Summary (AMS) should still be submitted with the annotation that it be considered for ***Information Only***.

Cases outside of standards will require waiver submission. This includes alternate procedures, complications, and failure to meet pre/post-op standards.

WAIVERS:

All Rated and Non-Rated Aircrew (to include ALL Applicants): FDMEs with PRK, LASEK or LASIK with an acceptable pre-/post-surgical assessment as outlined below shall be submitted with an AMS annotated “qualified, ***information only***.” All other personnel will require an AMS annotated as “disqualified” for waiver consideration.

Active duty: CRS is considered elective surgery and falls under the guidelines set forth in COMNDTINST M6000.1 (series) CHAPT 2. A.5. Personnel considering CRS must receive authorization from their commanding officer prior to the procedure. Commanders should be advised that the procedures have a 6-12 week recovery period before aviation duties can be resumed. Class 1 aviators may only have a CRS procedure done while serving in a non-DIFOPS billet. As for all types of elective surgery, any complications or adverse outcomes related to CRS are the responsibility of the aviator and if severe enough, may result in administrative action to include separation from the USCG.

All pre-operative, operative and post operative medical records must be submitted for review by the waiver authority.

Refractive Limits	Sphere	Cylinder	Anisometropia
Pre-Operative	-8.00 to +6.00	-3.00 to +3.00	3.5 diopters

Post-operative refractive stability: Demonstration of post-operative refractive stability shall be demonstrated by 2 consecutive manifest refractions, obtained at least 30 days apart. For those with a pre-operative refraction of Plano to -5.50 diopters of sphere the initial post operative refraction should be no sooner than 30 days after the surgery. A follow up refraction shall be done no sooner than 30 days after the initial post refraction. For those with a pre-operative

refraction of -5.75 to -8.00 diopters of sphere or +0.25 to +6.00 diopters of sphere, the earliest manifest refraction is at 6 months post-op.

Timing of Waiver Submission: If refractive stability is demonstrated as evidenced by less than a 0.50 diopters change over two separate exams at least four weeks apart, then the member can apply to PSC for a waiver 3 months after surgery. The post-operative manifest refractions can vary by no more than 0.50 diopters. Waiver consideration will not be made until this is achieved.

Quality of vision questionnaire: The member must not have any visual complaints post operatively per the quality of vision questionnaire which is to be included in the waiver package. This form can be found on the following Commandant (CG-112) Web Site:

<http://www.uscg.mil/hq/cg1/cg11/>.

Post operative standards: Post operatively the member must meet all aviation visual standards in this section. (Member must have 20/20 vision or vision correctable to 20/20 in both eyes). Submission of a waiver request and follow up will be IAW applicable message or COMDTINST. All required follow up exams will be accomplished on time and be within guidelines or conditions of the waiver will be deemed not met and the member will be grounded and required to re-submit the waiver request. Must insure that our post-operative, performance vision standards are identical to the USN's for LASIK so that we have no surprises for USCG SNA's. Recommend we elaborate exactly the tests that the USN performs or that we instruct our SNA's to have an evaluation at one of the USN's ten designated ophthalmological treatment facilities of excellence: NNMC, Bethesda, NMCP, Portsmouth, NH Camp Lejeune, Jacksonville, NC, NH Jax, Jacksonville, FL, NAMI, Pensacola, NH Bremerton, WA, NH Camp Pendleton, CA, Navy Refractive Surgery Center, NMCSO, CA, NH Clinic Annapolis, MD, NHCNE Newport, RI

Information Required for CORNEAL REFRACTIVE SURGERY:

Document that at least 3 months have elapsed since surgery or re-treatment and evidence of stable refractive error is demonstrated by two separate examinations performed at least one month apart.

From the Checklist for Eye Care Provider (Appendix 3):

- Pre-operative refraction—Cycloplegic preferred, manifest is an acceptable substitute.
- Type of procedure—LASIK, LASEK, PRK
- Date of procedure(s)—to include 'enhancements' or 'touch ups'.
- Post-op Measurements—only the latest set of measurements are required:
 - Refraction within standards—Cycloplegic for Class 1; Manifest for all others.
 - Intraocular Pressure
 - Visual Acuity within standards.
 - Slit Lamp Examination—showing no haze
 - Corneal Topography—post-operative, reported by eye surgeon as “acceptable”.
 - Low-Contrast Sensitivity testing (5% contrast using the Precision Vision backlit chart)—must pass 20/60 or better. The preferred test is the 5% contrast test; however, the following tests may be submitted:
 - BVAT low contrast acuity (set on 5%)
 - Bailey-Lovie 10% low contrast acuity test
 - Pelli-Robson Contrast Sensitivity Test
 - Small Letter Contrast Test

- VisTech or FACT Contrast Sensitivity Test
-

For any part of the evaluation that is out of CRS policy standards, submit the following as part of an AMS:

- Pre-operative refraction out of CRS standards: must include ophthalmology/optometry evaluation to include dilated fundoscopic examination to document no retinal strain, tears, or holes as well as corneal pachymetry to insure adequate corneal thickness.
- SLE reveals haze: must include ophthalmology/optometry evaluation documenting no visual impairment, glares, or halos as a result of haze.
- For any other deviations: discuss with the USCG Personnel Service Center senior medical officer to clarify waiver submission requirements.

FOLLOW-UP: A quality of vision questionnaire and visual acuity check is to be done every three months for one year after the surgery. This information is to be noted in the member's medical record and reviewed by the Flight Surgeon. All subsequent comprehensive FDMEs must include an optometry or ophthalmology consult with completion of a slit lamp examination of the cornea, manifest refraction and corrected visual acuity.

TREATMENT: Per appropriate surgical protocols.

DISCUSSION: Since CRS reduces/eliminates the need for corrective lenses and protective mask inserts, it facilitates operational readiness. Corneal refractive surgery has an additional benefit in the expanding arena of man-machine interfaced systems based on detailed vision parameters. This is especially important for increasingly complex flight environments where corrective lenses would be a hindrance.

APPENDIX 1. Aviation Commander's Authorization

APPENDIX 2. Medical Release

APPENDIX 3. Checklist for Eye Care Provider

APPENDIX 4. Refractive Surgery Check Sheet for Aviation Applicants

APPENDIX 5. Quality of Vision Questionnaire

Appendix 1: Aviation Commander's Authorization

Memorandum to: Unit Flight Surgeon

CC: Ophthalmology, Refractive Surgeon

Subject: Authorization for Aircrew members to receive surgery under the guidelines set forth in the USCG Aeromedical Policy Letter for Corneal Refractive Surgery.

1. _____, SSN _____ is authorized to receive refractive surgery per the guidance outlined in the Aeromedical Policy Letter: Corneal Refractive Surgery.
2. This authorization is based on the following understandings:
 - a) This authorization does not constitute a medical waiver; it only authorizes the individual to have refractive surgery. The individual will be DNIF for at least 12 weeks. Following the successful outcome of the individual's surgical procedure, the unit flight surgeon will submit an Aeromedical Summary to the USCG Personnel Service Center for waiver consideration.
 - b) In approximately 2-3 of every 1,000 refractive surgery procedures (0.2 to 0.3%), the individual will not recover 20/20 best-corrected vision. Although slight, depending on the nature and severity of the defect, there is a possibility that the individual may lose his/her flight status and may no longer be eligible for retention in the USCG.
 - c) A copy of this correspondence will be kept on file in the local flight surgeon's office.
3. POC is the undersigned at _____.

Commander's Signature Block

Appendix 2: Request for Release of Medical Records

(To be completed by patient and provided to eye care provider for completion)

From: (enter your information)

Date:

To: (enter eye clinic information)

Subject: Request for records related to refractive surgery procedure

1. I request that a copy of records pertaining to my refractive surgery be provided to:
(Enter unit flight surgeon information and address)
2. The following information is needed: (see attached Checklist for Eye Care Provider):

Date of procedure

Type of procedure (PRK, LASEK, or LASIK)

Type of laser (brand name)

Ablation parameters: size of ablation zone, microns of tissue removed, number of pulses (if any of the requested information is not available, please note)

Amount of correction (sphere, cylinder and axis)

Pre-operative refraction and date (specify manifest or cycloplegic)

Follow-up refractions with visual acuities and dates (most current refraction and as many postoperative refractions as possible)

Slit lamp assessment of cornea (presence or absence of haze or other complications)

Latest **post-operative COLOR** corneal topography (instantaneous or tangential corneal maps)

Contrast Sensitivity (preferred test is the 5% low contrast letter acuity)

Typed or Printed Name

Signature

Appendix 3: Check List for Eye Care Provider

Demographics Required (Applicant to complete):

Last Name: _____ First Name: _____ M.I. _____

Mailing Address: _____

E-mail Address: _____

Home/Cellular Phone: _____

Date of Birth: _____ SSN: _____

Checklist for Eye Care Provider (Surgeon/Doctor to complete below):

Surgeon/Doctor's Name: _____

Clinic Address: _____

Clinic Phone: _____ Date of Procedure: _____

Type: (circle one) PRK LASIK LASEK

Laser Used: (Manufacturer) _____ (Model#) _____

Ablation Parameters (Complete below, and if available, attach copies of laser printouts)

OD: Size of ablation: _____mm Tissue removed: _____microns # of pulses: _____

OS: Size of ablation: _____mm Tissue removed: _____microns # of pulses: _____

Amount of correction programmed into laser:

OD: _____ OS: _____

Pre-operative Refraction OD: _____ OS: _____

Did the applicant require any enhancement procedures? Yes _____ No _____ (If yes, provide details)

Follow-up Examinations (include most recent and 2 prior examinations—3 total)

DATE	REFRACTION	VISUAL ACUITY	CORNEAL HAZE*
	OD	OD	OD 1 2 3 4
	OS	OS	OS 1 2 3 4
	OD	OD	OD 1 2 3 4
	OS	OS	OS 1 2 3 4
	OD	OD	OD 1 2 3 4
	OS	OS	OS 1 2 3 4

*Haze 0-4 scale: 0=No Haze, 1=Trace, 2=Minimal, 3=Moderate, 4=Iris details obscured.

Checklist for Eye Care Provider (continued)

Corneal Topography (include a color copy of most recent post-operative corneal topography using the TANGENTIAL or INSTANTANEOUS map display option)

Topographer Manufacturer: _____

Topographer Model: _____

Date of topographies: _____

Contrast Sensitivity (attach copy of post-operative results)

Test Manufacturer/Model: _____

Date of contrast test: _____

Test Conditions:

Room Lights On? (circle one) **Yes** **No**

Backlit Chart? (circle one) **Yes** **No**

Distance to Test? _____ m

% Contrast? (if letters) _____%

Results:

OD: _____

OS: _____

Does applicant report any subjective visual changes? (i.e. increased glare, starbursts, halos, etc.) **YES** **NO**

If yes, please describe: _____

For Class 1 (PILOTS), complete a post-operative cycloplegic refraction, noting normal refractive DVA/NVA with best correction and IOP's.

Distant Vision

Near Vision

OD 20/____ Corrected to 20/____ 20/____ Corrected to 20/____

OS 20/____ Corrected to 20/____ 20/____ Corrected to 20/____

Cycloplegic Refraction

OD: _____ OS: _____

Intraocular Tension

OD: _____ OS: _____

Thank you for completing the information. Please return this form and supporting documents to your flight surgeon.

Appendix 4:

Corneal Refractive Surgery (CRS) Fact Sheet for Flight School and Aircrew Applicants

What: LASIK (laser in-situ keratomileusis), LASEK (Laser Subepithelial Keratomileusis), and PRK (Photo Refractive Keratectomy) are now aeromedically acceptable and applicants who have received these kinds of CRS may be granted a waiver, provided the operative outcome meets the standards IAW the current USCG Corneal Refractive Surgery Aeromedical Policy Letter (USCG CRS APL). A waiver is required for anyone failing to meet published standards as outlined in the USCG Aeromedical Policy Letters. Similar to any other medical issue, CRS requires submission of a waiver request in the form of an Aeromedical Summary (AMS). Based on the information submitted, the USCG Personnel Service Center (PSC) may or may not grant a waiver following CRS.

Who: This policy applies to individuals applying for aviation duties to include flight training. Active duty, Reserve, National Guard, ROTC, Academy cadets, OCS candidates, and civilians with a history of CRS may pursue an aviation career by first submitting a flight physical and aeromedical summary for waiver consideration. Applicants must coordinate with their eye surgeon and/or eye clinic to complete the visual exam forms required and forward them to the flight surgeon performing the flight physical. The flight surgeon will complete the flight physical and submit the AMS for PSC review.

Having a qualified flight physical/AMS does NOT guarantee a flight school slot or entry into an aviation rate; it only verifies medical eligibility following a refractive surgery procedure. Applicants still need to work through the standard channels to apply to flight school and/or aviation assignment/selection.

How, When and Where: This section describes the steps required in order to receive a qualified flight physical given a history of LASIK, LASEK or PRK surgery.

- 1) Complete a flight physical with a USCG or DOD flight surgeon using AERO.
- 2) Include results of all of the required CRS post-operative tests:
 - Post-surgical refraction (cycloplegic for flight school, manifest for all others).
 - 3 visual acuities with manifests.
 - Slit lamp examination demonstrating healing without complication, scarring, or haze.
 - Color corneal topography
 - Low contrast sensitivity visual testing.
- 3) A USCG flight surgeon will submit the flight physical/AMS to PSC. PSC then makes a waiver eligibility determination.

Point of Contact:

**For Questions Regarding CRS and Aviation Duties Policy:
Aviation Medicine Standardization Officer
Aviation Medicine Branch, Training Division
USCG Aviation Training Center, Mobile, AL
251-441-5757**

FREQUENTLY ASKED QUESTIONS:

QUESTIONS ABOUT CRS:

a. If I had a surgery other than PRK, LASEK or LASIK, can I still get a waiver?

Radial keratotomy (RK), intrastromal corneal rings (Intacs) and all other types of refractive surgery have not been aeromedically approved. It is unlikely that a waiver will be granted.

b. If I have NOT had refractive surgery yet, what do I do?

You should consult at least 2 eye surgeons before deciding to get surgery. It is also important to do individual research as to the pros and cons of each type of surgery. If you are currently on active duty, you should discuss the issue with your command. You are required to receive command approval BEFORE having CRS.

c. How can I verify if I meet the pre and post operative standards?

Consult with your eye doctor or flight surgeon. They will review your current eyeglass or contact lens prescription (if you have not had surgery) or records of your eyeglass or contact lens prescription before surgery (if you have already had surgery). Provide your eye doctor with the pre and post operative authorized limits that are found in the USCG CRS APL.

d. My refraction is outside the limits, is it still possible to apply for flight school?

If your post-operative vision is within standards, it is possible to receive a waiver.

e. What information do I need to provide about my surgery and where do I get it?

All the information needed is listed on the "Release of Medical Information" and "Corneal Refractive Worksheet" forms found in the USCG CRS APL. Provide the forms to your eye surgeon and/or the eye doctor who is providing your vision care after surgery. You may have to submit multiple forms to get all of the required information.

1. Surgical Information: Your eye surgeon will need to fill out the information about the laser, the type of surgery and the amount of correction.

2. Manifest Refraction: You will need three post-surgical refractions and visual acuities. This information can be a combination of examinations provided by your surgical center, your optometry office and your flight physical.

3. Corneal Exam (Slit-Lamp Exam): You will need verification that your cornea is clear of haze or any other post-surgical complication. Your eye doctor can provide this information.

4. Corneal Topography: This is the corneal map that shows the shape of your cornea after surgery. You must have a color copy of the map, either mailed, e-mailed, or taken to your flight surgeon. FAX'd versions are currently not acceptable because they come through in black and white.

5. LOW Contrast Sensitivity: This is a measure of your vision under low contrast conditions. Normal low contrast is 20/40 or better, but with corrective surgery, acceptable limits are 20/60 or better. Ask your eye doctor about availability of a contrast sensitivity or low contrast acuity test in your area. Examples of acceptable tests are:

- 5% low contrast testing using the Precision Vision Backlit Chart (preferred)
- VisTech Contrast Grating Test

- Functional Acuity Contrast Test (F.A.C.T.)
- Pelli-Robson Contrast Sensitivity Test
- Bailey-Lovie 10% low contrast acuity chart
- ETDRS low contrast acuity chart (5% is preferred)
- Mentor BVAT low contrast acuity chart (set on 5%)

f. What do I do if a contrast sensitivity or low contrast acuity test is not available in my area? Your packet cannot be processed without this test. The preferred test using the Precision Vision Backlit Chart is an inexpensive piece of equipment and should be available. Since poor low contrast acuity can compromise low light vision (dusk, driving at night), anyone who has had CRS should know what the results of this test are.

g. Where do I send all of my information? Your flight surgeon will collect and submit your flight physical and AMS through the electronic medical records system AERO.

QUESTIONS ABOUT THE FLIGHT PHYSICAL

a. How long do I have to wait after surgery to get a flight physical? Start your physical so it is completed 3-months after the surgery to be able to complete all of the required post-operative information.

b. I already took a flight physical before surgery; do I have to take another physical? No, as long as your initial Class 1 flight physical is still valid (up to 12 months). You **MUST** repeat the eye exam portion of the flight physical after surgery, however, and submit the required information. Coordinate this through your flight surgeon and the supporting eye clinic.

c. I have not taken a general military entrance physical yet; do I have to do that first? Yes, if you have not taken the MEPS, ROTC or other entrance physical, you will have to complete that physical before scheduling your flight physical. The entrance physicals require a 90-day waiting period after refractive surgery. Therefore you will have to wait **3 months** after surgery, take the entrance physical, and then you can schedule to take the flight physical.

d. I still need to wear glasses after surgery; does that mean I will fail the flight physical? No, as long as you meet the general entry standards for Class 1 which include 20/50 or better uncorrected visual acuity, and no more than -1.50 diopters of myopia or +3.00 diopters of hyperopia or 1.00 diopters of astigmatism. If you are outside of these limits, however, you will need a waiver. You should consult with your eye doctor and flight surgeon if this is the case.

Appendix 5: Quality of Vision Questionnaire
For aviation duty following corneal refractive surgery (CRS)

Read the questions carefully and answer truthfully. Concealment of medical history shall be reported to higher authority and may result in permanent disqualification. Each positive response for items 1-4 or negative response to item 5 requires elaboration by a flight surgeon or eye care provider. If symptoms are corrected by spectacle wear, note this and record the prescription used. Waiver recommendation after CRS for aviation duty requires compliance with the appropriate Class I (currently only pilot candidates) and Class II visual standards AND freedom from significant visual symptoms. If these conditions are achieved only with corrective eyewear, then updated spectacles shall be worn for all aviation duty.

1. When you read brightly illuminated road signs at night, do you have **any problems** with **hazy vision**?

YES ___ NO ___

2. Do you have **any problems** with **glare or halos** from oncoming headlights at night?

YES ___ NO ___

3. Do you have **any problems** seeing because of **double vision or ghost images**?

YES ___ NO ___

4. Do you have **any problems** seeing people or things at **twilight**?

YES ___ NO ___

5. Do you have **confidence** in your visual ability to perform your aviation duty?

YES ___ NO ___

Respondent's signature: _____ Date: _____

Provider Comment

Provider signature and identification:

RESPONDENT IDENTIFICATION:

Name: Last _____ First _____ M.I. _____

SSN: _____

DEPTH PERCEPTION DEFECT (ICD9 368.33)

AEROMEDICAL CONCERNS: Stereopsis (binocular depth perception) is generally not considered to be a factor in the perception of depth beyond 200 m. Monocular cues prevail beyond 200 m to facilitate perception of depth. In aviation, accurate perception of spacing or depth within 200 m is critical in a number of situations, such as formation flying, holding hover during 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. Therefore, individuals need to be monitored throughout their aviation career. Fourth cranial nerve (superior oblique) palsy has been shown to more likely decompensate over time in aircrew with resultant diplopia than the horizontal microtropias.

WAIVERS:

Initial Flight Applicants (All Classes): Defective stereopsis is considered disqualifying and waivers are not considered.

Rated and Non-rated Aircrew (All Classes): Waivers for aviators are considered on a case-by-case basis with a restriction of flying with another fully qualified pilot, rated in the type and model of the aircraft being flown. No waivers will be considered for aviators in solo control of aircraft.

INFORMATION REQUIRED: Near stereopsis tests should never be used alone to qualify any aircrew, since many microstrabismic may have defective distance stereopsis but normal near stereopsis and vice versa. Distance stereopsis is the main aeromedical concern. The USCG shall use the Armed Forces Vision Tester, the Optec 2300, for assessment of depth perception in aviators. Other testing instruments such as RANDOT are not authorized. Passing this test requires the ability to discern depth based on a disparity of at least 25 seconds of arc (line D), although the test is capable of testing as low as 15 seconds of arc (line F). The limit of human stereopsis is most probably around 5 seconds of arc. The Verhoeff test measures intermediate stereopsis and is not authorized as a screening test for USCG aircrew. The AO Vectograph should be utilized to determine the waiver potential of substandard stereopsis cases discovered by testing with the AFVT. The AO Vectograph should also be used to monitor stability in defective depth perception waiver cases.

Ophthalmologist/optometrist evaluation: The evaluation should address any history of diplopia or previous eye surgery and include the following tests:

- Full ocular muscle balance testing,
- Testing for diplopia in the nine cardinal directions,
- Pupillary exam
- Cover test (both near and far)
- Red lens test
- Maddox Rod test
- Worth four-dot exam
- AO Vectograph.

- Completion of the pre-printed ocular motility worksheet (Appendix 6).

If there is an obvious defect, such as a frank tropia, it is not strictly necessary to fill in every block in the motility worksheet since no waiver is possible.

TREATMENT: Correct any underlying visual acuity defect regardless of degree.

FOLLOW-UP: Depending on the findings, annual follow-up requirements may range from annual vision screening with PHA/FDME to annual optometric/ophthalmologic evaluation.

DISCUSSION: Defective stereopsis can be innate. Several sources of defective stereopsis include: defective ocular muscle balance, amblyopia, anisometropia, microtropia, and monofixation syndrome. All of these possible etiologies should be evaluated during the ophthalmology/optometry consultation. The most common causes of a recent loss of stereopsis are a change in refraction or presbyopia. The visual cues to the perception of depth are both monocular and binocular. The monocular cues are learned and some investigators feel that they can be improved by study and training. Monocular cues are ones that can be the most easily fooled by illusions. Therefore, an inexperienced aviator would tend to be far more susceptible to illusions; hence the prohibition on waivers for initial applicants. Binocular cues (stereopsis) are innate and are not easily fooled by illusion.

Stereopsis is not an absolute must in flying an aircraft, and in fact, the FAA does not require this to be tested. Through mathematical derivation, it has been shown that true stereopsis does not exist beyond approximately 200 meters; some believe it does not actually work beyond 20 meters. Numerous civilian individuals and past military aviators who lacked stereopsis have still made good aviators. However, the visually demanding environment of nap of the earth (NOE), pinnacle landings, and other various military operations requires the optimal senses.

Amplifying Discussion: Depth perception is derived from the interpretation and integration of a number of monocular and binocular cues. As such, defects or acquired abnormalities in any portion of the visual axis may adversely affect the perception of depth.

Monocular depth perception relies on learned cues such as physical appearance of an object or the size relationship of objects. Examples of monocular cues include motion parallax and perspective. Although monocular cues to depth and distance are the primary cues utilized beyond 200 meters (m), they are subject to visual illusion. The precision of monocular depth perception is highly variable, depending on stimulus, lighting and motion of the object, but is generally accepted to be inferior to binocular depth perception (stereopsis).

True binocular stereoscopic vision (stereopsis) represents the finest level of depth determination and refers to the interpretation of depth by detection and interpretation of retinal disparity. The ability to discern depth accurately seems to develop at about three months of age in normal infants. However, this ability is dependent on accurate depiction of an image upon the retina of both eyes simultaneously, and upon the correct interpretation of that stimulus. Any disruption of accurate retinal imaging will adversely affect depth perception. Some individuals are unable to accurately perceive depth secondary to developmental abnormalities of the neuro-retinal pathway. The most common example of such a defect is childhood amblyopia (also called “lazy” eye), which includes strabismic amblyopia (a misalignment of the optical axis), anisotropic

amblyopia (due to retinal image size disparity or clarity differences secondary to differential refraction between the two eyes) and deprivation amblyopia (from opacities or blockage of the optical media such as cataract, ptosis or uniocular retinal disorder). Some of these individuals may have transient misalignments of the visual axis sufficient to cause strabismic suppression of one of the misaligned images across such a small portion of the visual axis as to be undetectable by the individual, and detectable only with specific testing. Similarly, acquired disorders, such as imperfect refraction or uniocular visual disruption from ocular conditions, such as a cataract or trauma, can adversely affect the depth perception in a previously normal individual. Sources of depth perception defects commonly seen among aviators and aviator applicants include defective ocular muscle balance, uncorrected refractive errors, microtropia, anisometropia and monofixation syndrome.

Although some defects in stereoscopic vision may be ameliorated with correction of the visual abnormality, individuals with corrected childhood amblyopia (by eye patching and/or strabismus surgery) still exhibit a high prevalence of reduced depth perception capability.

Microtropia and monofixation syndrome represent defective forms of binocular vision in which there is preservation of peripheral extramacular fusion but the absence of central macular fusion and fine stereopsis. This results from subtle misalignment of the eyes (microstrabismus), but can also occur in some individuals whose eyes appear straight. Patients with these conditions have the inability to use both foveae simultaneously (bifixation) and must resort to fixating with one eye at a time (monofixation). Failure to have simultaneous bifoveal fusion always results in degraded development of normal stereopsis. Diagnosis of microtropia is based on the presence of a facultative macular scotoma, a stereopsis deficit (though it may be mild), and a tropia of less than or equal to 8 prism diopters of deviation. In monofixation syndrome no tropia is detected on cover tests. Both microtropia and monofixation syndrome may be present, either with good visual acuity in the deviated eye, or amblyopia. There is usually no indicated treatment for microtropias and monofixation syndrome.

V. References.

1. Aeromedical Policy Letters, US Army. March 2008
2. Aeromedical Reference and Waiver Guide, US Navy. May 2010
3. USAF Waiver Guide. December 2007

EXCESSIVE PHORIAS/TROPIAS/AMBLYOPIA (ICD9 378.4)

AEROMEDICAL CONCERNS: Excessive phorias are frequently associated with defective stereopsis and/or diplopia which can be a devastating state if it occurs during a critical phase of flight. Excessive esophoria/exophoria (>8 prism diopters), hyperphoria (> 1 prism diopters,) heterotropia of any degree, or a history of extraocular surgery after age 4 (to include before age 4 if other residual ocular abnormalities exist) are disqualifying for flight duties.

WAIVERS:

Initial Applicants (All Classes): Any of the above conditions are disqualifying and not waivable.

Rated and Non-Rated Aircrew (All Classes): Waiver requests are reviewed on a case-by-case basis and not normally recommended due to the relatively high risk for developing diplopia during extended operations, night or reduced ambient light flights. Severity of condition, crew position and years of experience are central to the waiver recommendation.

INFORMATION REQUIRED: Ophthalmology/optometry evaluation. The evaluation should address any history of amblyopia or diplopia, any patching of one/both eyes, or previous eye surgery, and include the following tests, as clinically indicated:

- Full ocular muscle balance testing,
- Testing for diplopia in the nine cardinal directions with vision testing apparatus (VTA), or Randot depth perception testing
- Pupillary exam
- Cover test (both near and far), alternate cover test
- Near point of convergence (NPC)
- Red lens test
- Maddox Rod test
- Worth four-dot exam
- AO Vectograph.

The pre-printed **Ocular Motility Worksheet (Appendix 6)** shall be completed and sent in along with the waiver request and cranial nerve palsies must be ruled out by this evaluation.

TREATMENT: N/A

FOLLOW-UP: Depending on the findings, annual follow-up requirements may range from annual vision screening with all PHA/FDMEs to annual optometric/ophthalmologic evaluation.

DISCUSSION: A phoria is a latent deviation of an eye which is present (at least to a slight degree) in nearly 100% of the population. When the phoria is in excess of the standards, a large neuromuscular effort is required to maintain fusion and binocular vision. Such individuals often break fusion during extreme fatigue or when flying at night with loss of external fixation points. Rapid instrument scanning may also result in fatigue and subsequent loss of visual fusion. A breakdown of fusion, usually leads to diplopia and loss of stereopsis. Tropias (manifest ocular

deviations) are present in approximately 3% of the population and may not be clinically obvious on examination. Subclinical tropia patients may be reluctant to divulge a history of double vision or decreased visual acuity in the affected eye.

APPENDIX 6: Excessive Phorias Work Sheet

Ocular Motility Work Sheet

(Exam and the reporting of results must conform with the instructions in the APL)

Date of Exam: _____ Facility/Clinic: _____

Pertinent History:

Distant Visual Acuity

Manifest Refraction

OD 20/

OD

Corrected to 20/

OS 20/

OS

Corrected to 20/

Cycloplegic Refraction

Habitual Rx

OD

20/

OD

OS

20/

OS

Correction Used for Remainder of Examination: Habitual ___ Manifest ___ None ___

COVER TEST:

Far

Near

All Gazes

All Gazes

Extraocular Motility:

Maddox Rod or Von Graeffe:

Stereopsis:

Worth 4 Dot:

Vectograph (anti-suppression):

Red Lens:

47 Base Out (if applicable)

Other Tests (if applicable)

Impression:

Qualified ____ Not Qualified ____

Provider Signature:

Provider Phone #

Specialty:

E-Mail Address:

Patient Name:

SSN

Rank/Rate:

Flight Hours:

Years of Service:

Airframe:

Patient Address:

Patient Phone#:

Patient Email:

LASER OCULAR STRIKE (ICD9 E926.4)
Specify component of eye and type of injury

AEROMEDICAL CONCERNS:

Laser strikes can adversely affect normal flight operations by causing distraction, glare, temporary flash blindness, eye injuries and psychological stress associated with perceived damage. The risk is greatest when the exposure occurs during critical phases of flight. While most laser exposures do not cause injury, eye injuries to aircrew and pilots may ensue. Specific laser injuries include

- flash blindness
- dazzle
- dark spots
- hazy vision
- floaters
- facial and retinal burns
- concern/anxiety among aircrew and pilots

The threat level depends on factors including: classification and wavelength of the laser, how the laser is operated, ambient lighting/time of day, aircraft motion and distance, flight phase, pilot workload and pilot awareness of laser hazards.

Lasers are divided into four classes (1 to 4) and two subclasses as established by the American National Standards Institute (ANSI). Potential for harm ranges from no known hazard (Class 1) to those that present serious danger (Class 4). Green lasers are especially problematic due to the eyes' inherent sensitivity to yellow/green light, particularly at night; green lasers appear up to 30 times brighter than red lasers using the same amount of power, increasing the risk of debilitating or distracting a pilot. Infrared and UV lasers may be undetectable and invisible.

WAIVERS: not applicable

INFORMATION REQUIRED: If significant symptoms are reported or found on initial exam following a laser exposure (see flight surgeon assessment below), further work up should assess the following and will require referral to Ophthalmology:

- Stereopsis (Optec Vision Tester (OVT) depth perception test)
- Color Vision: PIP II (SPP2) plates is desirable
- Slit Lamp: (Woods Lamp if Slit Lamp Unavailable)
- Dilated Retinal Examination
- Vitreoretinal Hemorrhage
- Chorioretinal Lesions
- Optical Coherence Tomography (OCT)

CLINICAL PRESENTATION:

Most laser exposures do not result in injury (Class 1, 2, or 3a with limited exposure duration). The most likely complaints from a person exposed to a laser are anxiety about the exposure and/or superficial irritation due to rubbing the eyes after the exposure (such

as conjunctival irritation, scratches to the cornea, and mild erythema surrounding the eyes). Laser exposures leading to injuries to the visual apparatus may manifest as clouded vision, blind spots, floaters, or visual distortion.

TREATMENT

Awareness Education: The majority of post laser exposure ocular injuries are due to self inflicted injuries from rubbing or concern out of proportion to the likelihood for injury. Therefore, a key component of medical force protection and prevention in operational units should include training and awareness of the entire laser beam threat spectrum, including what steps should be taken by aircrew after a laser exposure.

Crew Self Assessment: In the absence of signs, symptoms, or concerns by the affected member after a laser exposure, immediate medical evaluation may be deferred. The first step after an aircrew member or pilot is exposed to a laser is to complete the **Aviation Laser Exposure Self Assessment (ALESA - Enclosure (1))**. This will assist the affected member, his command, and the flight surgeon in determining if it is appropriate to continue participation in ongoing operations or to seek immediate medical evaluation and treatment.

Flight Surgeon Assessment

History

As much of the following information should be obtained following the strike to assess the potential threat associated with the exposure. Use of the **Laser Beam Incident Questionnaire** (Enclosure 2) may be used to gather this history:

- Laser intensity, color, constant or flicker nature of the light source
- Duration of exposure
- Estimated beam diameter, range from lasing source
- Laser source
- Tracking of the aircraft by the beam
- Location (airborne or ground)
- Glare, pain, photophobia, and any other immediate or delayed symptoms.
- Types of personal protective equipment or viewing devices being used (including NVGs)
- Past ocular and family eye histories

Initial Exam

- External Examination of surrounding tissues and surface of eye
- Near Visual Acuity Test
- Far Visual Acuity Test
- Amsler Grid Test
- Ophthalmoscopy/fundoscopy

DISCUSSION:

Aircrew laser exposures are common events. Most laser exposures do not warrant immediate cessation of flight duty. However, in the unlikely event of a significant injury or concern for injury, the affected member must be immediately removed from flight duty and evaluated in a timely manner. Effectively educating pilots and aircrew about

the risks of laser exposures and providing them with a self-directed assessment tool (ALESAs) to define their risk of damage and need for medical follow up after a laser exposure reduces both the anxiety concerning such exposures as well as the number of unnecessary aircrew or pilot medical groundings.

If a pilot or aircrew member has a laser exposure and meets the criteria for a deferred exam per the ALESA crew self assessment algorithm, COMDINST 3710. 1(series) allows for a deferred medical evaluation if the operational requirements of a given mission justify this decision. The decision for a pilot or aircrew to remain in operational status is at the discretion of the operational command. This decision is best made in consultation with a USCG Flight Surgeon.

REFERENCES:

- 1) Murphy, Patrick: LASERS AND AVIATION SAFETY International Laser Display Association Sept, 2009
- 2) Mainster, Martin A. PhD, MD et al: Assessment of Alleged Retinal Laser Injuries ARCH OPHTHALMOL /VOL 122, AUG 2004
- 3) Clark, Patrick J. Clark, Lieutenant Colonel, USAF, BSC, et al, Laser Injury Guidebook, United States Air Force School of Aerospace Medicine, September 2008, Air Force Materiel Command, Air Force Research Laboratory, 711th Human Performance Wing, USAF School of Aerospace Medicine, Brooks City-Base TX
- 4) FM 8-50: PREVENTION AND MEDICAL MANAGEMENT OF LASER INJURIES HEADQUARTERS, DEPARTMENT OF THE ARMY AUGUST 1990

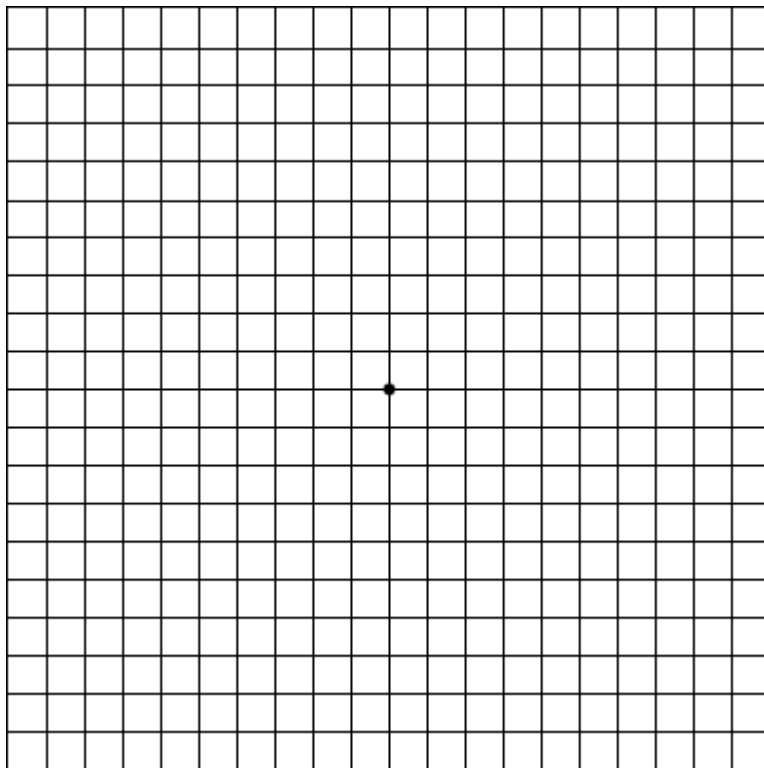
Enclosure (1): Aviation Laser Exposure Self Assessment (ALESA)

While viewing the grid from one foot (30 cm) in front of your eyes, test one eye at a time to answer the following questions:

1. Can you see a dot in the centre of the grid?
2. While looking at the centre dot, can you see all four sides and corners of the grid?
3. While looking at the centre dot, do all of the lines appear straight with no distortions or blank or faded areas?

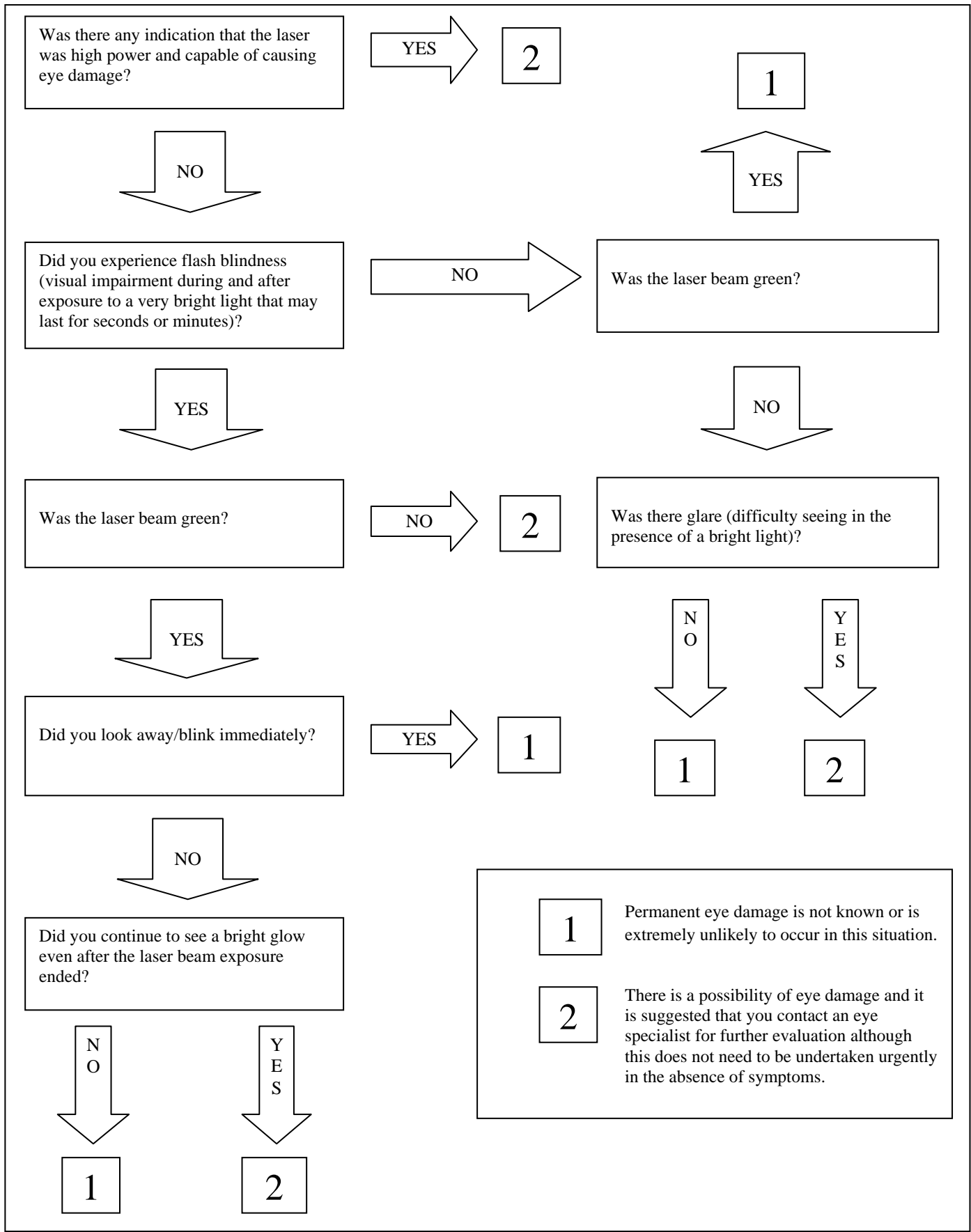
If you answered **YES** to all three questions, go to page 2

If you answered **NO** to any of the above questions then remove yourself from flying duties and consult a Flight Surgeon.



Enclosure (2): Laser Beam Incident Questionnaire

(appears on following page)



BACKACHE and OSTEOARTHRITIS OF THE SPINE (ICD9 724.2 / 721.90)

AEROMEDICAL CONCERNS: This APL addresses the non-specific severe, persistent, and/or recurrent episodes of back or neck pain which are not specifically covered by the other APLs for Intervertebral Disc Disease, Ankylosing Spondylitis, Spinal Fractures, and Spondylolysis/Spondylolithesis. Categories covered by this APL include: degenerative joint-facet arthropathy, generalized sero-negative spinal osteoarthritis, spinal osteoporosis, and “mechanical low back pain.” History of recurrent or low back pain is of aeromedical concern in that the individual is placed at risk for both compromise of mission capacity and for the acceleration of underlying spinal degenerative processes; making it disqualifying for all classes of duty.

WAIVERS/INFO ONLY/DQs:

Initial Class 1 Flight Applicants: History of recurrent or persistent back pain is disqualifying and will not ordinarily be favorably considered for waiver.

Rated and Non-Rated Personnel: Waivers are usually granted if the recurrent or chronic back pain has been easily controllable with OTC’s/ NSAIDS without significant/frequent lost duty time, and does not result in use of class IV medications. Isolated cases with full recovery may be managed as ***Information Only*** on an FDME. The unit flight surgeon should carefully investigate and document the duration and frequency of lost duty time when making a decision to use the ***Information Only*** format. Consultation with the member’s command to assess the degree to which lost duty time has impacted operational commitments should be considered.

INFORMATION REQUIRED:

Local FS Evaluation with treatment plan outlines to include:

- Evaluation sufficient to exclude prolapsed (herniated) intervertebral discs, structural spinal disease (degenerative disease, spondylolysis or -lithesis), spinal injury (fractures), metabolic bone disease, metastatic lesions, myeloma, ankylosing spondylitis, rheumatoid arthritis, infection, or other structural defects/injuries.
- FS or PT documentation of back exam, mobility, and peripheral neuron-motor-sensory function
- Laboratory (minimum): CBC, CMP, Calcium, Uric Acid, UA, Arthritis Panel/ESR
- Imaging (minimum): Plain Films of affected region with CT or MRI-studies only as clinically indicated.
- Physical Fitness Scores and/or presumptive subsequent evidence of fitness.
- Orthopedic, Physical Therapy and/or Rheumatology Evaluation: As required as part of the clinical evaluation and treatment, based on severity, progression, deficits, or positive findings.

FOLLOW-UP: No annual follow-up requirement, beyond local flight surgeon assessment, is required for non-specific, stable back pain, which is non-progressive and without impact on flight duties/safety. Orthopedic or other specialty annual evaluations may be required for cases

with deficits or significant potential for progression. Progression of pain, worsening of symptoms, increased lost duty-time, or emergence of new findings/limitations will mandate complete re-evaluation, advanced imaging and specialty consultation followed by re-submission of an AMS for status recommendations and amendment.

TREATMENT: For back pain, simple conservative measures are usually effective, and often will not require prolonged restriction from flight. This can encompass temporary restriction from flight and strenuous PT, remedial exercises, hot/cold packs, and OTCs or NSAIDs. Symptoms severe enough to require use of narcotic analgesics, hypnotics, oral steroids, anti-depressants, back injections, and/or epidural steroids require DNIF status and should be handled through the AMS process and not reported as *Information Only*. Chronic medication for back pain beyond acetaminophen and NSAIDs is rarely considered for waiver.

DISCUSSION: The incidence of backache in pilots occurring only during flight has been reported as 13%. Helicopter pilots report a higher incidence. Degenerative changes in the cervical spine are common over the age of 30 years. Aviation environments require wearing heavy equipment, long periods of forced immobility (sitting) in seats designed for safety rather than comfort, exposure to high levels of vibration, and frequent awkward postures. All these factors are associated with aggravating back discomfort. Back discomfort, either in-flight or in a flight-associated environment, can result in task distraction, decreased concentration, and decrease in the motion/flexibility necessary for performance and safety. Individuals with recurrent or prolonged back pain are at risk for increased duty absences, disqualifying medications. Chronic pain is associated with depression. Two or more episodes of back discomfort indicate a substantial risk for future recurrence. The flight environment, like the commercial truck driving environment, is a risk factor for development of and/or worsening of degenerative spinal disease, presumably due to prolonged exposure to sitting and vibration.

INTERVERTEBRAL DISC DISEASE (ICD9 722.2)

AEROMEDICAL CONCERNS: Intervertebral Disc Disease (herniated nucleus pulposus, HNP) at any spinal level is of concern in an aviation environment due to its potential impact on mission availability, functional limitation, task distraction, and treatment side effects. Further concerns include the individual's increased risk in both short-term health status and in long term progression/extent from G-Forces, hard-landings, prolonged sitting, frequent awkward postures, wear of heavy equipment and career-long exposures to vibration. History of clinically significant spinal HNPs, degenerative disc disease (DDD), spinal stenosis, conditions producing neural impingement, and spinal conditions with associated radiculopathy (with or without corrective surgery and with or without current symptomatology) is disqualifying for all classes, both initial and rated aviators.

WAIVERS:

Initial Class 1 Applicants: History of HNP or any spinal condition producing radiculopathy, with or without surgery is disqualifying. Waivers, although not normally recommended, may be considered on a case-by-case basis, especially for remote histories with excellent recovery.

Rated and Non-Rated Aircrew: Waivers are favorably considered for cases, whether treated conservatively or surgically, so long as there has been resolution of symptoms, a return to normal duties, no residual motor-sensory-reflex deficits, no instability of posterior elements, and no requirement for limiting treatments or Class IV medications. Aircrew members with histories of cervical HNP and/or history of spinal fusion will be restricted from aircraft with ejection seat capacity (no current USCG aircraft are configured with ejection seats but certain assignments to DoD may require flying in ejection seat equipped airframes).

INFORMATION REQUIRED: Orthopedic or Neurosurgical consultation with appropriate imaging studies, electro-diagnostic studies and/or operative/treatment reports. Post-fusion stability studies (if applicable): PA/LAT and/or CT demonstrating satisfactory healing/stability of posterior (fused) elements.

TREATMENT: Initial conservative treatment follows that of the Back Pain APL, with discovery of disc disease through the evaluation or due to persistence or severity of symptoms. Further treatments range from conservative measures with PT, to medications and epidural injections, chemonucleolysis, and beyond. Standard surgical options include microdiscectomy, laminectomy, and fusion procedures. Waivers for lumbar disc implant replacement may be considered but cervical disc replacement is not waiverable. While symptomatic and during treatment/recovery, the patient should be grounded and not returned to flight duties until off Class IV medications, healed, back to full duties, and after clearance from their surgeon and PT.

FOLLOW-UP: No follow-up is normally required other than a routine FDME. Recurrence of symptoms will require further orthopedic/neurosurgical consultation and supplemental AMS submission. Use of NSAIDs/acetaminophen is waiverable.

DISCUSSION: Spinal Disc Disease (HNP, bulging disc, DDD, foraminal impingement, spinal stenosis) is a frequent (and often non-pathologic) finding on advanced imaging of all populations, regardless of symptomatology. Its prevalence is reported in the range 1% for every year of age in randomly selected, asymptomatic populations. That is, in asymptomatic 50 year olds, over 50% will have a HNP noted on MRI. Bulging Discs are even more common, approaching 80% by middle age, and may be unrelated to the underlying symptoms. Most cases of foraminal impingement are not due to disc disease, but rather to degenerative osteophyte encroachment, often with associated further decrease in foraminal space by a disc bulge. Surgical treatment is indicated for cases with neurologic deficits and for those cases with significant symptomatology, unresponsive to conservative measures. Surgical treatment is over 80% effective in relief of pain in those cases where imaging demonstrates a lesion correlating with peripheral findings. In cases where there are no neurologic deficits or there is incomplete correlation of symptoms to lesion, the five-year outcome is the same for conservative and for surgical treatments. Cervical symptoms are particularly concerning with pain, radiculopathy, exposure to Gz maneuvers, and the additional weight of ALSE equipment. Cervical disc implants show promise but have not yet been satisfactorily evaluated.

KNEES – including ACL/Ligament TEARS (ICD9 717.83)

AEROMEDICAL CONCERNS: Knee instability is a safety risk factor in the aviation environment during foot pedal operations (vehicle/aircraft), climbing ladders/preflight, emergency egress/rescue, or water and land survival.

WAIVERS:

1. Initial Applicants (All Classes): Internal derangement of the knee resulting in instability of either ACL or PCL is disqualifying. Waivers, although not normally recommended, may be considered on a case-by-case basis provided the waiver criteria set forth for rated/non-rated aviators are met.

2. Rated and Non-Rated Aviators (All Classes):

Information Only: Successfully repaired or conservatively healed knee lesions if:

- Repair was limited to one collateral ligament or structure, plus ACL
- No previous or subsequent surgical procedures on that knee.
- Stable, functional joint, well-healed w/o pain, effusions, deficits
- Sharp/well-defined end point on Anterior Drawer
- Ability to duck-walk, hop on affected leg, run without limitation
- Retained Hardware is limited to a single screw/pin

Waiver submission is required for all cases in which:

- Instability is not corrected
- More than two knee structures were injured
- Two or more surgeries were performed on the same knee
- Symptoms or deficits persist post repair
- Functional testing remains abnormal
- Recurrent (more than one episode) of internal derangement

ICD9 Code Condition

- 717.3 Medial Meniscal derangement
- 717.40 Lateral Meniscal derangement
- 717.7 Chondromalacia of the patella
- 717.83 Anterior Cruciate Ligament disruptions, old
- 717.84 Posterior Cruciate Ligament disruptions, old
- P80.26 Knee Arthroscopy
- 844.0 Lateral Collateral Tear
- 844.1 Medial Collateral Tear

INFORMATION REQUIRED:

- Orthopedic consultation
 - Documented stability and treatment success
 - Symptom-free

- Full ROM
- Adequate strength
- Medication requirements limited to OTC's/NSAIDS
- No orthotic use with normal functional stability testing: (-) anterior drawer testing, duck walk 20 feet, hop on affected leg 20 times
- Reports of Operative Report and Imaging Studies

TREATMENT: With Orthopedic and Physical Therapy management, most knee injuries are successfully managed with full return to function without limitations. While in therapy or rehabilitating, personnel should be temporarily grounded with simulator duties allowable. While most will proceed to surgical therapy, those minor injuries successfully managed conservatively to full recovery may be considered for waiver or information only, as outlined above.

DISCUSSION: Injuries producing tears to the collateral ligaments are commonly of the force/direction to have potential for injury to other knee internal structures. For example, anterior cruciate ligament tears are usually accompanied by associated damage to the medial and often the lateral complexes as well. These result from forced flexion or hyperextension injuries. A positive "anterior drawer sign" is evident on physical exam, usually with findings of medial ligamentous instability as well. Avulsion fracture of the anterior tibial spine may also be noted on x-ray. Prior to and following surgical repair, intensive quadriceps building is required to assist recovery and prevent recurrent injury. By contrast meniscal injuries may be isolated and allow recovery with Physical Therapy.

ALLERGIC / NONALLERGIC RHINITIS (ICD9 477 / 477.9)

AEROMEDICAL CONCERNS: Allergic rhinitis is a common upper respiratory condition with a potential for causing significant medical incapacitation in flight personnel. Rhinitis is not usually disabling but is a distraction and may cause significant periods of down time. The reduced sense of smell may be hazardous during flight. Congestion and swelling of the nasal passages can interfere with the movement of air and result in airway compromise and discomfort. The use of some medications may have unacceptable side effects (i.e., drowsiness). Congestion may obstruct nasal passages and lead to ear or sinus barotrauma with potential for in-flight incapacitation.

WAIVER:

Initial Applicants (All Classes):

Information only: Mild seasonal or perennial allergic rhinitis, treated successfully with short acting decongestants, non-sedating antihistamines, leukotriene modifiers, and/or intranasal steroids without side effects or adverse reactions will be recorded as information only.

Waivers: A waiver must be submitted for initial flight applicants who have:

- Required systemic steroids.
- Received immunotherapy.
- Have a history of sinus surgery to include polyp removal.

Rated Aviation Personnel (All Classes):

Information only: Mild seasonal or perennial allergic rhinitis, treated successfully with short acting decongestants, non-sedating antihistamines, leukotriene modifiers, and/or intranasal steroids without side effects or adverse reactions will be recorded as information only.

Waivers: A waiver will be required if the condition is controlled by immunotherapy, has ever required systemic steroid use, or is managed by specialty care.

INFORMATION REQUIRED: All requests for waiver should include:

- Detailed description of symptoms, duration and frequency, medications or treatments used in the past, environmental triggers (e.g. animals, pollens, cold, altitude changes, etc.), and any smoking history.
- Findings from imaging studies.
- Allergy skin testing (if done) results.
- ENT and/or Allergist reports/recommendations.
-

FOLLOW-UP: None required unless symptoms worsen.

TREATMENT:

How do you feel about **PATANOL® (Olopatadine) 0.1 % Eye Drops? Recommend inclusion.**

Intranasal Steroids — the recommended first line treatment for moderate disease.

- Dexamethasone (Dexacort), Flunisolide (Nasarel or Nasalide)
- Beclomethasone (Beconase, Beconase AQ, Vancenase, Vancenase AQ DS)
- Budesonide (Rhinocort)
- Triamcinolone (Nasacort or Nasacort AQ)
- Fluticasone (Flonase)
- Mometasone (Nasonex).

Antihistamines — the recommended first line treatment for mild, intermittent disease.

- Fexofenadine (Allegra)
- Loratadine (Claritin)
- Olopatadine (Patanol) eye drops for allergic conjunctivitis
- All other antihistamines are Class 4-nonwaiverable, including Cetirizine (Zyrtec).

Leukotriene Modifiers—Montelukast (Singulair)

Short acting decongestants – use as needed.

Intranasal Cromolyn sodium (Nasal crom) —Effective, but requires frequent (qid) dosing.

Intranasal Anticholinergics — Ipratropium bromide (Atrovent) 0.03% nasal spray is effective when rhinorrhea is the predominant symptom. It is not very helpful for relieving congestion, itchy watery eyes or sneezing.

Allergy testing – Consider allergy testing if no response to therapeutic course of antihistamines/intranasal steroids after 30-90 days of treatment or for patient education for control of trigger exposure.

Immunotherapy — may be used while the aviator remains on flight status provided he (or she) remains reasonably asymptomatic without the use of antihistamines. Occasional Sudafed or use of an intranasal steroid is permitted. Aviation personnel should be grounded 12 hours following immunotherapy injection or for the duration of local or systemic reaction. The accelerated method of reaching maintenance immunotherapy (Rush technique) can be used and should be considered to minimize grounding time.

DISCUSSION: Rhinitis is an inflammation of the nasal passages which can be subdivided into two major categories: Allergic and Nonallergic. Allergic rhinitis can be either seasonal or year round and can be characterized by any or all of the following symptoms: rhinorrhea, nasal congestion, sneezing, nasal or ocular pruritus and lacrimation. Seasonal allergic rhinitis is caused by an IgE mediated reaction to seasonal aeroallergens, typically tree, grass and /or weed pollens as well as molds. Perennial allergic rhinitis is a year round condition also due to an IgE mediated reaction to aeroallergens which primarily include dust mites, animal allergens and molds. Intranasal steroids and cromolyn have minimal side effects and are approved for use in aviation personnel. Nonallergic rhinitis may consist of nasal congestion, sneezing, and rhinorrhea. The congestion is often seen as alternating, with sometimes severe nasal obstruction. Inciting factors include temperature and humidity changes, odors, irritants, recumbency, and emotion. Treatment of nonallergic rhinitis with inhaled nasal steroids can be effective; and if symptoms are not disabling, no waiver is required. Daily antihistamine use is not recommended for treatment of nonallergic rhinitis. The diagnosis rests primarily on history (time of day, seasonal variation of symptoms, frequency and duration of episodes, environmental factors such as home or work exposures, whether symptoms improve with altitude or humidity and if there are any triggers such as MSG, pollen, smoke, cold weather, physical exertion). Further evaluation is indicated if symptoms are severe and do not respond to medical therapy. Sinus CT scans or rhinoscopy

would be part of a more in-depth evaluation. Allergy skin prick testing is the most sensitive test for identifying specific allergies. It is simple and inexpensive. RAST testing is a good screening test to help with identifying suspected triggers. Total IgE or eosinophil counts are not good screening tests and therefore are not recommended.

REFERENCES:

Dykewicz, MS, Fineman, S, et al. Diagnosis and Management of Rhinitis: Parameter Documents of the Joint Task Force on Practice Parameters in Allergy, Asthma, and Immunology. *Annals of Allergy, Asthma, Immunology* 1998; 81: 463-518.

HEARING LOSS (ICD9 38910)

AEROMEDICAL CONCERNS: Adequate hearing is essential for communication in flight and also for rapid and accurate assessment of warning tones in the cockpit.

WAIVERS: Unrestricted waiver can be considered depending on amount of hearing loss and functional capability, provided a complete audiological evaluation indicates no underlying pathology, and binaural speech recognition score is 84% or higher. Aircrew members with a recognition score of less than 84% are considered on a case-by-case basis.

HEARING STANDARDS

Acceptable audiometric hearing levels for USCG aircrew members and LSOs						
Class	500Hz	1000Hz	2000Hz	3000Hz	4000Hz	6000Hz*
1/1r	25	25	25	35	45	45
2	25	25	25	35	55	65

**Isolated hearing loss at 6000 Hz will not require full audiology work-up unless recommended by the local FS or audiologist (i.e., new onset, etc.) and is not considered disqualifying; however, 6000 Hz hearing measurements will be reported for AEDR data base and/or research and academic interest.*

INFORMATION REQUIRED:

- Complete initial audiological evaluation is required to include pure-tone air conduction testing (and bone conduction if deemed necessary by audiologist or FS), immittance audiometry to include:
 - Tympanometry
 - Acoustic reflex threshold testing
 - Speech reception threshold testing
 - Speech recognition (discrimination) testing in quiet under earphones. Speech recognition testing will be conducted both monaurally and binaurally utilizing the North Western University (NU6) word list material. Monaural testing will be conducted at a sensation level (SL) of 40 decibels (dB). Binaural recognition testing will be conducted at the patient's most comfortable listening level (MCL).
- ENT evaluation (should normally follow the audiology evaluation)
- An in-flight hearing evaluation may be necessary to fully evaluate an aviator's ability to effectively communicate in the aircraft. The in-flight evaluation consists of doing speech recognition testing (using common aviation terms) while exposed to in-flight conditions of noise and normal flight conditions in the individual's primary aircraft. An individual with normal hearing should also be tested at the same time to provide a control.
 - A list of common aviation terms should be generated pre-flight without the knowledge of the person(s) being tested. This list should include words or phrases often used in the aviators primary aircraft:

- Isolated Words (person/place names, locations, aircraft components)
 - A three word sequence (Alpha Charlie Delta)
 - An aircraft call-sign followed by an operational message up to five words (Alpha Victor Romeo clear for takeoff)
 - An aircraft call sign, a two to four digit sequence followed by a carrier phrase (Foxtrot India Zulu make your speed two six zero knots)
- The tested and control individuals should write down what they hear and a comparison made post-flight.

FOLLOW-UP: An annual manual or microprocessor pure-tone evaluation at 500 Hz, 1000 Hz, 2000 Hz, 3000 Hz, 4000 Hz, and 6000 Hz in each ear is required. Automatic Bekesy type tracings are not acceptable. A shift of 20 db or greater in EITHER ear (from the baseline established with the current waiver) at 500Hz, 1000 Hz, 2000 Hz, 3000 Hz, and 4000 Hz will require submission of a complete audiometric assessment, including air conduction, speech audiometry, and tympanometry.

NOTE: All personnel with noise exposure greater than 30 days per year based on OMSEP standards must be enrolled in the USCG Occupational Medical Surveillance and Evaluation Program (OMSEP) and followed throughout their career using the guidelines set forth in Chapter 12.C.7 of the USCG Medical Manual (COMDTINST M6000.1series).

TREATMENT: Patients with conductive hearing loss may be helped by the use of hearing aids for ground duties in nonhazardous noise environments. The use of a hearing aid in flight is not recommended or authorized since the headsets have volume controls.

DISCUSSION: Patients with conductive hearing losses often hear better in a noisy background, such as in the air; whereas those with sensorineural hearing loss, tend to perform less accurately in the noisy flight environment. The factors to be taken into account in deciding an aeromedical disposition are the degree and type of loss, the need to hear accurately on the ground and in the air, the possible effects of fatigue, and the rate and degree of hearing loss progression. Significant hearing loss requiring headset volume to be very high may accelerate/exacerbate the hearing loss and should be considered in the waiver recommendation process.

ALCOHOL ABUSE OR DEPENDENCE

AEROMEDICAL CONCERNS: Ethyl alcohol has a depressant effect on the CNS. Subtle performance effects such as procedural errors, decreased reaction time, and inattentiveness may occur even after low doses. More importantly, alcohol consumption can cause disorientation, including production of positional alcohol nystagmus, vertigo and impairment of the ability to suppress inappropriate vestibular nystagmus. This susceptibility exists long into the "hangover" period. Ingestion of alcohol causes reduced Gz tolerance by 0.1-0.4 G. Alcohol is associated with a higher accident rate in both ground and flight operations. Chronic ingestion with associated CNS, GI, and CV effects can produce performance degradation in flight and ground jobs.

WAIVER:

Initial applicants (all classes):

Alcohol Dependence: Candidates for Student Naval Aviator, Coast Guard Flight Officer and Aircrew with a history of alcohol dependence are not physically qualified. Waivers will be considered on a case-by-case basis after rehabilitation and 2 years of recovery.

Alcohol Abuse: Persons with a diagnosis of alcohol abuse are disqualified for at least one year after successful treatment (successful rehabilitation and normal after-care program).

It is rare that a waiver is ever given for a potential SNA candidate either of these diagnoses.

Rated and Non-rated (all classes): Members involved in alcohol-related incidents or who are referred for alcohol screening shall be recommended to the command for immediate grounding. If, after alcohol screening, a specific medical diagnosis of Alcohol Abuse (305.00 DSM-IV) or Alcohol Dependence (303.90 DSM-IV) cannot be made, the individual may be recommended to the command to be returned to aviation duties without a formal waiver. A diagnosis of abuse or dependence requires a reliable history. Fear of consequences and an inability to recognize the problem may result in the failure of a member to provide completely truthful answers. If there is doubt about the veracity of the history, after consultation with the command, the FS may submit an AMS for misuse or "no diagnosis" and request PSC endorsement for continued aviation duties.

Those aviation personnel who are diagnosed with Alcohol Abuse or Alcohol Dependence can return to duties involving flight only after favorable action by the appropriate waiver authority. In addition, class 2 aviation personnel with either of these diagnoses must be cleared by the FS/AMO before returning to flight-line duties or activities involving aircraft maintenance.

Waiver is considered if the patient:

1. Maintains unqualified acknowledgment of their alcohol disorder.
2. Successfully completes the appropriate treatment program.
3. Remains abstinent for a minimum of 90 days while off all medications used to control cravings or addictive behavior.
4. Maintains satisfactory participation with documentation in an organized alcohol recovery program (AA, Rational Recovery, etc.), 3-5 times per week for the first 90

days of recovery and then 1-3 times per week thereafter for a period of 5 years total. Validation of participation in an organized program shall be expected.

Noncompliance: Continued denial of an alcohol problem and refusal to abstain from alcohol following treatment are grounds for permanent termination from aviation duties. Any relapse requires resubmission for waiver. Waivers for relapses with further outpatient and/or residential treatment are rarely granted.

INFORMATION REQUIRED:

- Comprehensive FDME
- CBC
- LFTs
- AMS with the flight surgeon's recommendations to include a search for underlying psychiatric disorders, medical disorders, or significant social or family dysfunction and a detailed description of the aircrew member's drinking history:
 - How the problem was identified
 - When subject member first drank
 - History of DUIs or other legal consequences
 - History of blackouts, frequent sick-call visits, withdrawal symptoms, morning drinking
 - Domestic, social or economic difficulties
 - Impaired job performance or problems in the work environment
- All Narrative Summaries from rehabilitation authority, including the most recent.
- FS and rehabilitation authority's statement to document aftercare including AA attendance.
- Commanding officer's endorsement in accordance with ref (a), Chapter 3-A-8.d. (2) This must include details of any mandated aftercare plan.
- Chain-of-command recommendations through flag officer level.

FOLLOW-UP REQUIREMENTS: An active sobriety program with continued abstinence is essential. The member must visit the following professionals at the intervals specified:

1. Flight surgeon, monthly for the first year, every 3 months for the 2nd and 3rd years, every 6 months for the 4th and 5th years, then annually thereafter.
2. ASAP Clinical Director, monthly for the first year, every 3 months for the 2nd year, and then annually for the 3rd through 5th years.
3. Annual submission of a flight surgeon's recommendation, ASAP counselor's recommendation, documentation of AA attendance, and a letter of support from the aviation unit commander for 5 years.
4. FS comment regarding member's current use of and attitude towards ETOH on all subsequent physical examinations.

TREATMENT: Outpatient or inpatient/residential program as clinically indicated. Continued commitment to living a sober lifestyle remains paramount to service in USCG aviation.

DISCUSSION: Acute alcohol intoxication is implicated in about 16 percent of general aviation fatal accidents. The risk of liver damage in men drinking 80gm ethanol (equivalent to one 6-pack of beer, 3-4 mixed drinks, or 4-6 glasses of wine) and in women drinking about 50gm a day for some years has been reported as 15 percent. Acute alcohol intoxication can produce arrhythmias that usually disappear quickly but can leave moderate conduction delays for up to one week (the "holiday heart" syndrome). According to Vaillant*, relapse after treatment for alcohol dependence may be as high as 41% at two years but it is "rare after five years" (about 7%, less than the incident risk in the general population). The prognosis is much better for professionals (e.g., physicians, pilots, and lawyers) than for the general population, probably related to the potential loss of professional status.

Note: Non-alcoholic beer is considered an alcoholic beverage. The 12-hour "bottle-to-throttle" rule applies to drinking non-alcoholic beer.

DSM IV-TR CODES:

Alcohol Use Disorders:

303.90 Alcohol Dependence

305.00 Alcohol Abuse

Alcohol-Induced Disorders:

303.00 Alcohol Intoxication

291.8 Alcohol Withdrawal (*Specify if:* With Perceptual Disturbances)

291.0 Alcohol Intoxication Delirium

291.0 Alcohol Withdrawal Delirium

291.2 Alcohol-Induced Persisting Dementia

291.1 Alcohol-Induced Persisting Amnestic Disorder

291.x Alcohol-Induced Psychotic Disorder

.5 With Delusions (*Specify:* With Onset During Intoxication or Withdrawal)

.3 With Hallucinations (*Specify:* With Onset During Intoxication or Withdrawal)

291.8 Alcohol-Induced Mood Disorder

291.8 Alcohol-Induced Anxiety Disorder

291.8 Alcohol-Induced Sexual Dysfunction

291.8 Alcohol-Induced Sleep Disorder

REFERENCES:

*Vaillant, G, *The Natural History of Alcoholism*, Alcohol Health and Research World, 1996, (20) 3, 152-161.

O'Brien, C and McLellan A, *Myths about the Treatment of Addiction*, Lancet 1996; 347: 237-240.

ASTHMA (ICD9 493.9)

AEROMEDICAL CONCERNS: Asthma symptoms can rapidly progress from minimal to totally disabling at any time. Exacerbations and asthmatic symptoms may pose a threat to aviation safety by interfering with cockpit tasks and duties as well as general mission completion. Dust, fumes, vapors and rapid changes in air temperature or humidity may cause sudden and severe exacerbations of asthma symptoms.

WAIVERS:

1. Initial Applicants (All Classes): Asthma, including reactive airway disease, exercise induced bronchospasm, or asthmatic bronchitis reliably diagnosed at any age is disqualifying. Waivers, although not normally recommended, may be considered on a case-by-case basis provided the waiver criteria set forth for rated/non-rated aviators are met.

2. Rated and Non-Rated Aviators (All Classes):

Waivers are possible for mild intermittent and mild persistent asthma if individual meets the following criteria:

- Meet criteria for mild intermittent or mild persistent asthma (see below).
- Has demonstrated they can perform all military training and duties (including the PFT) without activity limitations.
- Has no past history of sudden severe exacerbations, severe persistent or moderate persistent asthma.
- No history of any hospitalizations or intubations for exacerbations.
- No history of recurrent oral steroid use for exacerbations.

INFORMATION REQUIRED:

- Reliable diagnostic criteria for asthma consist of any of the following: Substantial history of cough, wheeze, and/or dyspnea that persists or recurs over more than 6 months. If the diagnosis is in doubt, a 15 percent increase in FEV1 following administration of an inhaled bronchodilator OR an exaggerated decrease in airflow induced by a bronchial provocation challenge such as methacholine inhalation or exercise confirms the diagnosis. The table below provides guidance.
- Complete pulmonary function testing (PFT).
- Baseline, post bronchodilator, and methacholine/provocative testing may be required.
- Chest X-ray (PA/LAT) results where appropriate.
- Allergy/immunology work-up may be required.

Adapted from: National Asthma Education and Prevention Program Expert Panel Report 2: Guidelines for the Diagnosis and Management of Asthma

Class	Day/Night Symptoms	PEF or FEV1	Daily Medications
Severity		PEF Variability	
STEP 1	Less than or equal to 2 days/week	Greater than or equal to 80%	No daily medication needed.
Mild Intermittent	Less than or equal to 2 nights/month	< 20%	Severe exacerbations may occur, separated by long periods of normal lung function and no symptoms. A course of systemic corticosteroids is recommended.
STEP 2	>2/week but <1x/day	Greater than or equal to 80%	<i>Preferred Treatment:</i> Low-dose inhaled corticosteroids. <i>Alternative Treatment</i> (listed alphabetically): cromolyn,
Mild Persistent	>2 nights/month	20-30%	leukotriene modifier, nedocromil

FOLLOW-UP: For mild intermittent asthmatics, the recommended follow-up is every 6-12 months to reassess symptoms and appropriate classification. For those with mild persistent asthma, the recommended follow-up is every 6 months. The degree of symptom control, history of any exacerbations, current medications, and annual spirometry testing should be included.

TREATMENT: For aircrew members who meet the above criteria, short-acting beta-agonist rescue inhalers, low-dose inhaled corticosteroids, and leukotriene modifiers are authorized in addition to cromolyn sodium and nedocromil sodium inhalers. Smoking cessation, if applicable, is an essential component of the treatment regimen to prevent worsening of symptoms and exacerbations. Applicants for waiver who continue to smoke should be counseled on cessation and offered assistance. Immunotherapy is authorized where indicated and patient will be considered for waiver provided the above criteria are met.

DISCUSSION: Asthma currently affects 5-10 percent of the U.S. population. Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role, in particular, mast cells, eosinophils, T lymphocytes, macrophages, neutrophils, and epithelial cells. In susceptible individuals this inflammation causes recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, particularly at night or in the early morning. These episodes are usually associated with widespread but variable airflow obstruction that is often reversible either spontaneously or with treatment. The inflammation also causes an associated increase in the existing bronchial hyper-responsiveness to a variety of stimuli and pharmacologic therapy is directed at suppressing airway inflammation. Asthma may have an

allergic basis, be it associated with allergic rhinitis, occur secondary to gastroesophageal reflux, or occur subsequent to upper respiratory infection. Attacks can be precipitated or exacerbated by breathing dry, cold air, exercise, or exposure to a known allergen.

REFERENCES:

Expert Panel Report 3 (EPR3): Guidelines for the Diagnosis and Management of Asthma
<http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm>

OBSTRUCTIVE SLEEP APNEA (ICD9 78057)

AEROMEDICAL CONCERNS: Obstructive Sleep Apnea (OSA) is a condition resulting in disrupted sleep and excessive daytime sleepiness with demonstrable deficits in cognitive and psychomotor performance. The condition is linked to hypertension, angina, nocturnal cardiac arrhythmias, myocardial infarction, and stroke. Aircrew with OSA may develop cardiovascular abnormalities to include dilated cardiomyopathy. The repetitive nocturnal oxygen desaturations that are part of this condition can lead to the development of pulmonary hypertension and Cor Pulmonale.

WAIVERS:

Initial Applicants (Class 1):

Waivers are rarely granted unless the individual was surgically treated and postoperative polysomnography (PSG) demonstrates resolution.

Initial Applicants (Classes 2):

Waivers are considered on a case-by-case basis.

Rated Aviation Personnel (All Classes): Sleep apnea is disqualifying for aviation duty.

Waivers are possible and granted on a case-by-case basis if the condition is treated with weight loss, dental device, surgery, or use of Continuous Positive Airway Pressure (CPAP) devices with documented resolution via PSG.

INFORMATION REQUIRED:

Aeromedical Summary (AMS):

- Results of PSG to confirm diagnosis and a post-treatment PSG to document improvement.
- ENT or Pulmonary consultation.
- Oral Surgery consultation if a dental device is used.
- Note of current treatment for the condition.
- Copy of operative report if surgically treated.
- Functional testing post intervention – Maintenance of Wakefulness Test (MWT) and/or Mean Sleep Latency Test (MSLT) recommended

FOLLOW-UP: Annual ENT or Pulmonary Consultation. Oral Surgery consultation if a dental device is used.

TREATMENT: Weight loss is the simplest treatment and a loss of 10 percent body weight can result in symptom resolution. The identification and treatment of risk factors such as obesity and hypothyroidism may lead to resolution. In some cases, modification of sleep position may be adequate. Dental devices that modify position of the tongue or jaw, and upper airway and jaw surgical procedures such as Uvulopalatopharyngoplasty (UPPP) and Laser-assisted uvulopalatoplasty (LAUP) are additional therapies. Nasal CPAP is a common treatment, but may be challenging in the aviation environment with the possibility deployments.

DISCUSSION: OSA is caused by repetitive upper airway obstruction during sleep as a result of narrowing of the respiratory passages. Obstructive apnea is the cessation of airflow for 10 seconds or more associated with continued respiratory effort. Obstructive hypopnea is the reduction in airflow for 10 seconds or more associated with continued respiratory effort. The Apnea/hypopnea index (AHI) is a commonly reported result of the PSG. AHI is defined as the number of apneas and hypopneas per hour of sleep. Normal AHI is fewer than five per hour. In severe cases, of OSA, AHI exceeds 30 per hour. Another measure on the PSG is the respiratory distress index (RDI). Normal RDIs are generally less than 10 with values between 5 and 20 considered mild, 20-50 moderate, and greater than 50 indicative of severe sleep apnea. The obstructive episodes are often associated with a reduction in oxyhemoglobin saturation. The multiple arousals with sleep fragmentation are the likely cause of excessive daytime sleepiness. OSA is a significant medical problem affecting up to 4 percent of middle-aged adults. Common features include: Loud snoring, disrupted sleep, nocturnal gasping and choking, witnessed apnea, daytime sleepiness and fatigue, crowded posterior airway and short, thick neck.

REFERENCE: American Sleep Apnea Association, <http://www.sleepapnea.org/>

Benign Prostatic Hypertrophy (ICD 9 600)

AEROMEDICAL CONCERNS: The presence of BPH alone is not automatically disqualifying for flying duties. The primary aeromedical and operational concern with BPH relates to the potential for acute urinary obstruction/retention. The symptoms of acute urinary retention include severe lower abdominal pain, a distended abdomen, and the sudden inability to pass urine. Chronic urinary retention can be relatively painless, however it can lead to enuresis, hypertension, urinary tract infections, hydronephrosis, and renal impairment. Operationally, urinary frequency can be disruptive, and nocturia can result in sleep disruption and fatigue. The tendency to delay bladder emptying while in-flight can lead to excessive bladder distention and acute urinary retention. As such, judgment should be used in determining the aeromedical significance of reported symptoms.

WAIVERS: Waivers are considered so long as the obstructive symptoms are well controlled and there are no significant side-effects from any medications used. Asymptomatic BPH with a history of invasive surgical therapy such as TURP is not disqualifying, and does not require waiver submission so long as the obstructive symptoms are relieved, urinary continence is maintained, and healing is complete.

Initial Applicants (All Classes): A history of BPH is disqualifying and requires waiver.

Rated Aviation Personnel (All Classes): Mild BPH which does not require medical treatment and does not interfere with operational duties is not disqualifying and may be noted as ***Information Only*** on routine FDMEs. Since symptoms may worsen over time, the American Urological Association BPH symptom score (see below) should be included on all FDMEs. BPH symptoms severe enough to warrant medical control require waiver submission.

INFORMATION REQUIRED: Evaluation should include a thorough history and physical examination to rule out other causes of urinary symptoms or urinary obstruction. Physical exam should include a digital rectal examination of the prostate. Consultation with an urologist is important for patients with BPH symptoms, unless minimal. A detailed description of symptoms, clinical course, history of retention, absence of treatment side effects, and urologic follow up are important for a successful waiver.

A minimum urological workup for BPH should include:

- Urinalysis
- PSA
- Urine flow rate
- Post-void residual

Depending on the individual case, additional urological workup could include:

- Cystoscopy
- 24-hour urine for creatinine clearance and protein
- IVP
- Renal/prostate ultrasound
- Serum creatinine

The American Urologic Association (AUA) symptom score was developed to measure quantitative outcomes from different BPH treatments. It consists of scoring seven questions to evaluate frequency, nocturia, weak urinary stream, hesitancy, intermittence, incomplete emptying, and urgency. Results from this screening tool should be included in the comments section of all FDMEs and AMSs.

(Circle One Number on Each Line)	Not at All	Less than One Time in Five	Less Than Half the Time	About Half the Time	More Than Half the Time	Almost Always
Over the past month or so, how often have you had a sensation of not emptying your bladder completely after you finished urinating?	0	1	2	3	4	5
During the past month or so, how often have you had to urinate again less than two hours after you finished urinating?	0	1	2	3	4	5
During the past month or so, how often have you found you stopped and started again several times when you urinated?	0	1	2	3	4	5
During the past month or so, how often have you found it difficult to postpone urination?	0	1	2	3	4	5
During the past month or so, how often have you had a weak urinary stream?	0	1	2	3	4	5
During the past month or so, how often have you had to push or strain to begin urination?	0	1	2	3	4	5
	None	One Time	Two Times	Three Times	Four Times	Five or More Times
Over the past month, how many times per night did you most typically get up to urinate from the time you went to bed at night until the time you got up in the morning?	0	1	2	3	4	5

TREATMENT: Therapy is normally started when symptoms exceed the patient's tolerance and each case warrants individual assessment. In general, mild symptoms (AUA symptom score < 7) may be treated by watchful waiting. Non-invasive lifestyle modifications may be helpful and include reduced evening fluid intake, sitting to urinate, and avoidance of salt, caffeine, alcohol, and adrenergic decongestants. Herbal therapies, such as saw palmetto, are commonly used in Europe for BPH. The exact mechanism of saw palmetto is not known. Although they may be effective, potential side effects include headache, nausea, and dizziness.

Approved Medications: Moderate symptoms (AUA scores 8 to 19) may warrant medical treatment. There are two classes of medications approved in the United States to treat BPH.

- **Alpha-1-Adrenergic Antagonists:** TERAZOSIN (Hytrin), DOXAZOSIN (Cardura), TAMULOSIN (Flomax), and ALFUZOSIN (UroXatral) work against the smooth muscle dynamic component of bladder outlet obstruction. The side effects of the alpha-1-adrenergic antagonists include orthostatic hypotension (4%), dizziness (>10%), and somnolence (1-10%). These agents should be used with caution and aviators using these medications should be in a DNIF status for the first two weeks of therapy to allow for monitoring of side effects and accommodation to the medication.
- **5-Alpha-Reductase Inhibitors:** FINASTERIDE (*Proscar*) and DUTASTERIDE (Avodart) work against the structural component of bladder outlet obstruction by reducing the size of the prostate gland. Both appear to be effective long-term and a minimum of six months therapy is generally recommended. They significantly reduce obstructive symptoms, the need for surgery, and the incidence of acute urinary retention (50-74% reduction compared to placebo), especially in men with moderate to severe symptoms and significant prostate gland enlargement. Large clinical trials (over 14,000 patients) revealed that only the sexual side effects of impotence and decreased libido (3.1%) exceeded placebo. In men with mild disease, other therapy such as alpha-1-adrenergic antagonists may be at least or more effective. Women of childbearing age are advised to avoid touching crushed or broken tablets due to the potential for adverse pregnancy implications.

Severe symptoms (AUA scores > 20) may be candidates for invasive therapy. Transurethral prostatectomy (TURP) has been the primary therapy for many years. In general, men with moderate to severe BPH are candidates for invasive therapy. Newer invasive therapies include transurethral incision of the prostate, open prostatectomy, urethral stent, laser prostatectomy, microwave therapy, electro-vaporization, and transurethral needle ablation of the prostate.

FOLLOW-UP: Urology follow-up is only required if there is evidence of progressive disease, poor maintenance control, or recurrent symptomatology.

DISCUSSION: Benign prostatic hypertrophy (BPH) is a common disorder with increasing frequency in men older than 50 years. The average prostate weighs 20 gm in normal 20-year-old males and hypertrophy increases in direct correlation with age: 8% hypertrophy in men aged 31-40 years, 40-50% in men aged 51-60, and 80% in men by age 80. BPH can cause bladder outlet obstruction by two mechanisms: a reversible dynamic/physiologic component related to smooth muscle, and a fixed/structural component related to prostate bulk impinging the urethra. BPH develops primarily in the peri-urethral or transitional zone of the prostate. Obstructive symptoms

are not always related to the size of the gland on clinical exam, since compression of the prostatic urethra can occur even in glands of relatively normal size. Common symptoms of BPH include: increased frequency of urination, nocturia, hesitancy, urgency, and weak urinary stream. Other disorders which can cause similar symptoms to BPH include: urethral stricture, contracture of the bladder neck, carcinoma of the prostate or bladder, bladder calculi, urinary tract infection, prostatitis, and neurogenic bladder. BPH is not generally believed to be a risk for prostate cancer. The natural history of BPH is an age-related increase in symptoms, however not always progressive. Age, symptoms, urinary flow rate and prostate volume are risk factors for acute urinary retention. Men with symptomatic BPH who are not treated have approximately a 2.5% per year risk of developing acute urinary retention.

RENAL STONES (ICD9 592.0)

AEROMEDICAL CONCERNS: The pain resulting from renal colic can be very severe and disabling. In-flight incapacitation is the main concern. There has been one reported USAF mishap secondary to renal colic.

WAIVER:

Initial Applicants (All Classes):

A history of kidney stone is disqualifying. Waivers are may be granted for initial flight applicants and require the information listed below.

Rated Aviation Personnel (All Classes):

For rated aircrew members with a history of a solitary unilateral kidney stone that has resolved and there is a normal metabolic work-up, no waiver is generally required and the condition may be coded as ***Information only***. A history of multiple stone formation is usually granted a waiver unless there is a history of 3 or more episodes of stone formation within a 2 year time span. Waivers are granted for the presence of retained stones provided they are in the renal parenchyma, the metabolic work-up and renal function are normal, and the patient is asymptomatic. Retained stones within the calyx must be too large to pass into the ureter. If the metabolic work-up is abnormal, the condition must be satisfactorily controlled with approved medication before a waiver will be considered. Difficulty in controlling a metabolic abnormality may result in a permanent disqualification.

INFORMATION REQUIRED:

1. Renal Stone Worksheet (below) — urinalysis should be negative for hematuria, granular casts, or proteinuria.
2. Urine Culture and sensitivity- reflecting no bacterial growth
3. CBC with differential- normal

Initial AMS requires:

4. One set of blood chemistries collected when asymptomatic
5. 24-hour urine chemistry
6. IVP (after stone passage/removal)
7. Stone analysis (if possible)

The IVP is required as a functional study of the kidney as well as to rule out any evidence of obstruction or residual dilatation after stone passage.

FOLLOW-UP: Continued waiver will require blood chemistries and CBC with differential submitted with each annual FDME. A 24-hour urine should also be performed if the patient has had an abnormal 24-hour urine in the past or is currently on medication for their abnormality. If there is a prior retained stone, a KUB or CT should be done to confirm any increase in size or change in position. Any doubts must be confirmed by an IVP or CT. A urologist should review CT scan results.

Note: Annual KUBs or CTs are not required as follow-up for the history of solitary kidney stone that has been passed and provided the individual has a normal 24 hour urine collection. These studies may be required for individuals with a history of multiple stones, retained stones, or hypercalciuria. The presence of microhematuria in a patient with a prior history of stones will require imaging of the urinary tracts with either an IVP or CT to rule out an asymptomatic stone. A CT would be the preferred initial study. Consultation with a urologist is required.

TREATMENT: Conservative management aimed at encouraging natural passage of the stone, surgery, or extracorporeal shock wave lithotripsy (ESWL) will result in grounding until fully recovered. For those individuals with recurrent stones or those with metabolic abnormality, providing dietary advice and maintenance of adequate hydration with or without thiazides will normally allow for favorable waiver consideration. Patients requiring placement of a temporary ureteral stent will be grounded until the stent has been removed and the stone condition resolved.

DISCUSSION: The peak incidence of urinary calculi occurs in the twenties to forties, with a 3:1 male to female ratio. Dehydration is one of the contributing factors. There is usually a gradual onset of flank, abdominal or back pain over an hour or more before the acute colic episode. The patient can also present with micro or gross hematuria. The lifetime risk for stone formation in adult white men approaches 20%, while it is only 5-10% for women. In general, stone disease in adult white males is one-fourth to one-third more common than in black men. The recurrence rate of urolithiasis is reported to be as high as 50% within five years of the initial stone occurrence. Despite the less invasive nature of ESWL, there still remains a relatively high incidence of retained stone fragments.

REFERENCES:

Lifshitz DA, Shalhav AL, Lingeman JE, and Evan AP: Metabolic evaluation of stone disease patients: a practical approach, J Endourol 13: 669-678, 1999.

Rivers K, Shetty S, and Menon M: When and how to evaluate a patient with nephrolithiasis. Urological Clinics of North America 27: 203-213, 2000.

APPENDIX 7: RENAL STONE WORKSHEET

PATIENT NAME: _____ SSN: _____ DATE: _____

Urinalysis: *Date:* _____

- Ph _____
- Protein _____
- Microscopic _____
- Culture & Sensitivity _____

CBC: *Date:* _____

- HCT _____
- HGB _____
- WBC _____
- Seg: _____ Band _____ Mono _____ Lymph _____
- Baso _____ Eos _____

Blood/Serum Chemistry *Date:* _____

- Creatinine _____
- Uric Acid _____
- Calcium _____
- Phosphate _____
- Na _____
- K _____
- Cl _____
- HCO₃ _____

24-hour Urine Collection (Report in gm/24 hr): *Date:* _____

- Calcium _____
- Phosphate _____
- Uric Acid _____
- Creatinine _____
- Total Volume _____

IVP/CT Results: Pre (if available) _____

Post (required) _____

Stone Analysis (if available):