• Aeromedical Policy Letters

(Purpose, Authority, & Proponency)

• Aeromedical Technical Bulletins

Revision Date: 14 Jun 2002

This revision supercedes all previous revisions of the Aeromedical Policy Letters and Technical Bulletins.
(Download Most Recent Revision here)

NEW What's New?! NEW

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(*Please report any errors or policy issues to Director, Aeromedical Activity)

Purpose, Authority, Points of Contact

1. Authority. The Commander, USAAMC, is authorized to issue aeromedical technical bulletins and policy letters to provide flight surgeons guidance in regards to examinations and procedures to determine the fitness for flying duties, and the interim aeromedical disposition of disqualifying conditions, IAW para 6-5 b, AR 40-501.

2. Implementation. Policy letters and technical bulletins remain in effect from the date of publication until rescinded or superseded by the Commander, USAAMC, or a higher authority.

3. Purpose.

a. *Policy letters* recommend Army-wide standardization of aeromedical evaluation, treatment, and disposition for a variety of common clinical problems. They provide continuity of aeromedical care for flight surgeons and aircrew members world-wide and ensure the optimum quality of care. They ensure the safe return of countless aviators to flying duties once effective treatment has been achieved.

b. *Technical bulletins* recommend Army-wide standardization of aeromedical testing and administration. They ensure the proper use of testing equipment and testing procedures throughout the Army Medical System.

c. Policy letters and technical bulletins, while not regulations or orders, are a statement of policy by the Commander, USAAMC, as derived from the recommendation of the Aeromedical Consultant Advisory Panel's (ACAP) review of data from the Aeromedical Epidemiology Data Register, consultation with numerous specialists, and review of medical literature. The policy letters also recommend medical evaluations which are required to make a final recommendation for flying duties, thus avoiding the delays resulting from incomplete aeromedical summaries.

d. Policy letters and technical bulletins are designed to be updated as the standards of aeromedical care and knowledge change. *Flight surgeons are encouraged to submit recommendations for changes to director, Aeromedical Activity.*

4. Points of Contact. Please report any content or policy issues to Director, Aeromedical Activity, ATTN: MCXY-AER, Fort Rucker, AL, 36362-5333, DSN 558-7575 or COMM (334)-255-7575.

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5. The latest revision of this document may be downloaded at:
http://usasam.amedd.army.mil/_AAMA/files/ArmyAPLs.pdf

COMMANDER'S FORWARD

Aerospace medicine deals with normal physiology in an abnormal environment. Conditions that may be considered routine or benign at sea level may take on new significance in terms of aircrew health and mission completion at altitude. The classification of aeromedical standards in the United States reaches back to 1914 when Theodore Lyster established physical examination units and realistic medical selection standards for aircrew.

Our goal with these aeromedical policy letters and technical bulletins is to assist you, the aeromedical health care professional, in ensuring aircrew are fit and healthy for all missions. The focus of our aeromedical programs is on prevention of disease in our aircrew rather than on disease detection.

We have harnessed the power of evidence-based medicine, clinical practice guidelines, our own database information, and review and coordination with other military services and the Federal Aviation Administration to develop consistent, timely aeromedical standards. These serve to guide an aeromedical approach to evaluation for a majority of common conditions seen in our aircrew population. They are currently in a web-based format and will be undergoing significant revision over the coming year. These are living documents and initiative for change is welcome and encouraged from the field.

The personnel of the U.S. Army Aeromedical Activity (AAMA) are here to assist you in keeping aircrew flying safely and ensuring a long and successful aviation career for each individual. Unfortunately, some conditions are not compatible with flight and remain a threat to aviation safety despite appropriate evaluation, diagnosis, and treatment. Dealing with aircrew who are no longer medically qualified for flight can be disappointing for both the aircrew and their healthcare professional. We are committed to having a well-considered rationale and process for determining suitability for flight status.

The aeromedical policy letters and technical bulletins in this guide serve as an aid to flight surgeons and aeromedical physician's assistants in the field in the following areas: counsel of aircrew and commanders on conditions and the waiver or exception to policy process, guidance for completion of waiver packages, follow-up for individual conditions, and references to assist in further case management.

Providing medical care for and flying with our aircrew is a distinct privilege. We must always strive to keep our soldiers mission ready.

ALAN L. MOLOFF
COL, MC, MFS
Commanding

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ACKNOWLEDGEMENTS

This new format of the Army Aeromedical Policy Letters (APL) is designed to improve upon the tremendous work of Colonel Richard L. Broyles and is based on the familiar Windows Help Files, *COMPILED VERSION 97A* dated 15 March 1997, while incorporating all the most recent changes to the APLs.

This format is designed to take advantage of current technologies, and provide for improved portability of these APLs. It is fully searchable, easily printable, downloadable, and will transfer easily across various computing platforms, including most current palm top OS's. Additionally this new format will facilitate future updates to the APL's, which will ultimately allow us to better maintain the currency of this document. It is a work in progress, and as such, we solicit your input.

We have packaged this APL file with links to the most current versions of AR 40-501, and AR 40-8 and other Army regulations which were prepared and are maintained by the US Army Publishing Agency. The USAPA has done a tremendous service to the Army in converting most of our paper regulations and forms into electronic form, making them widely available to all officers and soldiers who need them. Current versions of these regulations may be downloaded and maintained on your local computer from http://www.usapa.army.mil/ for those times when you do not have an active internet connection. **Please note that many of the hyperlinks in this document WILL NOT WORK WITHOUT AN ACTIVE INTERNET CONNECTION.** This will not interfere with the normal utility of the document.

Please forward general comments and suggestions for inclusion, exclusion or modification of the material within this document directly to the editor via e-mail: Justin.woodson@us.army.mil

Please report any content or policy issues to Director, Aeromedical Activity, ATTN: MCXY-AER, Fort Rucker, AL, 36362-5333, DSN 558-7575 or COMM (334)-255-7575.

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INTRODUCTION

NEW SINCE LAST RELEASE

This revision supercedes the previous revision of the Aeromedical Policy Letters and Technical Bulletins dated 5 MAR 2002.

The following Aeromedical Policy Letters have been updated:

- Coronary Artery Disease — March 2002
- Diabetes Mellitus — May 2002
- Headaches — February 2002
- Migraine — February 2002

The following Aeromedical Technical Bulletins have been updated or added:

- ATB: Color Vision Testing — May 2002
- ATB: Depth Perception Testing — May 2002
- ATB: Field of Vision Testing — May 2002
- ATB: Cycloplegic Refraction — May 2002
- ATB: Manifest/Subjective Refraction — May 2002
- ATB: Night Vision — May 2002
- ATB: Ocular Motility — May 2002
- ATB: Visual Acuity Testing – Distant Vision — May 2002
- ATB: Visual Acuity Testing – Near Vision — May 2002

EXTERNAL LINKS

Army Links:

US Army Aeromedical Activity (USAAMA)

http://usasam.amedd.army.mil/_AAMA/index.htm

US Army School of Aviation Medicine (USASAM)

http://usasam.amedd.army.mil/index/index.htm

US Army Publishing Agency (USAPA)

http://www.usapa.army.mil/

Flight Surgeon Quick Reference Guide (available from USASAM www page)

http://usasam.amedd.army.mil/APLS/FDME/fdme.pdf

Other Links:

DSM IV (Psychology Net)

http://www.psychologynet.org/dsm.html

US Navy Aeromedical Waiver Guide

http://www.nomi.med.navy.mil/Nami/WaiverGuideTopics/index.htm

US Air Force Waiver Guide

http://quicksand.brooks.af.mil/web/af/afc/table.htm

THE WAIVER PROCESS

GENERAL: The waiver process has been developed to ensure the consistent and proper management of disqualified aviation personnel. This process has been responsible for the safe return of countless aviators to flying duties once effective treatment has been achieved. It also has been responsible for clearly identifying those individuals with medical conditions incompatible with continued safe flying or their continued good health. It allows for consistent health care management of individuals who routinely receive their health care from many different health-care providers. With proper utilization of senior health-care consultants, it ensures the highest level of health care and provides quality assurance. Most importantly, it ensures the maintenance of a readily mobile effective fighting force.

WAIVER AUTHORITY: Waivers are granted by PERSCOM; Chief, National Guard Bureau; and by the local Commanding Officer, depending upon the status of the aircrew member. USAAMA, much like the local flight surgeon, only recommends a course of action. The needs of the Army may occasionally supersede these medical recommendations.

THE PROCESS: The entire waiver process normally starts at the local flight surgeon's office at the time of the discovery of a disqualifying medical condition. Local evaluations and consultations must be obtained which support or fail to support a waiver recommendation. Once this packet is forwarded to USAAMA, it can take several different routes depending on the nature of the disqualification. Most waiver requests are considered routine waivers (those that have clear policy established) and require little more than review and endorsement, and then are forwarded with recommendations for appropriate follow-up or restrictions to the waiver authority. Occasionally waiver requests are forwarded for review to the designated Army medical consultant or to NAMI, Pensacola, FL, or AMCS, Brooks AFB, TX. Cases which are unusual, potentially precedent setting, involve flight or other operational limitations, and all Class 1 Exceptions to Policy are presented to the Aeromedical Consultants Advisory Panel (ACAP). The decision of the ACAP is reviewed and approved/disapproved by Commander, USAAMC and forwarded to the appropriate waiver authority. The waiver authority will then take appropriate action, normally producing a formal letter of waiver/termination notification.

Each condition will be dispositioned to one of the following categories:

- *Qualified* — No waiver is required.
- *Qualified, information only* — Condition will be tracked in database and reported on annual summary sheet, but is not disqualifying. No waiver is required.
- *Disqualified, waiver recommended* — Waiver recommendation will be forwarded to PERSCOM for final approval.
- *Disqualified, waiver not recommended* — Waiver/exception to policy is not recommended. If approved by PERSCOM, will result in termination of aviation service.

THE PACKAGE: An Aeromedical Summary (AMS) is required for any action which requires waiver, permanent medical disqualification (permanent termination from flying), termination of permanent termination from flying (i.e. reinstatement), and request for aeromedical consultation. The information needed to process a waiver is quite variable. The submitted information will usually need to include: any available supportive consultations; reports of all operations; tissue examinations; and path/lab reports; diagnostic studies; hospital summaries; past medical documents; reports of any proceedings (tumor board, MEB, PEB, FEB); and any letters of recommendation. Please insure that you have met the information requirements as outlined in the appropriate APL. An FDME is not always required since the AMS contains significant history or physical findings. Your recommendations should include any restrictions, follow-up, date of incapacitation, or request for consultations which you feel are appropriate. **Legibility** is a key. Altered (white out, erased, blocked out, etc.) records are not accepted.

Submit all FDMEs and Aeromedical Summaries to:

Commander
USAAMC (MCXY–AER)
301 Andrews Ave.
Fort Rucker, AL 36362–5333

WAIVER CRITERIA

INTRODUCTION: Factors commonly used in the consideration of granting a waiver include feasibility, in-flight safety, impacts on mission and deployability, progressive nature of the illness, requirement for treatment or medication which will not readily be available during mobilization and ultimately the needs of the Army.

WAIVER CRITERIA: To be considered waiverable, any disqualifying physical or psychological defect must pass the following screening criteria:

1. The disqualifying defect must not pose a risk of sudden incapacitation.
2. It must not pose any potential risk for subtle incapacitation that might not be detected by the individual but would affect alertness, special senses, or information processing.
3. It must be resolved or stable at time of the waiver (i.e., non-progressive).
4. It must not be subject to aggravation by military service or continued flying.
5. It must not lead to significant loss of duty such as precludes unsatisfactory completion of training and/or military service.
6. It cannot require the use of uncommonly available tests, regular invasive procedures, or non-routine medication especially during deployment or assignment to austere areas.
7. If the possibility of progression or recurrence exists, the first signs or symptoms must be easily detectable and cannot constitute an undue hazard to the individual or to others.
8. It cannot jeopardize the successful completion of a mission.

THE RECOMMENDATION: You should make a simple declarative statement of what you believe will be the best for the individual, flying safety, and the Army. Make concrete and positive recommendations. State the specific chapter/paragraph regulating the condition and any appropriate APLs. Try to be strictly objective and not allow your personal likes or dislikes, any outside pressure, personal biases influence your decision making.

SUMMARY: Just because this guide says that a waiver may be possible does not mean that it will inevitably be granted. In considering a waiver case, the waiver authorities will take into account the above criteria, the condition or combination of conditions concerned, the treatment given to the patient and other relevant factors. If necessary, they will consult medical specialists and line authorities. A consensus of opinion will be developed and forwarded for approval through Commander, USAAMC to PERSCOM or National Guard Bureau. The question, "Can a previously terminated individual be returned to flying status?" is commonly asked. The answer is frankly " it's possible", but it is very dependent upon the condition and the current requirements of the Army. Also, it should be noted that this office is required to pass to the Federal Aviation Administration the names of all aviators who are disqualified from flying duties in the US Army. Flight surgeons should brief patients who are facing likely disqualification accordingly.

AEROMEDICAL SUMMARY GUIDE TO COMPLETION

ORGANIZATION OF DOCUMENTS: In order to expedite processing it is important to place documents neatly labeled, tabulated and collated preferably in chronological order, earlier dates first. This will allow the reviewer to follow chronologically the development/resolution of the defect or condition. The documents should be assembled in the following order:

(a) Cover letter, if included
(b) Aeromedical Summary
(c) Discharge Summary
(d) Outpatient Reports
(e) Pathology Reports
(f) Specialty consultations
(g) Diagnostic Tests/Lab reports
(j) Letters of support from the command, SIPs, etc., as required

FORMAT: The AMS must be TYPED on either Optional Form 275 or SF 502 - Narrative Summary. Continuation sheets should be used as necessary. This will facilitate the incorporation of the AMS into Health Records. An original and three copies of the summary and supporting documents should be made. The original is forwarded to USAAMA. One copy of the AMS goes to the Health Record until it is replaced by the actual waiver/disqualification letter; the second goes to the aircrew member; and the third copy should be placed on file in the flight surgeon's office for a minimum of 3 years. This redundancy should help minimize problems with lost mail or PCSs of either the aircrew member or his flight surgeon.

NOTE: AMSs for civilian/contract personnel should indicate whether the individual is also in the Reserves or National Guard so that the waiver can be forwarded to all appropriate waiver authorities. This requires the submission of two summaries concurrently.

Follow the Template that follows. Items 4-11 may be combined as deemed appropriate.

AEROMEDICAL SUMMARY TEMPLATE

1. ADDRESS (of originating facility):

   a. Facility code:
   b. Originating facility address:
   c. APA/flight surgeon's name:
   d. APA/flight surgeon's telephone number (DSN and commercial)

2. GENERAL INFORMATION:

a. Name:
b. Rank:
c. SSN::
d. Age: DOB:
e. Component:
f. Primary SSI:
g. Years Service:
h. Profiles:
i. Previous Waivers/Terminations:
j. Home Address: Phone:
k. Unit Address: Phone:
l. Disqualifying Condition:
m. How was the condition discovered:
n. Primary Aircraft
o. Military flight hours:
p. Current Duty
q. Flying Position:
r. Grounded: YES ___ NO ___
s. Date Grounded:
t. Temp FFD issued: YES ___ NO ___
u. Date Temp clearance issued:
v. Date of Incapacitation

4. MILITARY/OCCUPATIONAL HISTORY:

5. AVIATION HISTORY:

6. SOCIAL AND FAMILY HISTORY:

7. PAST MEDICAL HISTORY:

8. PRESENT PROBLEM:

9. PHYSICAL EXAMINATION:

10. LABORATORY AND X-RAY DATA:

11. DISCUSSION:

12. RECOMMENDATIONS:

13. SYNOPSIS of DIAGNOSES:

Example:

DIAGNOSIS	***TESTS***	***PROCEDURES***	***MEDICATIONS***
Hypertension	Electrolytes		Capoten

14. ENCLOSURES:

E.g.: Discharge Summary, Outpatient Reports, Pathology Reports, Specialty consultations, Tests/Lab reports (include actual original tracings, ECHO videos, cardiac cineangiograms, etc.), Letters of support from the command, SIPs, etc., as required.

FLIGHT SURGEON'S SIGNATURE BLOCK

TEMPORARY CLEARANCE PENDING RECEIPT OF WAIVER

AEROMEDICAL CONCERNS: Returning disqualified aviators to full flight duty prior to receipt of waiver raises several possible concerns especially if done without coordination with USAAMA: (1) Waiver requests are not always granted; (2) Waivers may be granted with certain flight restrictions; and (3) Waiver policy is frequently changing to keep pace with current medical knowledge. Minor disqualifications, when following established policy however, may be granted local clearance, thus expediting the return to full duty for many aviators.

WAIVERS: Aircrew members with disqualifying medical conditions not listed in the below table may be returned to temporary flying duty by the local flight surgeon and unit commander as long as the condition will not compromise personal health, aviation safety, or mission completion. If the flight surgeon has any questions about temporary clearance, he/she should consult a regional flight surgeon or USAAMA.

INFORMATION REQUIRED: A copy of all aeromedical summaries and relevant DA Form 4186 will be forwarded both to the Regional Aviation Medicine Consultant and CDR, USAAMC, Fort Rucker, AL.

FOLLOW-UP: N/A

TREATMENT: N/A

DISCUSSION: Personnel with the following conditions may only be returned to flying duties under the following qualifiers with recommendation of CDR, USAAMC, or a flight surgeon designated by him on his behalf, or upon receipt of waiver from DA MILPERCEN (or NGB or SGO as appropriate):

CONDITION	QUALIFIER
Alcoholism	Alcohol dependency requires DA authorization prior to return to FFD.
Arteriosclerotic Vascular Disease *(See* Cardiovascular Screening Program*)*	Those who fail LVL 1 CAD screen may be granted temporary clearance pending completion of further work-up without restriction if asymptomatic. If LVL 2 CAD is abnormal but the crew member is asymptomatic, a restricted dual status may be approved by contacting USAAMA.
Cancer	Except single episode of basal cell carcinoma.
CVA and other Significant CNS Disorders	Includes TIA.
Loss of Consciousness (LOC)	When unexplained.
Medically Disqualified	Those who have been medically disqualified from aviation service. (Orders from DA MILPERCEN)
Myocardial Infarction	
Any condition which obviously impairs personal safety, safe flight, or mission completion	
Seizure Disorder	
Significant visual disturbances	Including visual acuity uncorrectable to 20/20 or Impaired depth perception.
Skull fracture or other significant head trauma	
Substance Abuse	

365 DAY LIMIT FOR INCENTIVE PAY

During early 1995 the 180 limit to temporary grounding without loss of aviation incentive pay was increased to 365 days. Although widely distributed at the time of implementation some individuals are still unaware of these changes.

DCSPLANS

FORCE MANAGEMENT POLICY

ASSISTANT SECRETARY OF DEFENSE
4000 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-4000

DEC 15 1994

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY
(MANPOWER AND RESERVE AFFAIRS)
ASSISTANT SECRETARY OF THE NAVY
(MANPOWER AND RESERVE AFFAIRS)
ASSISTANT SECRETARY OF THE AIR FORCE
(MANPOWER, RESERVE AFFAIRS, INSTALLATIONS AND ENVIRONMENT)

SUBJECT: Aviation Career Incentive Pay (ACIP) During Periods of Temporary Medical Grounding

Reference: DoD Directive 7730.57 "Aviation Career Incentive Act of 1974 and Required Annual Report," February 5, 1976

Under the referenced directive, officers continue to qualify for ACIP if they are medically incapacitated for six months or less. This policy is unduly restrictive. The following change is effective immediately: Aviation officers medically incapacitated will be considered qualified for aviation service unless such incapacitation continues for more than twelve months. Disqualification for aviation service by reason of medical incapacity will be effected on the first day following a period of 365 days that commences on the date of incapacitation, or on the date a competent medical authority determines the medical incapacitation to be permanent, whichever is earlier.

The next change to the directive will incorporate this policy change.

F. Pang

CLASS 3 AIRCREW MEMBERS

AEROMEDICAL CONCERNS: Class 3 aircrew members are at the same risk for disease incapacitation as any other aircrew. They perform duties which when impaired by physical or mental defect could jeopardize safety or completion of a mission. Occasionally, they even fly in the front with direct access to flight controls and must be treated in this context.

WAIVERS: Class 3 waiver actions rest with the local flight surgeon (FS) and the aircrew member's local commander. Temporary flight duties are authorized pending the receipt of final waiver action by the local aviation commander. The following conditions must be submitted for waiver action to CDR, USAAMC, for final aeromedical review; (a) Alcohol/drug abuse or dependence: requires PERSCOM or National Guard Bureau waiver; (b) Central nervous system dysbarism; (c) Coronary artery disease; (d) Positive HIV testing; or (e) Any other condition for which the local FS or aviation commander requests a consultation with the U.S. Army Aeromedical Consultation Service, Fort Rucker, AL, 36362-5333.

INFORMATION REQUIRED: Information required for waiver consideration of any of the 5 conditions listed above is specific to the condition. See the applicable APL. A waiver request to the local commander for other disqualifying condition(s) must include: (a) An AMS stating the basis for the aeromedical decision. (b) Memorandum from the aircrew member requesting either waiver or termination from flight status. (See Aircrew Member Memorandum) (c) Any supporting documents the aircrew member considers important. (d) Memorandum for the Commander which refers to applicable Army medical regulation and provides the Commander with a specific recommendation of waiver or termination. (See Flight Surgeon's Memorandum for the Commander) Once the recommendation is approved by the Commander, the FS should stamp the FDME with the appropriate stamp and enter the packet into the individual's health record. (See stamp examples below.)

FOLLOW-UP: See appropriate APL. Waiver must be recommended for continuation on each FDME.

DISCUSSION: Any Class 3 aircrew member with a major physical defect should be recommended for medical disqualification (permanent termination of flight duties). Due to the wide varieties of assigned duties which are performed by Class 3 aircrew members, the FS must take into consideration the operational duties and/or responsibilities of each individual. A major physical defect is defined as any defect that will: (1) Interfere with duties requiring visual or auditory acuity, speech clarity, dexterity, or adequate range of motion; (2) Interfere with wearing of aviation life support equipment, or use of controls at their duty station; (3) Reduce the ability to withstand rapid changes in atmospheric pressure or forces of acceleration; (4) Become disabling unpredictably or with time, compromising personal health, aviation safety, or deployability; or (5) Require medications or treatments that compromise flight safety or deployability.

Example of rubber stamps for use on front of Class 3 FDMEs.

OFFICE OF THE FLIGHT SURGEON
FORT SILL, OKLAHOMA 72503

DATE

QUALIFIED ARMY CLASS 3

FS INITIALS

Circle One →

OFFICE OF THE FLIGHT SURGEON
FORT SILL, OKLAHOMA 72503

DATE

DISQUALIFIED ARMY CLASS 3
By aeromedical reason of:

DIAGNOSIS
MEDICATIONS

WAIVER IS RECCOMMENDED
CONTINUE WAIVER
TERMINATION RECOMMENDED

FS INITIALS

AIRCREW MEMBER'S MEMORANDUM TO THE COMMANDER FORMAT FOR CLASS III WAIVER REQUEST

OFFICE SYMBOL DATE

MEMORANDUM FOR Commanding Officer, Unit, Address

SUBJECT: Request for Waiver

1. I hereby request a waiver for flying duties due to (condition) which does not meet the medical standards for Class 3 flying duties, IAW AR 40-501.

2. I do not feel that this medical condition will interfere with the performance of my flying duties, flight safety or mission completion.

3. (Any other statement the applicant desires to make.)

Signature of Aircrew Member
Rank, Branch
Unit

Revised: 15 Mar 1997

FLIGHT SURGEON'S MEMORANDUM FOR THE COMMANDER, CLASS III WAIVER

OFFICE SYMBOL DATE

MEMORANDUM FOR Commanding Officer, Unit, Address

SUBJECT: Recommendation for Waiver

1. Name_____, SSN __-_-__, is medically disqualified for Class 3 flying duties by reason of_____.
See AR 40-501, Chapter_____para _____.

2. Recommend waiver for this medical disqualification since it will not compromise flight safety or mission completion.

3. This waiver is contingent upon: (Examinations, tests, etc.) _____.

4. Submission of this waiver letter by aircrew member to his/her individual flight record and medical record will constitute an acceptance of the waiver IAW AR 40-501.

5 The aircrew member must present a copy of this waiver to the flight surgeon during each flying duty medical examination.

6. This waiver will remain in effect until receipt of a recommendation to the contrary from this office or the aircrew member has transferred from your command. A new waiver will have to be granted by the gaining unit.

JOHN DOE
CPT, MC, FS
Chief, Aviation Medicine Clinic

OFFICE SYMBOL DATE

MEMORANDUM FOR Flight Surgeon, Unit, Address

SUBJECT: Approval/Disapproval of Waiver

1. I do/do not approve waiver for Class 3 flying duty for
Name-_____, SSN-____-_____-____.

JAMES F. PILOT
MAJ, AV
Commanding

Revised: 15 Mar 1997

GLOSSARY

AA	Aeromedical Adaptability
AA	Alcoholics Anonymous
ACAP	Aeromedical Consultants Advisory Panel
ACL	Anterior Cruciate Ligament
AMCS	Aeromedical Consultation Service
AD	Active Duty
ADAPCP	Alcohol/Drug Abuse Prevention and Control Program
AEDR	Aeromedical Epidemiological Data Repository
AFIP	Armed Forces Institute of Pathology
AFMIC	Armed Forces Medical Intelligence Center
AGXT	Aeromedical Graded Exercise Tolerance Test
AIDP	Acute Inflammatory Demyelinating Polyneuropathy
AJCC	American Joint Commission on Cancer
AML	Acute Myelogenous Leukemia
AMS	Aeromedical Summary
ANA	Antinuclear Antibody
APA	Aeromedical Physician Assistant
APC	Atrial Premature Contractions
APL	Aeromedical Policy Letters
AR	Army Regulation
ARDS	Acute Respiratory Distress Syndrome
ARNG	Army National Guard
ARNGB	Army National Guard Bureau
ASD	Atrial Septal Defect
ATB	Aeromedical Technical Bulletin
ATC	Air Traffic Controller
ATLS	Advanced Trauma Life Support
AVM	Arteriovenous Malformations
BPPV	Benign Paroxysmal Positional Vertigo
CAD	Coronary Artery Disease
CADRISK	Coronary Artery Disease Risk
CBC	Complete Blood Count
CDC	Centers for Disease Control
CEA	Carcinoembryonic Antigen
CIDP	Chronic Inflammatory Demyelinating Polyneuropathy
CIN	Cervical Intraepithelial Neoplasm
CIS	Cervical Intraepithelial Syndrome
CIS	Carcinoma in Situ
CIV	Civilian
CLL	Chronic Lymphocytic Leukemia
CML	Chronic Myelogenous Leukemia
CNS	Central Nervous System
CVA	Cerebral Vascular Accident
CT	Computerized Tomography
DAC	Department of the Army Civilian
DCS	Decompression Sickness
DJD	Degenerative Joint Disease
DMO	Diving Medical Officer
DNIF	Duty Not Involving Flying
DQ	Disqualified

DVT	Deep Vein Thrombosis
EAATS	Eastern Area Aviation Training Site
ECG	Standard 12-lead Electrocardiogram
ECHO	Echocardiogram
EDC	Expected Date of Confinement
EP	Exception to Policy - Class 1 only
EPS	Electrophysiological Studies
ESWL	Extracorporeal Shock Wave Lithotripsy
FAA	Federal Aviation Administration
FDME	Flying Duty Medical Examination
FEB	Flight Evaluation Board
FFD	Full Flying Duties
FS	Flight Surgeon
GXT	Graded Exercise Test
HBP	High Blood Pressure
HCG	Human Corionic Gonadatropin
HCT	Hematocrit
HIV	Human Immunodeficiency Virus
HLA	Histocompatibility Locus/Antigen
HNP	Herniated Nucleus Pulposis
HPV	Human Papilloma Virus
HRAP	Health Risk Appraisal Program
IAW	In Accordance With
ICD	International Classification of Diseases
IDDM	Insulin Dependent Diabetes Mellitus
IO	Information Only
IOL	Intraocular Lens
IP	Instructor Pilot
JSMRO	Joint Services Medical Regulating Office
LDL	Low Density Lipoprotein
LEEP	Loop Electrosurgical Excision Procedure
LOC	Loss of Consciousness
LGL	Lown-Ganong-Levine Syndrome
LVOT	Left Ventricular Outflow Tract
MACOM	Major Command
MAT	Multifocal Atrial Tachycardia
MCAD	Minimal Coronary Artery Disease
MCL	Most Comfortable Listening Level
MEB	Medical Evaluation Board
MMPI	Multiphasic Personality Inventory
MR	Mitral Regurgitation
MRI	Multi-Resonance
MTC	Medullary Thyroid Carcinoma
NAMI	Naval Aerospace Medical Institute
NC	Non-contributory
NHIS	National Health Interview Survey
NOE	Nap of the Earth
NOS	Not Otherwise Specified

NPC	Near Point Convergence
NSGCT	Non-seminomatous Germ Cell Tumors
NVG	Night Vision Goggles
OCD	Obsessive Compulsive Disorder
ORB	Officer Record Brief
PCS	Permanent Change of Station
PEB	Physical Evaluation Board
PFT	Pulmonary Function Test
PID	Pelvic Inflammatory Disease
PKD	Polycystic Kidney Disease
PR	
PRK	Photorefractive Keratotomy
PSA	Prostate Specific Antigen
PTE	Post-Traumatic Epilepsy
PTS	Post-Traumatic Syndrome
PTSD	Post-Traumatic Stress Disorder
PV	Polycythemia Vera
PVC	Premature Ventricular Contraction
RAF	Royal Air Force
RBC	Red Blood Count
RF	Radio Frequency
RFS	Regional Flight Surgeon
RK	Radio-Keratotomy
SAR	Seasonal Allergic Rhinitis
SCAD	Significant Coronary Artery Disease
SFTS	Synthetic Flight Training Simulator
SIP	Standard Instructor Pilot
SSEP	Somatosensory Evoked Potentials
SSI	Service Skill Identifier
SVT	Supraventricular Tachycardia
TDY	Temporary Duty
TIA	Transient Ischemic Attack
TSG	The Surgeon General
TSH	Thyroid Stimulating Hormone
UA	Urinalysis
USAAMA	U.S. Army Aeromedical Activity
USAAMC	U.S. Army Aeromedical Center
USAARL	U.S. Army Aeromedical Research Laboratory
USAF	U.S. Air Force
USAHCSSA	U.S. Army Health Care Systems Support Activity
USAR	U.S. Army Reserve
USN	U.S. Navy
VASI	Vertical Approach Slope Indicator
VFR	Visual Flight Rules
VSD	Visual Septal Defect
VT	Ventricular Tachycardia
VTA	Vision Testing Apparatus
WBC	White Blood Count
WPW	Wolff-Parkinson-White

AEROMEDICAL CONSULTANTS ADVISORY PANEL

PURPOSE: The Aeromedical Consultants Advisory Panel (ACAP) has been created to: (1) Review the aeromedical evaluation of selected aviation personnel. (See below); (2) Review unusual medical problems in aviation personnel; (3) Determine the effects of a medical condition upon an aircrew member's safety in flight, continuity of service, deployability, and medical supportability; (4) Make recommendations on the aeromedical disposition of disqualified aviators through the CDR, USAAMC to CDRs of USAPERSCOM, ARNGB, and other appropriate waiver authorities; (5) Make recommendations to existing medical standards to the Surgeon General; and (6) Develop and review APLs and ATBs.

AUTHORITY: Established by USAAMC Regulation 600-108 and AR 40-501 under the authority of the Commander, USAAMC, Fort Rucker, AL 36362-5333.

CASES REVIEWED: The ACAP will review the following cases of medically disqualified aviation personnel: (1) Those evaluated locally by the Aeromedical Consultation Service; (2) Those with conditions for which no current aeromedical policy exists, and for whom an initial or modified waiver is requested; (3) Those applicants for training requesting waiver or exception to policy; (4) Those General Officers found to be medically disqualified; and (5) Those cases which are felt to be precedent setting, controversial, or which require highly individualized consideration.

MEMBERSHIP: The membership of ACAP will contain all board-certified or residency-trained Aeromedical Specialists; at least 2 highly trained and experienced Army aviators, and any other experienced flight surgeon assigned to Fort Rucker selected by the Commander, USAAMC.

Revised: Jun 2002

DIRECTORY OF AEROMEDICAL CONSULTANTS

Specialty	Rank	Name	Assignment/Station	Phone	Email
Aerospace Medicine	COL	Glenn Mitchell	HQ, USAMEDCOM, FSH	(210) 221-6616/6516	glenn.mitchell@cen.amedd.army.mil
	COL	James McGhee	USASAM, Ft Rucker	(334) 255-7409	james.mcghee@se.amedd.army.mil
Allergy/ Immunology	LTC	Bryan Martin	WRAMC, DC	(202) 782-8088	bryan.martin@amedd.army.mil
	MAJ	Gail Glushko	BMACH, Ft. Benning	(706) 544-3569	gail.glushko@se.amedd.army.mil
Addiction Medicine	COL	Ken Hoffman	VA, DC	(202) 565-6363	kenneth.hoffman@hq.med.va.gov
Cardiology	COL	Jerel Zoltick	Pentagon HC, DC	(703) 692-0964	jerel.zoltick@amedd.army.mil
Dermatology	LTC	Leo Conger	DACH, Ft. Hood	(254) 288-8088	leo.conger@cen.amedd.army.mil
	MAJ	Daniel Schissel	USAMH	DSN 371-2502	daniel.schissel@hb.amedd.army.mil
	MAJ	Richard James	Winn ACH, Ft. Stewart	(912) 370-6964/6023	Richard.James4@se.amedd.army.mil
Emergency Medicine	MAJ	Robert Gerhardt	BAMC, FSH	(210) 916-5512	robert.gerhardt@cen.amedd.army.mil
	COL	Glenn Mitchell	HQ,USAMEDCOM, FSH	(210) 221-6616/ 6516	glenn.mitchell@cen.amedd.army.mil
Gastroenterology	COL	D. Ken Block	WRAMC, DC	(202) 782-8397	dale.block@na.amedd.army.mil
General Surgery	COL	Steven Swann	USAAMC, Ft. Rucker	(334) 255-7342	steven.swann@se.amedd.army.mil
Oncology	COL	Richard Tenglin	WBAMC, Ft Bliss	(915) 569-2585	richard.tenglin@amedd.army.mil
Hematology	COL	Robert F. Reiss	IRR	(212) 305-2677	rreiss@ccmail.nybc.org
Hyperbarics	COL	Charles Gleaton	EAMC, Ft Gordon	(706) 787-3110/ 3111	charles.gleaton@se.amedd.army.mil
Infectious Disease	CDR	Robert W. Farr	NAMI, Pensacola NAS	(850) 452-4178	rwfarr@nomi.med.navy.mil
	MAJ	Nicholas Vietri	Brooke AMC, Ft Sam Houston	(210) 916-4355/5554	Nicholas.vietri@cen.amedd.army.mil
Internal Medicine	LTC	Monica Gorbandt	AAMA, Ft Rucker	(334) 255-7346	monica.gorbandt@se.amedd.army.mil
Nephrology	COL	Paul Welch	WRAMC, DC	(202) 782-0728	paul.welch@na.amedd.army.mil
Neurology	COL	Cornelius Maher	Ft Detrick, MD	(301) 619-2001	cornelius.maher@det.amedd.army.mil
	CDR	Henry Porter	NAMI, Pensacola NAS	(850) 452-2257 ext. 1022	hoporter@nomi.med.navy.mil
Pathology	COL	Eric Berg	BACH, Ft Campbell	(270) 798-8381	eric.berg@se.amedd.army.mil
	COL	Cherry Gaffney	ICAF		gaffneyc@ndu.edu
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	LTC	Ricky Malone	WRAMC, DC	(202) 782-8035	ricky.malone@na.amedd.army.mil
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	CPT	Robert Jackson	USAAMC, Ft Rucker	(334) 255-7028	robert.jackson@se.amedd.army.mil
	CPT	John Leso	WRAMC	(202) 782-0065	john.leso@na.amedd.army.mil
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	LTC	Mark Ivey	HHC STARC MIARNG	(616) 847-1009	markivey@novogate.com

Specialty	Rank	Name	Assignment/Station	Phone	Email
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Ophthalmology	COL	Walter Hubickey	WAMC, Ft Bragg	(910) 907-7921	walter.hubicky@amedd.army.mil
	COL	Donald Gagliano	BACH, Ft Campbell	(270) 798-8041/ 8042	donald.gagliano@se.amedd.army.mil
	MAJ	Joel Muirhead	USAAMC, Ft Rucker	(334) 255-7249	joel.muirhead@se.amedd.army.mil
Optometry	LTC	Corina van de Pol	USAARL, Ft Rucker	(334) 255-6876	corina.vandepol@se.amedd.army.mil
	MAJ	Linda Knapp	USAAM, Ft Rucker	(334) 255- 7185	linda.knapp@se.amedd.army.mil
Orthopedics	LTC	Schuyler DeJong*	BAMC,FSH	*	*
	MAJ	David Koon	USAAMC, Ft Rucker	(334) 255- 7020	david.koon@se.amedd.army.mil
Sports Medicine	MAJ	John Glorioso	CGSC,Ft Leavenworth		john.glorioso@us.army.mil
Urology	COL	Deogracia Quinones	WAMC, Ft Bragg	(910) 907-6885	deogracia.quinines@na.amedd.army.mil
	MAJ	John Coursey	BACH, Ft. Campbell	(270) 798-8403	john.coursey@se.amedd.army.mil
Other					
NGB	COL	Richard Carter	WAATS, AZ	(520) 616-5692	Richard.carter@az.ngb.army.mil
	LTC	John Wing	EAATS, PA	(717) 861-8855	John.wing@pa.ngb.army.mil
OTSG Consultant/ Dean USASAM	COL	James McGhee	USASAM, Ft Rucker	(334) 255-7409	james.mcghee@se.amedd.army.mil
CDR, USAARL/ Special Operations	COL	Brian Campbell	USAARL, Ft Rucker	(334) 255- 6917	brian.campbell9@se.amedd.army.mil
USASOC	COL	Rocky Farr	Ft Bragg	(910) 432-5408	farrwa@soc.mil

*Consultants designated with an asterisk (*) will not accept direct queries from the field and all questions to them should be directed through AAMA staff. The majority of consultants are available directly to aviation medicine personnel, but the Director and Chief, Consult Services, AAMA would like the primary route of communication to be through AAMA or if questions are sent directly to consultants that we be furnished information copies. This will aid us in rapidly responding and ensuring that our advice on case disposition meets waiver and aeromedical requirements.

CARDIOVASCULAR WAIVERS

ABNORMAL CARDIAC FUNCTION TESTING

AEROMEDICAL CONCERNS: Each of the cardiovascular function tests (EBCT, AGXT, 24-hour Holter monitor, ECHO, Thallium or Sestamibi scan, etc.), when either frankly abnormal or borderline is indicative of possible underlying coronary artery disease. The risk of sudden incapacitation in flight remains undefined until such time as an appropriate cardiovascular evaluation is completed.

WAIVERS: In the absence of coronary artery disease, full flight status is to be expected and the information is filed *Information only*. The presence of minimal coronary artery disease on catheterization may lead to restrictions in flight status (see Coronary Artery Disease APL). Waivers for dysrhythmias are discussed on the pages for the respective dysrhythmias. Aircrew members who are required to undergo further testing but refuse for any personal reason are normally terminated from aviation duties.

G Code	*Condition*
G349	Abnormal GXT
G985	Abnormal Holter
G992	Abnormal ECHO
G973	Abnormal Thallium Scan
G924	Abnormal EBCT

INFORMATION REQUIRED: Copies of only the final reports from ECGs, Holter monitor, AGXT, EBCT, echocardiogram and cardiac catheterization are required. Copies of all tracings from ECGs, Holter monitor, and AGXT as well as echocardiogram films and locally performed cardiac catheterization films may be requested for review by USAAMA in coordination with Aerospace Cardiology Consultants. Waivers will not be recommended until the requested studies are completed and forwarded for review. In certain cases, direct consultation will be arranged with the Army Aeromedical Cardiology Consultant.

FOLLOW-UP: None required if testing is normal. For specific waiverable abnormalities, see the individual conditions as listed in APLs.

TREATMENT: N/A.

DISCUSSION: In the U.S. Army cardiovascular screening program, 11% of over 40,000 males over the age of 40 had an abnormal ECG. Further investigation of such patients by AGXT would produce both false positives and false negatives. Rayman reported that 67% of airmen with positive GXT studies had normal coronary angiography. About 80% of patients with severe disease and poor prognosis will be detected by AGXT alone. Thallium scanning adds specificity, and can be used in the evaluation of aircrew members with borderline testing. Its main use is to identify those patients who actually require cardiac catheterization.

AORTIC REGURGITATION / INSUFFICIENCY

(ICD9 424.10)

AEROMEDICAL CONCERNS: Aortic regurgitation is usually asymptomatic for decades because of compensation of the left ventricle for volume overload produced by aortic regurgitation. Symptoms generally do not occur until after the 4th decade. These symptoms are related to left ventricular failure, e.g., exertional dyspnea, orthopnea, and paroxysmal nocturnal dyspnea. Syncope and angina are rare in the absence of associated CAD. Reports of exacerbation of valvular degeneration by repeated exposure to high Gz may be of concern in high performance helicopters.

WAIVERS: Very mild cases of aortic regurgitation with no structural abnormalities of the valve may be considered fully qualified, filed as *information only*. Any structural abnormality associated with aortic regurgitation is considered waiverable for rated aircrew members provided full cardiac work-up is negative. Specific aircraft restrictions are possible.

INFORMATION REQUIRED: Complete cardiology evaluation is required including AGXT , 24-hour Holter Monitor, and ECHO with Doppler flow study. Consultation with the designated Aeromedical Cardiology Consultant may be recommended by USAAMA. Local evaluations require submission of complete tracings and a duplicate ECHO tape.

FOLLOW-UP: Submission of annual cardiology evaluation to include ECHO with Doppler flow study.

TREATMENT: SBE antibiotic prophylaxis is required for all dental procedures as well as any other potentially septic exposure. Treatment of any underlying hypertension should be closely adhered to and avoidance of weight training recommended since these both may hasten the onset of symptoms.

DISCUSSION: The most common causes of this valvular disorder are rheumatic heart disease, degenerative changes in a tricuspid or bicuspid valve, and bacterial endocarditis. In the past, aortic regurgitation/insufficiency has not been considered a normal variant. Recently, studies conducted at both NAMI and AMCS have detected a limited degree of aortic insufficiency (AI) in a number of patients without detectable valvular pathology. On ECHO, these "physiologic" AI cases typically have a very small AI jet that does not extend out of the left ventricular outflow tract (LVOT). The high-pitched early diastolic murmur of aortic regurgitation is often missed. It is heard best with the diaphragm of the stethoscope, with the patient sitting upright, leaning forward, and deeply expiring. The murmur is loudest along the left sternal border. Other physical findings include signs secondary to hyperdynamic peripheral circulation and have been given eponyms of some use described below.

Corrigan's pulse -- Pulse brisk when it initially strikes the finger only to suddenly fade away.
Quincke's pulse --- Capillary pulsation seen in the skin with each systole.
Hill's pulse --------- Popliteal arterial pressure 60 mm Hg or more higher than brachial arterial pressure.
Pistol-shot pulse --- Loud systolic sound heard over femoral artery with each cardiac cycle.
Traube's sign ------ Double sound heard over femoral artery with each cardiac cycle.
Duroziez's sign ---- Systolic and diastolic bruit heard if femoral artery is slightly compressed with stethoscope.
De Musset's sign -- Uvular pulsation with each systole.
Gerhardt's sign ---- Pulsation in an enlarged spleen with each systole.
Landolfi's sign ----- Changes in pupillary size with each systole.

AORTIC STENOSIS (ICD9 424.11)

AEROMEDICAL CONCERNS: Aircrew members with aortic stenosis (AS) remain asymptomatic over the greater part of the illness. When symptoms develop they often start with angina, syncope, or left ventricular failure. The onset of these symptoms herald the start of increased risk of sudden death. Syncope has been reported in up to 20% of cases of aortic stenosis; it may even occur with mild AS. Sudden death occurs in 15-30% of all cases, with 3-5% occurring in symptom-free patients. Left ventricular failure may predispose individuals to dysrhythmias or syncope, and only 50% will survive over 2 years. Greater risk of catastrophic symptoms occur when AI is seen in the presence of coronary artery disease.

WAIVERS: Very mild AS (gradients below 20 mm Hg may be considered acceptable for all aviation-related duties (filed as *Information only*); bicuspid aortic valves with no other associated findings may also be considered qualified (filed as *Information only*). Moderate AS may be considered for waiver provided complete cardiology evaluation is negative. AS with associated CAD, syncope, or other symptom complex are considered unfavorable for waiver action. Surgery is also considered disqualifying with no waiver recommended.

INFORMATION REQUIRED: Complete cardiology consultation is required including AGXT, 24-hour Holter Monitor, and ECHO with Doppler flow study. Cardiac catheterization may be required. Consultation with the designated Aeromedical Cardiologist may be recommended by USAAMA.

FOLLOW-UP: Annual cardiology evaluation to include ECHO with Doppler flow study.

TREATMENT: : SBE antibiotic prophylaxis is recommended for all dental procedures as well as any other potentially septic exposure. SBE antibiotic prophylaxis is recommended for both bicuspid aortic valve and aortic stenosis. Neither aortic valvuloplasty nor aortic valve replacement have been considered for favorable waiver action

DISCUSSION: AS in individuals less than 30 years of age is almost always the result of a congenitally abnormal valve. When found in elderly patients (over 60 years of age), AS is usually secondary to the CAD and the calcific changes in a tricuspid valve. AS due to rheumatic heart disease is usually accompanied by mitral stenosis or regurgitation. Bicuspid aortic valves become stenotic two-thirds to three-fourths of the time. The percentage of bicuspid aortic valves that become stenotic increases with age.

ASYSTOLE

AEROMEDICAL CONCERNS: Asystole is defined as abnormal when accompanied by symptoms and/or the pause lasts greater than 2.5 seconds. Symptoms may be indistinguishable from other forms of cardiac arrest.

WAIVERS: Waiver for history of asystole is not normally granted since it is usually associated with myocardial infarction. In the rare event that it is induced by reversible precipitating factors, e.g., hyperkalemia or electrical shock, with no associated neurologic damage, waiver will be considered upon complete evaluation by Consultation Service, Brooks AFB, or the Army Aviation Medicine Cardiology Consultant.

G Code	Condition
G-064	Ventricular escape beat
G-065	Asystole

INFORMATION REQUIRED: Complete aeromedical summary with immediate DNIF is required. Submit any results of local cardiology testing for review with request for Aviation Medicine Cardiology Consultation to USAAMA.

FOLLOW-UP: N/A.

TREATMENT: N/A

DISCUSSION: As one might expect, a review of the AEDR reveals no previously granted waivers for history of asystole. Associated myocardial infarction is the primary cause of termination from aviation duties.

ATRIAL FLUTTER (ICD9 427.32)

AEROMEDICAL CONCERNS: Atrial flutter (AF) is relatively uncommon in adults and almost always associated with underlying organic heart disease. Symptoms may range from none (particularly in younger individuals) to dizziness, syncope, or angina pectoris. There is a significantly increased incidence of embolic phenomena.

WAIVERS: Waivers for non-recurrent AF or atrial fibrillation(AFIB)/AF spectrum are possible when precipitating factors are clearly documented and correctable and complete cardiology evaluation is normal. Recurrent AF or AF/AFIB is not considered favorably for waiver.

G Code	Condition
G-027	Atrial Flutter

INFORMATION REQUIRED: Complete cardiology evaluation is required. This includes AGXT, ECHO, and three 24-hour Holter monitors at monthly intervals. The grounded aircrew member must be observed for at least 6 months for evidence of recurrence. Document any history of precipitating causes, e.g., alcohol intoxication, hyperthyroidism, hypothermia, etc. Abnormalities in any of these studies may require further work-up.

FOLLOW-UP: In the absence of recurrence a repeat work-up is required every three years. This work-up includes a 24-hour Holter monitor and AGXT

TREATMENT: Maintenance drug therapy to control AV conduction or long term anticoagulant therapy is disqualifying. A history of cardioversion or short term use of drugs is not necessarily disqualifying. Avoidance of precipitating causes such as alcohol, caffeine, and tobacco is highly recommended.

DISCUSSION: In the usual variety of AF, the typical sawtooth pattern of flutter waves is usually best seen in the inferior leads. An atrial rate of 250-350 and varying degrees of AV conduction is the most common presentation; 2:1 conduction is the usual AV conduction ratio.

ATRIAL FIBRILLATION (ICD9 427.31)

AEROMEDICAL CONCERNS: About 20 times more common than atrial flutter, atrial fibrillation (AFIB) may be the result of any underlying cardiac disease but is occasionally seen in the absence of any apparent cardiac disease. It may be precipitated by alcohol, caffeine, tobacco, hyperthyroidism, hypoxia, hypothermia, etc. While atrial fibrillation is frequently asymptomatic, especially in younger individuals, its presence in association with rapid ventricular response may be responsible for palpitations. Angina may occur in those individuals with CAD. Dizziness or syncope and even focal neurological symptoms may occur in those with underlying cerebrovascular disease or cerebral embolism. Atrial fibrillation has also been associated with increased embolic events.

WAIVERS: A single episode of atrial fibrillation with clearly documented precipitating factors ("holiday heart") is waiverable following a 6 month period of observation to ensure the absence of recurrence. Waivers are not recommended in recurrent cases or in cases with underlying significant CAD.

G Code	Condition
G-026	Atrial fibrillation

INFORMATION REQUIRED: Local evaluation should include a cardiology consultation with AGXT, ECHO, and three 24-hour Holter monitors taken at monthly intervals. A 6-month observation period is required to ensure the absence of recurrence. A detailed history to document a precipitating event is essential to support waiver action.

FOLLOW-UP: In the continued absence of recurrence, a repeat cardiac evaluation is required every three years. This evaluation should include AGXT and a 24-hour Holter monitor. If AFIB is associated with any underlying disease, these requirements may be modified.

TREATMENT: A past history of electrical cardioversion or medication to induce cardioversion is not necessarily disqualifying. Any maintenance medication (to include anti-coagulant) is considered disqualifying. All underlying precipitating causes should be eliminated including smoking, caffeine, alcohol, etc.

DISCUSSION: The baseline rhythm of AFIB is characterized by chaotic atrial activity (P waves not discernible) at a rate of 350-700 times per minute. AFIB is most commonly accompanied by ventricular rates of 60-180 beats per minute. Ventricular rates are easily influenced by the presence of digoxin, beta blockers, high vagal tone, or intrinsic AV nodal disease. In 50% of cases of AFIB, the cause is underlying disease such as left ventricular failure, mitral valve disease, pericardial disease, chronic obstructive lung disease, sinus node disease, or hyperthyroidism. There is a 17-fold increase in risk of AFIB in patients where the AFIB is associated with by mitral valve disease compared to a 5-fold increase in risk in patients where the fibrillation arises from all other causes. Cardioversion is usually successful in restoring rhythm in flutter, but there is a relatively high relapse rate in fibrillation. Patients with idiopathic, paroxysmal atrial fibrillation have no increased mortality compared to normal.

ATRIAL PREMATURE CONTRACTIONS

AEROMEDICAL CONCERNS: Atrial premature contractions (APC) are common findings in normal individuals, particularly if in conjunction with anxiety or fatigue. Unfortunately, APCs are also found to be associated with underlying pathological conditions such as atrial enlargement, hypoxia, congestive heart disease, or cardiac ischemia or infarction. Some drugs, e.g., alcohol, tobacco, and caffeine may also be responsible for causing a significant increase in APC frequency. Symptoms are most often none or limited to mild palpitations.

WAIVERS: Waivers are common for those aircrew members with APCs occurring with a frequency of greater than 10 of any 50 beats, or 10% of any one hour of monitoring, or 1% of 24 hours of monitoring provided that a complete cardiology evaluation is normal. Those aircrew members with symptoms (lightheadedness, syncope, etc.) or those found to have underlying cardiac disease will be considered for waiver on a case-by-case basis. For those individuals with no symptoms and APCs occurring less than or equal to 10 of any 50 beats, 10% of one hour of monitoring, and 1% of 24 hours of monitoring require no waiver and are filed as "*Information only*".

G Code	Condition
G-006	Sinus node ECHO beat
G-023	Atrial premature beat
G-031	Atrial ECHO beat
G-032	Paired atrial premature beats
G-035	Atrial parasystole
G-043	Junctional premature beat
G-045	Junctional parasystole
G-046	Paired junctional premature beats
G-083	Supraventricular premature beat

INFORMATION REQUIRED: A 24-hour Holter is required for all individuals with a single APC or multiple APCs found on routine ECG or GXT tracings, if no previous evaluation exists. No further evaluation is required for those individuals without symptoms and whose APCs' frequency of occurrence is less than or equal to 10 of any 50 beats, 10% of any one hour of monitoring, and 1% of 24 hours of monitoring. If greater than 10 of any 50 beats, or 10% of any one hour of monitoring, or 1% of 24 hours of monitoring, or if the individual is symptomatic, perform an AGXT and ECHO. If these tests are normal, no further work-up required. If these tests are abnormal or the individual is symptomatic, further cardiovascular work-up may be required. Refer case and all associated documentation to USAAMA for further evaluation.

FOLLOW-UP: Only required if associated with underlying cardiovascular disorders

TREATMENT: Significant decrease in frequency of APCs is achieved through restricting the aircrew members ingestion of caffeine-containing beverages and cessation of smoking.

DISCUSSION: Aberrantly conducted junctional premature beats may frequently be misinterpreted as ventricular premature beats. When present in conjunction with true premature ventricular contractions (PVCs), these aberrantly conducted junctional beats may lead falsely to a finding of multi-focal PVCs. The wary flight surgeon must guard against this misdiagnosis to avoid needless cardiology work-up and associated anxiety.

ATRIAL SEPTAL DEFECT (ASD) (ICD9 745.5)

AEROMEDICAL CONCERNS: Most patients with ASD are asymptomatic. Those that do develop symptoms usually do so by the 3rd or 4th decade. These symptoms include exercise intolerance, chronic fatigue, and orthopnea secondary to the development of pulmonary hypertension, a common complication of all left to right cardiac shunts.
Significant pulmonary hypertension rarely occurs before age 20 but may happen at earlier ages in those individuals living in higher altitudes. Supraventricular dysrhythmias are not uncommon in patients with ASD and may persist even after successful repair of the ASD. While at one time it was postulated that ASD predisposes an individual to decompression sickness(DCS), this theory has not been demonstrated in clinical studies conducted by NAMI. The role of previously undiscovered ASD in the etiology of CNS DCS is still controversial.

WAIVERS: Exception to policy for initial aviation candidates is not normally recommended. When rated aircrew members are discovered with ASD, they are usually granted waivers provided complete cardiology work-up is normal.

INFORMATION REQUIRED: Cardiology consultation including an AGXT, 24-hour Holter Monitor, and ECHO is required. Submit copies of all tracings and films to USAAMA for review.

FOLLOW-UP: Repeat cardiology evaluation every three years including: 24-hour Holter Monitor and ECHO with Doppler flow study.

TREATMENT: Waiver is possible after surgical closure of ASD. The requirement for permanent pacing is disqualifying. SBE antibiotic prophylaxis is not indicated for uncomplicated ASD.

DISCUSSION: ASD is the most common form of congenital heart disease in adults accounting for almost 45% of all adult lesions. Autopsy series document a patent foramen oval in about 30% of cases in the 20-30 year age group. The incidence decreases as age advances. Ostium primum ASD (5-25% of all ASDs) is associated with deformity of the mitral valve in 88% of cases. Up to 25% of ostium primum ASD patients have at least one other congenital abnormality of the heart. In patients who have had ostium secundum ASD treated, 58% will have an abnormal stress test with a smaller increase in cardiac output than normal when performing intense, upright exercise. Dysrhythmias follow repair in 3 to 15% of cases, more than half of which have atrial fibrillation or flutter. Untreated secundum ASD is associated with pulmonary hypertension (22%), mitral stenosis (4%), atrial flutter or fibrillation (8%); and with patients experiencing dyspnea (83%), fatigue (27%), palpitations (37%), and chest pain (6%).

ATRIOVENTRICULAR CONDUCTION DISTURBANCES

AEROMEDICAL CONCERNS: Bradycardia, often associated with some of the below conduction disturbances, can result in a decreased tolerance to G-forces, syncope, or sudden death. See Bradydysrhythmias.

WAIVERS: Short PR interval (PR interval less than 120 msec in all 12 leads and asymptomatic), first degree AV block (PR interval prolonged > 220 msec in all leads), and Mobitz Type I second degree AV block ("Wenckebach block" - where AV conduction is progressively more delayed with each beat until there is a blocked beat after which the cycle starts again) have traditionally been considered for *information only*, no waiver required, providing complete cardiology evaluation reveals no underlying disease. Mobitz II second degree AV block and third degree AV block (complete heart blocks) are considered disqualifying and not waiverable.

G-Code	ICD9 Code	Condition
G-029		Short PR interval
G-100	426.11	First degree AV block
G-104	426.12	Mobitz type I second degree AV block (Wenckebach)
G-105	426.13	Mobitz type II second degree AV block
G-108	426	Complete heart block (third degree block)

INFORMATION REQUIRED: For short PR interval, submit a complete history directed toward symptoms of tachydysrhythmias, i.e., palpitations, lightheadedness, or syncope: if present, a work-up IAW Pre-excitation syndromes is required; if absent, no further information is required (service member is considered FFD). For 1st degree heart block, local evaluation should include a rhythm strip performed during exercise; the heart rate may need to be increased over 80-100 bpm. If the PR interval shortens to $\leq$ 220 msec, no further evaluation is required. If the PR interval remains prolonged despite increased heart rate, a complete cardiology consultation including treadmill testing, ECHO, and 24-hour Holter monitor is required. Mobitz I (Wenckebach) block also requires a rhythm strip performed during exercise. If the block is reversed, no further work-up is required. If, however, the block is refractory to exercise, a complete cardiology evaluation with AGXT, ECHO, and 24-hour Holter is required. If all testing is normal, no further evaluation is needed and the aviator may remain on flight status. All tracings and films must be submitted for review. Complete heart block must clearly be differentiated from AV disassociation due to a marked sinus bradycardia with an accelerated junctional rhythm since the latter may be a normal finding.

FOLLOW-UP: None required.

TREATMENT: Artificial Cardiac Pacemakers are not compatible with continued flying status.

DISCUSSION: Most cases of first degree and Mobitz type I second degree heart block are related to increased vagal tone. Exercise reduces vagal tone and often reverses the block. Recent evidence, however, suggests that in patients with Mobitz type I block refractory to exercise or atropine, syncope is common and the prognosis is similar to that for patients with Mobitz type II block. Syncope (the classic Adams-Stokes attack caused by transient asystole or ventricular fibrillation) occurs without warning. When the rhythm disturbance is short-lived, some patients experience "near-syncope" or a feeling of dizziness often misdiagnosed as vaso-vagal syncope.

AXIS ABNORMALITY

AEROMEDICAL CONCERNS: In the younger population group, significant axis deviation can occur as a normal variant but is occasionally found in other conduction abnormalities. In the older population group, newly discovered significant axis deviation may be an early sign of underlying cardiovascular disease or myopathy.

WAIVERS: If subsequent evaluation reveals no underlying cardiac disease, a waiver is routinely granted. If the evaluation reveals an underlying abnormality, waiver action is based upon the nature of that abnormality.

G Code	Condition
G-505	Left axis deviation of the P wave. The axis is less than -45 degrees (-45 to -180).
G-506	Right axis deviation of the P wave. The axis is greater than +120 degrees.
G-735	Left axis deviation of the QRS complex. The axis is less than -45 degrees (-46 to -180).
G-736	Right axis deviation of the QRS complex. The axis is greater than +120 degrees unless the finding is clinically consistent with a persistent juvenile pattern in young aircrew.

INFORMATION REQUIRED: Compare the tracing to any previous axis abnormality. If the axis abnormality has been acquired since the last examination and/or has never been evaluated previously, then perform an AGXT and an ECHO. If right axis deviation is found to be clinically consistent with a persistent juvenile pattern in a young aircrew member, however, only an ECHO needs to be completed. All tracings and films should be submitted together with the aeromedical summary.

FOLLOW-UP: None required for benign deviations.

TREATMENT: N/A

DISCUSSION: In normal adults, the axis is almost parallel to the anatomical base of the heart to its apex in the direction of Lead II. The axis is more vertical in thin individuals and more horizontal in heavy individuals. Abnormal axis deviations are more commonly associated with fascicular blocks and with bundle branch blocks.

CARDIOMYOPATHY (ICD9 425.4)

AEROMEDICAL CONCERNS: Cardiomyopathy may be dilated or hypertrophic. Dilated cardiomyopathies are associated with increased frequency of ventricular dysrhythmias and sudden death. Also, a reduced cardiac output during stress may limit performance abilities. In hypertrophic cardiomyopathy, there is a risk of sudden death from dysrhythmias or emboli, even in patients who had previously been asymptomatic. Annual mortality is 3.4% without surgery. Surgery (myotomy-myectomy) has a mortality of 5-10% and the long term gain is uncertain. Symptoms may include decreased exercise tolerance, fatigue, shortness of breath, angina, dizziness, and syncope.

WAIVERS: Waiver will only be considered in the very mildest of cases with minimal hemodynamic and ECHO abnormalities; and after the exclusion of underlying pathology, which is documented as having completely resolved after treatment. The majority of patients are terminated from military flying. If a waiver is to be considered, consultation with the Aeromedical Consultation Service, Brooks AFB, or Army Aeromedical Cardiology Consultant will likely be obtained after consultation with USAAMA. True primary hypertrophic cardiomyopathy is not granted a waiver; in fact, it is considered unfit for all military duties.

INFORMATION REQUIRED: Cardiology consultation is required, including ECHO, and cardiac catheterization if indicated. Exclusion of underlying disorders such as hypertension, pulmonary hypertension, valvular disorders, and hyperthyroidism is required.

FOLLOW-UP: N/A.

TREATMENT: Treatment, either medical or surgical, is disqualifying for all flight duties. It most be noted, however, that almost all patients require some form of treatment.

DISCUSSION: Dilated cardiomyopathy of the right ventricle usually presents in the first 2 decades of life. Death follows within 2-3 years of the onset of heart failure but may occur suddenly any time before then. Chest pain is present in 10% of patients. In one series, 26% of patients were dead within 2 years of diagnosis, with 77% dying by 8 years. Adverse predictors included left ventricle end diastolic pressure > 20 mm Hg and cardiothoracic ratio > 55%. In one series, the 5-year mortality rate was 57% in patients with high velocity (>2.5 ms-1) tricuspid regurgitation compared to 17% for patients with values less than 2.5 ms-1. A small minority of patients (5%) had right-sided cardiomyopathy with normal left ventricles; they presented either with dysrhythmias or heart failure. Hypertrophic cardiomyopathy also presents most frequently in the twenties. In a military population, it is important to exclude athletic heart syndrome. The level of hypertrophy and the severity of the hemodynamic changes do not help to determine the prognosis. Poor prognostic factors are a family history of sudden death, diagnosis in childhood, and a history of blackouts.

CARDIOVASCULAR SCREENING PROGRAM

AEROMEDICAL CONCERNS: Coronary artery disease (CAD) is the leading cause of permanent suspension from flying duties and non-accidental, premature death in aircrew members. The first signs and symptoms of CAD are often dramatic, incapacitating, or even fatal. A CAD screening program for asymptomatic aircrew members is vital for aggressive risk factor modification to prevent in- flight incapacitation with a secondary benefit of timely intervention and if possible, reversal or arrest of the disease process.

WAIVERS: Waivers for rated aircrew members are required only for documented CAD. (See CAD APL) Failure of any screening level with the subsequent passage of the following level is filed *Information only*. FDMEs submitted without completion of CAD screening will be returned disqualified as incomplete. Failure of Level 1 CAD screening may be locally returned to FFD; abnormal Level 2 CAD screening, i.e., abnormal AGXT or EBCT (Electron Beam Coronary Tomography), may be returned to flying with a second rated pilot pending completion of Levels 3 and/or 4 after approval by USAAMA. Aircrew members declining to complete any level of the screening program will normally be considered for permanent medical suspension.

INFORMATION REQUIRED: All aircrew members are required to undergo CAD screening at 40 years or greater, but risk factor evaluation should be assessed annually for all aircrew regardless of age.

- **ATCs (Class 4 FDME)**: Civilian ATCs failing Level one are counseled on risk factor modification. Military ATCs failing Level one will be further evaluated as per AR 40-501, 8-25.
- **LEVEL 1**: Annual submission of risk factors to include: age, family history, blood pressure, smoking history, serum lipids (See Hypercholesterolemia APL), blood sugar, ECG findings of Left Ventricular Hypertrophy (LVH). If Framingham risk index is 7.5 or greater, LDL 190 or greater (if LDL unavailable a serum cholesterol 255 or greater), or total cholesterol/HDL ratio is 6.0 or greater, rated aircrew members (except ATCs) will proceed to Level 2. Those rated aircrew members with borderline elevations of cholesterol or decreased HDL may use the average of 3 laboratory tests obtained over a six month period to calculate their risk index and ratio. If their risk factors are within standard as calculated with these average values they need not undergo AGXT or EBCT at that time.
- **LEVEL 2**: AGXT or EBCT. If either of these is abnormal, proceed to level 3. An EBCT Calcium score greater than 400 is considered abnormal. Borderline abnormalities should be referred to USAAMA.
- **LEVEL 3**: Noninvasive Cardiac Imaging: Thallium GXT (preferred) or Stress Echocardiogram. If abnormal, proceed to level 4, but only after consultation with USAAMA. If no hemodynamically significant perfusion defects are detected, aggressive risk factor modification is to be done.
- **LEVEL 4**: Invasive Cardiac Procedure: Cardiac catheterization. Results of cardiac catheterization must be forwarded to USAAMA for review along with the other reports from Levels 1-3. Final Disposition on cases will be made after review of study results.

FOLLOW-UP: Continued failure of Level 1 CAD screening after a normal subsequent work-up will necessitate the submission of a repeat Level 2 CAD screening every 3 years.

TREATMENT: The key to lowering the incidence of coronary artery disease is aggressive risk factor modification/reduction. Treatment of Hyperlipidemia, Hypertension, and increased blood glucose are essential. Additionally, therapeutic lifestyle changes focused on tobacco cessation, regular exercise and a healthy diet are of the utmost importance in lowering cardiovascular risk. Aircrew that fail Level 1 screening with subsequent passage of level 2 still require careful assessment and treatment of risk factors. See appropriate APLs for aeromedically acceptable treatment for these conditions.

DISCUSSION: The Framingham CAD Risk Index calculator is a computer generated, weighted multiple regression formula available from USAAMA and the U.S. Army Health Care Systems Support Activity. The risk calculator is available via the Ultimate Flight Surgeon CD, the USASAM website, or the USAAMA website.

Sudden incapacitation of aircrew secondary to heart disease may result in loss of life and aircraft, and resultant mission failure. In- flight cardiac events are rare. A review of the Army Safety Center Database over the last ten years indicates that there were no mishaps directly attributable to an incapacitating coronary event in flight. U.S. Air Force records analysis for the period 1988-1992 reveals an average 5 year incidence of cardiac events of less than 0.15%. The screening program is an

opportunity to diagnosis disease at a subclinical or asymptomatic level in order to ensure that in- flight incapacitation remains a rare event.

REFERENCE: *Prevention of Coronary Heart Disease in Clinical Practice.* European Society of Cardiology/European Atherosclerosis Society/European Society of Hypertension/European Society of General Practice/Family Medicine/International Society of Behavioral Medicine/European Heart Network. 1998. (Available from the National Guideline Clearing House: www. guideline.gov/index.asp)

FRAMINGHAM RISK INDEX

$$\text{Framingham Risk Index} = \frac{1}{1 + e^{-\text{coeff}}}.$$

The variable "coeff" is the total beta coefficient and is derived from the multiple logistic regression formula. (Gordon et al., 1971)

Total beta coeff = b0* +
(b1 x age) +
(b2 x age) +
(b3 x age x total cholesterol in mg/dl) +
(b4 x total cholesterol in mg/dl) +
(b5 x systolic blood pressure in mmHg) +
(b6 x smoking history** +
(b7 x LVH on ECG***) +
(b8 x diabetes****)

Framingham Risk Index beta coefficients by gender

Factor	*Gender is male*	*Gender is female*
b0	-22.227532	-19.066572
b1	0.460575	0.311558
b2	-0.002882	-0.001724
b3	-0.000416	-0.000190
b4	0.028590	0.016802
b5	0.012444	0.015278
b6	0.447815	0.049966
b7	0.743158	0.441707
b8	0.265016	0.416906

NOTES:

* Factors "b0" through "b8" are gender adjusted and are listed in the above table.

** For the variable "smoking history", the value is "1" if smoking history is 10 or greater cigarettes per day; value is "0" if smoking is less than 10 cigarettes per day.

*** For the variable "LVH", the value is "1" if left ventricular hypertrophy is found on ECG; and value is "0" if there is no left ventricular hypertrophy on ECG.

**** For the variable "diabetes", the value is "1" if the fasting blood glucose is 115 mg/dl or greater, and the value is "0" if the fasting blood glucose is less than 115 mg/dl.

CHAMBER WALL OR SIZE ABNORMALITIES

AEROMEDICAL CONCERNS: Atrial enlargement can be caused by many cardiac problems but is usually associated with enlargement of one or both of the ventricles. Right atrial enlargement is most often associated with pulmonary disease and left atrial enlargement is commonly caused by mitral valve disease. Right ventricular hypertrophy is also often caused by pulmonary disease but can be compensatory rather than pathologic. Left ventricular hypertrophy has been shown in several series to be associated with dysrhythmia, angina or sudden death. Idiopathic or secondary cardiomyopathies are discussed separately.

WAIVERS: In the active duty military population, almost all chamber abnormalities are non-pathologic. True chamber enlargement due to underlying pathologic disease is only waived when treatment and the underlying causative condition are resolved. Valvular diseases require special consideration (see specific valvular disorder). LVH based on ECG criteria is usually false positive. Current criteria, based on the general population, is not valid for our young, athletic population. Individuals with true LVH are terminated from flight status; no waiver recommended. Isolated findings of elevated voltages on ECG with normal echocardiogram are considered fully qualified with *information only*. Individuals with early mild LVH secondary to hypertension are waiverable if satisfactory treatment of hypertension is achieved. Forward all tracings and films with the aeromedical summary to USAAMA.

G Code	Condition
G-500	Left Atrial enlargement
G-720	Left ventricular hypertrophy by voltage criteria and ST-T segment abnormalities
G-727	Biventricular enlargement
G-501	Right Atrial enlargement
G-728	Septal hypertrophy
G-502	Bi-atrial Enlargement
G-721	Right ventricular hypertrophy with tall R-wave
G-729	Left ventricular hypertrophy by voltage only
G-722	Right ventricular hypertrophy with RSR’

FOLLOW-UP: An annual ECHO, and 3-day b.i.d. BP check are required for hypertension induced mild LVH.

TREATMENT: Treatment of underlying cause of hypertrophy.

DISCUSSION: In young individuals, the precordial voltages tend to be higher than in older individuals. If voltage criteria alone are used to diagnose LVH, many false positives will result. Below are some criteria for LVH from different authorities. As voltage criteria are not very sensitive or specific, additional ECG criteria can be used to bolster the specificity. Left atrial enlargement, ST segment abnormalities, widening of the QRS, and abnormal R-wave progression are supplemental characteristics of LVH. If any questions remain, an ECHO should be obtained.

Scott Criteria:

(1) S in V1 or V2 plus R in V5 or V6:
> 35 mm > 30 years old
> 45 mm > 20 - 30 years old
> 55 mm > 20 years old

(2) R in V5 or V6 > 26 mm; R + S in any V lead > 45 mm
R in aVL > 7.5 mm;
R in aVF > 20 mm;
or S in aVR > 15 mm.

USAFSAM Criteria:

S in V1 or V2 plus R in V5 or V6
> 55 mm if under 35
> 45 mm if over 35

Estes Criteria:

R or S in any limb lead > 20 mmg	= 3 points
S in V1, or V2, or V3 > 25 mm	= 3 points
R in V4, or V5, or V6 > 25 mm	= 3 points
Any ST shift without drugs	= 3 points
Typical “strain” pattern with digitalis	= 1 point
LAD of -15 or more	= 2 points
QRS width 0.09s or more	= 1 point
Intrinsicoid deflection in V5 or V6 0.04 or >	= 1 point
P terminal force in V1 more than 0.04	= 3 points

A score of 4 points indicates probable LVH.
A score of 5 and greater indicate definite LVH.

CORONARY ARTERY DISEASE (ICD9 414.9)

AEROMEDICAL CONCERNS: Coronary artery disease (CAD) is the leading cause of permanent suspension from flying duties. The major concern is sudden in-flight incapacitation as a result of sudden death, altered consciousness, or incapacitating angina. Heat, hypoxia, hyperventilation, work-related stress, and/or high Gz maneuvers all increase myocardial oxygen demand; thus, possibly provoking dysrhythmia and infarction in individuals with pre-existing coronary artery lesions.

WAIVERS:
Initial Applicants and Rated Aviation Personnel (All Classes): Coronary artery disease is considered disqualifying for all flying duty classes (AR 40-501, p. 4-15).

Minimal Coronary Artery Disease (MCAD): A waiver may be considered for those diagnosed with asymptomatic Minimal Coronary Artery Disease. MCAD is defined as gradeable lesions on angiography resulting in < 40% occlusion of any coronary artery provided that the aggregate of occlusions is < 120%. MCAD is waiverable in conjunction with right bundle branch block, multifocal atrial tachycardia, frequent ventricular ectopy, and recurrent, nonsustained supraventricular tachycardia (SVT). MCAD is considered non-waiverable if associated with left bundle branch block, WPW pattern on ECG, sustained SVT, mitral valve prolapse, or nonsustained ventricular tachycardia.

Significant Coronary Artery Disease (SCAD): Aircrew members with Significant Coronary Artery Disease , i.e., *single lesions > 40% or aggregate lesions > 120%,* or who have a history of myocardial infarction or coronary artery surgery to include PTCA, balloon angioplasty, coronary artery stent placement, endarterectomy or coronary bypass are not waiverable.

INFORMATION REQUIRED: Aviators with CAD need :

- Initial complete cardiology evaluation to include risk factor analysis,
- Aeromedical graded exercise test (AGXT),
- Baseline Thallium or Sestamibi GXT scan, Stress echocardiogram or Electron Beam Computed tomography (EBCT); and,
- Cardiac catheterization. (See Cardiovascular Screening APL.)

This testing may be done locally, by designated Army Aeromedical Cardiology Consultant, or with Brooks Aeromedical Consultation Service (AMCS) following consultation with USAAMA. Local work-ups, to include final reports of all studies will be forwarded to USAAMA for review prior to any waiver action. If films or complete tracings are required they will be requested. Local flight clearance is not authorized unless granted in coordination with USAAMA.

FOLLOW-UP: Comprehensive cardiology evaluations should be performed every three years and include an interval history and physical examination. Stress Thallium or stress echocardiogram should be performed every three years as well as localization of calcium deposits in the coronary artery distribution system by Electron Beam Computerized Tomography (EBCT) if available. If EBCT is planned for follow-up testing, a baseline study should be completed upon notification of waiver for use as comparison. Repeat cardiac catheterization is not required unless there is a change in the patient's condition (decreased exercise tolerance or angina for instance) or results from any of the previously mentioned follow-up examinations deviate from previous test results. In these cases, the aviator would be disqualified from aviation duties except for simulator flights until an evaluation and work-up by an aviation medicine qualified cardiology specialist is accomplished. The results would then be reviewed by AAMA and a recommendation for flying duty made.

TREATMENT: Only prophylactic aspirin, nicotine weaning, antihypertensive therapy and lipid lowering medications are approved. All other medications are not waiverable. (See Medication APLs)

DISCUSSION: The risk of sudden death from an unheralded heart attack at age 40/50/60 is 8/36/100 times greater than at age 30 and is the initial presentation in more than one third of myocardial infarctions. Up to 60% of patients die in the first hour. The literature suggests that individuals with normal coronary arteries on catheterization have a very low risk of experiencing a cardiac event within the next few years. Those with lesions less than 50% were found to have an incidence of endpoints (angina, myocardial infarct, progression, or sudden death) comparable to unscreened low-risk populations in the Framingham and Rochester studies. Those with 50% lesions had a 5 to 7 times higher risk of endpoints. After angioplasty, restenosis will occur in 30% within 6 months with an additional 15% restenosis over the next 2 to 7 years. The risk of a

cardiac event (infarct, death, bypass surgery) after angioplasty is 28% in 5 years in single vessel disease and 56% in 7 years in multivessel disease. Coronary artery bypass surgery will increase exercise tolerance and relieve angina in up to 85% of cases, but the symptoms will recur in approximately 8% of the patients per year.

REFERENCE:

OTSG Memorandum , 18 October 2001, SUBJECT: Flying Duty Medical Examinations (FDME) For Department of the Army (DAC) Employees.

Prevention of Coronary Heart Disease in Clinical Practice. European Society of Cardiology/European Atherosclerosis Society/European Society of Hypertension/European Society of General Practice/Family Medicine/International Society of Behavioral Medicine/European Heart Network. 1998. (Available from the National Guideline Clearing House: http://www.guideline.gov/index.asp)

HYPERLIPIDEMIA / HYPERCHOLESTEROLEMIA (ICD9 272.0)

AEROMEDICAL CONCERNS: Coronary Artery Disease (CAD) is the leading cause of permanent suspension from flying duties and non-accidental, premature death in aircrew members. In an effort to reduce the risk of CAD, it is necessary to reduce or prevent the identified risk factors such as hyperlipidemia (HLD). With the availability of highly efficacious statin drugs, and with newer clinical trials demonstrating a profound effect of these drugs in primary and secondary prevention of coronary artery disease, there is now widespread agreement that primary treatment of HLD is indicated. An increase in CAD risk occurs with elevated plasma cholesterol, increased low density lipoprotein (LDL), and reduced high density lipoprotein (HDL).

WAIVERS: Hypercholesterolemia and any drug therapy is disqualifying for initial flight applicants. **Hypercholesterolemia controlled by either diet or by those drugs listed below is not disqualifying for aircrew members and no waiver is required**. This information is filed **Information Only**. Several drugs listed require monitoring and annual submission of additional information with FDME. Submitted physicals without required laboratory values will be returned for completion. Patients requiring drug therapy should be DNIF for a trial period sufficient to observe for drug side effects prior to local flight clearance.

INFORMATION REQUIRED: For an accurate lipid profile determination: 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; and have no illness, operation or injury for the previous 4 weeks, and 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 erythematosis 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 appropriate laboratory testing, imaging for liver disease, and consultation with specialists as required. For assistance in determining evaluation requirements, contact USAAMA staff. Aircrew members of any age with serum cholesterol values greater than or equal to 255 mg/dl (90th percentile based on NCEP) should be evaluated for treatment with options as listed below. The goal is aggressive risk factor reduction for coronary artery disease.

FOLLOW-UP: Follow-up for specific drug regimens is listed below. Annual submission of plasma cholesterol and HDL are required.

TREATMENT: The first line of treatment for mild cases is Therapeutic Lifestyle Changes (TLC) including dietary control, weight loss, increased exercise, and reduction in alcohol intake. 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 of choice is the statins 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, ATROVASTATIN, and FLUVASTATIN. (Liver Function tests (LFTs) 6- 12 weeks after the start of therapy and then every 6 months thereafter, CPK every 6 months and Lipid profile every 6 months).
- **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).
- **Nicotinic Acid**: NIACIN, NIASPAN. Serum glucose and uric acid every 6 months. LFTsevery 6-12 weeks for the first year and then every 6 months thereafter.

DISCUSSION: The incidence of heterozygous familial hypercholesterolemia in the U.S. is 1 in 500. Of male heterozygotes, 50% will have CAD by the time they reach 50 years of age. In familial hypertriglyceridemia, there is a risk of acute pancreatitis when total cholesterol > 1000 mg/dl and in severe cases, a rare incidence of peripheral neuropathy and dementia. The treatment of severe hypercholesterolemia has been shown to reduce the incidence of a first myocardial infarction. The treatment of mild/moderate cases of HLD is becoming increasingly recommended as a preventive strategy for CAD. A review of recent data in the AEDR shows that 10 % of aircrew have total cholesterol levels greater than 255 mg/dl. This figure is

unchanged from 1990 and indicates a key area for preventive strategies. ATP III guidelines reflect a simple seven step process to evaluate HLD, the cardiac risks associated, and recommended treatments. The primary target for therapy is the LDL with the goal for LDL cholesterol <100 mg/dl. Major risk factors that modify LDL goals include: tobacco use, hypertension, 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).

REFERENCE: *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

HYPERTENSION (ICD9 401.9)

AEROMEDICAL CONCERNS: 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.

WAIVERS: Waivers for hypertension are routinely granted for Class 2, 3, & 4 aircrew members 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: The goal of initial work-up of a questionably hypertensive patient is to verify the diagnosis with a 3-day b.i.d. BP reading. 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.

FOLLOW-UP: Continuation of waiver requires the annual submission of a CHEM. 7, ECG, UA, and 3-day b.i.d. BP determination. Annual submission of 3-day b.i.d. BP determinations are also required for those individuals controlled by diet and exercise alone. Certain medications will require unique annual submissions - see below.

TREATMENT: JNC VI report(reference listed below) contains detailed guidance and evaluation and therapy for hypertension. Lifestyle modifications to include: exercise, weight loss, salt restriction, alcohol abstinence, smoking cessation, reduction in caffeine consumption, adequate dietary potassium, calcium, and magnesium, and a diet limited in saturated fat and cholesterol is the suggested initial treatment for hypertension. If medication is required, the aircrew member must be grounded for a sufficient period to observe for side effects and can resume flight when stable on medications and blood pressure is trending appropriately. Waiver should be requested when on a stable dosage and adequate BP control is achieved. 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. Per JNC VI, the initial medication should be a diuretic, but operational conditions and individual response will guide therapy. A current (within 90 days) set of laboratory results are required on the annual FDME.

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.

Angiotensin II Receptor Blockers: LOSARTAN (Cozaar), Valsartan (Diovan), Irbesatan (Avapro), Candarsartan (Atacand). ACE and ARB II in Combination with approved diuretics may be used.

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

Beta Blockers: ATC PERSONNEL ONLY - ATENOLOL (Tenormin), METOPROLOL (Lopresor), PROPRANOLOL (Inderal). These are considered Class 4 medication for all other aircrew. (See Medication APLs)

Calcium Channel Blockers: AMLODIPINE (Norvasc) can be used with waiver in any aircrew member. **ATC PERSONNEL ONLY** - VERAPAMIL (Calan), NIFEDIPINE (Procardia), DILTIAZEM (Catapres). These are considered Class 4 medications for all other aircrew.
Clonidine: ATC PERSONNEL ONLY – This is considered Class 4 medication for all other aviation classes.

Diuretics - Thiazide, Potassium-sparing, and combinations. All LOOP DIURETICS are Class 4 medications and will not be waived. 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.

DISCUSSION: Primary Prevention is key. A significant portion of cardiovascular disease occurs in people whose blood pressures is above the optimal level (120/80 mm Hg) but not so high as to be diagnosed or treated as hypertension. Review of AEDR data indicates that 86% of those requesting waiver for this condition have them granted and those who do not receive waivers generally have another more serious condition leading to suspension. USAAMA stresses the need for flight surgeons to work on primary prevention with aircrew members and to aggressively diagnose and treat hypertension to prevent 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 Sixth Report of the Joint Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.* NIH: National Heart, Lung, and Blood Institute 98-4080, Nov 1997
http:www.nhlbi.nih.gov/guidelines/hypertension/jncintro.htm

IDIOVENTRICULAR RHYTHM

AEROMEDICAL CONCERNS: Idioventricular rhythm is frequently asymptomatic. However, if the ventricular rate is slow enough to depress cardiac output and decrease blood pressure, it may result in increasing fatigue, dizziness, syncope, and, rarely, angina.

WAIVERS: Waiver is possible if complete cardiac evaluation rules out the possibility of underlying disease.

G Code	Condition
G-060	Idioventricular rhythm
G-076	Accelerated idioventricular rhythm

INFORMATION REQUIRED: Complete cardiology evaluation is required. Submit results of AGXT, 24-hour Holter monitor, and ECHO. The asymptomatic aircrew member does not need to be grounded during this evaluation if the studies are normal.

FOLLOW-UP: None.

TREATMENT: Treatment includes correction of reversible precipitating factors such as hypoxia, hyperkalemia, or acidosis.

DISCUSSION: ECG shows a regular rhythm characterized by a wide, bizarre QRS and rates of 20 to 100 beats per minute. Idioventricular rhythm may occur as a result of hypoxia, acidosis, severe hyperkalemia, during general anesthesia, or with acute myocardial infarction. Idioventricular rhythm must be differentiated from any of the bradycardias and is most frequently confused with AV junctional rhythm with aberrant ventricular conduction or sinus bradycardia with bundle branch block. When the rate exceeds 50 beats per minute, the term “accelerated idioventricular rhythm” is used. This is often associated with acute myocardial infarction and thus, it is not normally waiverable.

INNOCENT MURMUR (ICD9 785.2)

AEROMEDICAL CONCERNS: The finding of a heart murmur in an aircrew member has a broad range of implications depending upon the type of murmur, the valve involved, and the actual aircraft position the aircrew member occupies. It is important to document the presence of an innocent heart murmur as soon as possible and to definitively rule out the presence of pathologic valvular changes. The presence of a truly innocent heart murmur is of no consequence in aviation medicine.

WAIVERS: Once an innocent murmur is discovered, no waiver is required. The diagnosis is filed for *information only*.

INFORMATION REQUIRED: FDME must clearly document the presence of an innocent heart murmur. This documentation should include a complete description of the murmur to include auscultation and palpation. Since most innocent heart murmurs are brief, buzzing, mid-systolic murmurs, other murmurs are suspicious for pathology. Evaluation should consist of: complete history and physical, PA and lateral chest X-ray, resting 12-lead ECG, a 24-hour Holter monitor and a ECHO cardiogram (2-D & M-Mode) with color-coded Doppler flow study. If no pathology is found, the murmur should be designated as "functional" or "innocent flow murmur". Forward all studies to include ECHO films to USAAMC (ATTN: MCXY-AER, Aeromedical Consultation Svc, Ft Rucker, AL 36362).
(Note: Echocardiogram findings of "trace" or "minimal" valve dysfunction should be interpreted as aeromedically normal.)
FOLLOW-UP: N/A

TREATMENT: N/A

DISCUSSION: Innocent murmurs are by definition, those murmurs which occur in the absence of anatomic or physiologic abnormalities of the heart. Such murmurs may be present at any time during anyone's life. An understanding of the nature of innocent murmurs is necessary in order to avoid mistaken diagnosis which can result in erroneous administrative action in flight applicants as well as rated personnel. The majority of innocent murmurs are systolic, occasionally are continuous, but rarely are they diastolic.

INTRAVENTRICULAR CONDUCTION ABNORMALITIES

AEROMEDICAL CONCERNS: Acquired bundle branch or fascicular block may be the result of serious cardiac disease, including coronary atherosclerosis and myocardial infarction; but also may be the result of hypertension, volume overloading, cardiac valvular diseases, and may even be found in normal individuals.

WAIVERS: Incomplete right bundle branch block (RBBB), unless acquired as a serial change, and proven congenital RBBB are considered normal variants, recorded for *information only* , no waiver required. Acquired RBBB, left bundle branch block (LBBB), left anterior hemiblock (LAHB), and left posterior hemiblock (LPHB) require waiver action upon completion of a cardiology evaluation. Bifascicular blocks (LAHB or LPHB with RBBB) and trifascicular blocks (1st degree AVB with RBBB and either LAHB or LPHB) are not considered waiverable. Local flight clearance for any of these abnormalities is not authorized unless in coordination with USAAMA.

G Code	ICD9 Code	Condition
G-120	426.4	Right bundle branch block (RBBB)
G-121	None	Incomplete right bundle branch block (IRBBB)
G-126	426.2	Left anterior hemiblock (LAHB)
G-124	426.3	Left bundle branch block (LBBB)
None	426.53	Bifascicular block (LAHB & RBBB
None	426.54	Trifascicular block
G-128	None	Left posterior hemiblock

INFORMATION REQUIRED: A complete current FDME and cardiology evaluation, i.e., PA and lateral CXR, AGXT, 24-hour Holter, ECHO, and exercise Thallium Scan, are required for LBBB, RBBB, LPHB, and acquired LAHB. Cardiac catheterization is required for those 40 years of age or older; and may, at the discretion of USAAMA, be required for those under 40 years of age. If LAHB is found in an aircrew member 35 years of age or younger and no prior tracings are available, an ECHO should be performed to rule out congenital heart disease. If older than 35 and no prior tracings are available, an AGXT and ECHO should be performed. If LAHB has been present for over 5 years, only an ECHO is required. IF LAHB develops slowly over a number of years as a result of progressive left axis deviation, no further evaluation is required.

FOLLOW-UP: Only required in those with other underlying cardiac disorders.

TREATMENT: N/A

DISCUSSION: RBBB occurs on up to 2 per 1000 ECGs. It is often congenital (seen on earlier ECGs) or develops at high heart rates. If it has been present for years, is not associated with symptoms, and is accompanied by an otherwise normal cardiac examination, RBBB carries no known adverse risk or prognostic significance. One report states that the risk of RBBB progressing to complete block is a few percent a year. The risk increased when RBBB is associated with left posterior fascicular block or when RBBB and LBBB alternate. In the absence of heart disease, acquired RBBB carries the same risk for death or syncope as the general population. Similarly, isolated left anterior fascicular block carries no known increased risk; not enough is known about isolated left posterior fascicular block to access its risk potential. In the absence of demonstrable pathology, there is no justification for termination from flight status. Persons with known, recently acquired LBBB have a 10-fold increase in mortality compared to normal. From 10-20% of patients with asymptomatic LBBB are discovered to have coronary artery disease following catheterization.

MITRAL VALVE PROLAPSE (ICD9 424.0)

AEROMEDICAL CONCERNS: Most mitral valve prolapse (MVP) is considered a benign condition from which no significant symptoms ever occur. However, MVP is occasionally associated with development of palpitations, chest pain, severe mitral regurgitation, infective endocarditis, syncope, ventricular dysrhythmias, and even sudden death.

WAIVERS: Exception to policies for Class I flight applicants are not recommended. Waiver for all other applicants and rated aircrew members are considered favorably in the presence of only mild mitral regurgitation and no significant dysrhythmia. Nonsustained supraventricular tachycardia when in association with MVP is also considered favorably for waiver action.

INFORMATION REQUIRED: Complete cardiology consultation is required, including AGXT, 24-hour Holter Monitor, and 2-D M-mode ECHO with Doppler flow study.

FOLLOW-UP: Submission every three years of 24-hour Holter monitor and ECHO with Doppler flow study. Findings of progressive regurgitation or unusual dysrhythmias will require further testing as indicated.

TREATMENT: SBE antibiotic prophylaxis is required for all dental procedures as well as any other potentially septic exposure. Beta blockers, used to reduce the incidence of palpitations, may used on ATC personnel but are prohibited for all other classes of aircrew. Annuloplasty may be required for the more severe forms of regurgitation, but is rarely considered favorably for waiver.

DISCUSSION: Mitral valve prolapse (MVP) is the one of the most common abnormalities of the heart valves with a prevalence in various studies between 0.33% to 17%. It is generally accepted that the overall prevalence of MVP is about 4-5%. Women account for about two-thirds of these cases. Most MVP is congenital and in fact has been found in family groupings; but a small percentage of MVP occurs due to inheritable connective tissue disease (such as Marfan syndrome, pseudoxanthoma elasticum, and Ehlers-Danlos syndrome). Middle aged and elderly men, who have MVP, are at a higher risk of developing progression of mitral regurgitation (5.5%), ruptured chordae tendinea, and endocarditis (2-8%). Neurologic ischemic events occur in individuals with MVP more commonly than in the normal population, but this can only be clearly identified in groups at low risk of stroke, such as young women. Risk of sudden death is well established in MVP patients with severe mitral regurgitation. Patients without known MVP, at autopsy, are found often with an associated severe valvular deformity as well as increased heart weight suggesting the presence of undiagnosed regurgitation. To date specific dysrhythmias have not been documented to increase the risk of sudden death in the MVP but have been linked with symptoms incompatible with aviation status, i.e., sudden onset syncope, chest pain, and associated anxiety.

MITRAL REGURGITATION (ICD9 394.3)

AEROMEDICAL CONCERNS: Aircrew members with mitral regurgitation may remain asymptomatic for decades. Eventually, however, left ventricular failure develops and patients note exercise intolerance, dyspnea, and fatigue. Complications of mitral regurgitation include arterial or venous embolism, bacterial endocarditis, left and right ventricular failure. Sudden attacks of acute pulmonary edema, and atrial fibrillation are common in severe mitral regurgitation.

WAIVERS: Waiver may be favorably considered for mild cases of mitral regurgitation provided it is not associated with mitral stenosis or connective tissue disease and there is normal exercise tolerance, no abnormalities of the left atrium or left ventricle, and no dysrhythmias.

INFORMATION REQUIRED: Complete cardiology evaluation including AGXT, 24-hour Holter Monitor, and ECHO with Doppler flow study. Consultation with an aeromedical cardiology consultant may be required, particularly if moderate or severe disease is present, by USAAMA.

FOLLOW-UP: Annual submission of AGXT, 24-hour Holter Monitor, ECHO with Doppler flow study, and cardiology consultation are required. Submit actual tracings and films with FDME.

TREATMENT: SBE antibiotic prophylaxis is required for all dental manipulations and potential septic exposures. Associated left atrial enlargement may be severe enough to warrant anticoagulation, but this is incompatible with continued flight status.

DISCUSSION: Now known to be one of the most common valvular lesions, it is found by ECHO in 35-40% of normal 20-40 year old individuals. It can be the result of many different pathologic processes: rheumatic heart disease, coronary artery disease, bacterial endocarditis, Myxomatous degeneration of the mitral valve, mitral annular calcification, left ventricular dilation, idiopathic hypertrophic subaortic stenosis, various congenital heart disease, and (more uncommonly) tumors, syphilis, ankylosing spondylitis, trauma, amyloidosis, granulomas, and Hurler's syndrome. With severe regurgitation, the 5-year survival rate is less than 50%.

Diagnostic Criteria

Mild	Restriction of the regurgitant jet to less than or equal to 2 cm behind the valve leaflets. Additionally, it should be 4 cm^2 or less by planimetry, or less than 20% of the total left atrial area.
Moderate	Extension of the jet to the mid-atrium.
Severe	Flow velocity of 1.5 m/s. Severe regurgitation should also have a jet area greater than or equal to 8 cm^2, or > 40% of left atrial area. The flow should extend through more than 2/3s of systole. Pre-valvular acceleration of the MR jet implies more significant regurgitation.

MITRAL STENOSIS (ICD9 394.0)

AEROMEDICAL CONCERNS: Most patients with mitral stenosis remain asymptomatic until early middle life (30-40 years). The first symptoms to appear include exertional shortness of breath and hemoptysis. Symptoms continue to worsen with continued loss of effective valve area. Chronic fatigue, worsening dyspnea, and ankle edema are present in later stages. Complications include atrial fibrillation with or without rapid ventricular response, pulmonary edema, arterial or venous embolism, and right ventricular failure. Mitral stenosis may also present with chest pain. The progressive nature of this process and its risk of significant complications are incompatible with the military aviation environment.

WAIVERS: Any degree of mitral stenosis is disqualifying, and waivers are generally not granted. Occasionally, those aircrew members with extremely mild stenosis, who are asymptomatic with a pliable valve, minimal orifice reduction, normal exercise testing and no dysrhythmia may be considered for a waiver.

INFORMATION REQUIRED: Complete cardiology evaluation including: AGXT, 24-hour Holter Monitor, and Echocardiogram (2-D & M-Mode) with color Doppler flow study. Consultation with the designated Army Aviation Medicine Cardiology Consultant or AMCS (Brooks AFB) may be required by USAAMA.

FOLLOW-UP: Annual submission of AGXT, 24-hour Holter Monitor and ECHO with Doppler flow study with cardiology consultation. Submit complete tracings and films with FDME.

TREATMENT: SBE antibiotic prophylaxis is required for all dental procedures as well as any other potentially septic exposure. Valve replacement is not considered waiverable.

DISCUSSION: Approximately 50% of patients with mitral stenosis report an episode of rheumatic fever in childhood. The patient becomes symptomatic 10-20 years after an attack of rheumatic fever and becomes incapacitated 5-10 years later. Pregnancy can result in earlier manifestations of mitral stenosis due to the increased workload pregnancy places on the heart. Pulmonary edema, heart failure and even death have been reported in pregnant women with mitral stenosis. Atrial fibrillation becomes chronic in over 50% of patients with mitral stenosis. Paroxysmal atrial fibrillation will occur in up to 80% of patients with mitral stenosis and of these, 20-30% will form atrial thrombi with subsequent embolization. Between 10 and 20% of patients with mitral stenosis, including those with only mild disease, can throw off emboli with a subsequent mortality rate of 15%. Once patients become symptomatic, survival is 50% at 4-5 years without surgery. After valve replacement, the 50% survival rate is improved to 10 years.

MYOCARDIAL ISCHEMIA / DAMAGE (POSSIBLE) (ICD9 459.9)

AEROMEDICAL CONCERNS: Occasionally ECG findings, when discovered as new or serial changes, are suggestive of ischemia or myocardial damage. Silent myocardial infarction or ischemia may be present without the knowledge of either the aircrew member or his physician. These individuals are at risk for further ischemia, dysrhythmia, sudden loss of consciousness, and even sudden death.

WAIVERS: In the absence of symptoms and with negative cardiovascular evaluation, waivers are possible for several ECG variations.

G Code	Condition
G-200	Low amplitude T-waves less than 5 mm in all leads
G-201	Nonspecific T-wave changes
G-203	Nonspecific ST depression less than 0.5mm at 80 msec past the J-point in any lead
G-299	Unspecified ST and/or T-wave abnormality
G-600 series	
	Convex ST elevation with symptoms
	Borderline ST depression with greater than 0.5 mm but less than 1.0 ST segment depression at 80 msec past the j-point.
	Abnormal ST depression with greater than 1.0 mm ST segment depression at 80 msec past the j-point.
	T-wave inversion. A pattern of T-wave inversion in several ECG leads and not simply due to the T-wave axis.
	Significant Q-wave. Any Q-wave wider than 40 msec.
	Poor R-wave progression with the finding persisting with repeat ECGs one intercostal space above and below the normal precordial lead placement.

INFORMATION REQUIRED: When discovered on routine ECG, these findings should be initially verified by repeating the ECG following a 8 - 12 hour fasting period. If the fasting ECG is normal, no further evaluation is required. If the fasting ECG is abnormal, submit aeromedical summary with full cardiology evaluation. This includes related history, cardiac risk factor analysis, AGXT and cardiac fluoroscopy. If these findings are suggestive of disease then proceed with further testing to include 24-hour Holter Monitor, ECHO, and Thallium or Sestamibi scan. Cardiac catheterization may be required but if doubt exists, please contact USAAMA.

FOLLOW-UP: None required

TREATMENT: N/A.

DISCUSSION: Although sudden arrhythmic death occurs most often in patients with previously recognized ischemic heart disease, unexpected cardiac arrest is the first manifestation of underlying heart disease in up to 20% of patients. The majority of these patients suffering from sudden death have no symptoms prior to their arrest or may have symptoms which are not recognized as cardiac in origin. Abnormal ECG findings, while not totally indicative of underlying pathology, desire careful consideration, particularly when accompanied by other risk factors.

NORMAL VARIANT ELECTROCARDIOGRAMS

AEROMEDICAL CONCERNS: Normal variant ECG findings differ from the normal pattern but are usually not indicative of underlying cardiovascular disorder. Occasionally. however, they may be indicators of disease if discovered as a new change in the pattern.

WAIVERS: In the absence of underlying pathology, no waiver is required. The information is coded using the "G" coding system developed to compensate for the lack of coding ECG abnormalities in the ICD9 coding system, and entered as *information only*.

G Code	Condition	Qualifiers to Diagnosis
700	Normal ECG	Without normal variant or any abnormal findings
002	Sinus bradycardia	Resting pulse 40 to 50 b/m, asymptomatic, aerobically conditioned crew member
007	Sinus dysrhythmia (sinus arrhythmia)	
028	Ectopic atrial rhythm	
040	Accelerated junctional rhythm	
080	Supraventricular rhythm	With a rate of less than 100 beats per minute.
085	Wandering atrial pacemaker	
104	Second degree AV block, Mobitz Type I (Wenckebach)	
121	Incomplete right bundle branch block	When not acquired as a serial ECG change. (See below)
123	Terminal conduction delay	(i.e., S wave in V6 greater than or equal to 0.04 sec).
132	Nonspecific intraventricular conduction delay	QRS is less than 120 msec in all leads.
204	ST segment elevation	Due to early repolarization.
219	Persistent juvenile T-waves	In anterior leads.
729	LVH	By voltage alone when not presenting as a serial change and/or not associated with hypertension.
735A	Leftward axis	From 0 to -45 degrees unless a serial change.
736	Right axis deviation	+120 degrees or more unless a serial change.
737	Indeterminate axis	
743	S1-S2-S3 pattern	With QRS less than 100 msec.
744	S1-S2-S3 and RR' in V1 or V2	With QRS less than 120 msec.
755	R>S in V1	With no other evidence of right ventricular hypertrophy.
764	RSR' in V1 or V2	With QRS less than 120 msec. (See below)

INFORMATION REQUIRED: A 12-lead ECG interpreted by a physician is required on all flying duty medical examinations. The flight surgeon should line through computer-generated ECG readings that are in error, compare the ECG tracing with all available previous ECG tracings, and comment on serial ECG changes. Each ECG should be signed by the reviewing physician and submitted with relevant previous tracings. If no previous ECGs are available for comparison, further work-up may be required. **Incomplete right bundle branch block and RSR' patterns** require an ECHO if no previous tracings are available or if they are acquired findings.

DISCUSSION: Normal variant ECGs are often found in young athletic individuals to include bradycardia, LVH by voltage criteria, etc. Other normal variants are found in large groupings of the normal population, i.e., ectopic atrial rhythms and congenital incomplete right bundle branch blocks, etc. In no study have these variants of normal been linked with any increased risk of cardiovascular disease or dysrhythmia.

RAYNAUD SYNDROME (ICD9 443.0)

AEROMEDICAL CONCERNS: The primary concern is that the symptom complex (which includes numbness, tingling, and burning sensation which often accompanies the color changes within the fingers could) interfere with successful operation of cockpit buttons, switches and controls. Raynaud syndrome has also been linked with the development of connective tissue disorder (See Discussion)

WAIVERS: Waivers are considered favorably provided symptoms within the cockpit are manageable and underlying pathology has been excluded. The requirement to be deployed to cold environments may lead to limitations in deployability. This limitation is often viewed unfavorably in the waiver recommendation decision process.

INFORMATION REQUIRED: Complete history with complete hand radiography and thoracic outlet radiography to exclude cervical rib are required. Blood tests including anti-DNA and anticentromere (ANA) antibodies and nerve conduction studies to exclude nerve entrapment syndrome should be considered. Local MEB recommendations should be submitted. An in-flight evaluation with cold exposure may be recommended by USAAMA.

FOLLOW-UP: Yearly complete history with specific attention to functional limitations and progression of symptom complex.

TREATMENT: Behavioral adaptations such as avoidance of cold conditions, stopping smoking, wearing layered clothing, and keeping the hands warm are acceptable preventative measures. Drug therapy (Persantine, Amyl Nitrite) are not compatible with waiver because of the side effects of the drugs in common use. Thoracic sympathectomy is also not compatible with flying status.

DISCUSSION: Females constitute 60-90% of the patients presenting with Raynaud syndrome. Males present when older and are more likely to have arteriosclerosis. Up to 50% of patients with Raynaud syndrome develop a connective tissue disorder (frequently scleroderma) within 10 years. There is a strong relationship between presence of ANA and the later onset of scleroderma. Between 70-80% of scleroderma patients and 8-10% of systemic lupus erythematosis patients present with Raynaud syndrome. Migraine development was reported in 61% of one series of patients. There was a positive association with self-reported use of alcohol. Vasospasm is also reported to occur in the lungs resulting in a decrease in gaseous diffusion capacity.

PERICARDITIS / ENDOCARDITIS / MYOCARDITIS

AEROMEDICAL CONCERNS: Pericarditis can lead to pericardial effusion and even cardiac tamponade in more severe cases. These result in chest pain and shortness of breath and even dysrhythmias which can lead to dizziness, syncope and rarely death. Endocarditis, generally the result of bacterial infection, can present in an acute or chronic nature. The subacute or chronic nature of the disease leads to vague symptoms which are often difficult to diagnose. These symptoms include low-grade fever, weakness, easy fatigability, anorexia, weight loss, and muscle pain. Later manifestations of endocarditis include valvular damage with resultant regurgitation and potential for cardiac failure and embolic events. Myocarditis, usually the result of a variety of causes including infection, toxins, rheumatoid disease, sarcoidosis, may also present in either an acute (often fatal) manner or in a chronic insidious form. Cardiac failure is the most important feature of this disorder since it is generally progressive and often results in fatal outcome.

WAIVERS: The aircrew member should be grounded during the acute illness. Idiopathic pericarditis can be considered for waiver after the acute episode resolves provided there has been no recurrence and no sequelae for six months. Endocarditis may also be waivered if there are no significant sequelae. A six month period of observation for lack of relapse is normally required. Myocarditis, since it is rarely free of significant sequelae, has rarely been waivered in the past. The disposition of cases secondary to underlying disease will depend on the disease process.

G Code	ICD9 Code	Condition
G-706	420.9	Compatible with pericarditis
G-707		Compatible with myocarditis or endomyocarditis

INFORMATION REQUIRED: Cardiac evaluation is necessary to exclude connective tissue disorder, myocardial infarction or other disease, and neoplasm. This consultation should include a post-recovery ECHO to ensure the absence of pericardial effusion or constrictive pericarditis.

FOLLOW-UP: N/A.

TREATMENT: Idiopathic pericarditis is usually self-limiting. Rest and aspirin or nonsteroidal anti-inflammatory agents are often all that is required for treatment. If maintenance medication is required, then a waiver is not favorably considered. Bacterial endocarditis, if treated early enough with appropriate antibiotic coverage, may require no other therapy.

DISCUSSION: About 50% of the cases of acute idiopathic pericarditis are viral in origin, usually Coxsackie B. A small minority of cases may progress to pericardial constriction or tamponade. On initial presentation, more than 90% of the patients will have symmetrical ST elevation of most or all ECG leads, which become inverted over the next 2-3 weeks before reverting to normal. Some patients will be left with minor nonspecific ECG abnormalities.
Bacterial endocarditis is due in about 95% of cases to Streptococcus, Enterococcus, or Staphylococcus. Failure of diagnosis, delay in diagnosis and treatment, and extreme resistance of the organism to available antibiotics are the factors that account for the mortality and associated morbidity. Other factors leading to a relatively less than favorable outcome include an age over 50 and persistently negative blood cultures. Relapses usually occur, if at all, in the first 4 weeks after discontinuing treatment. Rarely do relapses seem to develop as late as 3 months afterward. Clinical and bacteriologic cure for 6 months after treatment almost always denotes permanent recovery.

PRE-EXCITATION SYNDROMES

AEROMEDICAL CONCERNS: There is a risk of tachydysrhythmias with associated hemodynamic compromise presenting as palpitations, lightheadedness, or syncope. There is also an association of pre-excitation with other types of heart disease.

WAIVERS: Pre-excitation syndromes such as Wolff-Parkinson-White (WPW) (defined as a short PR interval, widened QRS complex with a prolonged upstroke (Delta Wave), and tachydysrhythmia) and Lown-Ganong-Levine syndrome (LGL) (defined as short PR interval with associated tachydysrhythmia) are considered noncompatible with flying duties because of the increased risk of having symptomatic dysrhythmias. Waivers have been considered favorably 6 months following radio frequency (RF) ablation of accessory pathways provided the patient is asymptomatic and full electrophysiological studies (EPS) are normal (dysrhythmia unable to be provoked). A pre-excitation pattern alone, either WPW pattern or LGL pattern, may be waivered for Class 2, 3, and 4 aircrew members following normal work-up (outlined below); but, exceptions to policy for Class 1 or 1A are not normally granted. While not medically recommended, occasionally candidates elect to undergo EPS in hopes of proving the pathways are non-conducting. If EPS is negative, some exceptions to policy have been granted, but this step should be discouraged due to the risk of inducing potentially fatal dysrhythmias during the procedure.

G-Code	ICD9 Code	Condition
G-702		Wolff-Parkinson-White pattern, Type A
G-703		Wolff-Parkinson-White pattern, Type B
G-705	426.81	Lown-Ganong-Levine syndrome

INFORMATION REQUIRED: Cardiology evaluation is necessary to exclude such causes as hypertrophic cardiomyopathy or Ebstein malformation. Waiver for pre-excitation patterns may be made for rated aviation personnel following cardiology consultation to include 24-hour Holter monitor, AGXT, and ECHO. Aircrew members with pre-excitation patterns and associated tachydysrhythmia or related symptoms will be referred by USAAMA, upon approval by the receiving physician, to the designated Army Aeromedical Cardiology Consultant; Aeromedical Consult Service (AMCS), Brooks AFB; or to Navy Aeromedical Institute (NAMI), Pensacola NAS.

FOLLOW-UP: Annual report of history of any hemodynamic compromise or tachydysrhythmia (negative comments are required) and an annual 24-hour Holter monitor.

TREATMENT: The only available treatment for accessory pathway syndromes is ablation. Surgical ablation or DC catheter ablation is associated with a risk or recurrence as well as significant complications and is considered disqualifying. RF ablation can be waivered provided the procedure is coordinated with USAAMA. There is no need to consider ablation for asymptomatic accessory conduction pathways.

DISCUSSION: This condition occurs in 1 to 3 per 1000 of the population. The lowest incidence of dysrhythmia is in young adults without a past history; it is estimated that up to 20% of such individuals will develop tachycardia at some time. It is not possible to predict which patients will develop SVT and which will develop atrial fibrillation with or without catastrophic rapid ventricular response. Studies reporting atrial fibrillation rates up to 40% have been reported. RF ablation as reported in one series has resulted in 95% of patients with no recurrence or symptoms; those who developed complications did so within 6 months.

SINUS BRADYDYSRHYTHMIAS (ICD9 427.80)

AEROMEDICAL CONCERNS: In our population of young adults, bradycardia occurs very commonly and is considered a normal variant. Indeed, in some individuals it is a sign of excellent physical conditioning. This dysrhythmia is known to occur also in a wide variety of cardiac and extracardiac pathologic conditions. Pathologic bradycardia can occur as a result of some drugs, e.g., beta-blockers, guanethidine, digitalis, quinidine, etc., and in pathologic conditions such as myocardial infarction, sick sinus syndrome, pericarditis, hypothyroidism, hypothermia, etc. In the healthy adult, symptoms are usually not present. Individuals with impaired left ventricular function may be unable to compensate for the reduced heart rate and may exhibit symptoms referable to low cardiac output. These include: lassitude and easy fatigability, breathlessness upon exertion, postural dizziness and syncope, and even angina in extreme cases. Symptoms are unusual at any age in those with heart rates in excess of 40 beats per minute.

WAIVERS: Sinus bradycardia of less than 40 beats per minute, if a new finding or cannot be accounted for by a vigorous exercise program, is considered abnormal and requires further cardiac work-up as described below. If testing is normal, no waiver is required and is filed *information only*. If sinus bradycardia is accompanied by symptoms or hypotension, waiver is unlikely unless the underlying pathology is determined and is correctable.

G Code	Condition
G-002	Sinus Bradycardia

INFORMATION REQUIRED: Sinus bradycardia less than 40 beats per minute, if a new finding which has never been evaluated or cannot be accounted for by a vigorous exercise program, should be initially evaluated by performing a rhythm strip during exercise with the goal of attaining a heart rate of 100 beats per minute or double his resting heart rate (whichever is less). If unable to achieve this increase in rate, the aircrew member should undergo an AGXT and 24-hour Holter monitor. Further testing will be at the discretion of the USAAMA. Submit exercise ECG and/or documentation of excellent physical condition and all other documents with complete FDME.

FOLLOW-UP: Required only if an associated waiverable condition requires follow-up.

TREATMENT: N/A

DISCUSSION: A slow resting heart rate in an active duty army soldier is almost invariably caused by excellent physical conditioning resulting in a high resting vagal tone.

SINUS PAUSE

AEROMEDICAL CONCERNS: Sudden sinus pauses are common but are defined as abnormal when accompanied by symptoms and/or last more than 2.5 seconds. When sinus pauses are brief, the differential diagnosis includes sinus node failure, sinoatrial block, and an atrial premature beat (APB) that fails to conduct to the ventricles. When sinus pauses are prolonged, symptoms may include sudden loss of consciousness or seizure.

WAIVERS: Waivers are largely dependent on lack of symptoms with relative brief pauses. The underlying cardiogenic or neurogenic etiology is often difficult to elucidate despite full evaluation. Waivers for prolonged sinus pauses and/or those with symptoms are not possible unless the underlying cause is discovered and correctable.
Local flight clearances pending waiver are not authorized unless prior coordination with USAAMA has occurred.

G Code	Condition
G-005	Sinus Pause (Arrest)
G-024	Atrial escape beat
G-044	Junctional escape beat
G-084	Supraventricular escape beat

INFORMATION REQUIRED: Complete cardiology evaluation with accompanying AGXT, 24-hour Holter and ECHO. Electrical Physiologic Studies may be indicated. If this fails to produce evidence of the underlying cause, a complete neurological evaluation is required. Submit all tracings and films for USAAMA review.

FOLLOW-UP: Annual submission of a history directed at detecting underlying symptoms and annual 24-hour Holter.

TREATMENT: Pacemakers are not waiverable.

DISCUSSION: When pauses are significantly prolonged, failure of all pacemaking cells must be considered. The differential between an abnormality in the control of these pacemakers by the autonomic nervous system and an abnormality with the pacemaking cells is often difficult to determine, as previously mentioned. Without a known etiology the risk for sudden incapacitation during flight is possible but difficult to calculate. It is this uncertainty which makes waiver impossible.

SINUS TACHYCARDIA (ICD9 785.0)

AEROMEDICAL CONCERNS: Sinus (nodal) tachycardia is considered abnormal if the resting heart rate is greater than 100 beats per minute (bpm). In the flight applicant, this tachycardia may simply be caused by anxiety and is rarely persistent. Persistent sinus tachycardia may be secondary to significant metabolic or exogenous abnormalities. Other causes of sinus tachycardia existing must be diagnosed and treated before FFD is considered. These include: medication, caffeine, fever, hyperthyroidism, dehydration, anemia, hypoxia, pulmonary emboli, pain, and psychosomatic and psychiatric disorders.

WAIVERS: Anxiety-provoked sinus tachycardia, if found to be resolved upon retesting, is not considered disqualifying. Persistent tachycardia greater than 100 bpm while supine or greater than 110 bpm while standing is considered disqualifying. Waiver consideration is based upon the underlying cause of the tachycardia and the treatment plan. If no cause is discovered, the aircrew member will normally not be considered favorably for waiver. Initial applicants will be disqualified.

G Code	Condition
G-001	Sinus (Nodal) Tachycardia

INFORMATION REQUIRED: Obtain a 3-day b.i.d. pulse determination. If this remains elevated. consider elimination of possible exogenous factors and obtain thyroid function tests. Submit an internal medicine evaluation to assess underlying pathology. An AGXT, ECHO, and 72-hour Holter monitor may be required. Further evaluation will be at the discretion of the USAAMA.

FOLLOW-UP: Periodic follow-up is dependent upon the underlying etiology of the tachycardia.

TREATMENT: Treatment is also determined by the nature of the etiology. Hyperthyroidism is covered under Metabolic/Endocrine Waivers.

DISCUSSION: Anxiety of applicants, and rarely active aircrew members, often results in not only tachycardia but also hypertension. This “White Coat Syndrome” can often be overcome with desensitization, i.e., repeated exposure to the procedure of obtaining the measurement. Technicians obtaining these readings must be as non-threatening as possible, friendly, and not in a rush to complete the test.

SUPRAVENTRICULAR TACHYCARDIA (ICD9 427)

AEROMEDICAL CONCERNS: The primary concern in supraventricular tachycardia (SVT) is the risk of significant hemodynamic compromise causing in-flight incapacitation. These symptoms include lightheadedness, dizziness, presyncope, and loss of consciousness.

WAIVERS: Only asymptomatic (excluding the sensation of palpitations alone) cases will be considered for waiver since symptoms are usually an indication of hemodynamic compromise. Waiver may be considered for those aircrew members with the following asymptomatic conditions: episodes of single or recurrent, non-sustained SVT including those with coexisting mitral valve prolapse (MVP), left or right bundle branch block (LBBB or RBBB), mitral regurgitation (MR), and sarcoidosis or a single episode of sustained SVT including those with coexisting MVP, L/RBBB, MR, or sarcoidosis. Multifocal atrial tachycardia (MAT) may also be considered for waiver provided there is no indication of underlying heart disease. Waiver may also be considered for the following asymptomatic conditions: single or recurrent, nonsustained SVT with minimal coronary artery disease (MCAD) [(see CAD APL)], ventricular tachycardia (VT), or aortic insufficiency (AI); single episode of sustained SVT with VT or AI; recurrent, sustained SVT when the interval of recurrence is 3 years or greater. Termination of aviation status is mandatory in cases of: SVT with hemodynamic compromise; single sustained SVT with significant CAD; recurrent, sustained SVT when the recurrence is at intervals less than 3 years; and any SVT associated with a pre-excitation pattern on ECG.

G Code	Condition
G-036	Multifocal atrial tachycardia
G-081	Supraventricular tachycardia

INFORMATION REQUIRED: For cases of a single, asymptomatic, 3-10 beat run of SVT local evaluation will include thyroid function testing, ECHO, AGXT, and three 24-hour Holter monitors at monthly intervals to identify cardiovascular risk factors. Abnormalities will require further evaluation. Contact USAAMA. More complex cases of SVT will require additional noninvasive testing - thallium GXT and fluoroscopy. If either of these tests is abnormal, left heart catheterization will be required. Full documentation of studies will be forwarded to USAAMA for review.

FOLLOW-UP: Asymptomatic, single, nonsustained SVT requires repeat cardiac work-up (24-hour Holter and AGXT) every 3 years. More complex SVT may require additional testing, depending upon the associated condition.

DISCUSSION: SVT is defined as 3 or more consecutive nonventricular ectopic beats at a heart rate greater than 99 BPM. Excluded are atrial flutter or fibrillation and MAT. Recurrent is defined as occurring more than once in any test or during any evaluation. Sustained tachycardia is defined as lasting more than 10 minutes. SVT is characterized by a narrow QRS complex rhythm (except with aberrant conduction in which the QRS is wide) and P waves are usually hidden. Seventy percent are related to an AV reentry mechanism; 20% involve an accessory conduction pathway e.g., WPW; and 10% are SA nodal in origin. Non-reentry SVTs are due to ectopic pacemakers, paroxysmal atrial tachycardia (PAT) with block, or MAT as in COPD patients. In MAT, P waves precede each QRS but have at least 3 different P wave morphologies. An irregularly irregular rhythm and a narrow QRS complex are seen. MAT is often clinically significant and heart disease has to be excluded. The Air Force has reviewed 430 individuals with SVT. Of these, 42 (10%) had symptoms of hemodynamic compromise with syncope, presyncope, lightheadedness, chest discomfort, dyspnea, or visual changes. There were also 21 (5%) with recurrent, sustained, asymptomatic SVT. Of those with hemodynamic compromise, 90% had symptoms on initial presentation with the remainder developing symptoms after they were diagnosed as having SVT. Three of these individuals were initially found to have recurrent, sustained SVT and the fourth had a single, sustained SVT. The only co-factor that was associated with either hemodynamic compromise or recurrent, sustained SVT was pre-excitation syndrome (WPW or Lown-Ganong-Levine syndrome).

VALVULAR DISORDERS, OTHER

AEROMEDICAL CONCERNS: The major aeromedical concern is the risk of incapacitating symptoms associated with mitral and aortic valves previously discussed. Pulmonary valve and tricuspid valve stenosis can both produce fatigue or shortness of breath. Tricuspid insufficiency is associated with dysrhythmias

WAIVERS: Exception to policy for initial flight applicants is normally recommended. Newly discovered valvular disorder in rated aircrew members with very mild functional abnormalities of the tricuspid or pulmonary valves may be considered for waiver provided complete cardiology evaluation is normal. Other valvular disorders not discussed within this policy book are too rare to develop formal waiver policy or are considered on a case-by-case basis.

ICD9 code	Condition
424.0	Mitral Valve not otherwise specified
424.1	Aortic Valve not otherwise specified
424.2	Tricuspid Valve (Stenosis & Insufficiency)
424.3	Pulmonic Valve (Stenosis & Insufficiency)

INFORMATION REQUIRED: Complete cardiology evaluation including AGXT, 24-hour Holter Monitor, 2-D M-Mode ECHO with Doppler flow study. Further cardiology evaluation may occasionally be required by USAAMA.

FOLLOW-UP: Repeat cardiology evaluation every three years including 24-hour Holter monitor, 2-D M-Mode ECHO with Doppler flow study. Further follow-up may be required upon development of a significant dysrhythmia, progressive regurgitation, or progressive hemodynamic instability.

TREATMENT: : SBE antibiotic prophylaxis is required for all dental procedures as well as any other potentially septic exposure.

DISCUSSION: Tricuspid insufficiency may present with a clinical picture of severe right-sided heart failure. Fatigue, peripheral edema, anorexia, and abdominal swelling are its primary symptoms. Atrial fibrillation is estimated to occur in 86-90% of patients with tricuspid insufficiency. Most pulmonary stenosis is congenital and if severe, is normally treated with surgical repair in infancy. Most patients with mild to moderate pulmonary stenosis rarely if ever develop heart failure and can easily be managed usually with nothing more than antibiotic prophylaxis.

VENOUS THROMBOSIS (ICD9 453.8 / 415.1)

AEROMEDICAL CONCERNS: The pain and swelling from deep venous thrombosis occurring in flight could be distracting, while pulmonary embolism could be incapacitating as a result of chest pain, shortness of breath, hypoxia or cardiac dysrhythmias. Dyspnea occurs in nearly 90% of patients with symptomatic pulmonary emboli, and syncope occurs upon occasion. Cramped cockpit conditions may exacerbate or provoke a thrombotic event.

WAIVERS: Provided no predisposing factors exist, such as malignancy or disorders of clotting, a waiver can be considered for acute, nonrecurrent conditions after cessation of anticoagulant therapy. The development of pulmonary hypertension or the requirement for continued anticoagulation or surgical procedures such as plication of the vena cava is disqualifying. Waiver is not required for superficial thrombophlebitis.

INFORMATION REQUIRED: Internal medicine evaluation including normal exercise tolerance and pulmonary functions is necessary. In cases of pulmonary embolism, an internal medicine consultation may be necessary to exclude underlying malignancy. Any MEB recommendations should be forwarded.

FOLLOW-UP: Annual internal medicine consultation is required for prior pulmonary embolism. Submit annually at time of FDME. Recurrence of thrombotic event will require resubmission for waiver with full work-up.

TREATMENT: Drug therapy is considered incompatible with continued flying duties.

DISCUSSION: Some 2-5% of the population suffer from venous thrombosis at some time. Risk factors related to hypercoagulability (e.g., the risk of developing DVT after open prostatectomy has been quoted as 35%) and stasis (e.g., being strapped into an aircraft seat for long missions) should be considered. In 50% of cases of deep vein thrombosis (DST) of the leg, there are no signs or symptoms relating to the lower limbs. Untreated, acute ileofemoral venous thrombosis has a 50% chance of causing pulmonary embolus. Up to 30% of such patients have malignant disease. It is estimated that only 20-30% of pulmonary emboli cause symptoms. The vast majority of patients who survive pulmonary embolism will recover normal or nearly normal cardiac and pulmonary functions within 2-8 weeks.

VENTRICULAR PREMATURE BEATS (ICD9 427.69)

AEROMEDICAL CONCERNS: A single ventricular premature beat (PVC) may not be abnormal, but requires further evaluation to verify the absence of any associated cardiac abnormality. If progression of disease occurs, there exists the increasing risk of symptoms or more severe dysrhythmia which could be disabling in flight.

WAIVERS: If PVCs occur with a frequency of 10 or less of any 50 beats, or 10% or less of each hour of monitoring, or 1% or less of 24 hours of monitoring; and if the PVC is not a paired PVC (couplet), or a PVC with R on T, waiver is not required and the information is filed *information only*. If PVCs occur with a frequency of greater than 10 of any 50 beats, or 10% of any one hour of monitoring, or 1% of 24 hours of monitoring; or if the PVC is a couplet or with R on T, then waiver is required. If the PVCs are not completely suppressed by exercise, and/or are multiform, and/or the subsequent evaluation is aeromedically abnormal, waiver is not favorably considered.

G Code	Condition
G-063	Uniform ventricular premature beats.
G-068	Multiform ventricular premature beats.
G-070	Fused ventricular premature beats.
G-072	Paired ventricular premature beats (couplets).
G-095	Ventricular premature beats with R on T.

INFORMATION REQUIRED: Submit tracings of the original PVC and 24-hour Holter monitor. If the beats occur with a frequency of greater than 10 of any 50 beats, or 10% of any one hour of monitoring, or 1% of 24 hours of monitoring; or if the PVC is a couplet or with R on T, then also perform an AGXT and ECHO. If these further tests are abnormal, additional cardiology evaluation is required to rule out underlying cardiovascular disease. This may include thallium GXT or cardiac catheterization. Consultation with USAAMA is required.

FOLLOW-UP: No follow-up is required for those cases simply filed *information only* unless PVCs are detected on future routine annual ECG, then a repeat 24-hour Holter is required. If a change in morphology, or the aircrew member develops symptoms, then a complete work-up is required. For those aircrew members with waivers for PVCs, a repeat 24-hour Holter and AGXT are required annually. Any change in rhythm or development of symptoms requires complete cardiovascular evaluation.

TREATMENT: Drug therapy or pacing is not compatible with flying status.

DISCUSSION: On routine ECG, 1-5% of healthy adults exhibit some form of ventricular ectopy; this increases to 20-30% in a maximal exercise test and to 40-60% during 24-hour Holter monitoring. The incidence of ventricular ectopy and its rate increases exponentially with age. Between 5-10% will show complex ventricular ectopy (multiform PVCs, pairing or more or PVCs or R on T phenomenon). In these cases, coronary artery disease, MVP, ventricular hypertrophy and cardiomyopathy need to be excluded. Although complex ectopy has been reported to be associated with an increased risk of sudden death, there has been no demonstration of prognostic importance in young, healthy runners, asymptomatic subjects during near-maximal exercise or in persons without clinical evidence of heart disease.

VENTRICULAR SEPTAL DEFECT (VSD) (ICD9 745.4)

AEROMEDICAL CONCERNS: Adults with VSD may be symptom free, or they may complain of fatigue and exercise intolerance. Aortic insufficiency and bacterial endocarditis in patients with VSD result in marked increase in mortality as a result of right ventricular outflow obstruction and heart failure.

WAIVERS: Initial flight applicants with VSD are not considered for exception to policy. History of spontaneous closure with no significant childhood sequelae may be considered for exception to policy. Newly discovered VSD in a rated aviator, or newly discovered history of closure of VSD (either spontaneously or surgically) may be recommended for waiver provided complete cardiology work-up is normal.

INFORMATION REQUIRED: Complete cardiology consultation including AGXT, 24-hour Holter monitor, 2-D, M-mode ECHO with Doppler flow study is required. Further evaluation may be required after consultation with USAAMA and an aeromedical cardiology consultant.

FOLLOW-UP: Complete cardiology evaluation every three years including 24-hour Holter monitor and ECHO with Doppler flow study.

TREATMENT: : SBE antibiotic prophylaxis is required for all dental procedures as well as any other potentially septic exposure.

DISCUSSION: VSD is the most common congenital defect in children. The incidence of VSD is decreased in adults as a result of either spontaneous or surgical closure of defects during childhood or adolescence or mortality from this lesion before adulthood. It is estimated that as many as 60% spontaneously close by 5 years of age and 90% by 18 years of age.

VENTRICULAR TACHYCARDIA (ICD9 427.1)

AEROMEDICAL CONCERNS: Ventricular tachycardia (VT) is commonly associated with underlying cardiac disease. Hemodynamic changes causing lowered blood pressure and reduced cerebral blood flow can result in sudden onset of weakness, dizziness, and frank loss of consciousness. Decreased myocardial perfusion may provoke angina with the risk of ventricular fibrillation and sudden death. However, short runs of VT usually do not produce cardiovascular symptoms.

WAIVERS: Waiver is not recommended following ventricular fibrillation or flutter. Waiver for VT will be considered for those aircrew members with asymptomatic non-sustained VT less than or equal to 11 beats and less than or equal to 4 VT episodes per evaluation. Waiver will be possible even in the presence of aortic insufficiency (AI), SVT, RBBB, LBBB and sarcoidosis. Waiver will not be recommended for those with symptoms, those with non-sustained VT greater than 11 beats, sustained VT greater than 30 seconds in length, greater than 4 VT episodes per evaluation, or VT with associated underlying cardiac disease, e.g., CAD, cardiomyopathy, and MVP.

G Code	Condition
G-061	Ventricular tachycardia
G-066	Ventricular fibrillation
G-067	Ventricular flutter
G-086	Reciprocating bi-directional tachycardia

INFORMATION REQUIRED: It is strongly recommended that the cardiac evaluations of these cases be coordinated with USAAMA. Complete cardiology evaluation is required. This includes: AGXT with thallium or Sestamibi, ECHO, and three 24-hour Holter monitors done at monthly intervals over three months. Cardiac catheterization is required if these noninvasive tests are suggestive of underlying coronary disease. Electrophysiologic studies may be required if there is uncertainty regarding the origin of the tachycardia (VT vs. SVT with aberrant conduction).

FOLLOW-UP: Will require annual cardiology consultation preferably performed by Aeromedical Consultation Service, Brooks AFB, or by the Army Aviation Medicine Cardiology Consultant for two years, then every three years thereafter. These evaluations will include Thallium or Sestamibi AGXT, 24-hour Holter monitor, and ECHO. If other abnormalities are present, further testing may be indicated.

TREATMENT: Artificial cardiac pacing is not compatible with flying duties. Anti-arrhythmic drugs impair cardiac function and are not compatible with flying duties.

DISCUSSION: VT is defined as 3 or more consecutive ventricular beats at a heart rate greater than 99 beats per minute. Recurrence is defined as occurring more than once in any Holter monitor or period of work-up, or more than once in any subsequent evaluation. The Air Force consultation service recently completed a review of 193 aviators with VT. Their conclusions included: The presence of nonsustained VT did not predict the occurrence of sustained VT. The coexistence of MVP and VT appeared to represent an unacceptable risk for future hemodynamic compromise (2.3% per year). All aircrew members with underlying CAD had at least one abnormal noninvasive test. In another study, 35% of patients with VT had a recent myocardial infarct.

DERMATOLOGY WAIVERS

ACNE (ICD9 706.1)

AEROMEDICAL CONCERNS: Severe active cystic acne will likely produce lesions which prevent adequate sealing of a mask or respirator seal; prevent proper or comfortable fit of a helmet; can cause severe enough distraction to impede proper harness or equipment fit; or act as a distraction to the aviation environment. If severe enough, cystic acne can even produce sufficient facial deformity to result in various psychological problems serious enough to impede adaptation to an aviation or military career. Treatment with certain drugs is incompatible with the aviation environment.

WAIVERS: Initial flight applicants with severe active cystic acne are rarely recommended for exceptions to policy. Most waivers of aircrew members with cystic acne are granted provided the aviator is not restricted from routine use of mask or helmet and approved drugs are used for treatment.

INFORMATION REQUIRED: Submit a complete AMS describing the current treatment plan, documented lack of side effects, and if appropriate, verification of the ability to properly fit a mask or helmet.

FOLLOW-UP: Annual update of medication treatment plan and any limitations.

TREATMENT: Use of topical agents is the initial preferred mode of treatment. Topical bacteriostatics (Benzoyl peroxide), antibiotics (topical clindamycin or erythromycin), or topical tretinoin (RETIN A) are all acceptable forms of treatment and do not normally require waiver. Systemic antibiotic treatment using tetracycline, erythromycin, or doxycycline if used chronically must be reviewed and will be filed as *information only*; waiver is not usually required. Initial use of antibiotics should always be proceeded by a period of observation for adverse effects prior to return to full flight status. Minocycline (MINOCIN) andIsotretinoin (ACCUTANE) are considered non-waiverable. Hormonal therapy, i.e., estrogen and prednisone should not normally be attempted without prior approval from USAAMA.

DISCUSSION: Minocycline is not acceptable because of the risk of CNS side effects such as light headedness, dizziness, and vertigo. The incidence of dizziness with minocycline use has been reported as high as 17%; but, this is dose-related and actually the risk is only 5% with the dosages required for acne control. Isotretinoin (ACCUTANE) has frequently been associated with xerosis, cheilitis, alopecia and hypertriglyceridemia, but all of these are reversible on discontinuation of therapy. The most disturbing side effect of isotretinoin therapy is the development of vertebral hyperostoses and pseudotumor cerebri. While not recommended, it would be feasible to use isotretinoin in aircrew members who are not required to fly for any given 6-8 month period.

ATOPIC DERMATITIS (ECZEMA) (ICD 9 692.9)

AEROMEDICAL CONCERNS: One of the outstanding features of dermatitis is the manifestation of severe, easily triggered itching. This can easily be distracting in the aviation environment. Some dermatitides may also interfere with proper wear of equipment. Those patients with atopic dermatitis are often more susceptible to contact irritants found in the aviation environment. Atopic dermatitis, if manifested during early infancy, childhood or adolescence, may produce psychological trauma which could adversely effect a career in aviation.

WAIVERS: The severity of symptoms and the requirement for therapy will determine if waiver action is recommended. Generally, if symptoms are controlled with topical agents and if the affected areas are small and do not interfere with aviation duties or if symptoms are absent without therapy, a waiver is recommended. Self-limited contact dermatitis does not require waiver.

ICD9 Code	Condition
691	Atopic Dermatitis
692	Contact Dermatitis
708.0	Allergic Urticaria

INFORMATION REQUIRED: Dermatology consultation along with allergy/immunology consultation to rule out asthma or hay fever.

FOLLOW-UP: Annual dermatology consult may be required.

TREATMENT: Intermittent use of topical steroids over a limited area is considered compatible with continued flight status. Non-sedating antihistamines have occasionally been approved for use in treating dermatitis.

DISCUSSION: Atopic dermatitis affects 1-3% of the population. Around 90% of affected children manifest their disease by 5 years of age. A family history of atopy is quite common (70%), and about 50% of children with atopic dermatitis, beyond the age of 12, develop either rhinitis or asthma. Patients with atopic dermatitis have frequent immunologic abnormalities, including elevated serum IgE levels, reduced cell-mediated immune responses, and slowed chemotaxis of neutrophils and monocytes. About 20% of adults with atopic dermatitis have normal or low IgE levels; others have no IgE at all.

DERMATOPHYTOSIS OF THE NAIL (ICD9 110.1)

AEROMEDICAL CONCERNS: While the disease process does not interfere with aviation duties, the medications commonly used in its treatment do present enough side effects to warrant careful observation.

WAIVERS: Waiver for the use of Griseofulvin is commonly approved. Dermatophytosis of the nail is not considered disqualifying. Waiver for other (newer) antifungals are generally not required since they are only used for a short duration.

INFORMATION REQUIRED: Documentation of an observation period, free of side effects, and an ongoing follow-up plan.

FOLLOW-UP: CBC should be done repeatedly every 2-3 months.

TREATMENT: Griseofulvin is the only routinely approved medication for chronic use. Other medication may be considered only on a case-by-case basis.

DISCUSSION: Griseofulvin's most significant side effect is suppression of bone marrow with resultant leukopenia and granulocytopenia. Since these are reversible side effects with discontinuation of the drug, it is considered safe to use in a carefully monitored situation.

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 which respond well to treatment. Some what unpredictable, however, extensive or even generalized involvement may develop; and in some, its severity is incompatible with the military aviation environment or unfit for mobilization. Some cases are actually exacerbated by the stress and anxiety brought about during a deployed situation. In addition, some forms of therapy have side effects incompatible with aviation duty.

WAIVERS: A history of or an active case of psoriasis is considered disqualifying for initial flight applicants. Exception to policy is not recommended. 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 is readily waivered. More severe cases are considered on an individual basis.

INFORMATION REQUIRED: Submit dermatology consultation along with AMS. Photographs of affected areas may be required.

FOLLOW-UP: Annual dermatology consultation.

TREATMENT: Use of topical steroids applied bid-tid to localized 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. Ultraviolet light is of use in a garrison situation but of little use when deployed to remote areas, so its use is not encouraged. Other treatments such as 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) are also incompatible with flying.

DISCUSSION: Psoriasis typically does not manifestate itself until the 3rd decade of life, though it may develop at any time. A family history of psoriasis is found in 30% of patients. It is less common in sunny climates and in those with darker skins. Psoriasis' fluctuating course of spontaneous remissions and relapses makes estimations of a cure totally unpredictable and unreliable. Up to 1/3 of cases go into spontaneous remission each year. Psoriatic arthritis has been reported in up to 7% of psoriasis cases. Conversely, 4% of patients with inflammatory polyarthritis have psoriasis.

ENDOCRINOLOGY WAIVERS

DIABETES MELLITUS (ICD9 250.0) and GLUCOSE INTOLERANCE

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. Deployment frequently exacerbates symptoms/complications secondary to uncontrolled diet, long hours, and environmental stresses.

WAIVERS:

Diabetes Mellitus:

Initial (Class 1A/1W):
Exceptions to policy are generally not recommended.

Initial (Class 2, 3,4):
Waivers will be granted on a case-by-case basis.

Rated Aviation Personnel:
Class 2 Aviators: Waivers are recommended provided the diabetes is controlled without medication, i.e. treatment is with diet and weight control alone. These lifestyle changes must result in a normal fasting blood glucose (<126 mg/dl), a glycosylated hemoglobin (HbA1c) less than 7%, and no medical sequelae. Use of medications is considered on a case-by-case basis and in the majority of cases will not receive waiver.

Class 2F, 3 and 4: Waivers are recommended provided the diabetes is controlled with diet, weight control, or using medications: oral hypoglycemic agents or Metformin (See Medication APLs), laboratory values are as above, and there are no medical sequelae. Use of other medications is considered on a case-by-case basis.

Waivers/Exception to Policy will not be granted for diabetes requiring insulin for control.

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:

- Internal Medicine consultation, and
- Testing confirming diagnosis (See below).

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 Mellitus	>105	>165

DIAGNOSTIC CRITERIA: Diagnosis of these conditions can be made with confirmatory tests as listed below. All individuals with a fasting plasma glucose of >110mg/dl must have one of the three tests meeting criteria and a second confirmatory test by any of the three methods done on a subsequent day. Methods:

1. FPG (Fasting Plasma Glucose) >126 mg/dl,
2. OGTT 75 gm glucose load with 2-hour postprandial value > 200 mg/dl,
3. Symptoms present or review of symptoms positive with a casual plasma glucose > 200 mg/dl.

Fasting is defined as no caloric intake for at least 8 hours.
Casual is defined as any time of day without regard to time since last meal.
Classic symptoms of diabetes include polyuria, polydipsia, and unexplained weight loss.

FOLLOW-UP: Continuation of waiver requires semiannual evaluations with maintenance of satisfactory weight control, a fasting plasma glucose less than 126mg/dl, and a glycosylated Hb-A1c of less than 7%. These lab results must be submitted with the annual FDME.

For those aircrew on Metformin, the following laboratory evaluation is recommended: Renal function (BUN/Creatinine) and LFTs must be checked before the start of therapy and then every 3 months for the first year of therapy and then at least annually thereafter. On the annual FDME, in addition to the required evaluation listed above, the following laboratory values **MUST** be reported and should be assessed within 90 days of the date of the FDME: CBC, Chem 7 (to include BUN/Cr), Urinalysis, 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. Evaluation of fasting plasma glucose; and,
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 feet
c. Ophthalmologic examination by ophthalmologist; and
d. EKG, labs as above and also check of renal function with BUN/CR, full lipid profile, and urinalysis.

TREATMENT:
Diabetes Mellitus: For aviation personnel, the following are approved methods of treatment:

1. Diet,
2. Weight reduction,
3. In addition, Class 2F, 3, and 4 rated aviation personnel may use oral hypoglycemics or Metformin with waiver approved by USAAMA. Any other medications must be submitted for waiver and may only be approved for use by USAAMA.

Impaired Glucose Tolerance: Diet, exercise, and weight reduction are primary therapies. These individuals also require aggressive cardiac risk factor modification.

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 or 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

GOUT (ICD9 274.9)

AEROMEDICAL CONCERNS: Gout may often present with an acute, severe, often disabling arthritic attack, usually without warning. It may be associated with underlying disorders such as atherosclerosis, diabetes mellitus, hypertension, and renal disease.

WAIVERS:

Initial Applicants (All Classes):
Exceptions to policy are considered on a case by case basis.

Rated Aviation Personnel (All Classes):
Waivers are normally recommended when the aircrew member becomes asymptomatic and medication is tolerated without side effects.

INFORMATION REQUIRED: Confirmation of the absence of renal stones via an IVP or CT Scan is necessary for waiver.

FOLLOW-UP: Annual serum uric acid.

TREATMENT: For an acute gout attack, treatment can be one of three medications: 1) Colchicine, 2) Non-steroidal Antiinflammatory Drugs (NSAIDS), or 3) Intraarticular corticosteroid injection. In the aviation environment, the preferred initial therapy for gouty arthritis is treatment with NSAIDs. Treatment should be initiated rapidly as sooner treatment results in better patient response. If the condition recurs, a joint aspiration should be performed with fluid analysis to confirm the diagnosis. NSAIDs are a symptomatic treatment but long term control of hyperuricemia is via uricosuric drugs or allopurinol. Allopurinol or Probenecid are both acceptable therapies, provided there are no significant side effects.

DISCUSSION: In primary gout, 10-25 % of patients will develop renal stones. Fifty percent of those with a serum uric acid level greater than 13 mg/dl will develop renal stones. Starting treatment with Probenecid can precipitate stone formation in the kidney and the maintenance of an alkali diuresis at the start of treatment is recommended. In individuals at greater risk of developing renal stones, a large urinary volume through liberal ingestion of fluid should be maintained. Of relevance to aircrew is the association of gout with an increased level of alcohol consumption. Alcohol (Ethanol) increases uric acid production and reports indicate that of alcoholic beverages, beer may have the most potent effect on uric acid production.

Analysis of AEDR data indicates that in 2000, ten aircrew had the condition of gout and 50 % of these were granted waivers.

REFERENCE:

National Library of Medicine, http://www.nlm.nih.gov/medlineplus/goutandpseudogout.html

HYPERTHYROIDISM (ICD9 242.03)

AEROMEDICAL CONCERNS: Hyperthyroidism and the resulting thyrotoxicosis may either present with slowly progressive symptoms (thyroid ophthalmopathy, corneal damage, optic neuropathy, tachycardia, various supraventricular dysrhythmias, nervousness, emotional lability and hyperkinesis) or may present acutely as in thyrotoxic crisis with fever, marked tachycardia with possible pulmonary edema or congestive heart failure. Cardiac and psychiatric symptoms are common in men. Thyroid ophthalmopathy frequently limits full visual fields, primarily in the upward gaze and more specifically in the superolateral field of gaze.

WAIVERS:

Initial Applicants (All Classes):
Exceptions to policy or waivers are commonly recommended if the individual is euthyroid and there are no residual ophthalmologic deficits.

Rated Aviation Personnel:
Waivers are commonly recommended once the patient is euthyroid, and there are no residual ophthalmologic deficits. Aircrew members with ophthalmopathy may require grounding during treatment. Aircrew with abnormal cardiac dysrhythmia will require possible waiver action for the dysrhythmia as well. Waivers are commonly granted for hyperthyroid-induced dysrhythmias once the patient is euthyroid and cardiac evaluation reveals no underlying pathology.

ICD9 Code	Condition
242.01	Graves' Disease
241.0	Thyroid Nodule
241.1	Multinodular Goiter, non-toxic
240.9	Goiter, unspecified
242.9	Thyrotoxicosis other

INFORMATION REQUIRED:

- Endocrinology consultation
- Ophthalmology consultation
- Recent (within the previous 90 days) thyroid panel (to include as a minimum TSH and Free T4)
- Cardiology consultation and full work-up may be required for any associated dysrhythmias. (See appropriate APL)

FOLLOW-UP: Submission of thyroid panel (TSH and Free T4 as a minimum) is required with all comprehensive FDMEs. Although this requirement is only with the comprehensive FDME, the flight surgeon should assess for symptoms and check levels annually. Ophthalmology and/or cardiology consultations with associated work-up may be required for those with residual abnormality or in those with unusual cardiac manifestations.

TREATMENT: The three main forms of therapy include: 1) antithyroid drugs, 2) radioactive iodine (I 131), and 3) surgery. Anithyroid drugs (methimazole, and propylthiouracil) are waiverable but may cause side effects including vertigo and drowsiness as well as agranulocytosis (< 1%). Radioactive iodine is a simple and economical means of treating thyrotoxicosis with the principle disadvantage of producing a high incidence of late hypothyroidism. Surgery is also an alternative but has been declining in popularity; it may still have a role in treating females in their child-bearing years. Complications of thyrotoxicosis usually rapidly respond to therapy, but the patient usually requires grounding until euthryroid and all ophthalmologic or cardiac disorders, etc., are resolved.

DISCUSSION: Graves' disease is the most common cause of hyperthyroidism in patients younger than age 40 in the United States, occurring in an estimated 0.4% of the population. Muscle pain, weakness, and stiffness are the presenting symptoms in 25% of patients. Infiltrative ophthalmopathy is clinically evident in about 50% of patients. Approximately 10% manifest with atrial fibrillation. Paroxysmal supraventricular tachycardia may occasionally be present. Only about 25% of patients present with the classic features of thyrotoxicosis: tremors, tachycardia, nervousness, exopthalmos, heat intolerance, and weight loss despite increased appetite. When treated with drugs, there is a 30% lasting remission rate. Postradioiodine

hypothyroidism occurs in 30% of patients at five years and may reach from 40-70% within 20 years. A third of patients undergoing surgery will be hypothyroid within 10 years. It is essential; therefore, that all treated patients be monitored regularly for the rest of their life. The complete remission rate after radioactive iodine is 86% with 60% developing myxedema after 10 years and a further 2-3% a year developing myxedema after that. More than 50% of cases of exophthalmos will spontaneously remit within 5 years with no other treatment than that of the underlying condition. Only 5% of patients with ocular pathology will require surgery.

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.

HYPOGLYCEMIA (ICD9 251.2)

AEROMEDICAL CONCERNS: Asymptomatic hypoglycemia may be seen during prolonged fasting, strenuous exercise, or pregnancy. However, symptomatic fasting hypoglycemia is a serious and potentially life-threatening problem and of significant concern in the aviation environment. Fortunately, the true condition of hypoglycemia is quite rare, and the most common cause of hypoglycemia is as a complication of diabetes. Symptoms vary according to the degree of hypoglycemia. Acute hypoglycemia symptoms include weakness, drowsiness, confusion, hunger, and dizziness. Additional symptoms can include paleness, headache, irritability, trembling, diaphoresis, tachycardia, and a sensation of cold. Severe cases can lead to loss of consciousness or coma. Subacute or chronic hypoglycemic symptoms may be subtler with progressive confusion, inappropriate behavior, lethargy, and drowsiness. If the patient does not eat, seizures or coma may develop. The deployment of such an individual to remote field sites with poor nutrition and long duty hours is likely to exacerbate the condition.

WAIVERS:

Initial Applicants and Rated Aviation Personnel:
Transient asymptomatic hypoglycemia with a clear underlying etiology does not require waiver or exception to policy and will be filed as *information only*.

Symptomatic hypoglycemia may be recommended for waiver or exception to policy if the underlying condition is readily controlled. Any underlying medical condition must be evaluated for waiver and fitness for aviation duty.

INFORMATION REQUIRED:

- Diagnosis of Diabetes must be ruled out as cause. (See Diabetes APL for evaluation).
- If the individual does not have diabetes, the following must be documented in the AMS:
  - Patient complaint of symptoms consistent with hypoglycemia. (Refer to aeromedical concerns above)
  - Blood glucose levels are measured while the person is experiencing those symptoms and found to be 45 mg/dl or less in a female or 55 mg/dl or less in a male.
  - Symptoms are promptly relieved on ingestion or other administration of glucose.
- Laboratory: Plasma insulin and serum C peptide, done at the time of hypoglycemia if possible.

FOLLOW-UP: No follow-up is required for asymptomatic hypoglycemia unless the aircrew member develops symptoms or hypoglycemic lab values persist. Follow the procedures outlined in Information Required above. Those with waivers for symptomatic hypoglycemia require an annual internal medicine evaluation and a fasting blood glucose measurement.

TREATMENT: Dietary control of plasma glucose is the primary treatment available. If conscious and able to swallow, glucose-containing foods such as candy, orange juice with sugar, or cookies should be quickly ingested. If unconscious, rapid restoration of plasma glucose must be accomplished by giving 20-50 ml of 50% dextrose intravenously over 1-3 minutes in order to avoid possible permanent brain damage associated with prolonged hypoglycemia.

DISCUSSION: The most common cause of hypoglycemia is as a complication of diabetes. Other rare causes include early pregnancy, prolonged fasting, and periods of strenuous exercise. The entity of reactive hypoglycemia is a condition of low blood sugar with no known cause and in which symptoms appear 2-5 hours after consumption of foods high in glucose. In normal men, plasma glucose does not fall below 55 mg/dl during a 72-hour fast. However, for reasons that are not clear, normal women may experience a fall to levels as low as 30 mg/dl despite a marked suppression of circulating insulin to less than 6 U/ml. They remain asymptomatic in spite of this degree of hypoglycemia, probably because ketogenesis is able to satisfy the energy needs of the central nervous system. Iatrogenic or surreptitious administration of insulin or sulfonylureas may also cause symptomatic hypoglycemia. Other disorders that are associated with hypoglycemias include severe hepatic dysfunction, chronic renal insufficiency, hypocortisolism, alcoholism, some nonpancreatic tumors, and inborn errors of carbohydrate metabolism (glycogen storage disease, gluconeogenic enzyme deficiencies). Nonfasting hypoglycemia can result from occult diabetes, alcoholism, leucine sensitivity, and galactosemia or after alimentary surgery.

A current review of the AEDR for the year 2000 reveals that only three cases of hypoglycemia were reported and all of these were disqualified most likely due to underlying medical conditions.

REFERENCE:

National Institutes of Health Publication No. 95- 3926, Hypoglycemia, May 1995 (e-text October 1999): www.niddk.nih.gov

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 (Class 1A/1W):
Exception to policy is considered on a case-by-case basis.

Initial Applicants (Classes 2,3,4):
Waivers are commonly recommended 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.

ICD9 Code	Condition
244	Acquired hypothyroidism
245.0	Acute thyroiditis
245.1	Subacute thyroiditis
245.2	Hashimoto's thyroiditis
245.9	Thyroiditis, unspecified

INFORMATION REQUIRED:

- Endocrinology Consultation (preferred) or Internal Medicine Consultation,
- 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: Submission of thyroid function testing with all comprehensive physicals. Although this requirement is only with the comprehensive FDME, the flight surgeon should assess for symptoms and check levels annually.

TREATMENT: Levothyroxine (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 hypothyroid: 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.

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.

GASTROENTEROLOGY WAIVERS

CIRRHOSIS (ICD9 571.5)

AEROMEDICAL CONCERNS: Liver cirrhosis may present slowly or acutely with associated development of gastrointestinal hemorrhage, malaise and lethargy, symptoms arising from encephalopathy and peripheral neuropathy, abdominal pain, jaundice, and Dupuytren's contracture. Osteomalacia occurring in cases of primary biliary cirrhosis could theoretically give problems on ejection. If secondary to alcohol use, the diagnosis of alcohol dependence must be considered. (See Alcohol Abuse APL)

WAIVERS: Rated aviators may be considered for waiver provided they are asymptomatic, stable, require no treatment, and do not exhibit any evidence of esophageal varices.

ICD9 Code	Condition
571.2	Alcoholic cirrhosis of the liver
571.6	Biliary cirrhosis
571.8	Other chronic non-alcoholic liver disease

INFORMATION REQUIRED: Submission of an internal medicine or gastroenterology consultation is necessary. A complete panel of liver function tests is also required. A liver biopsy may be required. Alcoholic liver cirrhosis must also submit the requirements as discussed in the Alcohol Abuse APL.

FOLLOW-UP: Annual submission of an internal medicine or gastroenterology consultation with complete panel of liver function tests.

TREATMENT: The need for any form of therapy will probably lead to termination from flight duties.

DISCUSSION: Cirrhosis resulting from Wilson's disease, hemochromatosis or chronic active hepatitis tends to present in the teens and twenties, while patients with other etiological factors present after age 40. The male**:**female ratio for alcoholic cirrhosis ranges from 2-10**:**1 in contrast to that for primary biliary cirrhosis where it is 1**:**9. Alcoholic cirrhosis occurs in 15% of heavy drinkers. In clinically compensated cases, the 5-year survival for those who stop drinking alcohol is 90% as compared with 70% for those who continue drinking; for cases who are not clinically compensated, the corresponding figures are 60% and 30%. The incidence of symptoms in cirrhosis is malaise (30-80%), abdominal pain (30%), gastrointestinal hemorrhage (up to 25%), neurological features (<10%) and Dupuytren's contracture (10-30%). Survival rates in progressive cases are reported as > 50% at 1 year falling to 10% at 6 years. In primary biliary cirrhosis, pruritis occurs as the first symptom in 80% of cases and jaundice in the remainder. The incidence of collagen diseases in association with primary biliary cirrhosis is 70-80% with joint involvement in over 40%. Bacteriuria is found in 35% of cases but may be asymptomatic. For primary biliary cirrhosis, the average survival is 11.9 years but may be less than 2 years when serum bilirubin levels rise quickly.

CROHN'S DISEASE (ICD9 555.9)

AEROMEDICAL CONCERNS: Frequent bowel movement, diarrhea, rectal urgency and incontinence are obviously things to be avoided in the military aviation environment where it can cause delay, interruption, or failure in completion of military operations. Abdominal cramps and pain and the potential for hemorrhage can cause incapacitation during flight. Anemia, bowel obstruction, fistulization, as well as a multitude of potential extraintestinal manifestations of Crohn's disease are also of grave concern. Deployment to remote areas with poor dietary habits, high stress, and little rest are all factors which are responsible for relapse.

WAIVERS: Request for waiver may be considered provided the patient has been completely asymptomatic for 2 years, current colonoscopy reveals no active disease, a maintenance dose of Sulfasalazine is no greater than 2 gm/day and the initial disease presentation was mild and of short duration. Unlike ulcerative colitis, the risk of recurrence of Crohn's disease following surgery does not justify waiver action.

INFORMATION REQUIRED: A complete AMS with detailed dietary history, disease course, and gastroenterology evaluation to include colonoscopy with biopsy. A biopsy report as well as colonoscopy films will be forwarded to USAAMA for review.

FOLLOW-UP: Annual submission of an internal medicine or gastroenterology consultation to include sigmoidoscopy or colonoscopy report when indicated.

TREATMENT: Sulfasalazine in doses up to 2 gm/day as maintenance therapy. Higher doses, if required, are not normally accepted for waiver.

DISCUSSION: Crohn's disease is most common in young adults, with a positive family history in 6-15%. There is an association with smoking. Patients present with diarrhea (70-90%), abdominal pain (45-60%), weight loss (65-75%), fever (30-40%) and rectal bleeding (50%). Extraintestinal manifestations include gallstones (13-34%), oxalate kidney stones (5-10%), sacroiliitis (15-18%), aphthous ulceration of the mouth (20%), erythema nodosum (5-10%) and acute arthropathy (6-12%). The risk of carcinoma of the colon is reported to be 3-5%. After the initial episode, there is a 70% chance of relapse in the following 5 years with most occurring in the first 2 years. Between 70-80% of patients will need at least one operation (for failure of medical therapy in 33%, fistula formation in 24% and intestinal obstruction in 22%). After resection, the risk of recurrence in the following 5 years is 30-70% and 50-85% in the next 10 years; of these, up to ½ will need a further operation. Without an operation, the annualized risk for recurrence is 1.6% in those with single site involvement and 4% in those with multiple site disease. The overall mortality is 10-15%.

DIVERTICULAR DISEASE (ICD9 562)

AEROMEDICAL CONCERNS: About 80% of those affected with diverticular disease never develop symptoms. The remaining 20% have a slight risk of in-flight incapacitation secondary to the development of severe colic or massive diverticular hemorrhage. Also there exists the possibility that the altered bowel habits, flatulence, pain or nausea may cause significant distraction in flight, possibly interfering with mission accomplishment. Completely asymptomatic diverticulosis without complication is not considered disqualifying but will be filed *information only*.

WAIVER: Waiver for rated aircrew members may be recommended provided symptoms are minimal and that grounding medication is not required.

ICD9 Code	Condition
562.10	Diverticulosis of Colon
562.11	Diverticulitis of Colon

INFORMATION REQUIRED: Surgical consultation to exclude malignancy. Submit colonoscopy or barium enema report.

FOLLOW-UP: Minimally symptomatic diverticular disease previously granted waivers require annual submission of surgical consultation. Asymptomatic patients whose diverticulosis was found incidentally require no specific follow-up other than an annual FDME.

TREATMENT: A high fiber diet is compatible with flying. Psyllium or other fiber supplements may also be used under the flight surgeon's observation only due to the possibility of bowel obstruction. Partial colectomy may be required to control symptoms but surgery for asymptomatic diverticula should not be recommended.

DISCUSSION: Diverticulosis is rare before the age of 30 but affects 30% of the population by the sixth decade. It is more frequent in the 20 and 30 year age groups in patients with Marfan's syndrome. Some 20-25% of patients require surgery on their initial admission to the hospital. Once symptoms occur, the disease is one of frequent recurrence. Rectal bleeding may occur in 10-30% of patients with diverticular disease; severe blood loss from colonic diverticula is reported to occur in 3 to 5% of those with diverticulosis. Morbidity is reported as a 70% 5-year survival period. Mortality and morbidity information provided by most published clinical reports are unfortunately skewed with populations including the elderly. Little data is available in population groups matching the age distribution of the military population.

GALLSTONES (ICD9 574.2)

AEROMEDICAL CONCERNS: The most common presenting symptom (75%) of gallstone disease is pain. This pain often is acute and disabling and is a potential risk of incapacitation during flight. Complication of gallstones include acute cholecystitis (90% have gallstones), choledocholithiasis (common duct stones), bacterial cholangitis, and gallbladder perforation.

WAIVERS: Asymptomatic gallstones found incidentally and with no evidence of cholecystitis on ultrasound examination are routinely granted a waiver in rated aviation personnel. Initial applicants will be considered for exception to policy on a case-by-case basis. Aviators with symptoms should be grounded until the stones are removed. A history of cholecystectomy, if uncomplicated, does not require a waiver and will be filed as *information only*.

ICD9	Code Condition
574.0	Gallstones with acutecholecystitis
574.2	Gallstones without cholecystitis
575.0	Acute Cholecystitis
P51.2	Cholecystectomy

INFORMATION REQUIRED: For symptomatic patients, the initial waiver requests should contain the operative report with confirmation that the patient is symptom-free after the procedure and that any bile duct stones are absent as demonstrated by ultrasound examination. Asymptomatic patients with gallstones require submission of report of ultrasound examination to confirm the absence of cholecystitis.

FOLLOW-UP: None required provided the aviator remains asymptomatic.

TREATMENT: Patients who have undergone conventional cholecystectomy can normally return to flying duties within 3 months provided that an absence of bile duct stones is demonstrated. Return to flying duties after endoscopic cholecystectomy may be achieved sooner provided the same criteria can be met. Extracorporeal shock wave lithotripsy (ESWL) and chemical dissolution of gallstones are not recommended for aviation personnel due to the high rate of recurrence of the stone.

DISCUSSION: Gallstones affect between 10 and 20% of the world's population. Cholesterol stones account for 70% of those found in the United States. The prevalence of asymptomatic cholelithiasis in USAF aircrew has been estimated as 2%; this is less than in the general population because of age and gender factors. An annual onset rate of 1-4% for developing severe medical symptoms requiring eventual cholecystectomy can be anticipated in this population group. Overall, it may be appropriate to offer treatment to younger patients with asymptomatic gallstones who run a greater cumulative risk of developing complications than older patients. However, the total incidence of acute cholecystitis would not be affected by cholecystectomy being carried out on incidentally found, asymptomatic gallstones. While 60% of patients with cholesterol stones and a functioning gall bladder will have a successful chemical dissolution of their stones, the risk of recurrence in the first year after treatment is 10-30%; chemical dissolution is not, therefore, recommended for waiver. The clearance rate in ESWL for those with 1 stone < 20mm diameter at 2/4/8/18 and 24 months is reported as 45/69/78/95/100%; the corresponding figures for a single stone < 30mm diameter are 18/29/51/81/100%; and for 2-3 stones 13/17/29/49/67%. About 35% of all patients undergoing ESWL have 1 or more episodes of biliary colic before the clearance of all stone fragments. About 10-15% of patients with gallstones will also have stones in the common bile duct.

GASTRITIS / DUODENITIS (ICD9 535.5 / 535.6)

AEROMEDICAL CONCERNS: While often patients with gastritis or duodenitis will be minimally symptomatic, some will experience significant pain and occasional severe hemorrhages. Chronic gastritis may also occur in conjunction with other conditions which in themselves are disqualifying. Complications may include Mallory-Weiss tear or ulcer formation.

WAIVERS: If symptoms are mild and controlled with occasional antacid use, no waiver is required. If, however, chronic medication requiring a waiver is used to control symptoms, a waiver must be obtained. (See Medications - Class 3 APL) No waiver action is required for transient gastritis which resolves easily with short term treatment or avoidance of inciting agents.

INFORMATION REQUIRED: An internal medicine or gastroenterology consultation to exclude the presence of pernicious anemia, thyrotoxicosis, diabetes, and iron deficiency anemia. Endoscopy is required to exclude the possibility of ulceration, hiatus hernia, and malignancy. Cultures for H. pylori should also be obtained.

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

TREATMENT: Life style changes such as reduction in smoking and alcohol intake are compatible with recommendation for waiver. The following medications may be used and a waiver recommended once the treated patient demonstrates no idiosyncratic reactions to the medication (a 30 day period of observation is recommended) and the medication is effective in providing relief of symptoms.

Antacids - Chronic use is Class 3. Occasional or infrequent use is Class 1. Check electrolytes when used chronically.

H2 Blocker - CIMETIDINE, RANITIDINE, FAMOTIDINE, NIZATIDINE. Occasional drowsiness is associated with these medications. When treatment is first initiated, a 72-hour observation while the aviator is DNIF is required to ensure the absence of any significant side-effect.

Proton Pump Inhibitor - Omeprazole

Sucralfate - Class 2A provided underlying condition does not require waiver.

Clinical trials have failed to present convincing evidence that clearance or eradication of *Helicobacter Pylori (H. pylori)* affects symptoms of gastritis or duodenitis.

DISCUSSION: Up to 25% of clinically significant upper gastrointestinal bleeding is caused by acute gastritis or duodenitis. Less than 5% require surgery to control the hemorrhage. Chronic atrophic gastritis increases the risk of pernicious anemia three-fold in the normal population and the risk of adenocarcinoma of the stomach twenty-fold. One of the most important discoveries to effect the understanding of gastritis in recent years is the recognition of *H. pylori* as the cause of most forms of nonerosive chronic active gastritis. Unfortunately, as stated above, this discovery has had little impact on the treatment of gastritis. *H. pylori* has also been proven to be of importance in regard to both the pathogenesis and potential therapy for peptic ulcer pathogenesis. (See Peptic Ulcer APL) Other recognized causative factors include: alcohol, NSAIDs, radiation, post-traumatic and prolapse gastrophy produced by repeated retching and vomiting.

GILBERT'S SYNDROME (ICD9 277.4)

AEROMEDICAL CONCERNS: Symptoms may include abdominal pain, weakness, and malaise but most cases remain asymptomatic.

WAIVERS: Waiver is not required for Gilbert's syndrome or disease provided the patient remains asymptomatic. This diagnosis is filed as *information only*.

INFORMATION REQUIRED: Internal medicine or gastroenterology consultation is required to confirm the diagnosis. The diagnosis of Gilbert's syndrome can be established by the repeated demonstration of normal liver function tests in an asymptomatic individual with mild elevation in the concentration of unconjugated bilirubin in serum and no evidence of hemolysis. Liver biopsy is unnecessary in routine cases but may be required if the diagnosis is in doubt.

FOLLOW-UP: None

TREATMENT: N/A

DISCUSSION: The incidence of Gilbert's syndrome is 1-7% of the population. Up to 50% of cases have a slightly reduced red cell survival time compared to normals. The condition is totally benign and there is no known association with more serious conditions. Gilbert's syndrome results from a decreased hepatic clearance of unconjugated bilirubin, probably related to diminished hepatic UDP-glucuronosyltransferase activity. Serum bilirubin concentration in these patients may rise two- to threefold with fasting and dehydration. The condition may result in slower liver detoxification of some therapeutic agents such as acetaminophen.

IRRITABLE BOWEL SYNDROME (ICD9 564.1)

AEROMEDICAL CONCERNS: While most of the patients with irritable bowel syndrome (IBS) have mild nonincapacitating symptoms, some will present with significant painful abdominal cramping and discomfort. Along with increased urgency and frequency of defecation, these symptoms may most certainly be distracting in flight and is inconvenient and possibly aggravated by mobilized "field" conditions. Often the disease is compounded after or during periods of stress and emotional tension. Perhaps, primarily because of the embarrassment over a perceived "inability to deal with stress", or due to the infrequency or inconsistency of the disease symptoms, most of the cases go unreported and thus, untreated.

WAIVERS: As long as the symptoms can be controlled, the evaluation is negative for underlying pathology, and the underlying psychological disorders have been fully treated, a waiver for rated aviators is normally recommended. Exception to policy is rarely granted.

INFORMATION REQUIRED: Submit an AMS with complete description of symptom complex. An internal medicine and psychology and/or psychiatry evaluation is normally required.

FOLLOW-UP: Close follow-up by the local flight surgeon. Further evaluation is only required with exacerbation of or failure to control disease symptoms.

TREATMENT: Advice, possibly including psychiatric counseling or stress management and dietary management to include pectin stool expanders, are compatible with continued flying status. Avoidance of caffeine and alcohol may also be of benefit.

DISCUSSION: Over 50% of patients are under 35 years old with female-male ratio being reported as 2:1, a report potentially biased by the greater tendency for women to seek medical assistance. The criteria for making the diagnosis can be met by 6-15% of normal young people. Only an estimated 20% of people who qualify for the diagnosis seek medical attention for it. Almost half of the reported IBS patients report sexual abuse as children. The four symptoms that help distinguish IBS from organic disease are: (1) visible abdominal distention, (2) relief of abdominal pain by bowel movement, (3) more frequent bowel movements with the onset of pain, and (4) looser stools with onset of pain. Ninety-one percent of IBS patients have two or more of these four symptoms, whereas only 30% with organic disease have two or more symptoms.

PEPTIC ULCER (ICD9 533.9)

AEROMEDICAL CONCERNS: Individuals presenting with acute hemorrhage and associated dizziness, perforation, pain, and/or vomiting are of primary concern in the aviation environment. Undetected chronic blood loss with no other symptoms can result in an iron deficiency anemia which can lead to cardio-respiratory embarrassment in flight due to altitude or high G-maneuvers.

WAIVERS: Waivers are normally recommended for single occurrence, uncomplicated ulcers on approved maintenance drug therapy, currently asymptomatic, and ulcer healing has been demonstrated by endoscopy. Waivers for recurrent ulcer disease are considered on a case-by-case basis. In cases where the etiology is known, e.g., NSAID ingestion, waiver recommendations are commonly recommended. Waivers for Helicobacter pylori (H. pylori)-induced ulcers are possible following demonstrated irradication of the organism. Exceptions to policy for initial applicants have never been recommended.

INFORMATION REQUIRED: An AMS including a history of caffeine, tobacco, and medication use, any hospital summaries or operative reports, CBC, and three stool-for-occult blood tests should be obtained. A PT, PTT and platelet count are required if hemorrhage or occult blood is detected in stool. Internal medicine or gastroenterology consultations are required to exclude malignancy. Endoscopy is required to demonstrate ulcer healing. If cancer is suspected, an endoscopy with biopsy and a cytologic washing are indicated. Other studies required may include gastric analysis, basal and stimulated, serum gastrin by radioimmunoassay, stool examination for ova and parasites, cultures for *H. pylori,* and an ECG to rule out myocardial damage. If ulcer is not present on endoscopy, further work-up is required to determine etiology of any bleeding.

FOLLOW-UP: Annual gastrointestinal/internal medicine evaluation is required to exclude silent relapsing disease.

TREATMENT: Successful surgical treatment is usually recommended for waiver provided there is an absence of post surgical complications and symptoms for four months. Various regiments of antibiotic therapy for H. pylori are acceptable along as erradication is possible. Other approved medications are:

Antacids - Chronic use is Class 3. Occasional or infrequent use is Class 1. Check electrolytes when used chronically.
H2 Blocker - CIMETIDINE, RANITIDINE, FAMOTIDINE, NIZATIDINE. Occasional drowsiness is associated with these medications. When treatment is first initiated, a 72-hour observation while the aviator is DNIF is required to ensure the absence of any significant side-effect.
Proton Pump Inhibitor - Omeprazole
Sucralfate - Class 2A provided an underlying condition does not require waiver.

DISCUSSION: Gastric ulcers and ulcers of the small bowel are found in 21.7% and 8.4% respectively of users of nonsteroidal anti-inflammatory drugs. Between 3 and 5% of gastric ulcers are carcinomatous. The death rate from acute hemorrhage from duodenal ulcer is 6-10% and is up to 22% in cases of acute upper gastrointestinal hemorrhage. Bleeding stops spontaneously in 85% of those cases presenting with acute gastrointestinal hemorrhage. Of those who perforate, 10% will do so with no previous history of symptoms. The use of H2 blockers is associated with 80-90% of patients healing in 2-3 months, although healing can be delayed in smokers; subsequent relapse rates while on maintenance therapy are higher in smokers than nonsmokers. Without maintenance medication, the relapse rate has been reported to be 50-100% at one year with 30% of the relapses being asymptomatic. The risk of hemorrhage has been reported as 2.5-2.7%/year in patients not on maintenance medication. The rate increased to 5%/year if there was a history of previous ulcer complications. The annual risk of perforation in similar patients ranges from 0.8-2% in males. There is no evidence that painless ulcers are less likely to bleed or perforate, although one bleed is predictive of others. With surgery, 5-15% of duodenal ulcers will recur after highly selective vagotomy and 3% will relapse after partial gastrectomy. Recurrence rates are less if the patient abstains from tobacco and alcohol. The role of *H. pylori* in the pathogenesis of peptic ulcer disease has become clearer. The bacterium is strongly associated with gastritis, ulcer disease and recently has been linked to the development of gastric carcinoma. Eradication of the organism is difficult and recurrent infection is common. However, the absence of the organism 4 to 6 weeks after discontinuation of therapy is accepted as an indication of sustained eradication.

REFLUX ESOPHAGITIS (GERD) and HIATUS HERNIA (ICD9 530.1 & 553.3)

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: Exception to policy for initial flight applicants have never been granted for either GERD or symptomatic hiatus hernia. A truly asymptomatic hiatus hernia is not considered disqualifying. Aviators with symptomatic GERD or hiatus hernia are routinely waivered provided their symptoms are mild and are adequately controlled by approved medication.

ICD9 Code	Condition
530.1	Reflux esophagitis
530.3	Esophageal stricture
530.7	Mallory-Weiss Tear
553.3	Hiatal Hernia

INFORMATION REQUIRED: Symptomatic GERD or hiatus hernia requires submission of endoscopy to exclude gastric or duodenal ulceration and malignancy. Cultures for H. pylori may be required.

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

TREATMENT: 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, and avoidance of tight fitting clothing.
The following medications may be used and waiver recommended once the treated patient demonstrates no idiosyncratic reactions to the medication (a 30 day period of observation is recommended) and the medication is effective in providing relief of symptoms.

Antacids - Chronic use is Class 3. Occasional or infrequent use is Class 1. Check electrolytes when used chronically.

H2 Blocker - CIMETIDINE, RANITIDINE, FAMOTIDINE, NIZATIDINE. Occasional drowsiness is associated with these medications. When treatment is first initiated, a 72-hour observation while the aviator is DNIF is required to ensure the absence of any significant side-effect.

Proton Pump Inhibitor - Omeprazole

Sucralfate - Class 2A provided underlying condition does not require waiver.

Surgical repair of hiatus hernia is compatible with return to full flight status, no wavier required, provided the repair is without complication and 60 days has elapsed since surgery.

DISCUSSION: Esophageal reflux is experienced by 10% of Americans at some time and, with careful scrutiny, most people over the age of 40 can be demonstrated to have a hiatus hernia. The majority of these cases are asymptomatic but 15% of cases will have frequent symptoms of reflux. The major complications of esophagitis are stricture formation (8-20%), Barrett's epithelium (8-20%), and hemorrhage (less than 2%). Mortality associated with esophagitis is minimal with estimates of 0.1:100,000. Recovery from surgery for hiatus hernia will depend on whether an abdominal or thoracic approach was used; the latter will involve more recovery time. In esophagitis, 90% of patients lose their symptoms on reaching their recommended weight. Mallory-Weiss tear, commonly following acute or chronic alcohol ingestion, accounts for 10-12% of all cases of acute upper gastrointestinal tract bleeding. The majority of patients stop bleeding spontaneously and in some the tear may heal within 24 hours although it may take up to a week.

ULCERATIVE COLITIS (ICD9 556)

AEROMEDICAL CONCERNS: Risk of in-flight incapacitation is small but real. The symptom complex tends to differ according to the extent of disease, but generally the severity of the symptoms correlates with the severity of the disease. Diarrhea, rectal urgency (occasionally intense), rectal bleeding, passage of mucus and abdominal pain are all possible presentations and all in varying levels of severity. While most of the time the process is insidious with gradual onset of symptoms, it can also present with an acuteness which mimics an infection (e.g., Salmonella sp. or Campylobacter sp.). Significant hemorrhage and even bowel perforation are possible complications of severe disease. There is also a risk of discomfort, feeling unwell and chronic fatigue between episodes which can detract from operational efficiency and availability. Iritis is a complication in up to 3% of patients.

WAIVERS: Exception to policy for initial flight applicants has never been granted in the past.
Rated aviation personnel are recommended for waiver if their disease is classified as mild, left-sided cases in remission, and limited to the distal 25 cm of the colon. If the disease is treated by partial colectomy, a waiver recommendation can be made one year after surgery provided the patient is asymptomatic and is without a colostomy or ileostomy.

INFORMATION REQUIRED: Internal medicine or gastroenterology consultation including recent sigmoidoscopy.

FOLLOW-UP: Annual submission of internal medicine or gastroenterology consultation to include CBC.

TREATMENT: Sulfasalazine in doses up to 2 gm/day may be used as maintenance therapy. Higher doses may be required for treatment, but are not recommended for waivers. Steroid and 5-aminosalicylic acid (5-ASA) enemas have been approved for treatment of proctitis. Partial colectomy is a viable alternative in patients who cannot tolerate medication or are unmanageable with medical therapy.

DISCUSSION: Most patients (80%) with ulcerative colitis have intermittent attacks of their disease, but the length of the remission varies considerably from a few weeks to many years. Following the initial attack, less than 10% remain in remission for 10 years without treatment. In patients younger than 40 years, up to 90% relapse within 5 years. Even on maintenance treatment of Sulfasalazine, there is an annual relapse rate of between 13% and 20%. Side effects of Sulfasalazine therapy include headache and nausea, oligospermia, skin rashes, agranulocytosis, interference with folate absorption, alopecia, hemolytic anemia, and occasionally hepatitis. About 15% of patients cannot tolerate the drug. In patients who present with moderately severe symptoms, the 5-year mortality is up to 20%; those who present with severe symptoms run a 10% chance of dying during the first episode and an up to 40% chance of dying in the first 5 years. Of those presenting with disease of any severity, up to 25% will have required total proctocolectomy within 5 years. After 5 years, the risk of requiring surgery for the colitis is fairly constant at about 8%. The risk of developing colon cancer is approximately 0.5 -1% a year. About 6% of patients will also have ankylosing spondylitis and a further 4-14% will have asymptomatic sacroiliitis. Ocular complications are present in 4-10% of cases but this rises by 2-30% when arthritis is also present. Cirrhosis, bile duct carcinoma and primary sclerosing cholangitis all occur in 1 - 4% of cases of ulcerative colitis.

HEMATOLOGY WAIVERS

ANEMIA / BLOOD LOSS (ICD9 285.9)

AEROMEDICAL CONCERNS: Anemia is best defined as a decrease in hemoglobin outside the normal range for a patient's age, sex and ethnic makeup. In this context, it is an objective sign of the presence of blood loss, decreased production or increased destruction. This underlying process and end organ hypoxia if hemoglobin levels drop significantly represents the major concerns to aviation safety.

WAIVERS: The potential for waiver will be determined by the underlying disease process. Diseases that are easily treated and have resolved will be more compatible with return to FFD than those causes that are recurrent, symptomatic or progressive. Lab errors, racial differences and "anemia of athletes" are not disease processes and do not require waiver.

INFORMATION REQUIRED: Requests for waiver should include all CBC results and the causative etiology or disease. Verified HCT values, obtained from 3 CBCs separately with an average below the range of 40-52% for men and 37-47% for females, should be evaluated using the following guide.

	Males	Females	
HCT	38-40	35-37	Obtain:
			• CBC with RBC count, indices, RBC morphology, reticulocyte count, WBC count, differential, and platelet count.
			• Stool guaiac from 3 separate stools.
			• Full clinical history and examination to include a search for any underlying physiologic cause.
			• If any underlying abnormalities are discovered or if etiology is unclear, do the below listed evaluation.
HCT	<38	<35	Obtain:
			• All of the above.
			• Serum iron studies, folate and B12 levels.
			• SMA-20 (including liver function testing).
			• Hemoglobin electrophoresis.
			• Hematology or internal medicine evaluation.
			• Rule out adenopathy and hepatosplenomegaly.

FOLLOW-UP: Follow-up will be directed at insuring treatment response and resolution or control of the underlying disease process. The frequency of follow-up will be often enough, especially initially, to insure this proper treatment response.

TREATMENT: Oral iron supplements are authorized for use for documented iron deficiency, but require waiver if needed to maintain a hematocrit within standard.

DISCUSSION: The acceptable levels of hemoglobin are lab specific, but generally fall into the 13.5-18 gms/dl for males and 12-16 gms/dl for females. The differential diagnosis of anemia is extensive. The local flight surgeon may proceed with the evaluation of anemia to his/her level of expertise. DNIF should be based on the level of hemoglobin, the rate of its decline, and the health of the aviator. Symptoms or hemoglobin less than 10-11 gms/dl should result in prompt grounding.

HEMOCHROMATOSIS (ICD9 275.0)

AEROMEDICAL CONCERNS: Hemochromatosis may present with a classic triad of diabetes mellitus, hepatomegaly, and skin hyperpigmentation. Cardiac complications, primarily in the form of congestive heart failure, occur in 5-35% of patients and in the young may rapidly lead to death if untreated. Increased susceptibility to infection and arthropathy are also reported. CNS complications, primarily weakness, fatigue, and lethargy occur in up to 75% of symptomatic patients but occasionally severe depression with psychomotor retardation, frank disorientation, or stupor may occur.

WAIVERS: Aircrew members with hemochromatosis are granted waiver only on a case-by-case basis.

INFORMATION REQUIRED: Internal medicine or hematology consultation is required to confirm the diagnosis and exclude hepatic involvement, diabetes, and other pathology causing secondary hemochromatosis. Investigations should include histocompatibility locus antigen (HLA) typing, serum iron, total iron-binding capacity, serum ferritin, total iron body content, and transferrin saturation. Liver biopsy and family studies may be necessary. Cardiology consultation with 24-Holter monitor and echocardiogram is required to exclude cardiac dysrhythmias.

FOLLOW-UP: Annual internal medicine with serum iron, total iron-binding capacity, serum ferritin, total iron body content, and transferrin saturation. Annual cardiology consultation with submission of ECHO and 24-hour Holter.

TREATMENT: Frequent phlebotomy and/or ongoing treatment with chelating agents such as desferrioxamine is not compatible with waiver.

DISCUSSION: Among populations of European origin (including U.S., Canada, Australia, etc.), the average frequency of hereditary hemochromatosis is estimated at about 3-5 per 1000 individuals. Phenotypic expression of the idiopathic hemochromatosis gene usually occurs between the ages of 20 to 40 with symptoms mainly occurring after the age of 50 and delayed until after menopause in females due to menstrual blood loss. The condition is lifelong in occurrence. Hepatic fibrosis is unusual in patients younger than 35 but will occur sooner and progress more rapidly to cirrhosis in heavy drinkers. Hypogonadism will occur in 25% of male patients and primary hypoaldosteronism in 10%. Cardiac failure and arrhythmias are common presenting features in younger patients. Up to 50% of patients over 40 years old have ECG irregularities and 43% of autopsied hearts from hemochromatosis patients show iron deposits in the AV-node and conduction system. Arthropathy is present in 30-50% of those patients with hemochromatosis (commonly in the proximal interphalangeal and metacarpophalangeal joints). A phlebotomy 2-3 times a week until hemoglobin is less than 10 g/dl, serum iron is less than normal, or ferritin is in the low normal range, followed by maintenance phlebotomy every 2-4 months, will reduce the incidence of complications other than arthropathy. The death rate at 5 and 10 years with phlebotomy is 32 and 66% compared to 6 and 18% in those who do not require treatment.

POLYCYTHEMIA (ICD9 238.4)

AEROMEDICAL CONCERNS: Symptoms of increased hemoglobin levels (erythrocytosis or polycythemia) result largely from slowing of blood flow through capillaries as a result of the increased blood viscosity. Primary polycythemia, or polycythemia vera (PV), is a neoplastic disease with increased risk of stroke and myocardial infarction. Secondary polycythemia is less often symptomatic, but its cause (chronic carbon monoxide exposure, certain tumors, severe lung disease, etc.) may have a significant impact on aviation safety.

WAIVERS: Waivers for PV are unlikely to be approved. Waivers for secondary polycythemia will be dependent on the cause and severity of the underlying condition. Hematocrits (HCT) above 55%, especially with elevated white cell and platelet counts, strongly suggest PV and should prompt immediate grounding. Acceptable aeromedical values are HCTs from 40-52% in males, and 37-47% in females and hemoglobins from 14-18 gm in males and 12-16 gm in females. HCT averages of 47-50% for females or 52-55% for males are routinely recommended for waiver provided they are symptom free and have no underlying pathology (see work-up below). Temporary local flight clearance pending receipt of waiver is authorized. HCT averages of greater than 50% for females or greater than 55% for males are recommended on a case-by-case basis only. Local flight clearance is not recommended pending waiver action.

INFORMATION REQUIRED: Abnormal values should be verified by averaging three complete blood counts (CBC) obtained at one-week intervals. When this average is above the range of 40-52% for males and 37-47% for females should be evaluated using the following guide. Internal medicine or hematology consultation are required.

	Males	Females	
HCT	52-55	47-50	Obtain: • Recent history of living at altitude over 5000 feet for longer than 6 months. • Smoking history. • Chest X-ray. • Pulmonary function testing with DLCO. • If any abnormalities are discovered, complete the evaluation listed below.
HCT	>55	>50	Obtain: • Oxygen saturation. • Spleen size (determined by CT, radionuclide scan or physical examination). • B12 and B12 binding capacity. • Leukocyte alkaline phosphatase score (LAP) values are used to diagnose PV. • Erythropoietin levels currently do not play a role in separating primary from secondary polycythemia. • If PV is ruled out, the secondary cause of polycythemia must be determined.

FOLLOW-UP: Insuring stability or improvement of secondary conditions is the goal of follow-up and will determine the frequency of visits.

TREATMENT: Hydroxyurea and phlebotomy are the common initial treatments for PV and are incompatible with waiver. Splenectomy has been proven to be valueless as primary therapy and is considered harmful. Treatment of secondary polycythemia is directed at the cause.

DISCUSSION: Secondary polycythemia may occur as a physiological response to decreased tissue oxygenation, i.e., high altitude, chronic lung disease, smoking, right to left cardiac shunt, etc. PV is a disease of insidious onset, chronic course, and unknown cause. The most common symptoms associated with PV are headache (48%), weakness (47%), pruritus (43%), dizziness (43%), sweating (33%), visual disturbances (31%), weight loss (29%), paresthesias (29%), dyspnea (26%), joint symptoms (26%), and epigastric distress (24%). Vascular occlusions of the brain and/or heart constitute the most serious complications. Various resulting paralyses may be the first symptoms of the disease. Myoclonia, chorea, grand mal seizures, general paresis, catalepsy, and various cognitive defects have all been reported. Investigators have shown clearly that cerebral blood flow is greatly diminished at hematocrit levels between 53 and 62%. Venesection can be the sole therapeutic measure in two-thirds of the patients. Venesection is performed repeatedly at 1-3 day intervals until the HCTs are between 40 to 45%. Good control can usually be maintained by one or two 500-ml phlebotomies every 3 to 4 months.

SICKLE CELL DISEASE/TRAIT (ICD9 282.5 / 282.6)

AEROMEDICAL CONCERNS: Patients with the sickling hemoglobins (SS, Sb-thal, SC and SD) are at risk for painful vaso-occlusive sickling crisis of multiple organ systems (especially in hypoxic environments), aplastic crises and overwhelming infection. Those with AS (sickle trait) are at increased risk for sudden death with exercise, and splenic infarcts even at moderate elevations (10-12,000 feet and, at times, even lower). There are no predictors in "pure" AS, except an accurate history of altitudes/extent of hypoxia that will induce symptomatic sickling in individual patients.

WAIVERS: Asymptomatic AS (where A is greater than S) is not disqualifying for aviation duty in the Army. A sickling history, history of painful crises, or presence of sickling hemoglobins is disqualifying with waiver unlikely. Note: The occurrence of abdominal pain with mountain climbing, chamber rides, or other hypoxic exposure in an individual with AS should be considered a sickling event unless another etiology is CLEARLY to blame.

INFORMATION REQUIRED: A hematology consult is required for all patients except where hemoglobin electrophoresis clearly shows A greater than S, and history (as above) is negative.

FOLLOW-UP: For individuals with AS, specific indicators of crises (any pain) induced by hypoxic exposure should be sought at the annual FDME.

TREATMENT: Avoidance of hypoxia and dehydration is good advice for AS patients. Treatment for other types of sickling diseases is not within the scope of these policy letters and not considered waiverable .

DISCUSSION: It is becoming clear the AS disease (sickle trait) is not uniformly the benign disease once thought. Those individuals so affected should receive as up-to-date information regarding the understanding of this disease and its risks as it is available.

SPLENECTOMY (ICD9 P415)

AEROMEDICAL CONCERNS: There is a long term risk of overwhelming, serious infection leading to death. The increased risk of infection is related to the underlying illness for which the splenectomy was performed and is most marked in patients with neoplastic disease.

WAIVERS: History of splenectomy for any reason except trauma is considered disqualifying for all classes of aviation duties. Waiver recommendation can be considered on a case-by-case basis provided there is full recovery from the condition necessitating the operation. Initial flight applicants are rarely considered for exception to policy.

INFORMATION REQUIRED: The information required will depend on the precipitating condition. Coordination with USAAMA is required.

FOLLOW-UP: None.

TREATMENT: Prophylactic antibiotics may be acceptable in certain circumstances. Immunization against pneumococcus, meningitis, and Hemophilus B is highly recommended and is considered compatible with flying status. Repeat vaccination is often recommended every 5 to 10 years. Patient education is a must to reduce the mortality from postsplenectomy sepsis. Asplenic patients must be taught to recognize the earliest signs of infection in order to seek immediate medical care or promptly start taking antibiotics dispensed in advance by their physicians.

DISCUSSION: The underlying disease process which necessitates the splenectomy is generally responsible for the overall clinical outcome. The mortality following splenectomy, regardless of cause, is around 3% of which infection accounts for 11%. Mortality for isolated injury to the spleen is less than 1%. Late sepsis after splenectomy for Hodgkin's disease occurs in 11.5% with a 5% mortality. In adults who have had splenectomy, the mortality from pneumococcal pneumonia is 17% despite administration of antibiotics. If the patient is older than 50, the mortality is 28%.

THALASSEMIA (ICD9 282.4)

AEROMEDICAL CONCERNS: Decreased oxygen carrying capacity secondary to decreased hemoglobin may lead to organ hypoxia.

WAIVERS: Waivers are normally granted to aviators with normal hemoglobin levels and microcytosis, and those with mild anemia. (See Discussion below)

INFORMATION REQUIRED: A consultation with a hematologist is required to insure accurate diagnosis.

FOLLOW-UP: Annual CBC is required.

TREATMENT: N/A

DISCUSSION: Thalassemia describes a condition of decreased amounts of hemoglobin due to faulty alpha and/or beta chain production. Old terms like "trait", "intermedia" and "major" are being replaced with more accurate descriptive terminology as a result of molecular biologic characterization of hemoglobin production. At any point in the initiation, promotion, transcription, translation and synthesis of hemoglobin protein chains, partial or complete absence of one or more of the 4 alpha chain gene products or one or both of the beta chain gene products can occur. The clinical course is determined by multiple factors including amounts of underproduced and overproduced chains, their interactions with other abnormal chains or hemoglobins, and individual patient characteristics. The diagnosis should result from a work-up prompted by anemia, microcytosis, or both.

INFECTIOUS DISEASE WAIVERS

HEPATITIS (ICD9 573.3)

AEROMEDICAL CONCERNS: The symptoms of acute and chronic hepatitis include fever, malaise, nausea, and pain, any or all of which could be distracting in an aviation mission. Risk of transmission to other unit personnel is of great concern. Cases may progress to cirrhosis which has its own aeromedical significance. (See Cirrhosis APL) Care should be taken to identify those individuals whose disease is complicated by alcohol ingestion.

WAIVERS:

Initial flight applicants :

- *Acute Hepatitis A, B, E:* A history of these acute infections is not disqualifying as long as six months have elapsed, liver functions have returned to normal, they remain asymptomatic and in the case of acute hepatitis B, that the HB surface antigen has cleared.
- *Acute Hepatitis C:* This condition may be filed as *information only* if the condition is fully resolved with no evidence of disease via RNA viral load testing.
- *Chronic Hepatitis:* Usually not granted exception to policy or waiver.
- *Other Forms of Hepatitis:* Evaluated on a case-by-case basis.

Rated Aviation Personnel:

- *Acute Hepatitis A or E:* Personnel will be grounded until the liver enzymes have returned to normal, but then may be returned to full flying duty without further action.
- *Acute Hepatitis B:* Personnel may be returned to full flying duty when liver enzymes return to normal, they are asymptomatic and the HB surface antigen has cleared. This will be filed as *information only*.
- *Acute Hepatitis C:* Personnel may return to full flying duty if the condition is fully resolved with no evidence of disease via RNA viral load testing. This will be filed as *information only*.
- *Chronic Hepatitis B:* This condition is disqualifying but waivers are possible provided liver biopsy shows no evidence of significant fibrosis and hepatitis studies do not show active replication (HBeAg or HB DNA present).
- *Chronic Hepatitis C:* This condition may be considered for waiver after treatment and/or if liver enzymes are normal and liver biopsy does not reveal significant, progressive disease as reviewed by a gastroenterology specialist.
- *Other Forms of Hepatitis:* Evaluated on a case-by-case basis.

INFORMATION REQUIRED:

- Complete IM or GI Consult,
- Complete panel of liver function studies (to include AST, ALT, Alkaline phosphatase, LDH, Total bilirubin, and GGT) and full hepatitis serologies (to include hepatitis A, B, and C); and
- Liver biopsy may be required.

FOLLOW-UP: Acute hepatitis once resolved requires no specific follow-up. Those aircrew members with chronic hepatitis will require annual internal medicine or gastroenterology consultation with annual submission of liver function tests and full hepatitis serologies. Due to the predisposition of the development of hepatoma, those with chronic hepatitis-B will require annual ultrasound evaluation with alpha-fetoprotein levels. Repeat liver biopsy may be required upon progression of liver disease or with any relapse. Those with chronic hepatitis C will require evaluation by gastroenterology every 3 years for repeat liver biopsy and evaluation for therapy.

TREATMENT: Treatment for hepatitis A and E is supportive. Aircrew will be grounded during the acute phase. All military personnel should be immunized with the two shot series of Hepatitis A vaccine as prophylaxis. Aircrew will be grounded for the duration of all other forms of treatment for chronic hepatitis to include interferon with ribivarin or other nucleoside analogue (e.g. lamividine) combinations, steroids, or azathioprine due to multiple side effects. Treatment with alpha interferon and or lamividine has been shown to moderate signs of chronic HBV infection and eliminates HBeAg in one third of patients, with eventual clearance of HBsAg in some of the responders. Treatment for chronic hepatitis C has only a sustained virologic and biologic response rate of approximately 40% with the new, longer acting interferon and ribivarin. Waivers are not recommended during treatment.

DISCUSSION: The most common causes of hepatitis are the viruses (A, B, C, D, E), alcohol and drugs. Less common etiologies include other viruses (Epstein-Barr, yellow fever, cytomegalovirus, and coxsackievirus).

Hepatitis-A infection is fortunately brief in duration and chronic hepatitis does not follow acute infection. Rare cases lead to fulminant hepatitis. In the majority of aviation personnel, administration of the Hepatitis A vaccine should greatly reduce, if not eliminate, this disease in our population.

For those patients whose hepatitis is a result of infection with hepatitis-B virus as an adult, 10% progress to chronic disease; cases arising in childhood progress to chronicity more frequently. Spontaneous recovery after 1 year is rare and only occurs in 5-15% of cases.

With hepatitis C, after acute infection, 15%-25% of persons appear to resolve their infection without sequelae as defined by sustained absence of HCV RNA in serum and normalization of ALT levels. Chronic HCV infection develops in most persons (75%- 85%) with persistent or fluctuating ALT elevations indicating active liver disease developing in 60%-70% of chronically infected persons. In the remaining 30%-40% of chronically infected persons, ALT levels are normal. Most studies have reported that cirrhosis develops in 10%-20% of persons with chronic hepatitis C over a period of 20-30 years.

The majority of those with chronic persistent hepatitis following acute hepatitis do not progress to cirrhosis. In autoimmune chronic active hepatitis, 25% have established cirrhosis at the time of the first biopsy. As many as 20-30% will have evidence of other autoimmune disorders such as arthritis, thyroiditis, or SLE. Mean survival is approximately 5 years in untreated patients. Treatment is often withdrawn at 1 year but there is a 50% relapse rate in the following year with most relapsing within six months. Many of those who relapse will require lifelong maintenance therapy. Approximately 40% of all patients with acute alcoholic hepatitis will develop cirrhosis in 5 years; abstinence in the interim does not guarantee avoidance of this condition. Those who continue heavy alcohol consumption have a mortality rate of greater than 50 % at seven years; this is reduced to 25% with abstinence.

REFERENCES:

Centers for Disease Control and Prevention: http://www.cdc.gov *"Recommendation for the Prevention and Control of Hepatitis C Virus (HCV) Infection and HCV-related Chronic Disease."* MMWR Oct 16, 1998/47 (RR 19): 1-39.

HIV INFECTION (ICD9 795.8)

AEROMEDICAL CONCERNS: Persons with HIV infection are at risk for multiple complications including HIV encephalopathy, opportunistic infections, and malignancies. Treatment of HIV infection requires the use of at least three antiretroviral medications with multiple side effects and drug interactions. Mandatory restrictions on deployability preclude operational assignment for those individuals affected.

WAIVERS: To date, no waivers for HIV have been recommended for rated aircrew. Civilian ATCs and aircrew members will be considered on a case-by-case basis and may be granted restricted duties if completely asymptomatic with frequency of monitoring to be determined individually for each case.

INFORMATION REQUIRED: AR 600-110, Identification, Surveillance, and Administration of Personnel Infected with Human Immunodeficiency Virus (HIV), guides management of HIV positive individuals. Submission of a complete and current clinical staging along with CD4 Cell count and plasma HIV RNA level (viral load) and any medication regimen is required for any waiver consideration.

FOLLOW-UP: Annual follow-up at a MEDCEN or equivalent for reevaluation is required.

TREATMENT: Treatment is disqualifying. The adoption of highly active antiretroviral therapy (HAART) with a three drug regimen has resulted in much improvement in short term survival rates. The recommended regimens involve the use of two nucleoside reverse transcriptase inhibitors (N-RTI) plus either a protease inhibitor (PI) or efavirenz, a non-nucleoside reverse transcriptase inhibitor (NN-RTI). Drug regimens involving less than three antiretroviral drugs are contraindicated. Some of the potential side effects of these regimens include anemia, leukopenia, thrombocytopenia, hepatitis, pancreatitis, peripheral neuropathy, lactic acidosis, rash, diarrhea, abdominal pain, nephrolithiasis glucose intolerance, hyperlipidemia, etc. The regimen for timing and storage of medication is complex and requires strict adherence.

DISCUSSION: Neurological infection heralds HIV infection in 10-20% of patients. Following the acute viral syndrome characterizing initial infection with the virus, a variety of neurologic disorders may develop. Aseptic meningitis, encephalitis, brachial plexopathy, and a multiple sclerosis- like illness have been observed. Several groups have demonstrated neuropsychologic dysfunction in asymptomatic HIV-1 positive patients. Abnormalities in gaze pursuit movements have also been reported. Late in the course of the disease, the CNS is the target for opportunistic infections, as well as effects attributed to the virus itself. HIV encephalopathy results in cognitive and motor deficits that can impair the ability to fly aircraft. The mean incubation time between HIV-1 infection and symptomatic AIDS for adults is at 8-10 years. An estimated 100% of those infected with HIV-1 but not treated with HAART will progress to AIDS given sufficient time. The indications for initiation of HAART can occur years before the development of symptomatic AIDS. Initiation of HAART is recommended when the CD4 lymphocyte count is less than 350 cells/mm 3. and /or the HIV viral load is greater than 55,000/ml copies by reverse transcriptase polymerase chain reaction (RT-PCR). Treatment with HAART improves survival in AIDS patients and may slow onset to symptomatic AIDS. However, the side effects associated with HAART severely limit its compatibility with duty involving flying. AIDS-defining events have changed radically since the disease was first described. In someone whose HIV-1 status is known to be positive, the list of conditions defining the transition to AIDS is broad. The treatment and prophylaxis of AIDS-related opportunistic infections have improved. The prophylactic medications also have many side effects. Some antiretroviral agents, especially the PIs have drug interactions with AIDS-related prophylactic medications and medication for non HIV-related conditions.

REFERENCE: HIV/AIDS Treatment Information Service: http://www.hivatis.org/

LYME DISEASE (ICD9 088.81)

AEROMEDICAL CONCERNS: The neurological complications of the early disseminated stage of Lyme disease may include headache, photophobia, difficulty with memory or concentration, and emotional lability. Carditis during the same stage can cause tachyarrhythmias, atrioventricular conduction defects, and rarely, mild congestive heart failure. Late neurological complications may include progressive encephalopathy, polyneuritis, and psychiatric changes. Arthritis may also occur in the late stage. Persistent fatigue and malaise have been reported as features of the condition.

WAIVERS: Waiver is not required for acute Lyme disease, although patients should be DNIF during antibiotic therapy. Any case of disseminated Lyme disease, substantiated by appropriate serology (acute IgM titer, rising IgG titers) will require waiver. CNS findings will require complete resolution and a 3-month period of observation prior to consideration of waiver recommendation.

INFORMATION REQUIRED: Appropriate specialist consult will depend on the nature of the symptom developed. Internal medicine or infectious disease consultation may be required. Neurology consultation with neuropsychiatric testing will be required in all cases with CNS findings.

FOLLOW-UP: No follow-up is required unless there has been residual damage.

TREATMENT: Patients should be DNIF during treatment of early localized cutaneous disease with oral amoxicillin, penicillin, doxycycline, tetracycline or cefuroxime. Intravenous therapy, with third generation cephalosporins or other antibiotics, for disseminated or chronic disease (Stages 2 and 3), is compatible with later waiver depending on outcome.

DISCUSSION: The risk of developing Lyme disease from a single tick bite has been reported to be so low that prophylactic therapy for asymptomatic patients is unjustified. Between 50-70% of patients with chronic disease recall erythema migrans, occurring one day to one month after tick bite. About one-half of patients have multiple lesions. Up to 50% of patients in the early stage have elevated erythrocyte sedimentation rate and about 20% have mildly abnormal liver function tests. Disseminated disease occurs mainly in untreated or inadequately treated cases. Up to 10% of such patients will have carditis and up to 15% will have neurological symptoms. Months to years after the tick bite, up to 50% of untreated patients will have intermittent arthritis, of whom one fifth have a chronic monoarthritis usually of the knee.

MALARIA (ICD9 084.6)

AEROMEDICAL CONCERNS: Developing malaria is a risk which some aircrew members are exposed to when deployed to areas of high risk. Clinical signs and symptoms of malaria are fever, tachycardia, hypotension, cough, headache, delirium, vomiting, and diarrhea. The onset of malaria while in flight is not an ideal situation, and its widespread occurrence may result in significant loss of personnel. During the Vietnam War entire units were declared "Combat Non-effective" due to a high incidence of malaria.

WAIVERS: Malaria is considered disqualifying until it has been completely treated. Chemoprophylaxis during deployment to endemic areas is not considered disqualifying but should be carefully monitored by a flight surgeon.

INFORMATION REQUIRED: Once disease has been successfully treated, forward a current infectious disease consultation or internal medicine consultation. Also submit the results of a microscopic examination of both a thin and a thick blood smear for malaria.

FOLLOW-UP: Lengthy follow-up is normally not required once a cure has been obtained.

TREATMENT: Chloroquine phosphate 500 mg weekly or Doxycycline 100 mg daily. 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 the Centers for Disease Control (CDC) at 1-404-639-3311.

DISCUSSION: Chloroquine is the chemoprophylactic agent of choice for susceptible plasmodia because of its low side-effect profile, and it is safe to use in children and pregnant women. Side effects, including headache, dizziness, blurred vision are usually transient and can be controlled by taking one-half the dose twice a week rather then one weekly dose. Drugs used for chemoprophylaxis should be begun 2 weeks before departure in order to permit time to change if unacceptable side-effects develop. Chemoprophylaxis should continue for 4 weeks after leaving endemic areas to cover for infection acquired before or at the time of departure.

DRUGS USED FOR MALARIA PROPHYLAXIS

DRUG	ADULT DOSE	PEDIATRIC DOSE
Mefloquine (Lariam®)	228 mg base (250 mg salt) orally, once /week	15-19 kg: 1/4 tab/wk 20-30 kg: 1/2 tab/wk 31-45 kg: 3/4/tab/wk >45 kg: 1 tab/wk
Doxycycline	100 mg orally, once/day	>8 years of age: 2 mg/kg of body weight orally/day up to adult dose of 100 mg/day
Chloroquine phosphate (Aralen®)	300 mg base (400 mg salt) orally, once/week	5 mg/kg base (8.3 mg/kg salt) orally, once/week, up to maximum adult dose of 300 mg base
Hydroxychloroquine sulfate (Plaquenil®)	310 mg base (400 mg salt) orally, once/week	5 mg/kg base (6.5 mg/kg salt) orally, once/week, up to maximum adult dose
Proquanil	200 mg orally, once/day in combination with weekly chloroquine	<2 years: 50 mg/day 2-6 years: 100 mg/day 7-10 years: 150 mg/day >10 years: 200 mg/day
Primaquine	15 mg base (26.3 mg salt) orally, once/day for 14 days	0.3 mg/kg base (0.5 mg/kg salt) orally once/day for 14 days

Note: This information was obtained from "Health Information for International Travel 1995" a publication of the Centers for Disease Control and Prevention.

SYPHILIS (ICD9 097.9)

AEROMEDICAL CONCERNS: Known for centuries as "The Great Imitator", syphilis, if not treated in its primary stage, can affect any organ in the body producing clinical illness years after initial infection. Neurosyphilis may present with the insidious onset of changes in personality, intellect, affect, insight, and judgment totally unrecognizable to the individual. A host of symptoms may develop too lengthy to discuss or even list, many of which are incompatible with continued aviation.

WAIVERS: Syphilis in any of its stages is considered medically disqualifying until treatment is completed and there are no residual effects. Primary syphilis, once treated, is not considered disqualifying. Any positive antibody test, i.e., FTA abs, MHA-TP, or TPI with no history of primary disease or those at clear risk of neurosyphilis, will require the aircrew member to undergo further evaluation or treatment for neurosyphilis (as described below). Residual complications of tertiary syphilis are rarely recommended waivers.

INFORMATION REQUIRED: Documentation of adequate treatment is required with a normal convalescent VDRL titer. Positive serology will not be assumed false positive until confirmed by negative spinal tap or the aircrew member undergoes complete treatment for neurosyphilis. Infectious disease, neurology, cardiology, or ophthalmology consultations may be required.

FOLLOW-UP: Careful monitoring for relapse following treatment is required, especially when this treatment is provided with other than penicillin. If treated with benzathine penicillin alone, the patients should be evaluated at 6-month intervals for neurosyphilis. Re-treatment is required in 1 out of 10 cases.

TREATMENT: Primary and secondary syphilis may ideally be treated with Benzathine penicillin G, 2.4 million units IM weekly for 2 or 3 doses. Since a few treatment failures have been reported when using benzathine penicillin alone, the addition of an alternative oral medication, e.g., Doxycline 200 mg po bid x 21 days is advisable. Other treatment regimens are possible but their effectiveness has not been well studied especially in syphilis of longer than 1 year's duration. Neurosyphilis may ideally be treated with aqueous crystalline penicillin G, 2.0 - 4.0 million units by IV injection q4h x 10 days.

DISCUSSION: The number of reported cases of syphilis in the U.S. has waxed and waned since the 1940s. Its latest peak starting in 1986 primarily as a result of HIV and the increased usage of drugs such as cocaine. Within hours to days after *T.pallidum* penetrates intact mucous membrane or gains access through abraded skin, it disseminates throughout the body. The primary stage, development of a chancre, takes an average 21 days. But a chancre does not develop in every case or may be so inconspicuous as to go unnoticed. Secondary syphilis becomes evident in 2-12 weeks after the appearance of the chancre. After the secondary stage subsides, the patient enters a latent period during which the diagnosis can only be obtained by a positive serologic test. Late syphilis (tertiary) develops in up to one-third of untreated patients. False-positive nontreponemal reaginic tests can usually be verified and syphilis excluded by obtaining a negative, specific treponemal antibody test (FTA-abs, TPHA, MHA-TP). Occasionally the FTA-abs will also give a false reaction and even be positive in the presence of a negative VDRL. The only definitive way to make the distinction is to obtain the functional TPI test. The reaginic antibody (RPR, VDRL, ART) tests are used for screening sera; the specific treponemal tests (TPHA, MHA-TP, FTA-abs) for confirming the diagnosis; and the quantitative nontreponemal antibody tests (RPR, VDRL) for assessing adequacy of treatment.

TUBERCULOSIS (ICD9 011.9)

AEROMEDICAL CONCERNS: The primary concern is prevention of this communicable disease's spread to other members within the aviation unit. While active tuberculosis (TB) is somewhat unlikely in the aviation community, it is still important to provide adequate treatment for those unit members discovered to be at risk for TB. Primary infection with TB may occur without symptoms and signs or may generate classical symptoms of low grade fever, night sweats, weight loss, cough, bloody sputum, etc. This pneumonia-like process puts an aviator at additional risk when exposed to altitude changes by causing small pulmonary plugs of sputum which close off alveolar ventilation. These obstructed air-sacks may expand and burst when exposed to decreased ambient pressure resulting in possible pneumothorax, pneumomediastinum, or even air embolism.

WAIVERS: Active tuberculosis is considered disqualifying with no waiver possible until complete recovery. Individuals with no evidence of active disease but who are a recent tuberculin converted (especially when young) will normally be recommended for chemoprophylaxis. If used as chemoprophylaxis, INH does not require waiver activity. (See Medications APL) Any other prophylactic drug is unlikely to have favorable waiver action due to potential side effects.

INFORMATION REQUIRED: Complete AMS with infectious disease or pulmonary medicine consultation and with documentation of complete recovery from infection. Post-convalescent negative sputum cultures followed by an observation of 6 months is generally required before return to aviation duties.

FOLLOW-UP: Following successful treatment of active TB, a program of continued observation should be developed for the next two years. However, relapse after adequate treatment of drug-sensitive infections is very infrequent. Patients receiving INH should be instructed about symptoms of hepatitis and have serum transaminase levels monitored every month.

TREATMENT: The Centers for Disease Control currently recommends several regimens for the initial treatment of tuberculosis. One such regimen employs 2 months of isoniazid (INH), rifampin (RMP), and pyrazinamide (PZA) [plus either ethambutol (EMB) or streptomycin (STM) if INH resistance is suspected] followed by INH and RMP daily or 2-3 times weekly for 4 months. Chemoprophylaxis is achieved with use of INH 300mg daily for 12 months (6 months has recently been proposed as providing greater risk/benefit for most individuals). Pyridoxine supplementation, 10-25 mg daily, is recommended for ages older than 65, pregnancy, diabetes mellitus, chronic renal failure, alcoholism, use of anticonvulsants, and malnutrition.

DISCUSSION: *Mycobacterium tuberculosis* infects 1.7 billion people worldwide, a third of the world's population, and causes 3 million deaths each year. In the U.S., the steady decline in TB infection occurred until 1986, at which time a steadily increasing infection rate occurred, probably due to increase incidence within the homeless, HIV epidemic, increased intravenous drug use, and declining TB control measures. About 3-4% of infected individuals will develop active TB during the first year after tuberculin conversion and a total of 5-15% will develop at some later time.

Criteria for Prescribing Preventive Therapy for Persons with Positive Tuberculin Reaction From CDC

Category	less than 35 years of age	35 and older
With risk factor[a]	Treat at all ages if reaction to 5 TU (PPD) $\geq$ 10 mm (or $\geq$ 5 mm if recent contact, HIV infected, or x-ray evidence of old TB)	
No risk factor, high-incidence group[b]	Treat if PPD $\geq$ 10 mm	Do not treat
No risk factor, low-incidence group	Treat if PPD $\geq$ 15 mm	Do not treat

[a] Risk factors: HIV infection, known recent exposure, recent skin-test conversion, abnormal chest x-ray, IV drug abuse, other.
[b] High-incidence group: immigrant from high incidence areas, medically underserved population, resident of long-term care facilities.
Lower or higher cutoff points may be used depending on the prevalence of TB infection & nonspecific cross-reactivity of the population.

MALIGNANCY WAIVERS

INTRODUCTION

AEROMEDICAL CONCERNS: Cancer may present with a myriad of signs or symptoms, including those which may present with sudden incapacitation, cognitive disorders, or seizures. The known cancer patient must face innumerable psychological adjustments, life style changes and a lengthy treatment process with follow-up which often interferes with deployment as well as their normal duties. The impact that cancer has on aircrew requires consideration of the organ of origin, the clinical or surgical stage and the treatments that are being or have been used.

WAIVERS: Initial flight applicants are rarely considered for exception to policy. Occasionally survivors of childhood leukemia or lymphoma are considered cured if their disease-free survival is greater than 5-10 years. Waiver recommendations are based upon the type of tumor and any residual effects of therapy. In general terms, waiver authorities will often recommend a return to restricted flying status as long as there is a minimal risk of incapacitation as a result of recurrence, treatment is complete, no residual affects from surgery/treatment are present, and the risk of relapse/CNS relapse is minimal (note: USAAMA ACAP has established that risks of CNS relapse of greater than 1%/year is not currently considered waiverable. In many cases, upgrading to a less restrictive waiver or a return from termination of flying status can be considered 2 years after completion of therapy provided there is no recurrence. Specific exceptions to this are addressed on the individual data sheets.

INFORMATION REQUIRED: For the vast majority of tumors, Tumor Board evaluation and (if done) Medical Evaluation Board (MEB) recommendations and Armed Forces Institute of Pathology (AFIP) confirmation of diagnosis are essential before waiver consideration can be given. It is extremely helpful to include an objective assessment by the oncologist of the chances of cure, the risks, likely nature and ease of detection of recurrence and recommendations for follow-up. Also submit complete AMS summarizing the complete course of the disease and copies of diagnostic procedures, hospitalization, treatment, and recommended limitations.

FOLLOW-UP: The necessity for follow-up will almost certainly interfere with mobility requirements unless the follow-up is at greater than 6-month intervals or the tests required are very simple.

TREATMENT: Surgery is not disqualifying for flight as long as major organ dysfunction does not exist. The condition for which the surgery was performed may, however, be disqualifying. All surgical procedures for the removal of cancer will require a variable period of grounding. The time of disqualification will depend on the chance of cure, the likelihood that recurrence will cause a flight safety hazard or otherwise interfere with the military task and on the site and extent of operation. Radiation therapy is generally delivered to a localized area for a limited time. The immediate side effects of nausea, neutropenia and other dose-related effects usually disappear a few weeks after completion of therapy. Until then, the patient should be disqualified from flying. Follow-up is required because of the risk of developing another primary cancer. Chemotherapy is incompatible with flying until full recovery from side effects such as anemia, thrombocytopenia, granulocytopenia, nausea and vomiting has occurred. Use of steroids or hormone therapy for the treatment of tumors is also disqualifying although waivers can be granted for their use as replacement therapy. Follow-up may be required for long term side effects of chemotherapy such as cardiac or pulmonary toxicity.

DISCUSSION: Classification of tumors into categories facilitates decision making on aeromedical outcome. The minimal requirements are accurate diagnosis, indication of tumor size, differentiation and local invasion, and confirmation of the presence or absence of lymph node or distant metastases. The American Joint Commission on Cancer (AJCC) TNM classification of malignant disease allows an accurate standardization of the staging of the malignancy which, in turn, should allow more consistency in the aeromedical disposition. In summary, T refers to the size of the primary tumor with subscripts to quantify the size; N with subscripts 0 or 1 identifies absence or presence of spread to the lymph nodes; and M with subscripts 0 or 1 identifies absence or presence of distant spread. Other classification systems for staging cancer exist and are useful. Further classification gives some indication of the virulence and potential for relapse. To provide standardization in disposition of these cases, it is essential for the histology to be confirmed by AFIP.

BLADDER CANCER (ICD9 188.9)

AEROMEDICAL CONCERNS: Tumors of the bladder may cause pain, urgency, chronic blood loss with development of anemia, or acute blood loss with obstruction by clot. Metastatic disease may cause pain from organ invasion and pathologic fractures.

WAIVERS: A recommendation for waiver will be considered after initial, localized therapy, provided the tumor is confined to the epithelium. Localized transitional cell carcinoma generally responds well to treatment. Muscle invasive disease may require more extensive resection, which results in residual defects and may be incompatible with aviation duties. Cystectomy or the requirement for repeated catheterization results in disqualification with only rare waiver recommendations.

INFORMATION REQUIRED: Complete AMS is required. Tumor Board and (if done) MEB recommendations and AFIP confirmation of histology are necessary for the initial waiver request. Oncology or urology evaluations are required to include: FDME with AMS, chest X-ray, cystoscopy, contrast studies of the entire urinary tract and CT scanning of the abdomen and pelvis.

FOLLOW-UP: Oncology or urology review is required annually for continuation of waivers. CT scanning of the abdomen and pelvis may be required periodically. Frequency of follow-up is dependent upon the severity of the disease and may vary from case by case as indicated upon review by the aeromedical oncology consultant.

TREATMENT: Surgical resection via transurethral approach is usually used for diagnosis and therapy of localized disease. BCG is often added for treatment of residual superficial disease. Surgery, radiation, and chemotherapy are used for more extensive disease. Ongoing therapy is not considered compatible with continued flying duties.

DISCUSSION: An estimated 50,000 new cases of bladder cancer occur in the U.S. each year, 75% of these new cases will occur in males. Most cases occur in the 50 to 70 year-old age group. However, carcinoma in situ or papillary noninvasive carcinoma are associated with a high probability of cure. Recurrence is primarily local. Bladder cancer most frequently results from the effect of carcinogens (smoking in the U.S.). This diffuse exposure results in a "field cancerization" where all the urothelium is at risk. Urologic expertise is critical to accurate staging (obtaining bladder muscle at biopsy, for example). Though risk of CNS recurrence is minimal, high risk of recurrence and the deforming surgeries done for more advanced disease make consideration for waiver difficult in all but the most local and superficial cases.

BREAST CANCER (ICD9 174.9)

AEROMEDICAL CONCERNS: Advanced local disease and effects of surgery or radiation can affect comfort in restraint harness, and metastatic disease can cause pathologic fractures and involve the CNS. As in all forms of cancer, careful consideration must be given to the patient's overall psychological fitness for flying.

WAIVERS: Waivers will normally be granted for those aviators who have completed and recovered from therapy and are free of disease. Patients with metastasis to lymph nodes or more distant sites will not normally be considered for waiver.

INFORMATION REQUIRED: Complete AMS is required. Tumor Board and (if done) MEB recommendations and AFIP confirmation of the histology are all necessary. For initial waiver, surgical / oncology opinion is needed including: CBC, chest x-ray, bone scan, CT scan of the liver and mammography of the opposite breast. MRI scan of the brain is required in the presence of any suspected neurological disorder.

FOLLOW-UP: Annual surgical / oncology consultation, mammography, and chest x-ray are required. MRI scan of the brain, bone scan, and CT scan of the liver are required, if clinically indicated, as directed by the patients specialist.

TREATMENT: Surgery followed by radiation, chemotherapy or hormonal therapy based upon the extent of the surgery, tumor size and lymph node involvement, and patient's age. The aircrew member must be grounded during treatment. Tamoxifen, a common adjuvant treatment, is not an approved medication for aviation.

DISCUSSION: Breast cancer is slowly increasing in incidence and prevalence. The incidence of breast cancer is 100 per 100,000 females in any given year. The mortality rate of 28 per 100,000 has remained unchanged for over 50 years. At the time of detection, about half of breast cancers have metastasized to lymph nodes. Of those detected by screening, 42% are too small to detect by physical examination. Up to 80% of those detected by screening have negative axillary lymph nodes. Of patients with up to 3 affected nodes, 60% will relapse by 10 years. Even the earliest stage of breast carcinoma (Stage I) carries a relapse rate of 10% by 5 years. The average time to relapse is 3-4 years in patients with 1-3 involved nodes and 1-2 years if more nodes are involved, but may occur as late as 30 years after initial diagnosis. Aviators with a history of breast cancer should receive special attention at FDME for evidence of local recurrence at the surgical site or in the remaining breast tissue, occurrence in the opposite breast, bone pain, liver enlargement, neurologic and chest radiograph abnormalities, and be encouraged to report early, any new symptoms or findings. Immediate grounding and evaluation by specialists should be performed at the onset of any such abnormalities. From the point of view of comfort when wearing restraint harnesses, it may be necessary to delay return to flying duties until after breast reconstruction has been carried out in cases where simple mastectomy rather than "lumpectomy" has been performed. The site of metastasis is bone in 27% of cases, local in 26% and pulmonary in 21%.

Screening for breast cancer with the "Breast Self Exam" should be encouraged at FDME in all female aviators. Mammography screening is not required for FDME, or routinely for women under 50 years of age. A strong history would make earlier screening by mammography appropriate.

CARCINOID TUMOR (ICD9 Q240.1)

AEROMEDICAL CONCERNS: Carcinoid syndrome can produce a fall in systolic blood pressure, a rise in heart rate, sudden dyspnea with wheezing and altered mental function. Another presenting symptom which could cause embarrassment in flight is a copious secretory diarrhea accompanied by pain, nausea and occasionally vomiting. Severe abdominal pain can be caused by hypoxia of hepatic metastases.

WAIVERS: Patients with an adequately excised primary lesion may be considered for waiver. Patients presenting with carcinoid syndrome are unlikely to be waivered, unless rendered free of disease and symptoms with surgery.

INFORMATION REQUIRED: Complete AMS is required. Surgical consultation to include confirmation that the liver is free of metastases is also required. Cardiology consultation with echocardiogram may be needed to confirm that the tricuspid and pulmonary valves are not stenosed. If the primary is a lung lesion, cerebral metastasis should be excluded. AFIP confirmation of the histology, Tumor Board recommendations and (if done) MEB disposal are required.

FOLLOW-UP: Annual surgery/oncology consultations are required.

TREATMENT: Surgical removal is compatible with waiver.

DISCUSSION: Symptoms of carcinoid syndrome usually do not occur unless there are metastases, particularly when the drainage of the primary tumor is through an intact liver. Carcinoid tumors arising in the hindgut are usually benign and, along with bronchial carcinoids are often metabolically inactive. Bronchial carcinoids usually metastasize to the regional lymph nodes (30%) and to distant organs such as the liver or brain (10%). The 5-year survival of bronchial carcinoids is 70% if the regional lymph nodes are involved and is quoted to be "much higher" when there is no metastasis.

CERVICAL CANCER (ICD9 180.9)

AEROMEDICAL CONCERNS: Minimal symptoms occur with limited disease. Later manifestations of the disease include anemia, weakness and weight loss. Distracting pain may be caused by local invasion.

WAIVERS: Waiver is readily recommended for carcinoma in situ or for those cases treated by laser or cautery. For other patients without evidence of spread, waiver can be considered 6 weeks after surgery. Aircrew with evidence of metastasis are grounded but may be considered for waiver 2 years after completion of therapy as long as there is no evidence of recurrence. Those aviators requiring radiation as part of their treatment will require much closer scrutiny to insure absence of disease and side effects.

INFORMATION REQUIRED: Complete AMS is required. Tumor Board recommendations, (if done) MEB, and AFIP confirmation of the histology are required. Waiver requests should be accompanied by gynecology/oncology opinion.

FOLLOW-UP: Determined at time of initial treatment, normally by the treating subspecialist.

TREATMENT: Cervical cancer is treated with surgical techniques with early disease. Radiation is incorporated with invasive disease. Continuation of therapy is incompatible with flying status.

DISCUSSION: In the U.S., there are 12,900 new cases of invasive cervical cancer annually and it is responsible for approximately 7,000 deaths per year. For carcinoma in situ, there is an almost 100% survival rate with therapy. The 5-year survival rate for patients with localized but invasive carcinoma of the cervix is about 82% while for all groups as a whole it is 59%. Advanced cervical cancer is preventable when regular screening with exam and PAP smears is done. The history of multiple sexual partners and viral infection (Human papillomavirus and Herpesvirus type 2) should demand enforcement of screening.

COLORECTAL CANCER (ICD9 154.0)

AEROMEDICAL CONCERNS: Carcinoma of the colon presents as an emergency (abdominal pain, obstruction, or perforation) in up to 30% of cases. Rectal carcinoma rarely presents as an emergency. Both can cause anemia sufficient to cause problems in flight if undetected.

WAIVERS: Waiver can be considered where all gross tumor was removed at surgery, adjuvant therapy has been completed, all side effects of therapy have resolved, and no evidence of tumor is detected at post-therapy evaluation. For cases where nodes are involved, waiver may be considered 2 years after completion of therapy. Patients with metastasis, residual disease, or treatment-related side-effects will not normally be considered for waiver.

INFORMATION REQUIRED: Complete AMS is required. Histologic diagnosis, TNM tumor stage, Tumor Board, (if done) MEB evaluation, and AFIP confirmation of the diagnosis are necessary. Any post-operative therapies, results of restaging, and documentation of full recovery from effects of therapy are also required. CBC, liver enzymes, PT, PTT, BUN, creatinine, chest x-ray, computerized tomography (CT) to rule out extension to bone or other vital area, colonoscopy or adequate air contrast barium enema and serum carcinoembryonic antigen (CEA) measurements are also required.

FOLLOW-UP: The best follow-up for these malignancies is not clear. CT scanning can pick up early liver lesions, but at the cost of substantial radiation exposure. MRI is also effective but expensive. Liver enzyme testing has very low sensitivity and need not be done. Carcinoembryonic Antigen (CEA) is the first evidence of recurrent disease in 50% of patient, and will eventually become positive in 60-94%. The following are required: 1) History and physical (with rectal exam and occult blood testing), CEA, (and, for patients with anastamosis in the pelvis, sigmoidoscopy) every 3 months for 3 years, then every 6 months for 2 years. 2) Postero-anterior and lateral chest
x-ray every year. 3) Annual colonoscopy for 3 years, then every 3 to 5 years thereafter, if first three are normal. Discovered abnormalities will result in immediate grounding and referral to appropriate subspecialty physicians.

TREATMENT: Surgical exploration is the only curative treatment, and consists of resection of the tumor and surrounding lymph nodes, and search for metastatic disease. Pathologic evaluation of the surgical specimen for depth of tumor invasion and involvement of lymph nodes follows. Patients with colon cancer and positive lymph nodes should receive chemotherapy, generally for one year. Patients with rectal cancer with tumor through the bowel wall or with positive lymph nodes should receive combined chemotherapy and radiation therapy. Continuing treatment is incompatible with waiver. Potential treatment-related complications/side-effects include: Diarrhea, a common side-effect of surgery, radiation, and chemotherapy; post-operative constipation, less common and may be due to anastomotic strictures, disease recurrence, or adhesions; Chemotherapy may induce anemia, risk of bleeding from thrombocytopenia, and risk of infection from neutropenia, though generally, the incidence of these side-effects is low. Neurologic symptoms (dizziness and vertigo), effects on the eye (conjunctivitis), and nausea and vomiting may be seen during chemotherapy. Colostomy is not considered compatible with military aviation. Variations in atmospheric pressure may cause the colostomy bag to rupture.

DISCUSSION: Colorectal cancers account for more than 12% of all carcinomas and is the most common malignancy in the USA after lung, breast, and skin cancer. On average, 30% arise in the rectum, 30% in the sigmoid colon, and 30% in the proximal colon. The distribution of metastases is liver >60%, lung >50%, peritoneum 15% and bone 15%. There is a 20% incidence of coexisting benign or malignant neoplasms elsewhere in the colon. The 5-year survival rates for patients with Duke's stage A (limited to bowel wall, no nodes) is 90%; the corresponding rates for other stages are; stage B1 (not invading into the peritoneal cavity, no nodes) 80%; B2 (directly invading other organs or in the free peritoneal cavity, no nodes, no metastases) 65-75%; C1 (with positive nodes near the primary lesion) 50-65%; and C2 (proximal node involved at point of ligation) 25-50%. Between 60 and 84% of metastases occur within the first 2 years after resection and can be predicted up to 6 months in advance by CEA estimation in those cases with CEA-secreting tumors. Up to 20% of single hepatic or pulmonary metastases can be cured by resection. Liver function tests (LFT) can remain within normal limits until quite advanced disease exists.

GASTROINTESTINAL POLYPS (BENIGN)

AEROMEDICAL CONCERNS: Large polyps may bleed and cause mild anemia. Juvenile polyps may intussuscept in childhood but also rarely in later life and cause an acute abdomen. Some polyps may exhibit neoplastic change.

WAIVERS: Waiver may be considered for aircrew members with Peutz-Jeghers syndrome, the precise category depending on the mode of presentation. Peutz-Jeghers syndrome and familial adenomatous polyposis are both disqualifying for entry to flying training, and the latter is likely to lead to separation from the U.S. Army. Waiver is possible for other types of polyps, the category depending on type, symptoms, requirement for follow-up and potential carcinogenic change.

ICD9	Code Condition
759.6	Peutz-Jeghers syndrome
211.3	Familial adenomatous polyposis

INFORMATION REQUIRED: Complete AMS is required. Gastroenterology consultation and AFIP confirmation of histology are mandatory. MEB (if done) and Tumor Board recommendations may be needed.

FOLLOW-UP: Annual Gastroenterology consultation with colonoscopy or ileostomy.

TREATMENT: Simple surgery is permitted although the presence of a colostomy or ileostomy is not compatible with military aviation.

DISCUSSION: Malignancy associated with Peutz-Jeghers syndrome is rare except for the few cases that arise in polyps in the stomach or duodenum. Adenomatous polyps occur in 10% of the Western population. Approximately 5% of such polyps undergo carcinomatous transformation. The higher the number of adenomatous polyps, the higher the risk of carcinoma. Patients with familial adenomatous polyposis have a risk of 100%. About 90% of patients with polyps have only 1 or 2 of them. Once a polyp has been removed, that patient has a 30% chance of developing further polyps and a 2-4% chance of carcinoma.

GASTROINTESTINAL TUMORS (OTHER)

AEROMEDICAL CONCERNS: The most commonly presenting symptoms of discomfort, vague/nonspecific symptoms or occult/mild bleeding often prompt the search which finds the disease. Occasionally more serious complications may present. Esophageal carcinoma carries a risk of sudden hemorrhage and aspiration. Gastric carcinoma has the risk of incapacitating hemorrhage, anemia, or metastasis to brain, bone or lungs. Hemorrhage is also a risk in primary hepatic carcinoma. Pancreatic carcinoma is associated with a risk of developing diabetes mellitus and thrombophlebitis.

WAIVERS: Malignant tumors of the esophagus, stomach, and pancreas generally present in advanced stages or require significant surgery to render patients disease free. Waiver would be appropriate for early stage disease where patients are rendered disease free, "normal" function of the remaining organ, and recovered from surgery. These will be rare patients.

ICD9 Code	Condition
150.9	Malignant neoplasm of the esophagus
151.9	Malignant neoplasm of the stomach
157.9	Malignant neoplasm of the pancreas
211.0	Benign neoplasm of the esophagus
211.1	Benign neoplasm of the stomach
211.6	Benign neoplasm of the pancreas

INFORMATION REQUIRED: Complete AMS is required. Tumor Board and MEB (if done) recommendations and AFIP confirmation of the histology are essential. Request for waiver should include full flight physical, gastroenterology/oncology / internal medicine review, chest x-ray, CT scan of mediastinum and abdomen, together with endoscopy if indicated.

FOLLOW-UP: Follow-up as directed by the treating subspecialist. Other follow-up may be required as indicated by the aeromedical oncology consultant and may vary for each tumor type or organ affected.

TREATMENT: Surgical resection remains the only recognized means of cure, and it is frequently extensive. Radiation Therapy and/or Chemotherapy cannot be currently considered to add to surgical cure or to result in cures on their own.

DISCUSSION: The 5-year survival rates for the various carcinomas are as follows: esophagus 3%, stomach 12% (although 90% with early detection and resection has been reported), liver <1%, gall bladder 2½%, and pancreas 1%. Three disorders occur in pancreatic carcinoma that could affect aircrew efficiency. Diabetes mellitus occurs in 10-20% of patients. Thrombotic disorders including thrombosis of the splenic vein (15% of cases) or pulmonary embolism (10%) may also occur. Primary lymphoma of the bowel is discussed on page 5-3 under lymphomas. Colonic polyps are also considered separately.

HEAD AND NECK TUMORS

AEROMEDICAL CONCERNS: Local expansion and impingement on adjacent structures is the initial manifestation of most of these tumors. The extensive resection and resultant loss of structures vital for speech, swallowing (and control of secretions) and equipment fit will be important post-therapy concerns in the return of affected aviators to flight duties.

WAIVERS: Appropriate candidates for waiver are those aviators whose tumors have been completely removed in a manner that has not disturbed the surrounding structures needed to perform aviation duty. Impairment of speech, secretion control, and equipment fit are not considered favorably for waiver. Radiation Therapy will significantly impair chances of waiver.

ICD9 Code	Condition
161.9	Laryngeal Cancer
145.9	Oral Cavity Cancer

INFORMATION REQUIRED: Complete AMS is required. Tumor Board and MEB (if done) recommendations and AFIP confirmation of the histology is necessary. In addition, documentation of return of function of "aviation-quality" speech, swallowing/control of secretions, and equipment fit are required.

FOLLOW-UP: Determined by the ENT surgeon, with other involved specialists.

TREATMENT: Combined Chemo-Radiotherapy can result in retention of the larynx in 2/3rds of patients with laryngeal cancer, though results are not usually compatible with return to FFD. Surgical removal of the primary tumor, and further exploration of the neck based upon tumor size and clinical evidence of nodal involvement remains the standard for other malignant tumors of the Head and Neck. Radiation may add to cure, but only with more extensive tumors that are not likely to be waivered. Chemotherapy has no current role in adjuvant therapy in most tumors of the Head and Neck.

DISCUSSION: Peak incidence of laryngeal cancer occurs during the 6th and 7th decade of life with a male/female ratio of 9/1. Overall, early laryngeal cancer carries a 5-year survival of 76%, but localized glottic cancer has a figure of 90%. Recurrence is primarily local. Early laryngeal carcinoma (all sites) has a 5-year survival of 76%, while localized true vocal cord carcinoma has a 5-year survival of 90%. Laryngeal carcinomas are uncommon among nonsmokers, and tobacco use is incriminated as an etiology.

Cancer of the lower lip has the best prognosis, with a 10-year survival rate for early cases of over 95%. Most recurrence (to the lip in 43% and neck nodes in 43%) occurs in the first 2 years. Up to 12% of patients with lip cancer develop a second primary lesion, usually of the mouth or pharynx. Cancers of the upper lip carry a 5-year survival rate of 58-73%. Stage I (T1N0M0) and Stage II (T2N0M0) cancers of the oral cavity carry 5-year survival rates of 76% and 65% respectively but overall the 5-year survival rates are 25-35% for tongue, 20-40% for the floor of the mouth, 30-50% for cheek and 25% for oropharynx, palate and gingiva. Recurrence is primarily local, but up to 15% will metastasize while the local lesion is controlled. Up to 50% will manifest their metastasis within 9 months, and 80% will manifest it by 2 years. Between 15-35% of patients develop a second squamous carcinoma (head and neck 10-20%, esophagus 2-10%, bronchus 3-10%). Of those patients who have had a radical neck dissection, 30% develop a dropped shoulder because of sacrifice of the XI cranial nerve and weakness of the trapezius muscle; this may preclude flying duties. Pharyngeal cancers are usually diagnosed late and carry a 5-year survival of 33%.

HODGKIN'S DISEASE (ICD9 201)

AEROMEDICAL CONCERNS: There is little risk of incapacitation with active disease or in those undergoing therapy. However, more advanced cases can cause dysfunction of multiple organ systems due to tumor invasion and bulk.

WAIVERS: The significant curability of Hodgkin's Disease makes waiver, especially for early disease, appropriate. Waiver for more advanced disease is complicated by insuring that residual masses contain no active disease. Patients with IIB through IVB disease have a greater recurrence rate with up to 75% achieving median length of remission of 3½ years but can be considered for a waiver if free of disease, therapy is complete, and recovery from therapy is complete.

INFORMATION REQUIRED: Complete AMS is required. Staging classification must be submitted using Ann Arbor classification. Histology must be confirmed by AFIP. Tumor Board report and MEB (if done) recommendations are also necessary. There should be confirmation that the chemotherapy has not caused residual toxicity. A complete pulmonary functions testing, including DLCO, and an echocardiogram, with ejection fraction, can support lack of pulmonary and cardiac toxicity. A neurological exam for the presence of peripheral neuropathy is also necessary.

FOLLOW-UP: An appropriate follow-up plan should be determined by the treating subspecialist.

TREATMENT: Treatment options include radiation and/or chemotherapy. Patients must be DNIF when undergoing therapy. Patients treated with radiation are at risk for developing hypothyroidism and should have Thyroid Stimulating Hormone (TSH) tested yearly.

DISCUSSION: A bimodal age peak occurs with the incidence first peak in the mid to late 20s and the second peak in late adulthood. Because of the risks of long term complications of therapy, patients should be followed at least quarterly for the first 2 years, then at 6 month intervals for the next 8 years and then annually thereafter. After 3 years remission there is an 80% chance of permanent cure which rises to 96% after 5 years. The small risk for developing secondary tumors is enhanced when alkylator chemotherapy is added to radiation, and careful exam of the radiation port area during FDME in these patients is essential for detecting radiation induced skin cancer.

KIDNEY TUMORS (ICD9 189.0)

AEROMEDICAL CONCERNS: Early disease may present with significant bleeding and localized pain. There is a risk of metastasis to brain, with a risk of seizure, or to bone, with a risk of pathological fracture. Metastasis may also occur to the lung, mediastinum, skin and liver.

WAIVERS: Stage 1 tumors, completely surrounded by normal kidney tissue, with no involved lymph nodes, and completely resected, are good candidates for waiver. Those with more extensive disease may have an unacceptable risk of developing of CNS disease. Since applicants for flying training with congenital absence of one kidney are rejected, it follows that applicants with a history of nephrectomy for Wilm's tumor will be treated the same way.

INFORMATION REQUIRED: Complete AMS is required. Tumor Board appraisal, MEB (if done) recommendations, and AFIP confirmation of the histology are mandatory. Requests for waiver should be accompanied by full flight physical, AMS, oncology and urology consultation, CBC, liver enzymes, chest x-ray, CT scan of abdomen and retroperitoneum, MRI scan of the brain, and a bone scan.

FOLLOW-UP: Annual oncology and urology consultation is required. Further testing will vary and is dependent upon the type, stage of the tumor and the type of treatment and the recommendations of the patients urologist or oncologist.

TREATMENT: Surgical removal of the primary tumor is the most effective treatment. Renal cell carcinoma remains the most unresponsive tumor to radiation and chemotherapy. These agents do not yet play a significant role in improving survival in patients with extensive local or metastatic disease. Ongoing therapy is not compatible with flying status.

DISCUSSION: The most frequent traditional presentations are hematuria (56%), pain (38%), palpable mass (36%), weight loss and fatigue (27%), fever (11%), varicocele (2%), and incidental (27%). With localized disease, the 5-year survival rate is reported as 72%. The smallest tumors that exhibit minimal caliceal distortion and are surrounded by normal renal parenchyma have a good prognosis after surgery, but they are at risk for relapse. One third of patients already have disseminated disease at diagnosis, involving lung in 50% of cases, bone in 30%, liver in 30% and brain in 25%. Brain metastases from kidney are reported to be particularly susceptible to hemorrhagic degeneration with abrupt onset of headache and neurological difficulty. Hypertension occurs in about 30% of cases with renal cell carcinoma (hypernephroma) and a polycythemia syndrome occurs in 2-3%.

LEUKEMIA

AEROMEDICAL CONCERNS: Acute leukemias can cause overwhelming complications with bleeding and infection. Chronic leukemias are usually less catastrophic, though most will progress with time, and produce the same end results as their acute counterparts.

WAIVERS: A history of ALL as a child is compatible with waiver or exception to policy. Aircrew members with other leukemias may be considered for restrictive waivers provided they have been free of symptoms and off treatment for 2 years. While there may be rare aviators with successful treatment and recovery from therapy that may return to flight duties, this is not currently a possibility for most.

ICD9 Code	Condition
204.9	Lymphoid leukemia
205.9	Myeloid leukemia
206.9	Monocytic leukemia

INFORMATION REQUIRED: Complete AMS is required. Tumor Board and MEB (if done) recommendations are required. In patients who have had prophylactic CNS radiation, neuropsychology review and testing is necessary.

FOLLOW-UP: Oncology/hematology consultation is required at least annually for continuation of waiver. Other requirements may vary based upon the nature of the tumor, its stage and the treatment program. The requirement for frequent assessment may interfere with military mobility

TREATMENT: Acute leukemias are treated with intensive therapy, and relapse in still all too common. All acute leukemias should undergo MEB. Treatment of chronic leukemias mirrors the aggressiveness of the disease at presentation, though curability is not yet possible in most cases. Ongoing therapy is not compatible with waiver. Patients who have had marrow transplant are not likely candidates for waiver, unless they are asymptomatic and on no medications.

DISCUSSION: Acute ALL is primarily a disease of childhood; chronic lymphocytic leukemia (CLL) is a disease of the aged; acute myelogenous leukemia (AML) occurs with similar frequency at all ages; and chronic myelogenous leukemia (CML) occurs most frequently in middle life. Sex differences are slight except in CLL, where male predominance is more striking. Adult ALL has a high relapse rate and long term survival is uncommon; CNS relapse occurs in 50% of cases although this figure is reduced to 5% with chemical or radiation prophylaxis. Although 60-80% of cases of AML go into remission, this is short (15 months on average) and there is a high relapse rate. 60-90% of AML will respond to induction chemotherapy, and median survivals at 3.5 years of 83%, 50%, and 23% are reported for age groups 25 or less, 26-45, and more than 45 years of age. High dose chemotherapy with hematopoetic progenitor support (bone marrow transplant, peripheral stem cell harvest, etc) may have a place in some patients with AMI, but are not yet standard in the care of all AML patients. CLL spans the spectrum from indolent to aggressive disease, the development of a blast crisis is unpredictable and may be sudden. Therapy for CLL is currently directed at resolving symptoms or cytopenias; reproducible cure is not yet possible, and intense therapy may be no better than periodic therapy at prolonging life. Significant immune suppression and, paradoxically, autoimmune phenomenon (hemolytic anemia) may further complicate the clinical course. Hairy Cell Leukemia is a rare disease. 2-Chlorodeoxyadenosine (2-CdA) may be the treatment of choice, and long term disease-free survival (? cure) is increasingly being appreciated. Significant, long-term immune suppression may follow the use of 2-CdA.

LUNG CANCER (ICD9 162.9)

AEROMEDICAL CONCERNS: The major concern for aviators is the risk of cerebral metastasis with the development of seizures and neurologic compromise. In addition, bone metastasis could give rise to pathological fractures during emergency ground egress or ejection. There is also a possibility of diminished pulmonary function with compromised oxygenation, producing symptoms in-flight. Chest discomfort and/or hemoptysis is a presenting feature in 40% of cases and this discomfort may be exacerbated by the pressure of a restraint harness. Lack of energy and loss of interest in normal pursuits may impinge on flying ability or keenness to fly. Certain types of tumor may also be associated with neuropathies or endocrine disturbances. Small cell lung cancer commonly presents with paraneoplastic syndromes, and represent their own threats to aviation safety.

WAIVERS: Aircrew with small cell lung cancer are not considered waiverable in any stage due to the significant risk of development of CNS disease. Only those primary nonsmall cell lung cancers of less than 2 cms can be considered for wavier. Many of these tumors will be denied waivers(for example those patients with adenocarcinoma) as they represent a greater than acceptable risk for developing CNS metastasis. Tumors larger than 2 cms, or those with positive lymph nodes also carry a greater than acceptable risk of developing CNS metastasis, and are not appropriate for wavier. Aviators more than 3 years out from initial diagnosis, fully recovered from therapy and free of disease, may be considered favorably for waiver action.

INFORMATION REQUIRED: Complete AMS is required. Tumor Board recommendations, results of MEB (if done), and AFIP confirmation of the diagnosis are necessary. In addition, oncology consultation, chest x-ray, pulmonary functions testing, and MRI of the brain are required for initial waiver request.

FOLLOW-UP: No follow-up schedule is proven to improve survival. Aviators who have been waivered are at high risk for second primaries of the aero-digestive and urinary systems, and specific follow-up requirements will be depend upon the nature of the tumor, its stage, the treatment program, and the recommendations of the treating oncologist.

TREATMENT: Surgical treatment is the only current curative therapy for nonsmall cell lung cancer. Radiation therapy and chemotherapy is used in limited small cell lung cancer, with chemotherapy alone for extensive disease.

DISCUSSION: Lung cancer accounts for 19% of all cancer in men, compared to 11% in females. Overall, lung cancer has a 5-year survival rate of 9%; between 17-20% survive one year after diagnosis. Even those who have curative surgery for localized cancer of the lung and in whom all disease is confined to the lung without any spread to any lymph nodes have a 5-year survival rate of only 42% and a 10 year survival rate of 16-18%. The 5-year survival rate for resected Stage I carcinoma has been reported as 70%. However, most recurrences are distant suggesting that micrometastasis has already occurred by the time of diagnosis. The rate of cerebral metastasis for the varying types of lung carcinoma have been reported as ranging from 14-30%. Small cell lung cancer has a 15%, 3-year survival with limited disease, and less than 3% with extensive. Chest irradiation, used as therapy in small cell lung cancer, may result in the development of a second primary (most commonly nonsmall cell lung cancer) at the rate of 4.4%/year.

MALIGNANT MELANOMA (ICD9 172.9)

AEROMEDICAL CONCERNS: Failure to recognize early disease will compromise cure and result in the loss of the aviator. Advanced disease can affect many organ systems, especially the CNS, with obvious risks to aviation safety.

WAIVERS: Lesions that are less than 3 mm in depth without lymph node involvement are good candidates for waiver. Those lesions deeper than 3 mm, or that involve lymph nodes will not generally be waiverable, since the risk of CNS disease recurrence is greater than acceptable limits. Patients who have had melanoma of the uveal tract with enucleation of the orbit cannot be considered for waiver.

INFORMATION REQUIRED: Complete AMS is required with results of surgery, including whether or not lymph nodes were clinically involved and/or removed as well as the results of metastatic work-up. Histology and Breslow depth in millimeters must be confirmed by AFIP. Tumor Board report and MEB (if done) disposal are also mandatory. Clarks level description is not acceptable. Chest x-ray is required. MRI of the brain is required only if neurologic abnormalities are discovered.

FOLLOW-UP: Aviators must examine their excision site and skin monthly, for signs of new lesions. Flight surgeons must take an active role in educating the aviator on how to do this exam and what to look for. Quarterly evaluation by local FS directed at examination of the surgical site, the skin, lymph nodes, liver and neurologic exam. Chest x-ray should be done every 6-12 months. Additional studies may be directed by the subspecialist.

TREATMENT: Surgical excision of the primary lesion is the primary means of treatment. Lymph node dissection may play a role in improving survival in some stages, but should not be done sinply to increase the chance of wavier approval.

DISCUSSION: Patients with tumors too thin to obtain a Breslow depth (melanoma in situ) are considered cured provided the margins of the biopsy are clear of tumor. They should be reviewed regularly because of the propensity for the melanoma to recur at the site or elsewhere. The 10 year survival rate reported in one series is 98.5% at Breslow depth <0.75mm, 91.0% for tumors 0.76 to 1.49mm, 84.3% for tumors 1.50 to 2.99, and only 62.4% for those >3.00mm. However, another large series reported an occurrence rate of metastases at 4.8% in a mean of 3.6 years for patients with Breslow depth <0.76 mm. Tumors on the head, neck, trunk, hands and feet have a worse prognosis than those on the arms and legs. Histological regression in the primary is associated with a significantly higher rate of metastasis. Another series reported an occurrence of cerebral metastases in only 9% of over 600 cases and in these less than ¼ presented with symptoms ascribable to the brain metastasis. Not one had an incapacitating presentation without preceding, less severe symptoms. However, other studies report that brain metastasis from melanoma is particularly susceptible to hemorrhagic degeneration, producing sudden onset of headache and neurological difficulty. After recurrence, the 5-year survival rates have been reported as 55% after local recurrence, 51% after nodal involvement, and 20% after distant metastasis. Certain prognostic factors arguably improve or worsen survival. Some of those claimed to improve prognosis over that predicted by depth of invasion and lymph node status are: female sex and presentation on the extremity. Some claimed to worsen survival are: ulceration, male sex, and head, neck, trunk, hand, and foot sites.

NEUROLOGICAL TUMORS

AEROMEDICAL CONCERNS: Normal neurologic function is critical to aviation safety, and tumor disturbance may span the range of subtle loss of fine motor function to castastrophic seizure or loss of major function.

WAIVERS: Aircrew with tumors of the spinal cord may be granted a waiver provided there is no recurrence and any remaining neurological sequelae are acceptable 5 years after therapy. Waiver may be granted for tumors of the peripheral nervous system if there is no appreciable impairment of function. All tumors involving the brain or meninges, irrespective of therapeutic outcome, are permanently disqualifying. Waivers may be considered when: the tumor is clearly small, and benign; their is no risk of recurrence; and a neurological exam is completely normal. In general, the likelihood of waiver is inversely proportional to potential for tumor recurrence. Also see Pituitary Tumors APL and Acoustic Neuroma APL.

ICD9 Code	Condition
171.9	Malignant neoplasm of the peripheral nervous system
191.9	Malignant neoplasm of the brain
192.2	Malignant neoplasm of the spinal cord
215.9	Benign neoplasm of the peripheral nervous system
225.0	Benign neoplasm of the brain
225.3	Benign neoplasm of the spinal cord
225.4	Benign neoplasm of the spinal meninges

INFORMATION REQUIRED: Complete AMS is required. Tumor Board and MEB (if done) recommendations, and AFIP confirmation of the histology are required. Detailed neurologic exam by a neurologist is essential.

FOLLOW-UP: Work-up may vary upon the type and staging of the tumor, the organ infected, the treatment regimen, and is normally determined by the consulting Neurologist/Neurosurgeon.

TREATMENT: Complete surgical removal is the preferred means of therapy. A history of CNS radiation is incompatible with continued aviation duties..

DISCUSSION: The spectrum of neurologic tumors is broad. Terms such as "benign" mean little with tumors that, despite the lack of "invasive" potential, continue to grow and compress surrounding structures. The tremendous variation of neurologic tumors in their natural history, the lack of ability to "get clear margins", the recurrence potential even for "benign" tumors, and the multiple potential deficits therapy may induce and the criticality of an intact neurologic system for safe aviation makes clear guidance for each tumor type impossible. Fifteen thousand new cases of primary brain tumors and more than 4,000 new spinal cord tumors occur each year. Twenty to 40% of brain tumors are metastatic lesions from lung, breast, kidney, melanoma, and the gastrointestinal tract. Gliomas comprise 50% of all primary brain tumors, occur most commonly in the cerebrum, and most frequently between the ages of 40 to 74 years. Approximately 33% of all patients with malignant brain tumors experience unexpected and incapacitating seizures. Survival rates for malignant gliomas approach 20% after one year. Survival rates for other tumors range up to 90% but in most there is a greater than 10% chance of recurrence. Those tumors with the best prognosis (i.e., the least chance for subsequent seizure disorders or loss of neurologic function) are subtentorial, axial, and encapsulated. Those with the greatest chance of subsequent seizure disorder are supratentorial, extra-axial, and unencapsulated.

NON-HODGKIN'S LYMPHOMA (ICD9 202.8)

AEROMEDICAL CONCERNS: Early disease usually presents little risk to aviation, though advanced disease can cause dysfunction of multiple organ systems due to tumor invasion and bulk.

WAIVERS: Waivers are appropriate after successful treatment of aviators with malignant lymphoma, diffuse, large cell, especially stage I or II, or low grade stage I lymphomas. Cure of other types of lymphomas are not yet a reality (most low grade lymphomas), or involve therapy of such intensity (lymphoblastic, and Burkitts-type), that wavier is inappropriate.

INFORMATION REQUIRED: Complete AMS is required. Tumor Board and MEB (if done) recommendations, and AFIP confirmation of the histology is mandatory. Requests for waiver should include oncologist / hematologist consultation together with report of recent CT scans of the chest and abdomen. Bone marrow biopsy may be indicated. Experts in lymph node pathology, hematology, and radiology must be intimately involved to insure proper treatment, and correct information for waiver recommendation, if appropriate, is afforded the aviator.

FOLLOW-UP: Follow-up will vary and is normally determined by either the treating subspecialist or the Aeromedical Oncology Consultant.

TREATMENT: Ongoing treatment is not compatible with flying.

DISCUSSION: Each year, approximately 31,700 patients in the U.S. are diagnosed as having non-Hodgkin's lymphoma, and about 16,500 patients die of this disease. Extranodal presentation occurs in 20-30% of patients. Primary lymphoma of the stomach represents up to 10% of all gastric cancers; the presenting symptom is pain in 80% of cases and hemorrhage in 20%. The non-Hodgkin's lymphomas represent an extremely diverse group of malignancies. Current classification schemes have not yet incorporated advances in molecular biology for characterization, and, especially for T-cell lymphomas, are excessively complicated and diagnoses are often not reproducible among different pathologists. Pardoxically, the more aggressive tumors are the most curable, and the indolent lymphomas, though often characterized by years of symptom-free survival, are ultimately progressive and fatal.

OVARIAN CANCER (ICD9 183.0)

AEROMEDICAL CONCERNS: Abdominal enlargement secondary to ascites may cause discomfort with restraint harness. Even with advanced disease, however, ascites and pain may be the only prominent finding.

WAIVERS: Most patients present with advanced disease, and even with surgical debulking and chemotherapy, will relapse. Waiver would be appropriate for early stage 1A or B. Waiver may be considered for aviators with higher stage, with minimal disease rendered free of disease at surgery, and who have recovered from surgery and chemotherapy. Waiver is not required for benign ovarian tumor. (See Leiomyoma of the Uterus APL)

INFORMATION REQUIRED: Complete AMS is required. Tumor Board and MEB (if done) recommendations and AFIP confirmation of the histology are mandatory. The initial waiver request should include recent gynecology / oncology consultation, CT scan of the abdomen, retroperitoneum and pelvis and intravenous pyelogram. Negative tumor markers may also be helpful. The tumor markers, CA-125, AFP or βCG, if appropriate, should be obtained both pre- and post-operatively.

FOLLOW-UP: Determined by medical and gynecologic oncologists.

TREATMENT: Surgical debulking of tumor is critical. Post-operative chemotherapy appears to enhance the chance of remaining disease free in those patients with large tumors or intra-abdominal spread. Hormone replacement therapy after bilateral oophorectomy is acceptable.

DISCUSSION: There are 20,000 new cases of ovarian cancer diagnosed annually. A female born in the U.S. has about 1.4% chance of developing ovarian cancer within her lifetime. Almost 75% of ovarian tumors are benign. Of those with malignant disease, 80% will have metastases by the time of diagnosis and partly as a result of this, yearly mortality in ovarian cancer is approximately 65% of the incidence rate. Metastasis of breast or colonic carcinoma to the ovary is more common than primary carcinoma of the ovary. The 5-year survival of early ovarian carcinoma can reach 90%. CA-125 antigen assay is most useful in the detection of treatment failure and recurrence of epithelial ovarian cancer. AFP and βCG are useful in following response to therapy and recurrence of germ cell tumors that are antigen-positive, i.e., endodermal sinus tumor, embryonal carcinoma, and choriocarcinoma. Screening for ovarian carcinoma is currently not productive. Female aviators with a marked family history of ovarian cancer should consider innovative screening protocols, and prophylactic oophorectomy, though even this surgery does not absolutely eliminate the risk of developing this malignancy.

PITUITARY TUMORS (ICD9 194.3)

AEROMEDICAL CONCERNS: The major complications of pituitary tumors arise from enlargement. Hormonal hypersecretion may cause heat intolerance, diabetes mellitus, diabetes insipidus, hypercalciuria, hypothyroidism, nerve entrapment syndromes, hypertension, cardiomyopathy and spondylosis. Local pressure effects of the tumor can cause headache, cranial nerve palsies and visual defects.

WAIVERS: Waiver may be considered provided sequelae are within acceptable limits. Diabetes insipidus (either as a result of posterior pituitary tumor or following surgery or 90Yttrium implant) is not waiverable.

INFORMATION REQUIRED: Complete AMS is required. Tumor Board and MEB (if done) recommendations and AFIP confirmation of the histology (in those cases where surgical removal or biopsy has been carried out) are required. Endocrinology consultation and postoperative visual field studies are required for initial waiver.

FOLLOW-UP: Annual endocrinology consultation.

TREATMENT: Surgical removal of the tumor and insertion of 90Yttrium implant are both compatible with waiver if there are no complications or sequelae. Treatment with bromocriptine is also waiverable once the dosage is stable and the initial side effects have disappeared.

DISCUSSION: Cure rates of up to 80% for anterior pituitary tumors resulting in acromegaly can be expected with any of the treatment modalities. Prolactinomas have an even better success rate. There is no increased risk of seizure after normal trans-sphenoidal resection of a pituitary adenoma. Improvements in visual loss depends on the duration and extent of pretreatment visual loss but overall can be expected in 50% to 95% of patients.

PLASMA CELL DYSCRASIAS (ICD9 203.1)

AEROMEDICAL CONCERNS: Plasma cell dyscrasias encompass a diverse spectrum of diseases with varying clinical manifestations. Those that secrete the amyloid proteins result in diffuse organ damage due to these abnormal proteins. The "malignant" disease (multiple myeloma) infiltrate and crowd out bone marrow elements and suppress the immune system. Abnormal proteins can also result in intravascular sludging (Waldenstroms and Heavy Chain Disease), organ damage and immune suppression and infection.

WAIVERS: Most of these processes are progressive, incurable, not easily controlled, and are thus not candidates for waiver. Soft tissue plasmacytomas that are eliminated by treatment represent a rare type of this disorder that may be waivered. Benign Monoclonal Gammopathy may also be considered for waiver provided that the monoclonal spike comprises <2 g/dl of protein, there are fewer than 5% plasma cells in the bone marrow, the serum viscosity is normal, and there is no hematopoietic compromise or osteolytic lesions. Other conditions are not waiverable. These include amyloidosis associated with plasma dyscrasias, heavy chain disease, cold agglutinin disease and cryoglobulinemia.

INFORMATION REQUIRED: Complete AMS is required. Oncology/hematology review is necessary along with MEB (if done) and Tumor Board recommendations and AFIP confirmation of diagnosis. An extensive restaging post-treatment to insure all of the organs/organ systems that may be affected by the process in question are uninvolved must be included in initial waiver packet.

FOLLOW-UP: Appropriate follow-up will be established by the treating subspecialist. Those aviators granted waiver must anticipate evaluation every three months for life.

TREATMENT: Treatment will be determined by the type of plasma cell dyscrasia. Continuing therapy is not compatible with waiver.

DISCUSSION: The risks of benign monoclonal gammopathy are of progression to multiple myeloma and of increased serum viscosity leading to neurological impairment. The median survival for patients with gamma heavy chain disease is 12 months. Neuropathic involvement is insidious and, although usually a condition of older patients, has been reported in those as young as 23. Alpha heavy chain disease is associated with progressive and fatal abdominal lymphoma. There is a risk of sudden hemolysis in cold agglutinin disease and a risk of sudden vascular accidents and neurological dysfunction in cases of cryoglobulinemia. Up to 60% of patients with myeloma present with skeletal pain while anorexia and depression associated with hypercalcemia are present in 30%. About 10% present with paraplegia while others exhibit mental impairment or visual disturbance resulting from hyperviscosity. Amyloidosis is encountered in 5-10% of myeloma patients. Two year survival ranges from 9-76% depending on the stage of the disease at the time of diagnosis.

PROSTATE CANCER (ICD9 185)

AEROMEDICAL CONCERNS: Prostate cancer may be found during rectal-prostate exam during FDME, and is increasingly being found during work-up for elevated PSA. It may also initially present with urinary obstruction due to local disease, or as bone pain from metastatic disease.

WAIVERS: Aviation personnel without residual side effects from surgery, radiation, medication, or the disease itself are appropriate candidates for waiver. PSA's must fall to normal within one week of surgery, or within one month of Radiation Therapy. Aviation personnel with residual elevated PSA or positive radiographic findings (bone scan with plain film radiographs of abnormalities), or with other evidence of metastasis are considered for waiver on a case-by-case basis.

INFORMATION REQUIRED: Complete AMS is required. Confirmation of histology by AFIP and Tumor Board report and (if done) MEB recommendations are required for initial consideration of waiver. Urological consultation with renal function testing to include measurement of BUN and creatinine, IVP and bone scan or MRI of pelvis and abdomen are also necessary. Prostate-specific antigen (PSA) should be obtained preoperatively and postoperatively. Any complications resulting from surgery, i.e., incontinence, anesthesia, or DVT/PE must also be addressed for potential disqualification. The wearing of diapers or intermittent self-catheterization is not compatible with full duty in military aviation personnel but may be occasionally waivered in civilian aircrew members.

FOLLOW-UP: Prostate cancer most commonly recurs in local lymph nodes or bone. Follow-up for aviation personnel after potentially curative surgery or Radiation Therapy should include History (including questioning about any bone pain), Physical Exam (including prostate exam) every three months and PSA every three months. The first abnormal PSA will be rechecked before additional testing. Other abnormalities discovered will result in grounding and will be pursued with radiographic imaging techniques and additional testing in consultation with subspecialty physicians.

TREATMENT: While both surgery and radiation therapy may cure localized prostate cancer, the side effects and ability to determine true extent of disease differ with each of these therapies, and these differences will impact on future waiver decisions. Chemotherapy or hormonal therapy have no place in the setting of disease treated with curative intent.

DISCUSSION: Carcinoma of the prostate accounts for nearly 4% of all cancers, exhibiting increasing frequency with age and a higher incidence in black populations. Poor testicular function, as measured by a low plasma testosterone and a high level of luteinizing hormone, is associated with early death from the disease. The 5-year survival following diagnosis at the earliest stage of true invasive carcinoma is 77%. Younger individuals tend to have poorly differentiated tumors and do less well than older patients. PSA has been proven to be an effective tumor marker for prostate cancer. It has correlated with clinical stage related to tumor volume, and is useful for monitoring response to treatment and recurrence. Markers may be temporarily elevated after prostatic surgery, cystoscopy, catheterization, or needle biopsy. The current approach to elevated PSA and prostate cancer is extremely controversial. Biopsy of a prostate nodule is usually indicated, but the appropriate work-up of an elevated PSA is less clear. Even with a positive biopsy, the decision to operate, radiate, or watch-and-wait is a personal one and the options need to be discussed with each patient on an individual basis by subspecialists.

SKIN CANCERS (OTHER) (ICD9 173.0)

AEROMEDICAL CONCERNS: The lesion may be irritated by the wearing of protective equipment or, if it is on the face, may prevent adequate mask seal.

WAIVERS: Waiver is not required for the adequately treated initial occurrence of basal cell carcinoma. Waiver may be required if grafting has been necessary once the graft has settled adequately to allow wearing of flying clothing or equipment and provided there is no disability. Waiver of squamous cell carcinoma is considered on a case-by-case basis depending upon the stage and mode of therapy as well as complications to treatment.

INFORMATION REQUIRED: Complete AMS is required for recurrent basal and initial squamous cell carcinoma. Tumor Board and MEB recommendations are unnecessary but pathology report with histology is required.

FOLLOW-UP: Requirements may vary based upon the nature of the tumor, its stage and the treatment program.

TREATMENT: The aircrew member should be grounded during treatment.

DISCUSSION: Basal and squamous cell carcinomas are the most common types of malignant skin disease. Actinic keratoses (solar keratoses) are extremely common, but only a small fraction progress to frank cancer. The incidence of metastasis varies. The incidence of metastatic basal cell carcinoma is reported as less than 0.1%. Primary cutaneous squamous cell carcinomas have a secondary rate of 3%, compared to 11% with mucocutaneous lesions and 10-30% with tumors secondary to inflammatory and degenerative processes. Metastases tend to be in the regional lymph nodes.

TESTICULAR TUMORS (ICD9 186.9)

AEROMEDICAL CONCERNS: Bulky disease may cause varying discomfort, especially back pain. Pulmonary and rare CNS metastasis may cause hypoxia and seizures, respectively, though these are signs of advanced disease. **NOTE: THOSE AVIATORS TREATED WITH BLEOMYCIN ARE CURRENTLY PROHIBITED FROM EVERY BEING EXPOSED TO HIGH (OVER 40% FIO2) CONCENTRATIONS OF OXYGEN. THIS PRECLUDES CHAMBER RIDES OR OPERATIONS IN AIRCRAFT WITH OXYGEN USE AS A PART OF THE MISSION.**

WAIVERS: Waivers are appropriate for those aviators rendered free of disease, and recovered from surgery, chemo- and/or radiotherapy. Note: The MANDATORY frequent follow-up in the two to three year period after treatment may significantly effect deployment, thus is viewed negatively in some waiver considerations.

INFORMATION REQUIRED: Complete AMS is required. Histology and staging confirmed by AFIP and Tumor Board report, and (if done) MEB recommendations are required. Confirmation of absence of tumor markers and MRI scan report. If Bleomycin-based chemotherapy has been used, a complete set of pulmonary functions testing is required as well.

FOLLOW-UP: Non-seminomatous germ cell tumors (NSGCT) need to be followed every month for the first year, every two months for the second year, and every three months for the third year, and every 6 months thereafter. Alphafeto protein and Beta HCG are required at these visits. CT scans need to be done every three months for the first 2 years, then less frequently thereafter. Follow-up of seminoma mirrors that of NSGCT.

TREATMENT: Treatment involves surgical excision of the primary tumor, and extensive surgery may be required with NSGCT for residual masses after chemotherapy. Chemotherapy is used for residual disease in NSGCT. Radiotherapy is used adjuvantly, and/or chemotherapy, for extensive disease in seminoma. Treatment with Bleomycin-based chemotherapy may result in permanent termination of flight duties as noted above. Testicular tumors represent one of the few curable solid tumors. The care of these patients, however, requires absolute expertise to maximize this likelihood of cure. Aviators with these tumors must receive care at institutions skilled in the multidisciplinary approach required for these tumors.

DISCUSSION: Testicular tumors comprise 1% of all tumors in men and 0.1% of all cancer deaths. Seminoma (40% of the total) has a peak incidence at 30 years of age. The results of treatment, particularly for seminomas, are impressive. In Stage 1 tumors, orchidectomy alone leads to relapse in 26% in 2 years (the vast majority occurring in the first 9 months) but orchidectomy with retroperitoneal radiotherapy or dissection gives a relapse rate of 5-16% at 2 years, and approaches 100% survival at 5 years after chemotherapeutic salvage of those who relapse. Overall relapses after 2 years are uncommon. On the other hand, non-seminomatous tumors (embryonal carcinoma, teratocarcinoma, teratoma) have a peak incidence at 20 years. Approximately 33% are Stage 1 at presentation (disease confined to the testis). The risk of relapse of non-seminomatous tumors after treatment depends on stage (14% when limited to the body of the testis, 47% when extending through to the tunica albuginea), the type (teratoma <teratocarcinoma <embryonal carcinoma) and whether or not there is vascular/lymphatic invasion.

THYROID CARCINOMA (ICD9 193)

AEROMEDICAL CONCERNS: There is a substantial risk of hypothyroidism after surgical treatment. Local invasion and/or surgical damage may rarely result in injury to the parathyroid glands and/or recurrent laryngeal nerves.

WAIVERS: Waiver will be considered after treatment of papillary or follicular carcinoma of the thyroid. Medullary or anaplastic thyroid tumors are not normally considered for waiver recommendation due to the poorer prognoses of these tumors.

INFORMATION REQUIRED: Complete AMS is required. Tumor Board and (if done) MEB recommendations and AFIP confirmation of the histology is mandatory. Confirmation of euthyroid status and evidence of TSH suppression are also needed for initial waiver action.

FOLLOW-UP: Continuation of waiver requires annual submission of internal medicine/endocrinology consultation to include complete thyroid function testing.

TREATMENT: Surgery is the preferred form of therapy. Some authorities prefer to use radioiodine treatment after surgery.

DISCUSSION: Thyroid cancers are for the most part characterized by slow growth, delayed symptoms, and low morbidity and mortality. Thyroid nodules are quite common in our population, occurring in about 4%. Fortunately only few of these nodules prove to be malignant at time of biopsy. Generally, men over 40 years old and women over 50 have a worse prognosis. Another poor prognosticator is a primary tumor over 5 cm. Papillary carcinoma is slow growing, spreading locally to the strap muscles of the neck, lymph nodes and occasionally trachea but it may metastasize to lungs or bone. Some 20% are said to be multicentric. Overall 5/10 year survivals of better than 95 -90% can be achieved. Because the growth rate is slow and there is no particular trend to early recurrence (recurrence rates from 10-24% have been reported); patients should be able to return to flying as soon as they are euthyroid. Medullary carcinoma is often associated with the MEN II syndromes [for more detail click here] and routine screening should be conducted for the early detection of these syndromes. Follicular carcinoma tends to metastasize to lungs and bone rather than infiltrate locally. A major determinant of outcome is the extent of microinvasion. The usual treatment of choice is total thyroidectomy because there is an 87.5% chance of the opposite lobe containing microscopic follicular carcinoma. For patients treated with total thyroidectomy and radioactive iodine, the death rate at 5 years is quoted as 11%, rising to 30% when treatment is by incomplete thyroidectomy alone. This can be largely explained by the fact that only total thyroidectomy allows subsequent accurate localization and treatment of distant metastases by I-131. Medullary carcinoma and anaplastic carcinomas have a 10 year survival of 50 and essentially 00% respectively.

MEN II Syndromes

Multiple endocrine neoplasia (MEN) syndromes arise from Amine Precursor, Uptake and Decarboxylation (APUD) neuroendocrine cells, and are inherited as an autosmal dominant trait.

MEN 2a Syndrome
MEN type 2a involves patients with virtually a 100% incidence of medullary thyroid carcinoma (MTC), a 50% incidence of clinically significant, usually bilateral pheochromocytomas and a lesser incidence of parathyroid adenomas with associated hyperparathyroidism.

MEN 2b Syndrome
Men type 2b patients also have 100% incidence of MTC and frequent pheochromocytomas. They have a characteristic physical appearance due to multiple neural defects including mucosal neuromas of the eyelids, lips, and tongue. These neural abnormalities within the gastrointestinal tract often lead to diarrhea, constipation or megacolon. Patients with MEN 2b seldom have hyperparathyroidism.

UTERINE CANCER (ICD9 179)

AEROMEDICAL CONCERNS: Some cases develop anemia but there are otherwise very few specific aeromedical concerns in carcinoma of the uterus.

WAIVERS: Waiver may be considered 3 months after hysterectomy provided that there has been a full recovery and there is no indication of metastasis. Waiver may be requested 2 years after treatment of disseminated disease provided there is no evidence of sequelae or recurrence.

INFORMATION REQUIRED: Complete AMS is required. Tumor Board and MEB (if done) recommendations and AFIP confirmation of the histology are required. Initial waiver request should be accompanied by gynecology/oncology opinion, together with reports of the intravenous pyelogram and CT scan of the abdomen, retroperitoneum and pelvis.

FOLLOW-UP: Annual gynecology/oncology consultation are required**.**

TREATMENT: Aircrew are grounded during treatment and during the immediate postoperative period.

DISCUSSION: Endometrial carcinoma is the most common of the cancers of the female genital tract in the U.S.. Thirty-four thousand new cases are diagnosed annually, but an effective screening program has reduced the death rate to 3,000 women annually. The median age at onset is 61, however, 2.9% - 14.4% of patients with endometrial cancer are less than 40 years of age. The earliest truly invasive carcinoma of the endometrium has a cure rate of 90%. Spread is usually slow and recurrence is usually local for long periods of time. However, recurrence for all stages is unpredictable. The incidence of leiomyosarcoma arising in uterine fibroids has been reported to be 0.1-0.6% with a 5-year survival rate of 31%.

MEDICATION WAIVERS

INTRODUCTION

AEROMEDICAL CONCERNS: 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) Medication and/or the underlying medical condition is compatible with aviation duty, (2) Medication is effective and essential to treatment, (3) Aircrew member is free of aeromedically significant side effects after a reasonable observation period.

WAIVERS: The Commander, U.S. Army Aeromedical Center, 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 of its safe use in the aviation environment exists. New medications are reviewed constantly and waiver requests are considered on a case- by-case basis but often take a great deal of time. Flight surgeons are encouraged to use the medications on this list to avoid lengthy 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 or violate the intent of AR 40-8 , Temporary Flying Restrictions Due to Exogenous Factors, August 1976, when a flight surgeon is not available. These are approved for acute non-disqualifying conditio ns and do not require a waiver. Use in accordance with standard prescribing practices.

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 for 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 only 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. Herbal Preparations/Supplements: The majority 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. Some preparations may be used under the guidance of the flight surgeon. See the Herbals/Dietary Supplements APL (TBP).

INFORMATION REQUIRED:

- AMS listing:
  - Dosage
  - Frequency of use
  - Any side effects
  - Complete summary of the aircrew-members medical condition.
- If a new drug 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. Bear in mind that all FS/APAs can be contributors to policy change.

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.

REFERENCE:

Physicians Desk Reference, 56th Edition, Medical Economics, Montvale, NJ, 2002.

American Hospital Formulary Service Drug Information 2001, American Society of Health System Pharmacists, Bethesda, MD, 2001.

CLASS 1: OVER-THE-COUNTER MEDICATIONS

AEROMEDICAL CONCERNS: Self-medication in anyone on flight status is prohibited by AR 40-8 . 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 often giveonly sketchy information on side effects.

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. 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, Rolaids, Mylanta, Maalox, Gaviscon, etc.) When used occasionally or infrequently. Chronic use is Class 3.
Artificial Tears: Saline or other lubricating solution only. Visine or other vasoconstrictor agents are prohibited for aviation duty.
Aspirin/Acetaminophen: When used infrequently or in low dosage.
Cough Syrup Or Cough Lozenges: [Guaifenesin (Robitussin plain)]. Many OTC cough syrups contain sedating antihistamines or Dextromethorphan (DM) and are prohibited for aviation duty.
Decongestant: Pseudoephedrine (Sudafed). When used for mild nasal congestion in the presence of normal ventilation of the sinuses, and middle ears (normal valsalva).
Pepto Bismol: If used for minor diarrhea conditions and free of side effects for 24 hours.
Multiple Vitamins: When used in normal supplemental doses. Mega-dose prescriptions or individual vitamin preparations are prohibited.
Nasal Sprays: Saline nasal sprays are acceptable without restriction. Phenylephrine HCL (Neosynephrine) may be used for a maximum of 3 days. Long-acting nasal sprays [oxymetazoline (Afrin)] are restricted to no more than 3 days. Use of neosynephrine 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. Use requires the aircrew member to be free of side effects.
Psyllium Mucilloid: (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. 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: NO WAIVER ACTION REQUIRED

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

ANTIHISTAMINES:
FEXOFENADINE (Allegra), LORATADINE (Claritin). If used for chronic or recurrent allergic rhinitis, a waiver is required. (See Class 3) Short term use is permissible without waiver. All other anti- histamines are grounding (See Class 4).

ANTIMICROBIALS, ANTIFUNGALS, ANTIVIRALS:
ACYCLOVIR (Zovirax) VALCYCLOVIR (Valtrex), FAMCYCLOVIR (Famvir), AUGMENTIN (Amoxicillin), BACTRIM/SEPTRA, CEPHALOSPORINS, CHLOROQUINE (Aralen) or CHLOROQUINE/PRIMAQUINE, CLINDAMYCIN (remember Pseudomembranous colitis), ERYTHROMYCINS to include Azithromycin and Clarithromycin, ETHAMBUTOL HYDROCHLORIDE (Myambutol) (monitor serum uric acid during treatment), FLUCONAZOLE (Diflucan), METRONIDAZOLE (Flagyl), NITROFURANTOIN (Macrodantin) (watch for pneumonitis or peripheral neuropathy), PENICILLINS, QUINOLONES (many potential drug interactions), RIFAMPIN (Rifadin), TETRACYCLINES, DOXYCYCLINE (Vibramycin) for prophylaxis - includes malaria or leptospirosis) [(MINOCYCLINE (Minocin) is Class 4. Many potential drug interactions.)] Short term use does not require a waiver. A minimum of 24 hours of observation to ensure the lack of side effects and the overall general health of the aviator should be considered prior to return to flight status. For long term use refer to Class 2B.

ANTI-MOTION SICKNESS AGENTS:
PROMETHAZINE/EPHEDRINE, or SCOPOLAMINE/DEXTROAMPHETAMINE (alternative, monitor intraocular pressure), or Transderm Scopolamine (alternative, monitor intraocular pressure and wash hands after application). When used in accordance with approved Motion Sickness Protocols (See Motion Sickness APL). Other use is disqualifying. (See Class 4).

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 1or Class 3.

HOROMONAL PREPARATIONS:
ESTROGEN/PROGESTERONE preparations when used solely for contraception or replacement following menopause or hysterectomy. (Class 3 for other conditions). No other information required. Other hormonal drugs are Class 3.

PRE-DEPLOYMENT REST OR SUSTAINED OPERATIONS AGENTS:
Safe use is assured only following a negative test dose administration and careful followup to ensure the continued absence of side effects. Anyone with suspicious symptoms should be immediately grounded. Use of these agents should be under the direct supervision of the supporting flight surgeon following pre-established guidelines approved by local commanders.

Rest Agents:
Class 2A when prescribed and closely monitored by the unit flight surgeon. Do not mix with alcohol.
TEMAZEPAM (Restoril) - May perform crew duties 12 hours after use.
TRIAZOLAM (Halcion) - May perform crew duties 9 hours after use. (NOTE:Memory loss with associated alcohol use and night terrors have been reported)
ZOLPIDEM (Ambien) or ZALEPLON (Sonata) - May perform crew duties 8 hours after use.

Stimulants:
Class 2A when used in support of sustained operations.

DEXEDRINE: 5 mg every four hours.

PROPHYLAXIS: Class 2A when used for prophylaxis. Must be prescribed by a flight surgeon or under a protocol reviewed by the flight surgeon.

Abstinence Assistance: Following Track II or III treatment for alcohol abuse/dependence, DISULFIRAM (Antabuse) may be continued for up to 1 year as a Class 2A medication. All other components of an alcohol abuse/dependence waiver must also be completed. Use of DISULFIRAM requires documentation of LFTs, every 6 months while on therapy. Additionally, a baseline LFT must be obtained prior to initiating therapy. VHA/DOD guidelines recommend monitoring monthly for the first three months of therapy and then every 3 months thereafter for the first year. This is left to the discretion of 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. Local resistance specific drug regimens may also 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. 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 . (See Malaria policy letter)

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 with ISONIAZID is an acceptable prophylaxis, unless INH resistance is likely. The treated aviator mustalso be followed in a Tuberculosis Surveillance Program. See Antimicrobials, Antifungals and Antivirals for documentation of use of ISONIAZID.

SMOKING CESSATION AIDS:

NICOTINE GUM, NICOTINE PATCH, NICOTINE INHALER (Use of any tobacco with initial patch may cause nicotine toxicity). Must be enrolled in a smoking cessation program, under supervision by the program director or designated representative, and remain abstinate from any tobacco use. Requires initial grounding of 72 hours and if tolerating treatment well, may be returned to flying duty. Effectiveness of smoking cessation aids without participation in an ongoing support program is minimal to ineffective. (See Smoking Cessation APL)
ZYBAN: See Smoking Cessation APL.

TOPICAL PREPARATIONS:

Topical preparations are generally Class 2A due to the minimal systemic absorption of most topical treatments. 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: INFORMATION ONLY , CHRONIC USE

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 period of observation of at least 24 hours.

WAIVERS: Use of these drugs requires they be coded for Information Only. No waiver is required unless the underlying medical condition necessitates it.

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/Nonallergic Rhinitis APL)

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 - Ipatropium 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.

Cromolyn sodium (Nasalcrom)- This is effective, but requires frequent (qid) dosing.

ANTI-HYPERLIPIDEMICS: (See Hyperlipidemia/Hypercholesterolemia APL)

HMG CoA Reductase Inhibitors (Statins): LOVASTATIN, PRAVASTATIN, SIMVASTATIN, ATROVASTATIN, and FLUVASTATIN. [Liver Function tests (LFTs) 6- 12 weeks after the start of therapy and then every 6 months thereafter, CPK every 6 months and Lipid profile every 6 months].

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).

Nicotinic Acid: NIACIN, NIASPAN. Serum glucose and uric acid every 6 months. LFTs every 6-12 weeks for the first year and then every 6 months thereafter.

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.

NON-STEROIDAL ANTI-INFLAMMATORY AGENTS:
Chronic use of any NSAID requires a measurement of BUN and Creatinine to be completed 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. Persistent upper GI complaints necessitate grounding and upper GI evaluation for possible GI toxicity.

Acetic acids: Diclofenac (Voltaren), Indomethacin (Indocin), Sulindac (Clinoril), Tolmentin (Tolectin)

COX-2s : Celecoxib (Celebrex), Rofecoxib (VIOXX)

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.

CLASS 3: CHRONIC USE REQUIRING WAIVER

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 waiverable upon complete presentation to ACAP 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 the Consultant, Aeromedical Activity.

ALLERGIC RHINITIS AGENTS: (See Allergic/Nonallergic Rhinitis APL) When used chronically and recurrently for allergic rhinitis, they are considered Class 3.

> **Antihistamines:** Fexofenadine (Allegra), and Loratadine (Claritin), (all other antihistamines are Class 4 [non-waiverable] this includes Cetirizine (Zyrtec)).

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.

> **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.
> **Angiotensin II Receptor Blockers:** LOSARTAN (Cozaar), Valsartan (Diovan), Irbesatan (Avapro), Candarsartan (Atacand). ACE and ARB II in Combination with approved diuretics may be used.
> **Alpha Blockers:** PRAZOSIN (Minipress), DOXAZOSIN (Cardura), TERAZOSIN (Hytrin).
> **Beta Blockers:** ATC PERSONNEL ONLY- ATENOLOL (Tenormin), METOPROLOL (Lopresor), PROPRANOLOL (Inderal). These are considered Class 4 medication for all other aircrew.
> **Calcium Channel Blockers:** AMLODIPINE (Norvasc) can be used with waiver in any aircrew member. A**TC PERSONNEL ONLY** - VERAPAMIL (Calan), NIFEDIPINE (Procardia), DILTIAZEM (Catapres). These are considered Class 4 medications for all other aircrew.
> **Clonidine: ATC PERSONNEL ONLY** – This is considered Class 4 medication for all other aviation classes.
> **Diuretics:** Thiazide, Potassium-sparing, and combinations. All LOOP DIURETICS are Class 4 medications and will not be waived. 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: (See Glaucoma APL)
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 Maleate (Timoptic), Dorzolamide (Trusopt), Latanoprost (Xalatan).

GI MEDICATIONS:
All antacids (chronic use) and medications listed below are Class 3 except as noted. No additional requirements for a waiver other than the complete evaluation of the underlying condition and documentation of medication efficacy.

> **Antacids:** Chronic use is Class 3. Occasional or infrequent use is Class 1. Check electrolytes when used chronically.
> **H2 Blockers:** 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 is DNIF is required to ensure the absence of any significant side effect.
Proton Pump Inhibitor: Omeprazole (Prilosec), Lansoprazole (Prevacid), Pantoprazole (Protonix), Rabeprazole (Acifex), and Esomeprazole (Nexium).**Pepto Bismol:** Class 2A for diarrheal prophylaxis.
Loperamide (Imodium): Class 2A for treatment of minor diarrhea if medical condition is not a factor and no side effects for 24 hours.
Motility Enhancing Agents: Class 4, not waiverable. METOCLOPRAMIDE (Reglan).
Sucralfate (Carafate): Class 2A provided underlying condition does not require waiver.

HORMONAL PREPARATIONS: Class 3 medications unless specified otherwise below. Chronic use of any systemic steroid 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 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.
Botulinim Toxin
Desensitization Therapy/Injections: must be grounded for 12 hours (See AR 40-8).
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): Waiverable for class 2F, 3, and 4. (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 (Sereve nt), Bitolterol (Tornalate), Pibuterol (Maxair), Isoproterenol (Isuprel), and Fromoterol (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: MANDATORY DISQUALIFYING MEDICATIONS

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 (AR 40-8 , Temporary Flying Restrictions Due to Exogenous Factors, paragraph 4a, August 1976) 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: Require 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: Waiver is not recommended.
ANTI-ARRHYTHMICS: Waiver is not recommended.
ANTI-DEPRESSANTS: Waiver is not recommended.
ANTI-MIGRAINE AGENTS: Waiver is not recommended.
ANTI-MOTION SICKNESS AGENTS: Temporary use is approved when used in accordance with approved Motion Sickness Protocol. Chronic use is not waiverable.
ANTI-PSYCHOTICS: Waiver is not recommended.
ANTI-VERTIGO AGENTS: Waiver is not recommended.
ANTI-CONVULSIVES: Waiver is not recommended.
ANTI-HISTAMINES: Cetirizine (Zyrtec). Waiver is not recommended for this medication; see other medication policy letters and Allergic/Nonallergic Rhinitis APL for acceptable medications.
BETA BLOCKERS: Waiverable (Class 3) for ATC personnel. Waiver is not recommended for all other classes.
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: Waiverable (Class 3) for ATC personnel. Waiver is not recommended for all other classes with exception of Norvasc which may be approved for all other classes.
CLONIDINE: Waiverable (Class 3) for ATC personnel. Waiver is not recommended for all other classes.
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), Glimerpiride (Amaryl). All of these agents are waiverable (Class 3) for Classes 2F, 3, and 4. Waiver is not recommended for all other classes.
HYPNOTICS: Waiver is not recommended. Temazepam (Restoril), Zolpidem (Ambien), Zaleplon (Sonata), and Triazolam (Halcion) may be used for pre-deployment rest only. This is not approved for manipulation of work/rest cycle or as a sleep aide during normal operations.
INSULIN: Waiver is not recommended.
ISOTRETINOIN: (Accutane) 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.
LOOP DIURETICS: Waiver is not recommended.
SLEEPING AIDS: Requires 24 hours of restriction after use. (See Predeployment drugs).
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

MISCELLANEOUS WAIVERS

ALLERGIC REACTIONS TO INSECT BITES OR STINGS (ICD9 989.5)

AEROMEDICAL CONCERNS: Anaphylactic reactions to insect bites or stings may cause symptoms ranging from just mild local reactions to more severe reactions, i.e., generalized hives, angioedema, shortness of breath, wheezing, cardiac arrhythmias, and even death. Acute anaphylactic reactions may cause significant incapacitation within as little as 3 - 5 minutes. Although avoidance procedures and the availability of personal anaphylactic kits help to minimize the possibility of an acute reaction, deployment to field sites may place such individuals in significant jeopardy of health and cause mission delay or even mission failure.

WAIVERS: Any history of generalized allergic reaction is disqualifying and requires waiver action. Waiver recommendations primarily rest upon the severity of previous reactions coupled with the inherent risk of re-exposure. Immunotherapy is waiverable, when asymptomatic, and is also the preferred means of therapy for severe reactions. Initial flight applicants will only be recommended for exception to policy when they have completed a course of desensitization and have no reaction to a challenge dose.

INFORMATION REQUIRED: A thorough summary of all allergy history and symptoms along with allergy consultation are required. Medical records of previous treatments may also be required.

FOLLOW-UP: None required unless an anaphylactic reaction recurs.

TREATMENT: Avoidance procedure and anaphylactic treatment kits, when immediately available, may be waivered for those individuals with mild generalized allergic reactions. Desensitization therapy may also be waivered.

DISCUSSION: Following an initial anaphylactic reaction to an insect sting, the likelihood of a second anaphylactic reaction is 28 - 74 % (depending upon the study), and is unrelated to the time interval since the initial sting reaction. Traditional evaluations of susceptibility to allergic reactions, i.e., IgE, IgG4, skin venom tests are of little help in predicting the severity or likelihood of this second reaction. Too often the risk of a potentially lethal secondary reaction is minimized or completely ignored. Avoidance procedures and anaphylactic kits are generally of minimal benefit in severe anaphylactic reactions. Immunotherapy can reduce the risk of subsequent reaction from about 60% to less than 5%.

ANTHROPOMETRY (ICD 9 M700)

AEROMEDICAL CONCERNS: Individuals with short sitting height may not be able to see over the instrument panel. With short leg length they may be unable to apply the full range to the foot pedals with sufficient force. With short arm length they may be unable to reach crucial instruments or circuit breakers. Individuals with too long a sitting height often sit in hunched positions or must tilt their head forward to avoid the cabin ceiling; this reduces their range of vision, increases fatigue during long missions, and puts them at greater risk of significant spinal injury during heavy G-loading, e.g., ejection or crash. Excessive leg length, normally present in those with excessive sitting height, may interfere with full range of motion of the foot pedals and increased discomfort. Any combination of the above may exceed the optimal safety envelope developed during the aircraft's design and development as well as become uncomfortable enough to be distracting during flight.

WAIVERS: Waivers for failure of anthropometric standards for rated personnel are usually recommended provided they have demonstrated full adaptation to the designated aircraft. Waivers may include specific aircraft restrictions. Rated aviation personnel with greater then 95 cm sitting height are restricted from the OH-58. Exceptions to policy for initial flight applicants may be considered if a full cockpit evaluation has been conducted IAW established USAAMA and USAAVNC guidelines. Air traffic controllers require no anthropometric measurement.

INFORMATION REQUIRED: Complete anthropometric measurements in centimeters with tenth of a centimeter accuracy are required in Block 73 of SF 88. These may be repeated under the direct supervision of the flight surgeon. The average of three such measurements may be submitted for waiver action, if required. In-cockpit evaluations of individuals are best performed in cooperation with the unit's instructor pilot or standardization pilot and the flight surgeon. These evaluations should be performed under various conditions, to include use of chemical gear, full flight and field gear, armor panels in place, night vision goggles (NVGs), etc. Written results of these evaluations should be submitted with the waiver request.

FOLLOW-UP: Additional in-cockpit evaluations are required before transition to new aircraft.

DISCUSSION: The cockpits of most aircraft are developed using measurements based upon a normal distribution curve. On several aircraft, the seating is either not adjustable or has limited adjustability, therefore making this distribution curve even narrower. Exception to policy for anthropometric failures requires testing which has been non-standardized across the country. While most of these evaluations were done in the UH-1, this aircraft is being phased out of the training inventory and, thus is obsolete. As new anthropometric standards are developed for these newer aircraft, modifications to the existing standards will be developed.

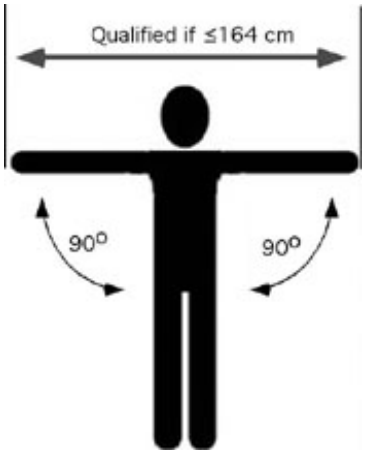
Crotch Height (Leg Length) - The subject must stand completely erect against a wall, heels together, weight evenly distributed, and knees locked. The measurement is taken parallel with the wall from the floor to a point where light contact is made with the perineum in the midline.

Total Arm Reach - The subject must stand erect against a wall, arms outstretched at a 90 degree angle and parallel with the wall. The elbows must be locked. The fingertips of one hand must be in contact with the adjacent wall in the corner of the room. The horizontal distance between fingertips is recorded.

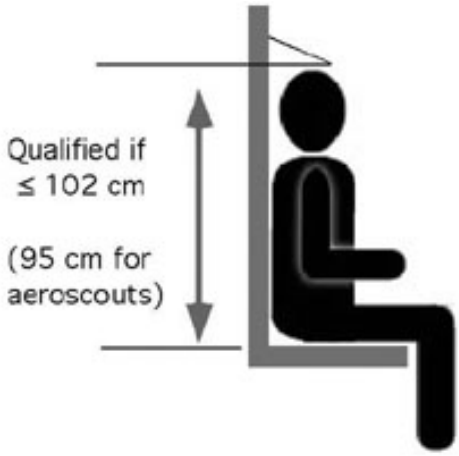
Sitting Height - The subject must sit on a hard, flat surface, facing forward, feet flat on the floor, with buttocks, shoulders, and back of head against the wall. Using a right angle on the head, the distance between the sitting surface and the top of the head is recorded in centimeters.

Measurement	Class 1/1A/2/2F *Qualified if:*	OH-58 Pilot or Aeroscout - *Qualified if*
CROTCH HEIGHT	≥ 75.0 cm.	≥ 75.0 cm.
TOTAL ARM REACH	≥ 164.0 cm.	≥ 164.0 cm.
SITTING HEIGHT	≤ 102.0 cm.	≤ 95.0 cm.

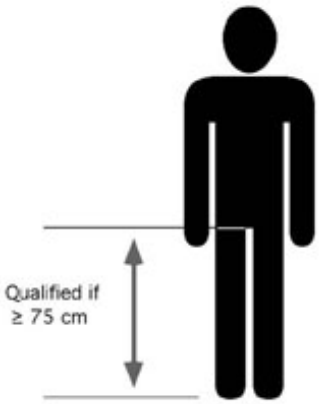
Anthropometric Diagrams



TOTAL ARM REACH—The aviator candidate must stand erect against a wall, arms outstretched at a 90 degree angle and parallel with the wall. The elbows must be locked with the fingertips of one hand in contact with the adjacent wall in a corner of that room. The horizontal distance between fingertips is recorded in centimeters.



SITTING HEIGHT—The aviator candidate must sit on a hard flat surface, facing outward, feet flat on the floor, with the buttocks, shoulders, and back of head against the wall. Using a straight angle ruler on the head, the distance between the sitting surface and the top of the head is recorded in centimeters.



CROTCH HEIGHT—The aviator candidate must stand completely erect against a wall in bare feet, heels together, weight evenly distributed, and knees locked. The measurement is taken parallel with the wall fromk the floor to a point where light contact is made with the perineum in the midline. Results are recorded in centimeters.

COLD INJURIES (ICD9 991)

AEROMEDICAL CONCERNS: Previous cold injuries including frostbite, chilblain, immersion foot, or trench foot may lead to residual extremity damage resulting in extensive tissue and vascular damage, nerve injury, leaving the extremity sensitive to cold re-exposure (e.g., Raynaud-like phenomena). Resulting numbness or pain may interfere with proper use of controls or may lead to distraction in flight.

WAIVERS: Residual damage manifesting as deep-seated ache, paresthesia, hyperhidrosis, easily traumatized skin, cyanosis, amputation of any digit, or ankylosis resulting from a previous cold injury requires waiver action. Waiver may be granted provided the residual injury is limited in nature, will not interfere with control operation, and the aircrew member is not restricted from cold weather operations.

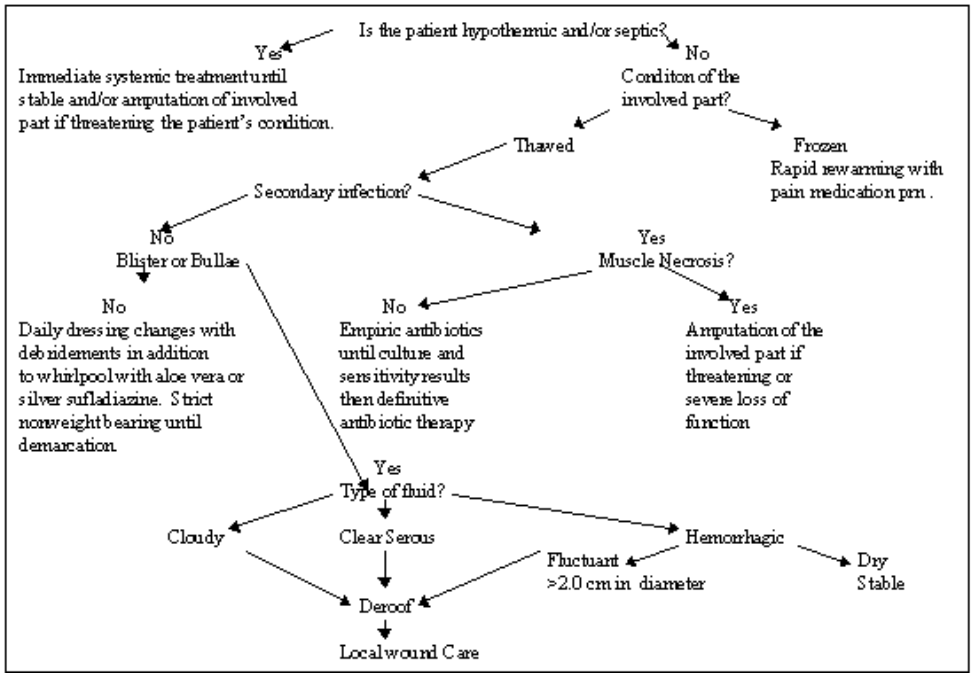
INFORMATION REQUIRED: A complete AMS to include neurologic examination. Cold water immersion test or in-flight evaluation may be required. Photographs of the injured extremity are recommended.

FOLLOW-UP: None normally required unless an associated neurovascular injury exists.

TREATMENT: Education and cold weather survival training is essential to successful military operations in cold weather and high altitude environments. Avoidance of fatigue, proper use of dry and insulated or layered clothing, and a buddy system of inspection are important prevention techniques. Once cold injury occurs rapid rewarming is the most affective initial therapy. The goal is to save as much viable tissue as possible. Do not do this rewarming if re-exposure to cold is likely. Subsequent efforts are oriented toward preventing injury to and infection of the involved areas.

DISCUSSION: Frost bite is a localized lesion preferentially affecting the extremities: feet 57%, hands 46%, and open areas such as the face (ears, nose, cheeks) 17%. Chilblain, a mild form of frost bite, is the presence of red, itchy lesions found on the dorsum of the foot due to prolonged and repeated exposure to above-freezing temperatures in the presence of high humidity. Trench foot or immersion foot is directly due to prolonged exposure (over 12 hours) to cold water, generally under 32°F. Hypothermia, unlike all the other cold injuries, can occur with prolonged exposure to any temperature below body temperature.

TREATMENT PROTOCOL From J. Foot and Ankle Surg.



DENTAL READINESS

AEROMEDICAL CONCERNS: Dental health is an essential component of medical readiness for Army aircrew. Dental panographic records are often the only means of identification following a fatal aircraft accident. Dental examinations may detect oral signs or symptoms of systemic disease.

WAIVERS: Dental Fitness Classification (see Dental Fitness Classification Table) establishes the basis for the aeromedical disposition of all aircrew members. In the event that no dentist is available, the flight surgeon may issue flight clearance provided there is no obvious contraindication to flight safety and a dentalpanograph has been documented as completed.

Dental Fitness Class 1 is fully qualified for all aviation-related duties.
Dental Fitness Class 2 may be recommended for full aviation duties unless temporary medical suspension is indicated for dental treatment requiring grounding medications (See Medications APL)
Dental Fitness Class 3 or 4 is considered disqualifying until the dental examination and treatment is complete and dental panograph is updated IAW AR 40-35.

Waivers are generally not required due to the transient nature of most dental conditions. Orthodontic appliances which interfere with proper enunciation or are a hazard in the aviation environment are not authorized. Local medical restriction (no DA 4186 form is required) from flying for 6 hours will follow routine dental procedures requiring short acting local anesthetics such as lidocaine and mepivicaine.

INFORMATION REQUIRED: Complete dental examination is required. An oral surgeon consultation may be required. All comprehensive FDMEs require the dentist to record the current dental examination and dental fitness classification IAW AR 40-35 in Block #44, SF 88, and sign Block #81, SF 88. The flight surgeon may transcribe this information to the FDME and sign Block #81, SF 88. If, due to mobilization, shortage of personnel, etc., a dental examination by a dentist is not possible, the FS will determine dental fitness to the best of his ability, but is not expected to be able to determine Dental Fitness Classes. As above, if a dental panograph is available and there is no obvious contraindication to flight safety, the dental portion of the FDME may be completed by the examining FS, and a local flight clearance issued. All Class I, IA, and Initial Classes 2, 3, and 4 are required to undergo examination by a military dentist.

FOLLOW-UP: Required follow-up conditions are established by the underlying nature of the disorder.

TREATMENT: The local flight surgeon must coordinate with the dental staff to ensure the staff is completely familiar with the unique requirements of the aircrew member, to include the AR 40-8 , Medications APL, Dental APL, and that procedures are established which require the flight surgeon to be notified of all grounded aviators. The flight surgeon should also ensure that procedures are established to conduct annual dental examinations on aviation personnel with completion of SF 88 prior to the completion of the comprehensive FDME.

DISCUSSION: The DoD Dental Fitness Classification System is extracted from DoD Instruction 6410.1 (8 Nov 90), Standardization of Dental Classification. Department of the Army Civilian (DAC) and contract civilian aircrew members are authorized DoD provider dental examinations IAW AR 40-3, Medical, Dental, and Veterinary Care, Ch. 4-50a, and Appendix B, paras 4-21 and 4-52. Dental fitness does not strictly apply to these civilians since they are not deployable, however, identification of potentially disqualifying dental conditions and maintenance of current panographic records are still essential. Dental assets within the reserve components in each state will provide this service to Reserve Component aircrew members. If military dental assets are unavailable, a civilian dentist may complete the examination upon coordination with the unit flight surgeon. The unit flight surgeon may then transcribe the results of the civilian examination upon the SF 88 and sign at Block #81. Flight surgeons without military dental consultation available can request assistance in coordinating dental care from U.S. Army Dental Command, Fort Sam Houston, TX 78234-6000; Commercial 210-221-6528/8241; DSN 471-6528/8241.

DoD DENTAL FITNESS CLASSIFICATION SYSTEM

1. Dental Fitness Class 1: No pathological oral conditions exist and no treatment is required to include no dental caries or defective restorations, healthy periodontium with oral prophylaxis not required, replacement of missing teeth not required, unerupted / partially erupted teeth not requiring care, and emergency care not required.

2. Dental Fitness Class 2: Oral conditions exist that will not require emergency care within 12 months. These include:

- Dental caries with minimal extension into dentin.
- Minor defective restorations maintainable by the patient.
- Periodontal conditions limited to:
    - Oral prophylaxis.
    - Generalized marginal gingivitis.
    - Early Periodontitis.
    - Maintenance therapy.
    - Slight to heavy plaque.
    - Any supragingival or slight subgingival calculus.
- Dentulous areas requiring elective replacement.
- Nerupted / malposed / partially erupted teeth recommended for extraction but without clinical radiographic pathosis.

3. Dental Fitness Class 3: Oral conditions exist that if not treated will require emergency dental care within 12 months. Place patients in Class 3 when they are determined to be between Class 2 and Class 3.
Class 3 conditions include:

- Dental caries, tooth fractures, or defective restorations where the condition extends beyond the dentoenamel junction and causes definitive symptoms; dental caries with moderate or advanced extension into dentin; defective restorations not maintained by the patient.
- Interim restorations or prostheses which cannot be maintained for a 12-month period. This includes teeth that have been restored with permanent restorative material but for which protective coverage is indicated.
- Periodontal diseases or periodontium exhibiting:
    - Acute gingivitis or pericoronitis.
    - Active moderate to advanced periodontitis.
    - Periodontal abscess.
    - Progressive mucogingival condition.
    - Periodontal manifestations of systemic disease or hormonal disturbances.
- Edentulous areas or teeth requiring immediate prosthodontic treatment for adequate mastication, communication, or acceptable esthetics.
- Unerupted, partially erupted, or malposed teeth with historical, clinical, or radiographic signs or symptoms of pathosis which are recommended for removal.
- Chronic oral infections or other pathological lesions including:
    - Pulpal or periapical pathology requiring treatment.
    - Lesions requiring biopsy or awaiting biopsy report.
- Emergency situations requiring therapy to relieve pain, treat trauma, treat acute oral infections, or provide timely follow-up care until resolved.
- Temporomandibular disorders requiring active treatment.

4. Dental Fitness Class 4: Patients who require dental examinations and / or updating of dental panographs as required by AR 40-35, Medical, Dental, and Veterinary Care. This includes patients whose dental classification is unknown.

HEAT EXHAUSTION / HEAT STROKE (ICD9 992.5 / 992.0)

AEROMEDICAL CONCERNS: Susceptible aircrew members are at risk for recurrence of heat exhaustion/heat stroke during critical operations in hot environments, thus putting their own safety and the accomplishment of these missions in jeopardy. A previous heat injury may result in residual injury which will compromise flight safety or the individual's health.

WAIVERS: Those individuals predisposed toward heat injury with recurrent episodes requiring medical care, or those with residual injury are considered disqualified from aviation duties. Waiver may be possible provided: (1) There is no evidence of a congenital predisposing condition (e.g., anhidrosis); (2) An identifiable situational stressor led to the episode, such as lack of acclimatization, dehydration, coexisting infectious disease, medication effect, fatigue, or sleep deprivation; (3) No residual injury exists; (4) A minimum of three months have passed since an episode of heat stroke; and (5) There is evidence of normal heat tolerance after recovery from the heat stroke episode. Individuals who fail to meet these criteria will remain disqualified with no waiver recommended. Recurrent episodes of heat stroke are considered nondeployable, thus disqualified with waiver unlikely. Initial flight applicants are not granted an exception to policy.

INFORMATION REQUIRED: Any history of heat stroke or a history of severe or recurrent heat exhaustion requires a full AMS. Complete cardiac and neurologic consultations are required. CT or MRI of the brain may be required. Further evaluation to include a heat tolerance test at the Consultation Service, Brooks AF Base, San Antonio, TX. or NAMI, Pensacola, FL, may be required.

FOLLOW-UP: None required unless the aircrew member experiences another heat injury.

TREATMENT: Prevention is the key. Encourage gradual acclimatization to the heat accomplished by gradually increasing, over 10 to 14 days, daily exposure to work and heat. Also, increased fluid intake with intake of at least 8 oz of water before heat exposure and moderate amounts of fluid every 15-20 minutes during intense exertion, vapor-permeable clothing, and frequent rest periods are important in preventing injury. Persons taking high-risk medications and those suffering from a mild illness or fever should avoid heat or extreme exercise.

DISCUSSION: Military operations, especially those in tropical and desert locations, continue to place crew members at risk for heat injury. Prolonged preflight exposure to extreme heat, humidity, dehydration, and the additional heat load occurring in an enclosed heated cockpit are major contributors to this increased risk. Studies show that exertional heat stroke in a young, healthy individual usually results from situational factors; an intrinsic predisposition to heat intolerance is extremely rare. Dehydration, febrile or infectious illness, skin disorders, poor physical fitness, the elderly, and obesity are all well accepted predisposing situational factors. Some of these are temporary or treatable, while others are permanent and thus put individuals at higher risk for heat injury. Exertional heat stroke is a state of hyperthermia that occurs when excess heat generated by muscular exercise exceeds the body's ability to dissipate it. Any individual with an alteration of consciousness in the presence of physical exertion in hot weather should be considered having a heat stroke; a core temperature of < 105° C does not preclude the diagnosis of heat stroke. Heat stroke may cause damage to the brain, liver, heart, kidneys, and occasionally result in adult respiratory distress syndrome, and coagulation disturbances. Complications of acute respiratory distress syndrome (ARDS), renal failure, and intractable disseminated intravascular coagulation is a common cause of death.

MOTION SICKNESS (ICD9 994.6)

AEROMEDICAL CONCERNS: Motion sickness may present with profuse sweating, nausea, vomiting, drowsiness, lethargy, apathy and headache. Depending upon the degree of these symptoms the pilot may be distracted or totally incapacitated. Motion sickness occurs most commonly in initial trainees. The early symptoms of motion sickness, especially in the student, may be interpreted incorrectly as the lack of skill or ability. Simulator sickness, a form of motion sickness, may occasionally occur in even highly experienced aircrew members.

WAIVERS: Aircrew members with intractable airsickness are considered disqualified and are normally terminated from aviation duties. A local program of airsickness desensitization is permissible (see below). Aircrew members with motion sickness or simulator sickness should be restricted from aircraft controls until fully recovered. Aircrew members involved in simulator training should not be in direct control of an aircraft following simulator training.

INFORMATION REQUIRED: Complete AMS with detailed history of airsickness, its effect on aviation duties, and the results of a locally supervised airsickness desensitization program.

FOLLOW-UP: None required unless symptoms reoccur.

TREATMENT: The majority of aviators become habituated to the stimuli and do not require treatment other than frequent regular flying. Others may benefit from a combination of desensitization, biofeedback training, relaxation training and psychological counseling. Promethazine (Phenergan) 25 mg. combined with ephedrine 25 mg. or L-scopolamine hydrobromide alone or in combination with dextroamphetamine (Scop/Dex) taken 1 hour prior to flight is permitted for up to 3 flights during training or for reacclimation of a rated aviator provided the patient is accompanied in flight by an instructor pilot. The scopolamine transdermal patch achieves peak blood levels 8-12 hours after application, but peak levels may not be needed to achieve symptom control.

DISCUSSION: In the RAF, 39% of flying students had airsickness at some stage during their training and in 15% of students, this is sufficiently severe to disrupt or abandon the flight. The USN experience is that 13.5% of all flights will lead to airsickness in non-pilot crews with vomiting occurring in 5.9%. Up to 63% of students were sick on their first flight, with only 15-30% not experiencing airsickness at all during their training. Females are almost twice as likely to report nausea as males and the incidence declines with age. While rare in rated aviators, most cases may be attributed to lack of acclimation to the flight environment. Occasionally, airsickness will present as a manifestation of an underlying psychological disorder or even fear of flying. Treatment utilizing biofeedback training, relaxation and psychological counseling achieves a success rate of 40%; when exposure to incremental Coriolis effect and flying is included, these success rates rise to 85%. All of the drugs used for motion sickness control have unacceptable side effects. Scopolamine and antihistamines act as central depressants; the former particularly degrades tasks that involve continuous attention and memory storage, as well as causing blurred vision, sedation and dizziness in some individuals. Mild in-flight conditions cause air sickness in only 10% of the untreated population, 0.4 mg. of scopolamine will reduce that number to 2%. Similarly, in rough conditions, airsickness occurs in 50% of the untreated population, 1 mg. of scopolamine will reduce the incidence to 8%, but with unacceptable side effects. The USN offers a formal desensitization training program at NAMI and the USAF offers a similar program at Shepard AFB.

SMOKING CESSATION

AEROMEDICAL CONCERNS: To provide an effective, safe methodology for achieving smoking cessation while ensuring a close monitoring program to provide a supportive platform, as well as to detect significant side effects as soon as possible. Such a program avoids the pitfalls of unsupervised attempts at smoking cessation, e.g., "Cold turkey", unsupervised drug use, and the possible anxiety produced by unaided smoking cessation attempts.

WAIVERS: No waiver is required. Nicotine gum may not be used while flying. Nicotine patches may be worn while flying; however, it is advisable to fly with another fully qualified, rated aviator. Local flight surgeons are responsible for prescribing and managing the nicotine weaning program for all aviation personnel. When initially prescribed a nicotine patch or gum, the aviator will be restricted from flying for 72 hours. Once 72 hours has passed with no evidence of significant side effects and the patient has successfully abstained from smoking, the aviator may return to full aviation duties. Smoking is absolutely forbidden at all times. One episode of smoking voids the contract made with the flight surgeon and the aviator must be considered to be medically restricted until cleared by the flight surgeon (FS). Temporary clearance should be granted for the duration of treatment while under the direct guidance of the FS.

INFORMATION REQUIRED: Local flight surgeons must be fully familiar with the potential effects of the prescribed medication, assess the patient's motivation for smoking cessation, and thoroughly counsel the patient regarding the role of medication in the smoking cessation, the need for absolute smoking abstinence while using a patch or gum, the correct technique for chewing gum to avoid nicotine overdose, the possible side effects, and a discussion of all restrictions while under treatment.

FOLLOW-UP: Initial follow-up should occur after 72 hours and then within 14 days; subsequent visits should be at least every 30 days.

TREATMENT: Aircrew members are encouraged to participate in formal cessation programs.

DISCUSSION: In the U.S. in 1990, smoking was directly responsible for 418,690 deaths. It was linked to nearly one in five of all deaths and more than one in four deaths in people ages 35-64. Cigarette smoking significantly increases the risk of cardiovascular disease, including coronary heart disease, stroke, sudden death, aortic aneurysm, and peripheral vascular disease. Of the more than 4000 substances in cigarette smoke, 43 are known carcinogens. Cigarette smokers have twice the risk of death from cancer as nonsmokers, and smoking accounts for 30% of all cancer-related deaths. Cigarette smoking is the leading cause of pulmonary illness and related deaths in the U.S.. Smoking has also been shown to increase the risk of miscarriage and stillbirth and have a higher risk of neonatal death. Smokers not only harm themselves, they harm those around them. Environmental tobacco smoke is increasingly being recognized as a major cause of morbidity and mortality; children are particularly vulnerable. The health benefits of smoking cessation are substantial. After 10-15 years of abstinence, the overall risk of mortality approximates the mortality rate of those people who have never smoked. After one year of abstinence, excess risk of CAD is reduced by one-half and approaches normal after 3 to 4 years. After 10 years of abstinence, the risk of lung cancer is reduced by 50-70% and almost all other smoking-related cancers occur less frequently. Behavioral modification is the mainstay of most smoking-cessation programs. Nicotine-replacement therapy has clearly been established when used in combination with such programs. There have been no controlled studies showing that nicotine replacement is effective when used alone. Complications of nicotine replacement therapy are mostly minimal, but occasionally excessive nervousness, gastrointestinal complaints, sleep disturbance including insomnia and vivid dreams, and lightheadedness have all been reported.

OVERWEIGHT AIRCREW MEMBERS (ICD9 2780)

AEROMEDICAL CONCERNS: The Weight Control Program is the responsibility of the aviation commander. (See AR 600-9). The flight surgeon is responsible for assisting this program by providing advice on nutrition, detecting unhealthy eating habits at mess and flight line visits, counseling individual aircrew members, and detecting any underlying medical condition. Occasionally, the flight surgeon will encounter individuals whose weight exceeds the design limits of the aircraft, i.e., exceeds seat belt or shoulder harness designs or exceeds seat crash protection limits.

WAIVERS: Those aircrew members who exceed screening table weight standards, but whose body composition meets percent body fat standards, are considered qualified. The information will be recorded in item #73, SF 88 for entry into the AEDR. Those aircrew members who exceed allowable percent body fat standards, excluding ATC and DAC/contract pilots, will be administratively suspended from flight duties. Those individuals who weigh over 250 lbs., or are otherwise determined to exceed safety limits of the aircraft, will be recommended for termination from flight duties. Waivers are not recommended.

INFORMATION REQUIRED: Local evaluation should contain a complete nutritional history, psychosocial history, review of previous trends from SF 88, a review of systems to rule out endocrine or neurologic disorder, a physical examination to rule out thyroid, adrenal, ovarian or testicular, or central nervous system disorder. Also submit: fasting and 2-hour postprandial serum glucose, fasting serum cholesterol, HDL cholesterol, and triglycerides, serum uric acid, serum thyroid stimulating hormone, and if appropriate, a Dexamethasone suppression test to rule out Cushing's Syndrome.

FOLLOW-UP: Submission of percent body fat measurements recorded on annual FDME.

TREATMENT: An effective weight loss program includes the establishment of a supportive rapport with frequent follow-up visits, the institution of a nutritional, well-balanced diet, and an aerobic exercise program. For weight loss of 10 lbs. or less, simple dietary changes which involve avoidance of fried foods, alcohol, soft drinks, sugar rich foods, and "junk" food and the greater reliance upon foods rich in complex carbohydrates - beans, grains, fresh fruits, vegetables, low fat dairy products and fish is recommended. For weight loss of greater than 10 lbs., caloric restriction must be included. The caloric intake must be over 1200 calories but less than approximately 13 times the patient's ideal weight in pounds. Dietitian consultation is required. If weight loss is unsatisfactory, a psychological consultation with consideration of behavior modification should be obtained. Weight loss goals should be realistically set at 4 to 8 lbs. / month. Fad diets, excessive exercise programs, hypnosis, either OTC or prescribed weight loss drugs, and surgery should be avoided.

DISCUSSION: Overweight is associated with a host of adverse health outcomes and places a severe burden on the U.S. health care system. National estimates of overweight in the United States show a striking increase in the prevalence of overweight in the U.S. during the past decade. The U.S. National Health Interview Survey (NHIS) found that the prevalence of overweight increased from 21.6% in 1983 to 27.5% in 1990. Factors such as dietary knowledge, attitudes, and practices, physical activity levels, and perhaps social, demographic, and health behavior factors are the most likely candidates responsible for these increases in the prevalence of overweight. Various techniques to lose weight exist across the country however, most individuals eventually gain this weight back. Because weight-related problems combine the physical and the psychological, multiple interventions are often appropriate. Although such programs as Optifast, Nutri-System, or Jenny Craig are thought to provide good motivational support, there has been little in the way of scientific analysis of their long-term effectiveness. If used, they should be combined with exercise and other behavioral changes. Using any anorectic drug currently is considered unsafe in the aviation environment due to potential side-effects. Their use, even in the temporarily grounded aviator, is not a miracle cure. Unless this medication is part of a comprehensive approach to nutrition and behavior, the patient will simply regain the weight lost after completion of the drug program. Note: Long term use of anorectic medications is not approved in the United States.

NEUROLOGY WAIVERS

CRANIAL NEURALGIA

AEROMEDICAL CONCERNS: The pain of cranial neuralgia can be incapacitating in flight. The symptoms of trigeminal neuralgia may be stimulated by the wearing of an oxygen mask. Glossopharyngeal neuralgia has been associated with syncope and cardiac arrest.

WAIVER: Because of the severity and chronic recurrent behavior of the neuralgias, a waiver is usually not considered.

ICD9 Code	Condition
350.1	Trigeminal neuralgia
352.1	Glossopharyngeal neuralgia

INFORMATION REQUIRED: Neurology or neurosurgical consultation.

FOLLOW-UP: Annual neurology or neurosurgical consultation required **only** in the presence of continued or recurrent symptoms.

TREATMENT: Pharmacological treatments (Tegretol, Triavil, Prolixin, Mexitil), although effective, are not waiverable due to their side effects profiles. Surgical "cures" (microvascular decompression) may be achieved in selected cases and subsequent waivers may be considered.

DISCUSSION: Although most cranial neuralgias are probably due to microvascular compression at the root entry zone, other etiologies need to be considered, especially in the young adult population in whom demyelinating disease, aneurysms, neoplasms, and infectious etiologies (post-herpetic, Lyme disease, etc.) may be more common. The finding of sensory loss with neuralgia should alert the flight surgeon to consider these other causes of cranial neuralgia. The branches of the nerve involved in trigeminal neuralgia are mandibular alone (20%), maxillary alone (16%), both combined (36%), ophthalmic alone (3%), maxillary/ophthalmic (11.5%), and all 3 divisions (16%). Medical treatment with carbamazepine, which is also used for glossopharyngeal neuralgia, can produce dizziness, somnolence, ataxia, disorders of accommodation and increased reaction times. Over time, the effectiveness of medication declines in 50-75% of patients. Microvascular decompression of the trigeminal root has a failure rate of 65% by 5 years. Gangliolysis, by a variety of techniques, has a failure rate of 20% after 2 years. Surgical treatment of glossopharyngeal neuralgia is of uncertain benefit.

DECOMPRESSION SICKNESS (ICD9 993.3)

AEROMEDICAL CONCERNS: Residual neurologic/neuropsychologic impairment is a safety of flight issue. Most but not all individuals who have suffered DCS make a full recovery and are not at increased risk for recurrent DCS.

WAIVER: All Type I (pain only) patients should be grounded 72 hours. All Type II patients should be grounded for one month. Upon full recovery, Type I DCS (single episode) in all classes is considered fully qualified. Type II DCS is considered disqualifying, with waivers considered on a case by case basis. Waivers are frequently granted for rated aviation personnel. Exceptions to policy (EP) have never been granted for initial flight applicants with a history of recurrent Type I DCS or Type II DCS.

ICD9 Code	Condition
993.3A	Type I DCS, pain only
993.3B	Type II DCS

INFORMATION REQUIRED: A Hyperbaric or Diving Medical Officer or neurology consultation and, where behavioral or cognitive symptoms or findings were part of the presentation, neuropsychologic testing ("Cog screen", MMPI, Halstead-Reitan and WAIS-R) are required.

TREATMENT: Recompression therapy is the overall standard, however many Type I patients will respond completely to surface oxygen therapy and may not require hyperbaric oxygen.

FOLLOW-UP: No follow-up is required unless the aircrew member has a recurrent DCS event or has residual abnormalities which require monitoring.

DISCUSSION: This is a difficult diagnosis to make and often we err on the conservative side and treat patients whose findings and symptoms may be equivocal. This is especially true in the training commands where students are instructed to report all and any symptoms that occur following low pressure chamber flights. A high index of suspicion in this setting coupled with enthusiasm for treatment are factors that must be weighed in evaluating the outcome and disposition of these patients. Diving-related cases of DCS tend to be more straightforward as well as more severe, receive relatively delayed treatment, and are more likely to suffer permanent residuals. Except for older age, no other factors are clearly linked to increased risk for recurrent DCS. Individuals who do suffer recurrent DCS are probably at higher risk for reasons that cannot be defined or predicted and should not be considered for waiver without careful evaluation of risk-benefit factors. The incidence of DCS in high altitude reconnaissance fliers has been reported to be 4.2%, with 62% of the pilots having experienced DCS. The predominant symptom was pain (51%) but skin (14%), neurological (14%) and respiratory (3%) symptoms were also reported. The US Navy has not found any evidence that divers who have had "Type II" DCS were statistically more likely to have a second episode than the remainder of the population. In another study of subatmospheric DCS, there was a 7.4% incidence of recurrent symptoms. Female risk generally is just over 2 times that of males; the incidence is highest just after the menstrual period, declining linearly to the next period. A variety of studies has shown that the incidence of residual sequelae is 2-4%; however, another study in divers which looked very carefully for neurological involvement found sequelae in 70% of those with initial CNS symptoms one month after decompression.

EPILEPSY / SEIZURE (ICD9 345.9 / 780.3)

AEROMEDICAL CONCERNS: The risk from a seizure in flight is obvious. The number of solo airborne seizures with a survivor equals zero.

WAIVER: A single, febrile seizure under age 5 is not considered disqualifying. Two or more febrile convulsions are considered disqualifying for initial entry into aviation, but an exception to policy may be considered. A single seizure clearly attributable to a remedial and avoidable cause may be considered for waiver. All other seizures are considered disqualifying with no waiver recommended. Myoclonic jerks associated with G-LOC or hypoxia during exposure to altitude are not considered disqualifying.

ICD9 Code	Condition
780.3	Convulsive episode, unspecified cause
780.3	Infantile Seizure
459.0	Epilepsy (w/o intractable epilepsy)
3459.1	Epilepsy (with intractable epilepsy)
3450.0	Absence Seizure (w/o intractable epilepsy)
3450.1	Absence Seizure (with intractable epilepsy)
345.50	Partial Seizure

INFORMATION REQUIRED: Neurological consultation, EEG, MRI scan.

TREATMENT: N/A for waiver purposes.

FOLLOW-UP: Since aircrew with seizures are rarely granted waivers, no specific follow-up is recommended.

DISCUSSION: The risk of having a first seizure falls from about 0.4% at age 20 to 0.06% at age 50 before rising sharply to 0.8% by age 70. The late rise is because of the increase in precipitating factors such as neuronal degeneration and cerebrovascular disease. After a single, unprovoked seizure in adults, the risk of a second episode while not taking anticonvulsants is 64% over 3 years and 80% at 5 years, with over two-thirds of these occurring during the first year. With no risk factors such as previous neurological insult or a sibling with epilepsy, the risk of a second seizure is 23% at five years. Relapse even after many years of symptom-free existence without therapy is possible. These figures apply to individuals living at one atmosphere and one +Gz. The risk for seizure recurrence associated with exposure to the physiological stressors of military aviation is likely to be much higher. Etiologies for seizures in the adult: alcohol (25%), brain tumor (16%), cerebral infarction (14%), trauma (4%), miscellaneous (5%) and unknown (38%). The EEG does not prove or disprove the diagnosis, although an unequivocally abnormal EEG with a good history of seizure does support the diagnosis. EEGs are normal in half the patients with frank epilepsy. An epileptiform EEG does not, by itself, signify the presence of epilepsy.

GUILLAIN-BARRE SYNDROME (ICD9 357.0)

(ACUTE INFLAMMATORY DEMYELINATING POLYNEUROPATHY)

AEROMEDICAL CONCERNS: Skeletal muscle weakness which can involve extremity, truncal or bulbar groups and typically evolves over a matter of several hours to a few days can affect flying and aircrew abilities creating safety of flight as well as mission completion concerns. In the C. Miller-Fisher variant, ataxia as well as ophthalmoplegia (internal and external) accompany the obligatory findings of areflexia. Dysautonomia may also be present, posing an additional concern regarding tolerance of gravitational force changes, blood pressure and cardiac rhythm disturbances that may be especially life-threatening in the aviation environment.

WAIVER: A waiver can be considered after full recovery of strength and autonomic nervous system function. Tendon-stretch reflexes may never return but would not prohibit waiver recommendation.

INFORMATION REQUIRED: Neurology or physical medicine and rehabilitation consultation with quantified strength testing of all motor groups and assessment of autonomic nervous system function (orthostatic BP measurements, treadmill testing and, if appropriate, thermal stress testing). Consider performing functional cockpit and egress testing. If autonomic instability is a concern, then gravitational tolerance testing should also be performed.

FOLLOW-UP: Annual neurology evaluation is required only in the presence of continued neuromuscular deficit.

TREATMENT: Plasmapheresis and/or intravenous immunoglobulin therapy is warranted in those cases which involve weakness progressing to the point of impairing walking or respiratory abilities. Adrenocorticosteroid therapy is not beneficial and may actually worsen the outcome.

DISCUSSION: Antecedent flu-like illness within two weeks prior to the onset of neurological symptoms occurs in approximately 65% of cases. This syndrome often occurs in clusters of small epidemic proportions and may have broad spectral presentations ranging from minor (e.g., Bell's palsy) to severe (complete paralysis of all skeletal muscle groups with respiratory and cardiovascular support dependency). Some of these patients may experience relapses and progress to chronic inflammatory demyelinating polyneuropathy (CIDP). HIV victims may present with AIDP. Lyme disease may mimic AIDP. The presence of pleocytosis in the CSF is incompatible with AIDP and suggests alternative diagnoses (e.g., sarcoidosis, leptomeningeal lymphomatosis). When adequate intensive care and respiratory support are available, overall mortality is less than 5%.

HEAD INJURY - MILD (ICD9 854.02)

- Loss of Consciousness (LOC) < 15 minutes.
- Post-Traumatic Amnesia (PTA) is < 12 hours
- Post-Traumatic Headache (PTH) is < 14 days
- Post-Traumatic Syndrome (PTS) is < 48 hours

AEROMEDICAL CONCERNS: Clinically these may appear to be mild injuries, although a surprising percentage of these patients (up to 11%) have significant craniocerebral damage (basilar skull fractures, linear as well as depressed skull fractures, sinus fractures, intracranial hemorrhages, fronto-temporal contusions) which would upgrade the severity level of their injury.

WAIVER: Temporary medical suspension is required for one month for all rated aircrew members (three months for applicants) if there are no fractures or intracranial structural pathology.

INFORMATION REQUIRED: Neurology and neuropsychological consultations and a brain imaging study (CT or MRI).

FOLLOW-UP: N/A

TREATMENT: All patients with head injury causing either loss of consciousness or amnesia (no matter how long) should undergo brain imaging (preferably CT) ASAP as part of their initial management.

DISCUSSION: Acute post-traumatic seizures (within one hour of the injury) are not a factor in determining the risk for developing post-traumatic epilepsy (PTE). The risk of developing PTE is not appreciably greater in the mildly head-injured population than in the general population. There is a risk of post-traumatic cognition problems (e.g., memory and information processing skills) and recovery should be documented prior to requesting a waiver.

HEAD INJURY - MODERATE (ICD9 854.02)

- Loss of Consciousness (LOC) > 15 minutes but < 2 hours
- Post-Traumatic Amnesia (PTA) >12 hours but < 24 hours
- Post-Traumatic Syndrome (PTS) > 48 hours but < two weeks
- Post-Traumatic Headache (PTH) > 14 days but < 1 month, or linear Basilar fracture with LOC < 15 minutes,
- Cerebral Spinal Fluid (CSF) leak < 7 days.

AEROMEDICAL CONCERNS: Risks include personality and performance changes and the development of post-traumatic epilepsy.

WAIVER: All aircrew members must be temporarily suspended for a 3 month period of observation. Applicants will not be considered qualified until two years post-injury pending normal neurological exam. (see below)

INFORMATION REQUIRED: Neurology and neuropsychological consultations ("Cog Screen", Minnesota Multiphasic Personality Inventory [MMPI], Halstead-Reitan test battery, Wechsler Adult Intelligence Scale-Revised [WAIS-R]) and brain imaging (either CT or MRI) are required.

FOLLOW-UP: Any abnormalities on initial screening must be resolved upon retesting at end of observation period. Further follow-up only required for continued abnormalities.

TREATMENT: These patients should undergo initial CT scanning and, if neurologically impaired, repeat scanning within 12 hours of the injury in order to detect "delayed" or progressive intracranial damage that would warrant a change of therapy. Non-surgical measures consist of the basic "ABCs" of ATLS, 30 degrees head elevation, beta-blockers as needed for control of elevated blood pressure and, when indicated, intubation with hyperventilation, mannitol, and THAM to manage increased ICP (best done with intracranial pressure monitoring).

DISCUSSION: The risk of post-traumatic epilepsy (PTE) in cases of moderate head injury at one and 5 years is 0.6% and 1.6%. Of those individuals who develop PTE, 80% do so within the first 2 years. The risk then declines to equal that of the normal population by 10 years post-injury. Approximately 50% of cases with PTE will spontaneously remit within 20 years.

HEAD INJURY - SEVERE (ICD9 854.03)

- Loss of Consciousness (LOC) > 2 hours but < 24 hours ,
- Post-Traumatic Amnesia (PTA) > 24 hours,
- Post-Traumatic Syndrome (PTS) > 2 weeks but < 6 weeks,
- Linear fracture with LOC < 15 minutes but > 2 hours,

AEROMEDICAL CONCERNS: There are greater risks for the development of post-traumatic epilepsy (PTE) and the persistence of permanent neurologic and neuropsychologic sequelae.

WAIVER: After 24 months grounding, designated personnel may be considered for waiver. Initial flight applicants are considered permanently disqualified.

INFORMATION REQUIRED: Same as for moderate head injury. Note that EEGs are no longer required as they have very poor predictive value for PTE. Furthermore, the finding of epileptiform activity in the EEG following head injury has only a 14% correlation with the development of PTE while fully one half of patients with epilepsy will have normal or non-diagnostic EEG findings even after the clinical appearance of seizures.

FOLLOW-UP Following waiver action no further follow-up is normally required.

TREATMENT: These patients require neuro-ICU level care, frequently with neurosurgical intervention as well.

DISCUSSION: The cumulative risk of PTE at 1 and 5 years is 7.1% and 13.3%.

HEAD INJURY - PERMANENTLY DISQUALIFIED (ICD9 854.04)

Permanently disqualifying for all aviation personnel (All Classes):

- Depressed skull fracture with or without dural penetration
- Basilar or linear skull fracture with Loss of Consciousness (LOC)> 2 hours
- Post-Traumatic Syndrome (PTS) > 6 weeks
- Loss of Consciousness (LOC) > 1 day
- Cerebral Spinal Fluid (CSF) leak > 7 days
- Any intracranial bleeding (SDH, EDH, ICH, IVH, SAH)*
- Dural or brain penetration (traumatic or surgical)
- Intracranial bone fragment or foreign body
- CNS deficits indicating parenchymal injury
- EEG abnormality due to injury

AEROMEDICAL CONCERNS: These patients are likely to have permanent, disabling residual neurologic and neuropsychologic impairments as well as an unacceptably high risk for post-traumatic epilepsy (PTE).

WAIVER: These aircrew members are usually permanently terminated from flight status, no waiver recommended.

INFORMATION REQUIRED: At least a brief AMS summarizing the case is required for termination.

FOLLOW-UP These patients will probably be under the long-term care of neuro-rehab as well as neurology care.

TREATMENT: These individuals will often require neuro-ICU and neurosurgical care.

DISCUSSION: The likelihood for developing PTE is nearly 30% in this group of head-injured individuals.

* **Glossary**

..... **SDH** Subdural Hematoma
..... **EDH** Epidural Hematoma
..... **ICH** Intracranial Hemorrhage
..... **IVH** Intraventricular Hemorrhage
..... **SAH** Subarachnoid Hemorrhage
..... **PTE** Post-Traumatic Epilepsy

HEADACHE (ICD9 784.0)

AEROMEDICAL CONCERNS: Headaches are common and estimated to affect over 70% of Americans. Occasional headaches, responding to simple analgesics, are not a major aeromedical concern and do not require extensive evaluation. Severe headaches can be incapacitating in flight while milder headaches will act as a distraction. Cluster headaches are incapacitating and may be associated with transient neurologic symptoms, rhinorrhea, lacrimation and a unilateral Horner's syndrome. (See also Migraine APL) Two main questions must be answered with regard to aeromedical evaluation of headaches: 1) Are the headaches primary or secondary to an underlying condition? 2) Are the headaches chronic, recurrent, and /or of sufficient severity to pose a risk to flight safety?

WAIVER:

> **Initial Applicants (All Classes) & Rated Aviation Personnel:** The aeromedical disposition of members with headache will depend on the frequency and severity of the symptoms, the etiology, and the medication required to control the headaches.

The specific nomenclature or diagnostic label of the headaches is not the key factor for determining fitness for aviation duty. Of greater concern is the effect on general performance, special senses, and the risk of recurrence.

ICD9 Code	*Condition*
346.2	Cluster headache
307.81	Tension headache

INFORMATION REQUIRED:
- Neurology consultation,
- AMS listing the timing, duration, frequency, triggers, and predictability of episodes,
- FDME- complete physical examination to rule out secondary causes; and,
- Brain imaging- contrast–enhanced CT or MRI to evaluate for structural disease when indicated by history or examination.

FOLLOW-UP: Follow-up is dictated by the frequency or severity of the headache as well as the response to therapy. If symptoms warrant, an annual neurology or internal medicine consultation may be required.

TREATMENT: Simple analgesics are acceptable. The chronic use of NSAIDs may be considered for waiver. Life-style changes, biofeedback and relaxation therapy, if successful, may permit return to flight status for the muscle-contraction or "tension" headache sufferer. Psychiatric/psychologic evaluation of these members is strongly recommended. Treatments for cluster headaches that are effective but not compatible with flight training include lithium, methysergide, intranasal lidocaine, adrenocorticosteroids, and oxygen inhalation. Sumatriptan or other 5HT serotonin receptor agonists may be used but require a 12-hour mandatory grounding period following use; frequency of its use should be carefully evaluated by the local FS. Frequent use of medications in this class may reflect vascular or migraine headaches. Verapamil may be an effective prophylactic treatment for cluster or vascular headaches in some cases. Use of verapamil must be waivered for rated aviation personnel and waivers for this will be considered on a case-by-case basis.

DISCUSSION: Cluster headaches occur almost exclusively in men, begin in the third or fourth decade, are unilateral and never change sides. Clusters consist of recurrent headaches lasting about 45 minutes, several times a day and night for a few weeks to months at a time with a tendency to recur annually, often around the summer or winter solstice. Recurrence patterns may be characteristic for an individual, but may vary considerably between sufferers. Recurrent muscle-contraction or tension headaches are normally associated with some psychosocial stress in the majority of cases; however, underlying cervical spondylosis and DJD may be a contributing factor and will respond to NSAIDs and physical therapy. Exertional headaches, cough headaches and immersion headaches may be associated with posterior fossa pathology (especially Arnold-Chiari Malformation) warranting an MRI scan. Coital headaches are almost always benign, but are sometimes associated with subarachnoid hemorrhage and should be evaluated with CT with and without contrast, MRI, and possibly even Lumbar Puncture (LP). Incorrect prescription for astigmatism may be a cause for headache. In general, however, eye and ENT pathologic explanations for headache are unlikely unless the patient has obvious gross clinical findings of disease in these areas.

REFERENCE:

American Academy of Neurology, *Multispecialty Consensus on Diagnosis and Treatment of Headache, "Headache Guidelines."*
www.aan.com/public/practiceguidelines/

MIGRAINE (ICD9 346.9)

AEROMEDICAL CONCERNS: Migraine headache may be incapacitating if not distracting for flight. Visual and other aura, nausea and vomiting, transient neurologic deficits (which may include aphasia, hemisensory and hemimotor impairment, vertigo, syncope, confusion and disorientation) may accompany migraines and are of obvious concern. (Also see Headache APL)

WAIVER:

Initial Applicants (Class 1A/1W):
Exception to policy is usually not granted but may be considered if the individual has been symptom free for 12 months on no medication and the information required below reveals no underlying problems.

Initial Applicants (Classes 2F, 3, and 4):
Waivers may be granted provided that the information required below reveals no underlying medical problems and will depend upon whether the condition will effect general performance and the risk of recurrence.

Rated Aviation Personnel (All Classes):
Waivers may be considered on a case-by-case basis. Waivers are usually not recommended if visual or other neurologic symptoms accompany the headaches, but final determination with regard to aviation duties will be based on effects on general performance, special senses, and the risk of recurrence. The specific nomenclature or diagnostic label of the headaches is not the key factor for determining fitness for aviation duty.

ICD9 Code	Condition
346.0	Migraine with aura (Classic Migraine)
346.1	Migraine without aura (Common Migraine)
346.8	Other forms of Migraine (Ophthalmoplegic)

FOLLOW-UP: Annual neurology or internal medicine consultation required.

INFORMATION REQUIRED:
- Neurology consultation,
- AMS listing the timing, duration, frequency, triggers, and predictability of episodes,
- FDME- complete physical examination to rule out secondary causes,
- Brain imaging- CT with contrast or MRI to evaluate for structural disease when indicated by history or exam; and
- Ophthalmology evaluation in the case of visual disturbances.

TREATMENT: Although there are many effective pharmacologic treatments for migraine, most are incompatible with waiver. Standard migraine therapy includes prophylactic, therapeutic, and abortive measures. The first line of prevention is avoiding known triggers.

DISCUSSION: Those patients who have returned to flying duties claimed to have had no symptoms for periods ranging from 6 months to several years. This suggests that the original diagnosis was incorrect, that our understanding of the natural history of migraine is at fault or that symptoms are being deliberately suppressed in order to return to flying. The International Headache Society criteria for migraine without aura include: episodic attacks of headache lasting 4-72 hrs, with two of the following symptoms: 1) Unilateral pain, 2) Throbbing, 3) Aggravation on movement, 4) Pain of moderate or severe intensity, and either nausea/vomiting or photo / phonophobia. Diagnosis is almost entirely dependent on the individual's description of the attacks. Migraines often begin in adolescence then may remit for several years, usually returning by mid-life. The prevalence of migraines is 11% overall with 6% among men and 15-18% among women. At least 70% of migraineurs have a family history for the same. Less than one third of patients have "classic" migraine with visual aura, but nearly one half will have paresthesias with their attacks. Vertigo occurs in about 10% of the cases. Auras typically last 15 - 20 minutes and are followed by unilateral, throbbing headaches associated with photo- and phonophobia, nausea, anorexia and torpor. Most patients prefer to lie in a dark quiet room for relief. Precipitants for migraine may include dairy products, chocolate, MSG, nitrates (preserved meats), tyramine (aged cheese, pickled herring, yogurt, fava beans), sleep deprivation or other chronobiologic challenges such as altered sleep patterns, or extended sleep periods, hormonal changes, osmotic stimuli, (e.g. cigar smoke, perfumes, oils), food deprivation, barometric pressure changes, ice cream and invariably, alcoholic beverages.

Digital pressure applied to the temples, cold packs and caffeine may be beneficial. Many patients have a history of car sickness in childhood.

REFERENCE:

American Academy of Neurology, *Multispecialty Consensus on Diagnosis and Treatment of Headache, "Headache Guidelines."*
www.aan.com/public/practiceguidelines/

MULTIPLE SCLEROSIS (ICD9 340)

AEROMEDICAL CONCERNS: MS typically presents with visual disturbance, vertigo, lower body weakness or sensory changes. The symptoms can present over a period as short as a few hours. Mild dementia may occur in 20% or more of patients. In some cases, paroxysmal events lasting less than 5 minutes (trigeminal neuralgia, abdominal "crises", myoclonus) can be the presenting feature.

WAIVER: A diagnosis of definite MS is permanently disqualifying without waiver. Waivers may be considered for uncertain diagnoses that may be classified as monosymptomatic demyelinating disease, possible MS, etc. Usually a period of grounding for observation of 6 to 12 months after full recovery from the "attack" of monosymptomatic disease is required. Additionally, laboratory findings are critical in predicting the likelihood of progression to MS.

ICD9 Code	Condition
341.9	Monosymptomatic demyelinating disease or possible MS
340	Multiple sclerosis

INFORMATION REQUIRED: Neurology consultation, multimodality evoked potentials, MRI scans (brain and spinal cord), CSF (cells, protein electrophoresis, IgG, oligoclonal bands, myelin basic protein), monocular color vision testing, visual fields, and where indicated, retinal photographs and neuropsychological testing.

FOLLOW-UP: Annual neurology evaluation is required.

TREATMENT: High dose intravenous methylprednisolone (250 mg qid x 3 days) followed by seven days of tapering prednisone (1 mg/kg) given ASAP for the first "attack" of MS may reduce or delay the subsequent progression to relapsing-remitting or chronic progressive MS. Beta Interferon may also have a prophylactic or delaying effect on the development of MS.

DISCUSSION: The average age of onset is 33 years, with a male**:**female ratio of 2**:**3. The onset is of a single CNS white matter lesion in 55% of cases, optic neuritis (ON) occurring in 16-30% of initial presentations. ON will occur at some time during the disease in 30-70% of cases and 25% of these will have a recurrence of ON. In 90% of persons with ON, recovery is complete. Up to 20% of cases follow a benign course with no permanent disability; 20-30% follow an exacerbating/remitting course; 40% follow a remitting/progressive course; and 10-20% show steady progression. In the early stage, the attack rate is 0.5/year falling to 0.25/year in intermediate years. In 5% of cases, there is a latent period of several years between first and second attacks while in a few cases the disease becomes totally quiescent. The features suggesting favorable prognosis are onset before 35 years, acute onset with only 1 symptom, and predominantly sensory symptoms. Poor prognosis is associated with onset older than 35 years, more than 1 symptom with each attack, early onset of motor signs within 5 years and male gender.

PERIPHERAL NEUROPATHY (ICD9 356.9)

AEROMEDICAL CONCERNS: Depending upon the nerve or nerves involved, peripheral nerve dysfunction may represent a trivial nuisance (e.g., **meralgia paresthetica**) or a grounding impairment (e.g., **radial nerve palsy**). Full recovery of neurologic function, elucidation of the underlying etiology and certainty regarding the prognosis are issues to be considered in the individual with peripheral nerve abnormalities.

WAIVER: Most conditions require grounding pending full recovery (if it occurs) and establishment of a firm diagnostic understanding of the cause of the patient's neuropathy.

INFORMATION REQUIRED: Neurology consultation including supporting laboratory findings (where appropriate) such as EMG, NCV, Evoked Potentials, thyroid functions, Lyme serology, VDRL, HIV, B12, folic acid, ESR, protein electrophoresis, heavy metals, etc.

FOLLOW-UP: Required follow-up may vary due to the type of condition, its severity, response to treatment, etc.

TREATMENT: Depends on the underlying cause, if known and if treatment exists.

DISCUSSION: Bell's Palsy (ICD9 351.0): During the acute phase of the paralysis, grounding is required both as a result of the disabling nature of acute facial nerve weakness (difficulty speaking clearly, inability to blink and close the eye in response to visual threats) and because of the fact that not all Bell's palsies are mononeuropathies (i.e., may evolve into acute inflammatory demyelinating polyneuropathy a.k.a. Guillain-Barre, or may be associated with other systemic conditions such as Lyme disease or sarcoid). Once full function has returned, the aircrew member is considered fully qualified, no wavier required. In the event of incomplete recovery or recurrence of facial palsy, waivers are considered on a case-by-case basis.

Carpal Tunnel Syndrome (ICD9 354.0): Safety of flight concerns due to impaired fine motor coordination, strength, sensation and abnormal sensations in the fingers and hands require grounding until adequate resolution of the neuropathy has been achieved. Waiver requests should include results of electrophysiologic studies and functional demonstration of satisfactory recovery (e.g., performance in simulator, cockpit egress testing, operation of safety harness and parachute fittings, etc.).

Ulnar/Radial Neuropathy (ICD9 354.2/729.2): Same as for Carpal Tunnel Syndrome.

Peroneal Neuropathy (ICD9 356.1): Please also submit electrophysiologic test results.

Sciatica (ICD9 724.3): Must demonstrate sufficient return of strength to control rudder and brake pedals and safely egress from aircraft (document by actual testing) to be considered for waiver. In addition, the disappearance of pain (while off medication) is required for waiver consideration.

Meralgia Paresthetica (355.1): As this is only a sensory neuropathy, waiver can be recommended as long as the member is not disabled or impaired by discomfort and can tolerate the symptoms without need of medication.

SUBARACHNOID HEMORRHAGE (ICD9 430)

AEROMEDICAL CONCERNS: The major risk is rebleeding but there is also a risk of developing hydrocephalus. Bleeding usually follows sudden increases in blood pressure, and it is likely that the anti-G straining maneuver could be just as potentially harmful in this as exercise, lifting or defecation.

WAIVER: Waiver is not usually granted for patients who have undergone surgical repair of leaking intracerebral aneurysms or removal of arteriovenous malformations (AVM). Patients who have recovered fully from idiopathic subarachnoid hemorrhage (SAH) with conservative measures may be considered for waiver after 2 years. Patients who have undergone surgical repair of unruptured aneurysms and exceptional cases of repaired ruptured aneurysms also may be considered for waiver.

INFORMATION REQUIRED: Neurosurgical opinion and confirmation of successful obliteration of the vascular anomaly, neurologic and neuropsychologic evaluations, MRI or CT scan to confirm absence of hydrocephalus or superficial siderosis.

FOLLOW-UP: Annual neurology/neurosurgical consultations are required.

TREATMENT: Intracranial surgery is medically disqualifying for flying duties.

DISCUSSION: Most patients with this condition have ruptured a Berry aneurysm. Approximately 5% have bled from an AVM and 15% have no identifiable cause. About 25% of patients treated conservatively die within 24 hours of rupture of intracranial aneurysm and up to 25% die in the following 6 months from recurrent hemorrhage, cerebral infarction or following vasospasm. In the survivors, the risk of rebleeding is just over 2% for the first year declining to almost 1%/year after that. Only 32% of such cases are reported to lead a normal life after the bleed. Those patients in whom no cause is found tend to have a better prognosis. Aneurysms are multiple in 10-20% of cases and the rate of rebleeding for these is 3% a year. In those patients treated surgically, the risk of rebleed is negligible if the aneurysm is solitary and has been successfully isolated from the cerebral circulation; but up to 20% of such patients exhibit cognitive or psychosocial decrements at one year. AVMs cause less early death (about 10%); the risk of rebleeding is 7% in the first year and 3% a year thereafter. In those patients with no prior surgery with AVMs followed for 20 years, there was a 42% incidence of hemorrhage, 29% incidence of death, 18% risk of epilepsy, and a 27% chance of having neurological impairment.

SYNCOPE (ICD9 780.2)

AEROMEDICAL CONCERNS: An episode of syncope in flight could obviously cause catastrophic results. The ability to determine which individuals are at a greater risk for recurrence under any given set of circumstances is, thus, of greatest interest.

WAIVER: A waiver is not required for simple episodes of vasovagal syncope with known precipitating causes such as pain, standing at attention for lengthy periods, or at the sight of blood (filed as *information only*). Normal physiological syncope in response to a training event (example: hypoxia demonstration in an altitude chamber or G-induced loss of consciousness in a centrifuge) does not require a waiver. A waiver is necessary for unexplained syncope, recurrent syncope, syncope associated with pathology (e.g., cardiac conduction or valvular defect), or when associated with incontinence or when associated convulsions last over 6 seconds. Recurrent syncope as a result of cough, Valsalva maneuver, certain postural positions, or exertion are generally considered non-waiverable. Unexplained syncope with no clear precipitating events are also generally not considered waiverable.

INFORMATION REQUIRED: In the presence of syncope, other than a single episode of vasovagal syncope, a detailed AMS with a complete history of the event(s) is required. Complete neurological evaluations and cardiovascular evaluations may be required.

FOLLOW-UP: Follow-up is rarely required unless an underlying etiology requires recurrent evaluation.

TREATMENT: Avoidance, if possible, of known precipitating causes is the single most effective treatment.

DISCUSSION: In 12% of patients with syncope, some type of convulsive movement may occur. Careful history taking, the presence of facial pallor and the rapid recovery without amnesia help to distinguish syncope from epilepsy. Head injury sustained during the fall may confuse the issue. Presence or absence of incontinence does not help in distinguishing between syncope and seizure. Tongue-biting is strong evidence in support of a seizure and unlikely in syncope. Recurrent, unexplained syncope often can be attributed to psychiatric causes, especially panic disorder, depression and somatization. Brain scans, EEGs, carotid ultrasound and lab tests are not usually helpful in arriving at a cause for syncope. If the history, PE and ECG don't provide the diagnosis, it is unlikely that further studies will help. In cases of cough-, Valsalva-, and exertion-induced syncope, remember to consider posterior fossa pathology, especially Arnold-Chiari malformation. Patients with micturition syncope rarely have underlying disease and can often safely continue unrestricted flying; they should, however, be warned that it would be wise to reduce alcohol intake.

TRANSIENT ISCHEMIC ATTACK (ICD9 435.9)

AEROMEDICAL CONCERNS: The symptoms develop abruptly and unrelated to any particular activity. Symptoms depend on the distribution of the blood vessel concerned and can range from distracting to incapacitating.

WAIVER: Transient ischemic attacks (TIAs) are permanently disqualifying. In rare cases where a curable cause is identified and treated (e.g., Atrial septal defect with aneurysmal defect - surgically cured), waiver consideration may be undertaken.

INFORMATION REQUIRED: Neurology consultation, MRI scan, ECHO to include bubble-contrast and if negative, trans-esophageal ECHO, cerebral angiography, ESR, Lupus anticoagulant, Antiphospholipid antibodies, platelet count, CBC, PT, PTT, Protein S, Homocysteine levels are also required.

FOLLOW-UP: Annual neurology consultation is required.

TREATMENT: Depends upon underlying cause, if identified. If no surgically correctable etiology, then ASA, low-dose Coumadin or ticlopidine may be appropriate. Life-style changes and treatment of risk factors (smoking, obesity, HBP, diabetes, hyperlipidemia, alcohol excess, sedentary behavior) need to be explored.

DISCUSSION: About 25% of patients with TIA do not appear to have any identifiable serious disease. Approximately 30% have a potential cardiac cause and diabetes is present in 6-28% of patients with TIA. The risk of developing cerebral infarction following TIA is 5-7% a year with a further 5% a year developing myocardial infarction. The risk of stroke and/or death is 10% a year. These risks rise with age, blood pressure and the presence of ischemic heart disease. In cases of purely retinal TIA (amaurosis fugax), the 7-year cumulative rate of cerebral infarction is 14% and the 5-year cumulative rate of recurrence is 37%.

OBSTETRICS & GYNECOLOGY WAIVERS

ABNORMAL PAP SMEAR (ICD9 795.1)

AEROMEDICAL CONCERNS: The purpose of the pap smear screening test is to detect premalignant conditions of the cervix. When positive, regardless of the nature of the underlying abnormality, this may be devastating news to the female aircrew member. Concern over the potential findings and the delay often associated with definitive diagnosis is most certainly a detractor to aviation duties. If cytology is positive for malignant cells, it is 95% predictive of cervical cancer. (See Cervical Carcinoma APL)

WAIVERS Pap smears are not required for initial flight applicants. Pap smears resulting in a diagnosis of benign cellular changes with or without atypia (inflammation, infection, repair, reactive) require evaluation with subsequent treatment and follow-up and require local flight surgeon review only. Rated aviation personnel may be followed locally for Atypical squamous cells of undetermined significance (ASCUS), and Low–grade squamous intraepithelial lesions (LGSIL) with no waiver action required and filed as *information only*. High Grade squamous intraepithelial lesions (HGSIL) and carcinoma in situ (CIS) are considered non-waiverable until satisfactory treatment is achieved (See Cervical Carcinoma APL).

INFORMATION REQUIRED: OB/GYN consultation is required.

FOLLOW-UP: Annual OB/GYN consultation. High risk patients will require serial cytological studies as indicated for their class of disease.

TREATMENT: Treat underlying etiology of inflammatory changes [Human Papilloma Virus (HPV), bacteria, Trichomonas vaginalis, Herpes simplex virus, etc.]. Cryosurgery, laser therapy, loop electrosurgical excision procedure (LEEP), and electrocoagulation are methods used most commonly to treat LGSIL.HGSIL lesions require laser, LEEP or definitive surgical therapy. CIS is often treated with hysterectomy but cervical conization may be considered for patients who desire pregnancy. Close monitoring is required.

DISCUSSION: Cervical cancer is the end result of progressive cervical epithelial alterations. Risk factors include multiple sexual partners, early first coitus (< 20 years of age), , young age of first pregnancy, lower socioeconomic status, smoking, male partners with multiple sexual partners, current or prior infection with HPV, condylomata, or herpes simplex infection, HIV infection, abuse of alcohol or other substances, and immunosuppression. Approximately 36% of treated CIS cases progress to invasive cervical cancer. 75% of lower grade dyplasias regress or persist without treatment with the remaining number progressing over various time intervals. The average time for progression of HGSIL to CIS varies and often depends on HPV serotype and can vary from just a few months to several years. Screening may reduce the risk of death from cervical cancer by as much as 80%. A review of current data in the AEDR indicates that in the past 15 years, screening revealed only four cases of CIS on initial exams and only three of these were disqualified. Other initial cases involved dysplasia of various degrees, and the majority of these cases went on to enter aviation service after treatment.

REFERENCE: Noble, *Textbook of Primary Care Medicine, Chapter 44, Gynecologic Neoplasms, 3rd Ed.,* 2001, p. 378-381.

ENDOMETRIOSIS (ICD9 617.9)

AEROMEDICAL CONCERNS: Pelvic pain, infertility, and abnormal menstrual bleeding are the primary symptoms. These symptoms may become severe enough to become distracting and the bleeding may be heavy enough to result in significant anemia. There is also a rare association with spontaneous pneumothorax.

WAIVERS: Mild endometriosis, requiring only mild analgesia for symptom control, is not considered disqualifying. A waiver may be required for more recalcitrant cases after the symptoms are controlled. Recommendations for waiver will be based upon degree of symptoms and the medications used and will vary case by case.

ICD9 Code	Condition
617.0	Endometriosis of uterus
617.9	Endometriosis, site unspecified

INFORMATION REQUIRED: OB/GYN consultation is required.

FOLLOW-UP: Those patients with a waiver will require periodic OB/GYN consultation. Frequency of consultation will vary by severity of disease process.

TREATMENT: Mild analgesia with NSAID or equivalent is permitted without waiver action. The use of progesterone or antigonadotrophin agents such as Danazol may be compatible with selected flying duties once the patient is stabilized. Patients may also be returned to flying duties after laser ablation of the lesions.

DISCUSSION: Endometriosis is the extrauterine occurrence of endometrial glands and stroma, most often involving the ovaries or dependent visceral peritoneal surfaces. Although a benign disease, endometriosis is progressive, tends to recur, may be locally invasive, may have widespread disseminated foci, and may exist in pelvic lymph nodes (30%). Ten to twenty percent of menstruating women are affected and it is found in 30% to 45% of all infertile women. Danazol is the most common medical treatment but almost 80% of patients have side effects (10%-20% severe enough to discontinue medication). These symptoms include: acne(15%), hot flashes (15%), uterine spotting (10%), gastrointestinal disturbances (8%), weakness and dizziness (8%), hirsutism (6%), edema (6%), decreased breast size (5%), weight gain, (5%), and change in libido (3%-5%). In addition, migraine headaches (2%), emotional lability and depression may occur. Spontaneous pneumothorax, sometimes called catamenial pneumothorax, occurs more on the right side (93%) than the left.

LEIOMYOMA OF THE UTERUS (FIBROIDS) (ICD9 218.9)

AEROMEDICAL CONCERNS: The majority (about two-thirds) of women with leiomyomas are asymptomatic. When symptoms occur, they depend on the number, size, location, situation, and status (usually vascular supply) of the tumor(s). Symptoms most often are abnormal uterine bleeding, pressure effects, pain, and infertility. Iron deficiency anemia commonly occurs as a result of increased menstrual blood loss. Larger tumors may exert pressure on various organs, producing symptoms of urinary frequency and ureteral obstruction. Pelvic congestion may occur rarely with very large tumors with resulting lower extremity edema or constipation. There is also an association between fibroids and polycythemia.

WAIVERS: Asymptomatic fibroids do not normally require waiver action. Once symptomatic fibroids are surgically removed, no waiver is required. Symptomatic fibroids, if symptoms are mild and there is no significant anemia, may be waivered.

INFORMATION REQUIRED: OB/GYN evaluation is required. If surgically removed, pathology report should confirm diagnosis of benign leiomyoma.

FOLLOW-UP: No follow-up is required for asymptomatic or surgically removed fibroids; however, routine OB/GYN follow-up is suggested. Symptomatic aircrew members require annual OB/GYN consultation with ultrasonic imaging as indicated.

TREATMENT: The majority of small asymptomatic leiomyomas can be managed conservatively with close observation. Surgical removal of the tumor or hysterectomy are possible options for symptomatic or large fibroids. If hysterectomy is performed, the aircrew member may be returned to full flight status following a 90 day recovery period. Aircrew members must be grounded during treatment with gonadotrophin releasing hormone agonist (GnRH) because of the incidence of depression and abdominal pain.

DISCUSSION: Fibroids are discreet, rounded, firm, white to pale pink, benign myometrial tumors composed primarily of smooth muscle with some connective tissue. About 95% arise from the uterine corpus and about 5% from the cervix. Only rarely do they arise from the fallopian tube or round ligament. They are the most frequent pelvic tumor, occurring in 25% of white and 50% of black women by age 50 years. Repeated surgery for adnexal disease occurs in up to 7% of patients following hysterectomy. Solitary fibroid removal results in 27% recurrence; for multiple fibroids the figure rises to 59%. The incidence of leiomyosarcoma arising in uterine fibroids has been reported to be 0.1 - 0.6%, with a 5-year survival rate of 31%.

PELVIC INFLAMMATORY DISEASE (ICD9 614.9)

AEROMEDICAL CONCERNS: Symptoms of pelvic inflammatory disease (PID) may include acute or chronic lower abdominal or pelvic pain, possibly radiating from the back to the leg, fever, headache, malaise, nausea, and vomiting. Such symptoms may cause distraction in flight or, in severe cases, could cause incapacitation. Sequelae may include hydrosalpinx, pyosalpinx, tubo-ovarian abscess, infertility, ectopic pregnancy and chronic pelvic pain, many of which may cause acute abdominal emergencies. Anxiety, depression, and tension can become important if the illness becomes chronic and treatment provides little relief.

WAIVERS: PID may be routinely recommended for waiver provided that the aircrew member is symptom-free and is undergoing approved treatment. Frequent episodes of PID may be grounds for termination of flight status.

INFORMATION REQUIRED: OB/GYN consultation is required.

FOLLOW-UP: None required when symptoms do not reoccur. Any recurrence of symptoms will require repeat OB/GYN consultation. This information must be referred to USAAMA for review.

TREATMENT: Mild cases of PID may be treated with oral antibiotics. Full flight status may be granted provided symptoms are absent, approved medications are used, and duty does not compromise the possibility of recovery. More severe cases may require intravenous medication and even exploratory surgery. Once recovered from surgery they may return to full flight status. Patients can return to flying one week following laparoscopy provided they are asymptomatic.

DISCUSSION: PID is an extraordinary health problem. There are about 1 million cases of acute PID a year in the United States, and the total cost is estimated to exceed $3.5 billion per year. PID affects 1% - 2% of sexually active females yearly and is more frequent in young women (75% of those affected are less then 25 years of age). PID is responsible for .29 deaths/100,000 women of age 15-44. A first attack of PID is followed by subsequent attacks in 20% of women. Perihepatitis can occur in 5% of patients with PID. Intraluminal adhesions, especially if the Fallopian tube is kinked, predisposes to ectopic pregnancy; the risk for patients who have had PID is increased from 0.7% to 4%. Up to 20% of patients develop chronic pelvic pain. Primary infertility has been reported in up to 20% and this is likely to have a psychological effect. Patients who have had gonococcal rather than non-gonococcal PID have a better prognosis since the symptoms are more acute, provoking much more rapid medical treatment.

PREGNANCY (ICD9 V222)

AEROMEDICAL CONCERNS: The effect of the aviation environment, i.e., vibration, high decibel noise, increased heat exposure, hypoxia, G-forces, toxic fumes, and other physiological stresses on the developing fetus is not clearly understood. During the first trimester, spontaneous abortion or tubal pregnancy may result in disabling pain, distracting symptoms, or total incapacitation. Complications of pregnancy, such as morning sickness, heat intolerance, genito-urinary infections, gestational diabetes, hypertension, pre-eclampsia, kidney stone and physiologic anemia may arise at any time during pregnancy. G-forces sustained during high performance maneuvers, ejection, or crash dynamics may be of danger during the entire pregnancy but is of particular concern during the final trimester when increasing size puts the pregnant aviator at greater risk of hemorrhage and premature labor.

WAIVERS: Initial flight applicants are considered disqualified until fully recovered (6 weeks postpartum). Rated aircrew members may, if the pregnancy is not complicated, remain on restricted flight status provided that this has been approved by the OB/GYN physician and the patient. This restriction should include: "Temporary flying duties with RESTRICTION to Synthetic Flight Training Simulator (SFTS)." After 12 weeks of gestation until the 25th week of gestation, the restriction may be changed to include: "May fly multiengine, non-ejection seat, fixed-wing aircraft with dual-pilot status and a cabin altitude less than or equal to 10,000 feet." During complications of pregnancy or from delivery until complete recovery, the aviator should be grounded. ATC (Class 4) may perform duties throughout pregnancy unless medical complications or hospitalization for delivery will prohibit or interfere with ATC duties. Uncomplicated pregnancy will be coded *information only*. **NOTE:** Pregnant aircrew members are now allowed up to 365 days DNIF status before DA waiver/termination action is required.

INFORMATION REQUIRED: An abbreviated AMS must be submitted at both the initial diagnosis of pregnancy (providing information of the expected date of confinement (EDC) and lack of risk factors) and upon termination of pregnancy with recovery (providing information of actual termination of pregnancy, lack of complications, and full recovery). Complicated pregnancy may require OB/GYN consultation.

FOLLOW-UP: N/A

TREATMENT: Prenatal vitamins, $FeSO_4$, and folic acid are permissible. Medications for morning sickness are not permitted due to secondary sedative side effects.

DISCUSSION: During the first trimester, teratogenic effects of the flight environment are unknown. Various animal studies have demonstrated potential teratogenic effects of vibration, hypoxia and to the various potential chemical hazards the aviator may be exposed to during military operations. In the second trimester, theoretically the fetus is relatively well protected against the aviation environment with its own liquid filled anti-G suit and with fetal hemoglobin. The restrictions in the final trimester are related to the increased risk of premature labor that is reported to occur with reduced atmospheric pressure and to the increasing physical difficulty in carrying out military duties.

PREGNANCY ABBREVIATED AEROMEDICAL SUMMARY

PART I: DEMOGRAPHICS

Full Name: _____ *Rank*: _____ *SSN*: _____

Component: AD USAR-AGR ARNG-AGR USAR USAR-IRR ARNG DAC CIV
(circle one)

Aviation Class: 2 (Aviator) 2F (Flight Surgeon) 2S (Aeroscout Observer)
(circle one)

Unit
Address
Phone

Aviation Medicine Clinic
Clinic Code
Address
Phone

PART II: INITIAL DIAGNOSIS OF PREGNANCY

Gravida _____ Parity _____ SAb _____ TAb _____

Date of Diagnosis: *Expected Date of Confinment:*

PART III: COMPLETION OF PREGNANCY

Outcome: Spontaneous miscarriage _____
(check one) Elective Abortion _____
Normal Vaginal Delivery _____
Caesarian Section _____

Date of pregnancy completion:

Weeks of gestation at completion:

Report complications in complete aeromedical summary.

FLIGHT SURGEON'S SIGNATURE BLOCK
DATE

OPHTHALMOLOGY WAIVERS

CATARACT (ICD9 366)

AEROMEDICAL CONCERNS: Aircrew members with cataracts are prone to develop uncorrectable visual acuity changes. When the cataract involves the visual axis, visual acuity can be further reduced in bright sunlight and conditions of glare.

WAIVER: Cataracts are considered disqualifying once diagnosed even if they are asymptomatic since most are progressive. Waivers for asymptomatic cataracts are routinely granted, but due to their rate of deterioration, ophthalmological follow-up is often required every 6 months. Once vision has deteriorated to less than 20/20 correctable or the patient has a positive Glare test, the aircrew member should be disqualified from flying until successful surgical removal of the cataract. This cataract surgery requires resubmission for waiver and is usually granted provided the visual acuity returns to 20/20 corrected, is within refraction limits, and the Glare test is negative (normal).

INFORMATION REQUIRED: Ophthalmology consultation is required for initial waiver request. Prior to and after surgery, a Mentor Brightness Acuity Test (BAT, a glare testing device) should be performed with visual acuity documented for each eye separately at the low, medium and high settings. Confirmation is needed of the exclusion of underlying pathology such as Wilson's disease, diabetes or hypoparathyroidism.

FOLLOW-UP: Because of the potential for deterioration, ophthalmological follow-up may be needed every 6 months until surgery is deemed necessary. Annual ophthalmologic evaluations are required.

TREATMENT: Extracapsular lens extraction with intraocular lens (IOL) implants usually provide a sufficiently acceptable visual acuity result for military flying duties.

DISCUSSION: The visual effect of a cataract depends on its encroachment on the visual axis and the proximity to the nodal point. A posterior subcapsular cataract can have a devastating effect on vision. Two to three episodes of serious dehydration can increase the risk of developing a cataract 21-fold. Surgical success rates of greater than 90% in achieving a 20/40 best corrected VA after 1 year has been reported. The RAF restricts the flying of personnel with IOL from high performance aircraft and helicopters. This is because of the risk of pressure on ciliary body blood vessels under high Gz or vibration and because of the unknown long term effect on the corneal epithelium.

COLOR VISION ABNORMALITIES (ICD9 368.5)

AEROMEDICAL CONCERNS: Normal color vision is required to accurately identify warning lights and color visual displays in the cockpit, external visual cues including airfield lighting, the Fresnel lens, aircraft formation lights and colored smoke or light signals commonly used in military operations. Interactions with other optical devices, such as laser protective visors, may compound the problem.

WAIVER: Initial flight applicants are disqualified; exception to policy is not granted. Waivers are routinely granted for flight surgeons but other rated aircrew are restricted to flying with an individual with normal color vision. Waivers for a change in color vision in rated aircrew are usually granted if not due to ocular pathology.

INFORMATION REQUIRED: Pseudoisochromatic Plates or FALANT lantern may be used, ensuring proper testing conditions. (See below) Any failure of these tests should be evaluated by an ophthalmologist to determine the color axis and the specific type of color vision deficiency, i.e., tritanomaly, protanomaly, or deuteranomaly. A "tendency toward" is termed an -anomaly; a severe condition is called an -opia, for example, trianomaly/tritanopia, etc. Ophthalmology evaluation must also rule out the existence of an underlying abnormality such as an optic nerve disorder or retinal/macular problem.

An in-flight evaluation is required, consisting of viewing Aldis Gun Light sequences from a control tower at a distance of 1/2 to 1 mile (normal traffic pattern during VFR conditions) .Three of five sequences of 5 lights each will be viewed.

FOLLOW-UP: No follow-up is generally required unless underlying abnormalities exist.

TREATMENT: N/A.

DISCUSSION: Defective color vision is usually congenital, showing the X-linked recessive pattern. In Caucasians, more than 8% of males and 0.5% of women have inherited color defective vision and more than 2% are dichromats with severe deficiency. The largest group is actually trichromatic, considered color weak rather than color deficient. Dichromatics are protanopes if they have a red-green deficiency related to red-sensitive cone loss; deuteranopes if they are red-green deficient related to green-sensitive cone loss; and tritanopes if they have blue-yellow deficiency related to blue-sensitive cone loss. Deuteranopes and protanopes have difficulty interpreting VASI lights' red-white color relationship. Protanopes have difficulty interpreting red high speed taxiway exit and runway end marker lights. At night, dichromats may be further reduced to monochromaticity when the physiological phenomenon of small field tritanopia is added; this is of relevance in distinguishing navigation and anti-collision lights. Thus, while some color vision deficiencies are acceptable, the most problematical is obviously red/green abnormalities. Color vision can be affected after optic neuritis or in macular degeneration, central serous retinopathy, multiple sclerosis or as a sequela to heavy metal poisoning.

Pseudoisochromatic Plates (PIP)

The primary color vision test for the FDME. The plates should be viewed at a distance of 20-30 inches under proper illumination (McBeth easel lamp, indirect sunlight, or fluorescent light). Do not use incandescent lighting as this may allow mild deuteranomalous (green weak) individuals to pass. Each eye should be tested separately. Greater than or equal to 5 errors out of the 14 plate set or greater or equal to 4 errors out of the 17 plate set constitutes a failure of the PIP color vision test. The plates should be shuffled periodically to avoid memorization of the testing sequence and they should be replaced every 1-2 years due to fading. Results should be recorded as Pass or Fail with the number wrong/total (ex. PASS 2/14, FAIL 5/14).

Farnsworth Lantern test (FALANT)

Used when an aircrew member fails the PIP test. It is given in normal room light with the patient seated eight feet from lantern. The patient is asked to identify the Red/Green or White pairs of light combinations presented. Nine pairs are initially given to the patient and if all are identified correctly, the patient passes. If any pair is missed, however, a set of 18 pairs are presented and 3 or more errors out of all 27 pairs presented constitutes failure. Record this exam same as above (ex. PASS 0/9, FAIL 3/27).

CONVERGENCE INSUFFICIENCY (ICD9 378.83)

AEROMEDICAL CONCERNS: Most aircrew with convergence insufficiency are asymptomatic since they are only exophoric at near. Symptomatic aircrew, however, may break down to exotropia with fatigue or stress and complain of asthenopic problems (i.e., tearing, blurring, headache, fatigue, halo images) or frank diplopia.

WAIVERS: Near point of convergence insufficiency greater than 100 mm is consider disqualifying. Initial flight applicants with convergence insufficiency are disqualified; exception to policy is rarely recommended. Rated aircrew with asymptomatic convergence insufficiency are routinely waivered. Symptomatic convergence insufficiency may be granted waiver provided treatment (see below) provides relief of symptoms.

INFORMATION REQUIRED: An optometrist/ophthalmologist evaluation is required.

FOLLOW-UP: An annual optometrist/ophthalmologist evaluation is required. More frequent (every 6 mo.) evaluations may be required in some cases.

TREATMENT: Treatment consists of a regular series of orthoptic exercises which can easily taught by the flight surgeon or ophthalmologist/optometrist. Treatment usually takes four to eight weeks and follow-up is usually performed bi-weekly and includes the following exercises:

Base Out Prism Exercises
Consists of viewing near objects (i.e., reading) with a base out prism over one eye for 10 minutes then the other eye for 10 minutes. The exercise should be performed twice daily starting with a prism power equal to the patient's near fusional convergence and steadily increase the power of the prisms until 30-50 PD is reached.

Binocular Push-ups
Consists of viewing a visual acuity chart as close to eyes as possible for 10 minutes twice a day. This exercise is useful if the near point of convergence is abnormal, but is usually not effective without concurrent use of the base out prism exercise.

DISCUSSION: Successful treatment is determined by relief of symptoms, improved near point of convergence, or improved fusional convergence, and can be expected in 90% of the cases.

DECREASED VISUAL ACUITY (ICD9 367.9)

AEROMEDICAL CONCERNS: Decreased visual acuity degrades look-out and target acquisition which has proven over and over again to be the most important factor in successful outcomes of a combat operation (air or air to ground combat). Myopes have a risk of further myopic progression which rises with the degree of myopia regardless of age. High myopes have considerable visual distortion at the periphery of their spectacle lenses. In addition, they may see halos or flares around bright lights at night and are also more at risk of night blindness. Myopes have an increased risk of retinal detachment and of lattice degeneration of the retina, although exposure to routine G-forces in flying has not been shown to increase the risk of retinal detachment. Hyperopes with 3.0D or more of correction may experience problems with vision after treatment with atropine during chemical warfare. Hyperopes also have more problems with visual aids such as night vision goggles when they develop presbyopia. The interposition of another layer of transparency (spectacle lenses) between the aircrew and the outside world increases the risk of internal reflections, fogging and reduces the light reaching the retina by about 6%. Finally, spectacle frames interfere with look-out, cause hot spots and create unacceptable interactions with items of aircrew equipment. Decreased visual acuity is often associated with other visual performance degradation such as decreased stereopsis.

WAIVER: Failure of Class 1 or 1A visual standards are rarely favorably considered for exception to policy. Waivers are required for anyone with uncorrected distant or near visual acuity of greater than 20/400 in any eye or with vision not correctable to 20/20 in any eye. Restrictions are, however, required of all spectacle wearers. These include restricted to fly with spectacles which correct to 20/20 and/or must have in possession a second pair of spectacles which correct to 20/20. Waiver for visual acuity less than standards may be considered in designated individuals provided the central and peripheral retina is normal and all other visual standards are met.

INFORMATION REQUIRED: An optometry or ophthalmology consult is required with any waiver request for refractive error. Ophthalmology consultation, to include dilated fundus examination, is required for cases of decreased visual acuity not due to simple myopia, hypermetropia (hyperopia), astigmatism or presbyopia. Retinal evaluation should be obtained at corrections greater than 5.5 diopters. Patients with progressive astigmatism should be evaluated to exclude keratoconus. Class 1 and 1A applicants may be required to submit three cycloplegic refractions completed IAW ATB-5 (Cycloplegic Refraction).

TREATMENT: Refraction by spectacles is allowed within the limits set by AR 40-501, Chapter 4. Radial keratotomy or other corneal surgical procedure for the correction of myopia is considered disqualifying, waiver not granted. The designated Army Aviation Medicine Ophthalmology Consultant should be contacted for initial flight applicants who have had or are suspected of having excimer laser photorefractive keratotomy (PRK).

DISCUSSION: Myopia is usually a progressive condition, stabilizing for individuals around the age of 30. Significant myopia is complicated by considerable visual distortion at the periphery of corrective lenses. In addition, individuals with significant myopia may see halos or flares around bright lights at night and are also more at risk for night blindness. Elongated globes are at an increased risk of developing retinal detachment and of lattice degeneration of the retina. Whenever a prescription is changed, aircrew should be warned about transient visual distortion and counseled on the period of adjustment necessary. Evidence suggests that there is no difference in civil accident rates or in naval carrier landing accidents in pilots who require visual correction. Severe myopia tends to be a problem pertaining to Class 2 personnel since the entry requirements for other aircrew tend to be sufficiently stringent to exclude those whose vision would deteriorate that much. The risk of retinal detachment in normals is 0.06% over 60 years compared to 2% in -5 diopter myopes. Beyond 9.75 diopters, the risk increases to 24%. Recent studies of radial keratotomy suggest that the procedure leaves 28% of the eyes with unstable refraction and nearly all with glare problems. There is also evidence that suggest that patients who have undergone radio-keratotomy (RK) have decreasing visual acuity with altitude.

DEFECTIVE DEPTH PERCEPTION (ICD9 368.33)

AEROMEDICAL CONCERNS: Stereopsis is important for the aviator to maintain visual references. Defective stereopsis may make certain aviation duties such as landing, formation flying and aerial refueling more difficult. Helicopter aircrew members require normal stereopsis in order to successfully operate winch and rescue equipment and to control aircraft position in a hover either verbally or by means of an auxiliary hover controls.

WAIVER: No waivers will be considered for aviators in solo control of aircraft. Waivers will be considered for selected aircrew such as flight surgeons, physiologists, and ATCs. Waivers for aviators are occasionally granted which restrict them to flying with another fully qualified pilot, rated in the type and model of the aircraft being flown.

INFORMATION REQUIRED: Consultation with an ophthalmologist is usually necessary. The consult should address any history of diplopia or previous eye surgery and include the following tests: full ocular muscle balance testing, Verhoeff depth perception 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, and AO vectograph. Be sure to attach the pre-printed ocular motility worksheet on your consult form and ask the consultant to have it completed. Send both the consult and the worksheet with the waiver request. 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: N/A

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 in the ophthalmology consult. The most common causes of a recent loss of stereopsis is 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. 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.

DETACHED RETINA (ICD9 361.9)

AEROMEDICAL CONCERNS: A detached or torn retina can lead to visual impairment, the seriousness of which depends on the part of the retina involved and the success of therapy. Routine exposure to G-forces has not been shown to increase the risk of retinal detachment.

WAIVER: Waiver can be considered if the aviator has normal vision without complication.

INFORMATION REQUIRED: Ophthalmological evaluation is required for retinoschisis, retinal tears or central serous retinopathy.

TREATMENT: Diathermy, photocoagulation, cryotherapy, scleral buckling or laser therapy are acceptable treatments for retinal detachment or tears. The duration of central serous retinopathy may be shortened and the incidence of further attacks reduced by laser photocoagulation. Usually no treatment is required for retinoschisis unless rhegmatogenous detachment occurs.

DISCUSSION: With surgical treatment, there will be permanent reattachment of the retina in up to 90% of uncomplicated cases. If the macula is involved, the resulting vision in that eye is likely to be of the order of 20/200. The risk of retinal detachment in the other eye has been quoted as up to 13% at a mean interval of 5.7 years. Retinoschisis occurs in 3% of the population, with increasing frequency from the second decade. The final outcome of central serous retinopathy (choroidopathy) seems unaffected by the duration of the condition, the initial visual acuity or the age of the patient. Recurrences are frequent and approximately 20% of patients have the condition for more than 6 months.

EXCESSIVE PHORIAS (ICD9 378.4)

AEROMEDICAL CONCERNS: Excessive phorias are frequently associated with defective stereopsis and/or diplopia, a devastating state if this occurs during a critical phase of flight.

WAIVER: Excessive esophoria/exophoria > 8 prism diopters, hypophoria > 1 prism diopters, heterotropia of any degree, and a history of extraocular surgery after age 4 or before age 4 if other residual ocular abnormalities exist. Exceptions to policy are not granted and waivers are not normally considered due to the relative high risk of developing of diplopia during extended operations and night or reduced ambient light flights.

ICD9 Code	Condition
378.41	Esophoria
378.42	Exophoria
378.40	Hypophoria/Hyperphoria

INFORMATION REQUIRED: Ophthalmology consultation, preferably with a specialist proficient in aviation medicine, is necessary. The consult should address any history of ambliopia (lazy eye) or diplopia, any patching of one/both eyes, or previous eye surgery, and include the following tests: full ocular muscle balance testing, Verhoeff, vision testing apparatus (VTA), or Randot depth perception testing, testing for diplopia in the nine cardinal directions, pupillary exam, cover test (both near and far), alternate cover test, near point of conversion (NPC), red lens test, Maddox Rod test, Worth four-dot exam, and AO vectograph. The pre-printed ocular motility sheet should be completed and sent in along with the waiver request Cranial nerve palsies must be ruled out by this evaluation.

TREATMENT: N/A

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 of AR 40-501, a large neuromuscular effort would be 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 is interfered with and flight students often are not able to overcome this handicap, resulting in elimination from the program. Any added stress might cause a breakdown of fusion, leading 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.

Ocular Motility Worksheet

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

Pertinent History

Distant Visual Acuity	OD 20/ OS 20/	**Manifest Refraction**	OD OS	Corrected to 20/ Corrected to 20/

Cycloplegic Refraction	OD OS	20/ 20/	**Habitual Rx** OD OS

Correction used for remainder of examination: ☐Habitual ☐Manifest ☐None

Cover Test

Far (all gazes)				Near (all gazes)			

Extraocular Motility	**Maddox Rod or Von Graeffe**	**Steropsis (Verhoeff)**
Worth 4 Dot	**Vectograph (anti-suppression)**	**Red Lens**
4$^{\nabla}$ Base Out (if applicable)	**Other test results (if applicable)**	

Impression ☐**Qualified** ☐**Disqualified**

Provider Signature Block **Provider Phone Number:**

Date of Exam:

Specialty: **Location:**

Patient Name		**SSN:**
Rank	**Flight Class (circle one):** **1 1A 2 3 4**	**Unit Address:**

Revised: 15 Mar 1997

INSTRUCTIONS FOR OCULAR MOTILITY WORKSHEET

PERTINENT HISTORY: Explain why the work-up is being done. For example: "scored 7 esophoria on VTA" or " muscle surgery OS at age 6 years."

REFRACTION: All Class 1 and Class 1A flight applicants require a cycloplegic refraction recorded; all others require a manifest refraction. Those applicants with less than 20/20 unaided also require a manifest refraction.

HABITUAL RX: Record the subject's habitual Rx here if different from the manifest. If none is used, or the subject wears contact lenses, please note on the form.

COVER TEST: Report numerical values. Use a prism bar or loose prisms. Do horizontal and/or vertical as applicable to the case. Horizontal limits are approximately 45 degrees to the left and right of center. Vertical limits are approximately 25 degrees above and 35 degrees below center. Limits may need to be modified as dictated by the size of the nose and brow.

EXTRAOCULAR MOTILITY: Give description, such as "smooth and full."

MADDOX ROD/VON GRAEFE: Report numerical values for both horizontal and vertical phorias. Fixation target must be at 20 feet.

STEREOPSIS: Verhoeff, done at 1 meter in a normally lit room, is currently the only acceptable test. Neither the device nor the patient should move during the test.

WORTH 4 DOT: Perform at both distance and near. Report "fusion," "diplopia," or "suppression OD/OS."

VECTOGRAPH: Test on the 20/40 (V O C S R K 4) line of the A.O. Vectographic slide. Report any suppression and which eye is suppressing. If there is no suppression, state so.

RED LENS TEST: Test all 9 positions of gaze, just like the cover test. Report any diplopia. If no diplopia is reported, state so.

4^{Δ} BASE OUT TEST: Used to augment the A.O. Vectograph in the diagnosis of microstrabismus. This test is not always applicable and may be left blank if not used.

PROVIDER PHONE NUMBER: Indicate both commercial and DSN.

GLAUCOMA & OCULAR HYPERTENSION (ICD9 365/365.04)

AEROMEDICAL CONCERNS: Glaucoma is typically asymptomatic, but early signs may include a slow progressive loss of contrast sensitivity and loss of central or peripheral visual fields. Patients with Acute Angle Closure Glaucoma may present with night vision problems such as halos and flares around lights.

WAIVER: Both glaucoma (IOP $\geq$ 30 mm) and ocular hypertension (IOP 22.0 to 29.9 mm) or a persistent difference of 4 or more mmHg tension between the two eyes when confirmed by applanation tonometry, are disqualifying and require a waiver. Waivers may be granted if visual field loss is minimal and intraocular pressure is controlled at normal levels without miotic drugs. Miotic drugs are incompatible with night operations due to the inability of the pupil to dilate to admit sufficient light.

INFORMATION REQUIRED: An ophthalmology consultation is required anytime there is one or more IOPs at one visit > 24 mmHg or at different visits > 22 mmHg; there is an IOP difference between the eyes of 4 mmHg or greater; there is a optic nerve cup-to-disc ratio is > 0.5 or an asymmetrical cup-to-disc ratio between the eyes with a difference of $\geq$ 0.2; or a visual field deficit is suspected; and when there is a recent change of visual acuity, ocular trauma, uveitis, or iritis. Document the patient's blood pressure and heart rate response to medications in prone and standing (after 2 minutes) positions, BID for two days. IOPs must be documented from a Goldman's applanation tonometer, not from a non-contact tonometer "puff test" and must be obtained in the AM and PM for two days. Waiver requests must be accompanied by dilated fundus examination (to include comment on the cup-to-disc ratio), legible drawings of bilateral optic discs (noting mathematical estimates of the cup-to-disc ratio, and optic disc asymmetry, notching, or any other abnormality), Humphrey visual field test battery (30-2, 24-2), slit lamp examination, gonioscopy, and bilateral color photographs of the optic disks. An ophthalmology consultant should report the presence or absence of punctate epithelial keratitis, corneal anesthesia, and describe any abnormalities of the retinal nerve fiber layer viewed in red free light by direct ophthalmoscopic examination.

FOLLOW-UP: Quarterly measurements of intraocular pressure (IOP) are required for at least the first year of treatment, unless the consultant ophthalmologist specifies less frequent assessment. Annual submission of these quarterly evaluations along with current ophthalmology consultation are required.

TREATMENT: Aircrew members with ocular hypertension with IOPs between 22-25 require no treatment but will require follow-up on a quarterly basis, as above. Those with ocular hypertension with IOPs between 26-29 mmHg require treatment. For open angle glaucoma and ocular hypertension, the first choice agents are topical beta-adrenergic blockers such astimolol (Timoptic), levobunolol (Betagan), or betaxolol (Betoptic). Other acceptable treatment include Dipivefrin (Propine) and the carbonic anhydrase inhibitor dorzolamide (Trusopt) provided there are no aeromedically significant side effects. Side effects may be minimized by pinching off the lacrimal duct on administration in order to limit systemic absorption. Waiver can be considered for successful surgical treatment of closed angle glaucoma.

DISCUSSION: Preglaucoma (intraocular pressure between 20 and 25 mm Hg) does not necessitate treatment but regular (every 3 to 6 months) ophthalmologist/optometrist review is essential. If the patient has changing cup to disk ratios or deteriorating visual fields with pressures less than 30 mm Hg, then treatment will be necessary. Most treated glaucoma patients can maintain visual acuity while on therapeutic ocular medications. This is a difficult area because a clinical ophthalmologist's perspective of a successful treatment may not be adequate for the additional demands of the aviation environment.

KERATOCONUS (ICD9 371.60)

AEROMEDICAL CONCERNS: Blurred vision can interfere with flying. There is a long term risk of corneal scarring.

WAIVER: Keratoconus is considered disqualifying for all classes of aviation duty. Initial applicants are not considered favorably for exception to policy. Waiver may be possible for all other aviation classes in the early stages of keratoconus provided visual standards are met.

INFORMATION REQUIRED: Ophthalmological and optometric consultations are necessary. Exclusion of connective tissue disorders such as Marfan's or Ehlers-Danlos syndromes may be indicated. Patients whose best corrected acuity falls below 20/20 or those requiring corneal transplant will be disqualified from flying.

FOLLOW-UP: Annual ophthalmology consultation is required.

TREATMENT: Spectacles and/or hard contact lenses may be necessary to restore visual acuity to acceptable standards. Hard contact lens wearers must have in possession a pair of spectacles with corrected vision to 20/20.

DISCUSSION: The syndrome is usually bilateral but may rarely affect one side only. The symptoms usually start in the teens. The condition has been reported to be slowly progressive in 22.5% of cases but stabilization can occur at any time. It is very difficult to diagnose keratoconus in the early stages unless a corneal topographic mapping apparatus is used. Aviators with rapidly increasing myopia or astigmatism may warrant such testing.

OCULAR HISTOPLASMOSIS (ICD9 115.02)

AEROMEDICAL CONCERNS: The maculopathy that occurs in ocular histoplasmosis syndrome can lead to legal blindness. Performing the Valsalva maneuver can cause leakage into the maculopathy. Hemorrhages can occur in the fundus at high altitudes.

WAIVER: Waiver is possible provided visual acuity is normal. If histoplasmosis spots are present in the macular area, the patient should be grounded. In cases with many histoplasmosis spots, it may be wise to consider restricting the flier from unpressurized flight over 8,000 feet.

INFORMATION REQUIRED: Ophthalmology consultation is required.

FOLLOW-UP: Annual ophthalmology consultation is required. Macular histoplasmosis involvement should be followed daily by the individual aircrew member using an Amsler grid. Peripheral manifestations of histoplasmosis are usually asymptomatic and clinically irrelevant requiring no such watchfulness.

TREATMENT: Laser photocoagulation to limit exudation and prevent serous retinopathy is compatible with flying status. Patients should not be on flying status while taking steroids should these prove necessary.

DISCUSSION: Over 99% of histoplasmic infections are benign. Up to 2% of adults in the midwest have histoplasmosis spots disseminated in the fundus. The spots are more frequent in left than right eyes, but they are bilateral in 67% of patients. Some studies have reported 60% of patients with macular involvement become legally blind. If spots are present in the area of the disc, the risk of a symptomatic attack in the next 3 years is 20%; if none are present, the risk declines to 2%.

OPTIC NEURITIS (ICD9 377.30)

AEROMEDICAL CONCERNS: Optic neuritis causes a decrease in visual acuity which may progress rapidly over 1-3 days to a level of counting fingers. The symptoms may be worsened on exercise or exposure to high environmental temperatures. In some cases the condition may be an early indication of multiple sclerosis (MS).

WAIVER: Waiver may be considered provided MS has been excluded and provided the patient is clinically stable with normal visual acuity, stereopsis and color vision.

INFORMATION REQUIRED: Full ophthalmological examination and neurology consult are required.

FOLLOW-UP: An annual ophthalmology evaluation is required.

TREATMENT: N/A

DISCUSSION: An Air Force study group has shown that over 90% of patients had the condition in only 1 eye. Approximately 17% of the patients had a recurrence. Up to 93% eventually recovered to a visual acuity of 20/40 with 87% achieving 20/20. A total of 30% of patients eventually progressed to MS within a time span of 3 months to 6 years. While this percentage is much less than reported elsewhere, it is worth noting that the females are 3 times as likely as males to develop MS.

CORNEAL REFRACTIVE SURGERY (ICD9 V802A/V802B)

This policy establishes a medical process by which aviators (and flight school applicants) and other aircrew may obtain a medical waiver (or exception to policy) for the voluntary refractive surgery procedures laser in-situ keratomilieusis (LASIK) or photorefractive keratectomy (PRK) in order to improve visual acuity. Additionally, this policy letter establishes the aviation Corneal Refractive Surgery Surveillance Program (CRSSP) in cooperation with the US Army Aeromedical Research Laboratory. All aviation personnel receiving corneal refractive surgery must be enrolled in the surveillance program. It is not the intent of this policy to obligate any resources not readily available.

AEROMEDICAL CONCERNS: Corneal refractive surgery is a surgical treatment for the correction of refractive error (myopia, hyperopia or astigmatism). There are four surgical procedures. Civilian eye specialists are performing all procedures, but LASIK is currently the most common. PRK and LASIK have similar results in uncorrected visual acuity improvement at 6 months but differ in technique and immediate post-operative results:

Radial Keratotomy (RK): RK involves a radial pattern of surgical incisions in the cornea. Military ophthalmologists determined that RK does not produce stable visual correction in operational environments and seriously weakens the integrity of the eye. This procedure is not waiverable for the Army or Army aviation.

Photorefractive Keratectomy (PRK): PRK involves removing the corneal epithelium and then applying a series of fine laser ablations to re-sculpt the cornea. PRK lases through the basement membrane of the surgically removed epithelium and sculpts the corneal stroma to an average depth of 70 microns (typical corneal depth 550 microns). During the first weeks after the procedure the surface epithelium must repopulate the corneal surface causing discomfort and fluctuating vision. Some studies suggest there is increased risk of haze at the treated interface with increased ultraviolet exposure due to the destruction of the basement membrane even years later.

Laser in Situ Keratomileusis (LASIK): LASIK also uses the laser to sculpt the corneal stroma to a 70 micron depth but it differs from PRK in that a surgical blade is used to create a hinged flap approximately 160 microns thick. This flap is laid back and the stromal bed treated with the laser. When the flap is repositioned, vision is generally excellent immediately and there is no significant discomfort. LASIK has the theoretic risk of displacement of this flap, however preliminary basic science studies and clinical studies in the Airborne and Ranger student populations as well as the experience in the civilian population does not seem to support this concern as being of any operational or clinical relevance. The incidence of displacement of the flap is extremely low and the risk decreases with time.

Intra-Corneal Ring Implants (ICR): ICR involves creating two channels in the corneal stroma and inserting plastic arcs which expand the peripheral cornea and flatten the central cornea resulting in a decrease in myopia. It is an incisional procedure and is not waiverable for the Army or Army aviation.

ADVANTAGES: Prior to FDA approval, extensive clinical studies were performed to assess PRK safety and efficacy. Ten year follow-u p data is available from some of the studies conducted. M ore recently, the pool of those who may be eligible for treatment has expanded to include more severe forms of myopia, as well as hyperopia and astigmatism. Potentially 80-90 percent of people who require glasses for distance vision may be eligible for PRK. It is an effective procedure, with up to 95 percent of treated patients not needing distance glasses to achieve 20/40 vision or better. Approximately 75 percent of patients achieve 20/20 vision. The results may not be quite as good among patients with more extreme form s of myopia, hyperopia or astigmatism. The visual improvement appears to remain stable after healing from the surgery. Developing wavefront technology holds the promise of custom corneal ablations to produce “super-vision” (20/10- the theoretic anatomic limit of vision- which statistically occurs naturally more frequently in aviators attending the Navy’s Top Gun Program).

DISADVANTAGES: As with any surgical procedure, there may be side affects and complications. Most of these are short term, and resolve within a few weeks following the procedure. Some may take longer to resolve, or in a small percentage of cases, could be permanent. These include decreased night vision, glare sensitivity, and/or worsening of the pre-operation best vision due to scar formation and other effects of the healing process. With both PRK and LASIK, it is not uncommon for up to 10% of patients to require retreatment with the laser to ‘fine tune’ the desired corrective affects of the procedure. While the final visual acuity results are identical for PRK and LASIK, there is a longer recovery time following PRK. Though it is not anticipated that adverse complications will occur 10 or more years after the surgery, there is no data available to determine what, if any, changes may develop later in life.

WAIVERS: All forms of corneal surgery are disqualifying. Class 1 applicants may be considered for an exception to policy to enter flight training under the USAARL research protocol "Evaluation of Refractive Surgery for Army Aviation." Class 2F, 3 and 4 aviation personnel can be considered for waiver for PRK or LASIK on a case-by-case basis. C lass 2 personnel (aviators) are not currently authorized to have any form of refractive surgery; this policy is currently under review pending outcome of ongoing research studies.

***New Accessions**:* New accession applicants having had PRK or LASIK (civilians, ROTC, Academy and enlisted accessions) may be granted an exception to policy for accession into aviation duty if they meet all the following criteria:

a. Accepted into an Army-approved corneal refractive surgery study protocol for long-term follow -up.
b. Pre-surgical refractive error was less than or equal to plus or minus 6.00 (total) diopters in any meridian with less than or equal to plus or minus 3.00 diopters of cylinder and anisometropia less than or equal to 3.50diopters.
c. Applicants must provide detailed pre-operative, operative, and post-operative refractive surgery followup records prior to acceptance into an Army approved study.
d. At least 3 months elapsed since surgery or re-treatment and evidence of stable refractive error is demonstrated by two separate examination s performed at least one month apart.
e. Meet all other applicant entrance criteria as delineated in AR 40-501 and as specified by approved aviation study protocols.

Trained Aviation Personnel (All Classes): Personnel electing the surgery must receive authorization from their commanding officer prior to the procedure. Commanders should be advised that the procedures have a six to twelve week recovery period before aviation duties can be resumed. Army aviation personnel (class 2F, 3 and 4), upon approval by their commanding officers, may seek acceptance into the Army aviation CRSSP program. A waiver to return to flight duties will be recommended if they meet all surveillance requirements and all other physical standards as delineated in AR 40-501.

FOLLOW-UP: The annual flight physical must include an optometry/ophthalmology consult for completion of a slit lamp examination of the cornea, manifest refraction, corrected visual acuity and 5% contrast sensitivity test. The5% contrast test is not required for follow -up for classes 2F, 3 , and 4, but will be completed if available.

TREATMENT: (Refer to the CRSSP protocol)

DISCUSSION: Corneal refractive surgery will optimally result in less optometric support before and during deployment to Stability and Support Operations as well as combat operations. There is a significant medical logistics "footprint" of combat health support activities providing corrective lenses and protective mask inserts that may be lessened. This is especially important in current rapid deployment, high op tempo environments. Corneal refractive surgery is an additional benefit in the continuous development of new man-machine interfaced weapons based on routinely updated detailed vision parameters. This is especially important for increasingly complex flight environments where corrective lenses would be a hindrance. This is a new technology and long-range ramifications are not fully understood. Therefore, central to this policy is the aviation Corneal Refractive Surgery Surveillance Program (CRSSP) at the US Army Aeromedical Research Laboratory (USAARL). All aviation personnel who undergo corneal refractive surgery must be enrolled in the surveillance program and follow its established protocols. Advantages and disadvantages for both LASIK and PRK have been identified and will be further elucidated by the CRSSP. In order to do this, there are two study arms in the CRSSP, one looking at civilian accessions into aviation and one looking at active aviation personnel who desire the procedure. The civilian accession arm will follow subjects who have had either LASIK or PRK and who meet criteria specified in the CRSSP protocol. The other arm will include trained aviation personnel upon whom LASIK or PRK has been performed at the US Army Aeromedical Center or a DOD medical treatment facility (IAW AR 40-3, Chapter 2-10). USAARL will be responsible for providing study results and any required documentation to the Department of Defense Accessions Medical Standards Analysis and Research Activity (ASMARA) at CHPPM.

Download the necessary forms the USAAMA Website:
Enclosure 1: ***CRSSP Protocol***
Enclosure 2: **Informed Consent Form**

RETINAL VEIN OCCLUSION (ICD9 362.30)

AEROMEDICAL CONCERNS: Symptoms range from mild peripheral visual blurring to severe visual field loss.

WAIVER: The granting of a waiver will depend on the resultant visual acuity and the absence of other pathology.

INFORMATION REQUIRED: Ophthalmology consultation is necessary with confirmation that the visual acuity meets standards and that neovascular glaucoma has not developed. Exclusion of other pathology such as hypertension, diabetes, blood dyscrasias, multiple myeloma and dysgammaglobulinemia is required.

FOLLOW-UP: An annual ophthalmology consultation is required.

TREATMENT: Photocoagulation is sometimes useful in central retinal vein thrombosis and in long-standing cases of branch retinal vein occlusion.

DISCUSSION: Macular edema occurs in 57% of cases of occlusion of the temporal branch of the retinal vein. Visual acuity improves in 60% of patients with branch retinal vein occlusion and 50% achieve visual acuity of 20/40 or better within 1 year. In central retinal vein occlusion, neovascular glaucoma develops in 15% of cases.

UVEITIS (ICD9 364.3)

AEROMEDICAL CONCERNS: The acute condition can cause distracting pain in the eye, floaters, excessive tearing, photophobia, and blurred vision. Long term sequelae include cataract, glaucoma, retinal damage, corneal band keratotomy and loss of vision.

WAIVER: This condition, when chronic or recurrent, is disqualifying.. There is no requirement for waiver request when transient uveitis is due to a traumatic event, provided symptoms completely resolve and visual acuity returns to 20/20.

INFORMATION REQUIRED: Ophthalmology consultation is mandatory for non-traumatic cases. Associated diseases causing uveitis, such as sarcoidosis, ankylosing spondylitis, tuberculosis, syphilis and toxoplasmosis should be excluded.

TREATMENT: Patients should be grounded during the active phase of the disease and while treatment is continuing.

DISCUSSION: Almost 3/4 of all cases of uveitis will have no identified etiology. The association with sarcoidosis, ankylosing spondylitis and Reiter's syndrome only accounts for 5% of all cases of uveitis. Up to 20% of all cases of ankylosing spondylitis will have uveitis, often presenting with the condition. The anterior uveitis of herpes zoster occurs in 40% of patients with ocular involvement and can last for 2 years. Toxoplasmosis or syphilitic uveitis is rare in adults but can occur.

ORTHOPEDIC WAIVERS

ABNORMAL SPINAL CURVATURE (ICD9 737)

AEROMEDICAL CONCERNS: Excessive kyphosis, scoliosis, lordosis or combinations of them may make the spine unstable during ejection or during a survivable aircraft accident. Symptomatic conditions may cause distracting backache during flight.

WAIVER: Scoliosis of the lumbar or thoracic spine of any degree is considered disqualifying for initial flight applicants. If the condition is proven to be stable over a 12-month period and is 20 degrees or less, initial flight applicants are considered qualified. Rated personnel are only considered disqualified if their scoliosis is greater than 20 degrees, but they can be routinely waived to 25 degrees if they are asymptomatic. Kyphosis or lordosis over 55 degrees is considered disqualifying. Waiver is not normally granted when there is pain or interference with function or when the condition is progressive.

ICD9 Code	Condition
737.0	Kyphosis
737.2	Lordosis
737.3	Kyphoscoliosis
737.30	Scoliosis, within standards

INFORMATION REQUIRED: Orthopedic consultation with measurement of any scoliosis by the Cobb method. Cardiology consultation may be required to exclude pulmonary hypertension in those cases where right axis deviation leads to ECG abnormalities. Forward copies of the radiographic films along with AMS to USAAMA for review. A photograph of the individual's back with markers in place to demonstrate abnormalities may also be helpful.

TREATMENT: Surgical treatment is disqualifying.

DISCUSSION: The center of gravity of the upper torso lies in front of the spine. Whenever loads are applied along the spinal axis, as in ejection or hard landings/crashes which involve a high sink rate, a torque is produced which increases as the disparity between the long axis of the spine and the line of application of the force is increased. Crash dynamics of Army helicopters' hard landings/crashes are such that the primary loads are applied along the vertical axis and are associated with an increased risk of back injury (compression fraction, ruptured intravertebral disk, etc.). Those individuals with an abnormally high degree of spinal curvature are at a significantly increased risk for serious back injury. The long term outcome in cases of scoliosis up to 30 degrees is very favorable but above 30 degrees is uncertain. Note that there is a 3-5 degree error in measurements taken by the Cobb method.

ANKYLOSING SPONDYLITIS (ICD9 720.0)

AEROMEDICAL CONCERNS: Cramped cockpit conditions for prolonged periods may exacerbate the eventual disability. Spinal rigidity in advanced cases is incompatible with ejection, may interfere with emergency ground egress and can cause restriction in peripheral vision. Concomitant iritis occurs in 10 to 25% of cases.

WAIVER: Waiver is possible in early cases with normal mobility.

INFORMATION REQUIRED: Orthopedic and optometric/ophthalmologic evaluations are necessary. Recommendations of a PEB or MEB may be required.

FOLLOW-UP: Annual orthopedic and optometric/ophthalmological evaluations are required. The local flight surgeon should follow such individuals closely for progression of disease or worsening of their disabilities.

TREATMENT: The cornerstone of treatment while continuing a flying career is a regular exercise routine which the patient must follow scrupulously. Physical rehabilitation may be necessary following flare-ups. Long term maintenance therapy with non-steroidal anti-inflammatory drugs is not normally considered for waiver.

DISCUSSION: Sacroiliitis is often the earliest manifestation of ankylosing spondylitis and can be noted on an AP view of the pelvis. No lab test is diagnostic, but the HLA-B27 gene is present in over 90% of caucasians and 50% of blacks. The ESR and C-reactive protein are usually elevated. Clinical diagnosis should be suspected with a history of chronic back pain, loss of motion of lumbar spine, limited chest expansion, and radiographic evidence of sacroiliitis. Other possible complications include cardiac conduction defects, aortic incompetence in about 4% of patients who have had the condition for 15 years, uremia arising from amyloidosis in up to 6%, and chest rigidity giving rise to ventilation/perfusion abnormalities. Spinal cord damage can arise from fractures of the rigid cervical spine, and spontaneous subluxation at the atlantoaxial joint with quadriplegia has been described.

BACKACHE & OSTEOARTHRITIS OF THE SPINE (ICD9 7242 / 721.90)

AEROMEDICAL CONCERNS: Discomfort in flight can make it difficult to remain seated for long periods and can detract from performance or interfere with the satisfactory completion of a mission.

WAIVER: A history of chronic or recurrent disabling episodes of back pain, especially when associated with significant objective findings, is considered disqualifying. Waiver can be granted when the pain or discomfort is controlled by conservative, non-pharmacological means or with the chronic use of NSAIDS. (See Medications APL) Initial flight applicants with any history of persistent back pain are not considered favorable for exception to policy.

INFORMATION REQUIRED: Sufficient investigation to exclude specific causes of back pain, such as prolapsed intervertebral disc, metabolic bone disease, metastatic bony deposits, myeloma, ankylosing spondylitis, rheumatoid arthritis, infection, structural defects and injury. Orthopedic or rheumatological opinion may be required.

FOLLOW-UP: Orthopedic consultations may be required. Normally, if the condition is stable and causes no interference with aviation duties, an annual follow-up may be performed by the local flight surgeon.

TREATMENT: For backache, simple conservative measures such as bed rest and some forms of remedial exercises or physiotherapy may be beneficial and do not interfere with flying status. A temporary surgical corset for use on the ground may be beneficial. The empirical use of local anesthetic and steroid by caudal or epidural injection may be used but the patient should be grounded at least 24 hours. NSAIDS may be used for treatment as long as the flight surgeon monitors side-effects closely. (See Medications APL) Other medications are usually not waiverable.

DISCUSSION: The incidence of backache in pilots occurring only during flight has been reported as 13%. Helicopter pilots reported a higher incidence. Degenerative changes in the cervical spine are common over the age of 30 years. Ninety percent of back pain is preventable, and it is the flight surgeon's responsibility to educate the unit's aircrew members to avoid these problems.

CHRONICALLY DISLOCATING SHOULDER (ICD9 718.31)

AEROMEDICAL CONCERNS: Dislocation of the shoulder may result in pain, limited range of motion, or parethesias. If this were to occur in combat situations or during critical flight missions, it could result in disastrous consequences with distraction, loss of control, and interference with mission completion.

WAIVER: A single episode of dislocation without recurrence for 12 months is not considered disqualifying. Substantiated history of recurrent dislocation of the shoulder is considered disqualifying. Waivers are usually recommended following surgical correction provided there is full range of motion and strength. Initial flight applicants are rarely granted exception to policy for history of recurrent dislocation.

INFORMATION REQUIRED: Orthopedic consult and physical therapy reports documenting full range of motion are required..

FOLLOW-UP: Follow-up is not normally required. If following a 12-month period in which the aircrew member has had no recurrence of symptoms, he may request the waiver be removed and return to full qualification.

TREATMENT: Surgical correction and rehabilitation.

DISCUSSION: Possible complications following surgery include subluxation, recurrent dislocations, bone block resorption and continued pain. Rates of complication are low, particularly with a modified Bristow procedure.

INTERVERTEBRAL DISC DISEASE (ICD9 722.2)

AEROMEDICAL CONCERNS: Discomfort or pain can degrade flying performance while the forces of ejection, excess G-forces, and hard landings can exacerbate the condition. One case of acute quadriplegia under G-stress has been reported.

WAIVER: A history of HNP with or without surgery in an initial flight applicant is disqualifying with no exception to policy. In asymptomatic aircrew members, it is considered disqualifying but usually waivered provided there is no instability of posterior elements (as demonstrated by lateral flexion/extension radiographs), full ROM, and no symptoms, a normal neurologic exam, and no medications. Aircrew members with cervical HNP will normally be granted waiver with restriction from all aircraft with ejection seats.

ICD9 Code	Condition
722.0	Cervical disc displacement without myelopathy
722.11	Thoracolumbar disc displacement without myelopathy
722.70	Herniated Nucleus Pulposus with symptoms
P80.51	Laminectomy
P80.52	Intervertebral Chemonucleolysis
722.10	Lumbar, lumbosacral

INFORMATION REQUIRED: Orthopedic/neurosurgical consultation with confirmation of the diagnosis by visualization of the herniated nucleus pulposus by MRI scan or other methods. If surgically fused, post-operative radiographic studies demonstrating stability of the posterior elements are required..

FOLLOW-UP: No follow-up is normally required other than a routine FDME. Recurrence of symptoms will require further orthopedic/neurosurgical consultation

TREATMENT: Conservative therapy (i.e., bed rest, NSAIDS, physical therapy) is normally the first treatment considered. Following a reasonable course of conservative therapy, if symptoms persist, surgery may be considered. Physical therapy consultation will help to maintain strength and flexibility in any chosen course of therapy.

DISCUSSION: In 50% of cases of lumbar disc protrusion, there is a history of trauma, straining or lifting heavy weights. Cervical symptoms may arise as a result of high Gz maneuvering particularly in crew members other than the pilot in control of the aircraft. Conservative therapy yields a 20% cure rate; the remainder experiencing some pain or discomfort. Surgical treatment of selected cases where root compression is symptomatic and progressive can yield complete relief from symptoms in up to 80% of cases.

KNEES - ACL TEARS (ICD9 717.83)

AEROMEDICAL CONCERNS: An unstable knee is a safety factor during foot pedal (helicopter) or rudder/brake pedal (fixed wing aircraft) operations especially during emergency procedures (i.e., hydraulics off, engine failure, loss of tail rotor effectiveness, etc.), emergency egress, or water and land survival (both training and potential real life scenarios). It also puts the aviator at a significant disadvantage when confronted with actual combat situations.

WAIVER: Waiver recommendations require that the patient have a stable, functional joint. Recurrent internal derangement of the knee is considered disqualifying without exception to policy for initial flight applicants and evaluated for waiver on a case-by-case basis for rated aviators. A history of ACL repair is considered disqualifying but may be granted a waiver or exception to policy once full stability and strength of 90% is achieved compared to the other knee as measured by a Kin-Com device; available at most physical therapy clinics, or equivalent testing. This normally takes up to 6 months after surgery.

ICD9 Code	Condition
717.3	Medial Meniscal derangement
717.40	Lateral Meniscal derangement
717.7	Chondromalacia of the patella
717.83	Anterior Cruciate Ligament disruption, old
717.84	Posterior Cruciate Ligament disruption, old
P80.26	Knee Arthroscopy
844.0	Lateral Collateral
844.1	Medial Collateral

INFORMATION REQUIRED: Orthopedic consultation documenting stability of the knee and a successful outcome of surgery. Member must be pain-free with full ROM, normal strength, and requiring no medications. Requests for waiver should contain a complete picture of the patient's level of physical activity, any limitations, and most recent PT scores. A simple test of functional stability should be included:

- Duckwalk 20 feet
- Do ten squat jumps
- Hop on the injured leg 20 times.

TREATMENT: Only surgically repaired ACLs will be considered for a waiver. Conservatively treated ACLs remain disqualified and are not usually recommended for waiver.

DISCUSSION: 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 be found on x-ray. Following surgical repair, intensive quadriceps building is required to prevent recurrent injury.

JOINT REPLACEMENT

AEROMEDICAL CONCERNS: The major concerns following joint replacement relate to stability of the artificial joint during ejection, emergency ground egress, or escape and evasion.

WAIVER: Waivers are possible following hip or shoulder replacement, but the aircrew member will likely be restricted from aircraft with ejection seats. Joint replacements in other joints have been granted without restriction.

ICD9 Code	Condition
8151	Hip Replacement (total)
8152	Hip Replacement (partial)
8154	Knee Replacement
8156	Ankle Replacement

INFORMATION REQUIRED: Full orthopedic evaluation is required. A cockpit assessment by a flight surgeon and the unit's senior instructor pilot may be necessary.

FOLLOW-UP: Annual orthopedic consultation is required.

TREATMENT: N/A.

DISCUSSION: The cemented total hip replacement provides a good to excellent clinical result in up to 85% of patients for at least 15 to 20 years. The failure rate is about 1% a year of follow-up. Cementless hip replacement has not been used for as many years but there is a low revision rate and high durability for at least 12 years. Up to 20% of patients with cementless hips experience unexplained pain or limp. Some movements predispose to dislocation of an artificial hip although dislocation is only reported in 1% of patients. In particular, the abduction, flexion and rotation of the hip during entry to the cockpit may result in dislocation. In addition, flailing of the limbs following ejection may result in dislocation. Moreover, the replacement joint is often much heavier than the original and may affect flotation. A case has been reported where a strong swimmer could not stay afloat following bilateral knee replacement. Failure of the artificial joint (fracture) or loosening of the attachment of the joint has been reported during athletic activity in up to 6% of patients, particularly in those who are younger and heavier, and in those with cementless prostheses. Heterotopic bone formation occurs in up to 70% of patients with total hip replacement, but this causes pain in less than 4%.

ORTHOPEDIC HARDWARE - RETAINED (ICD9 V457.8)

AEROMEDICAL CONCERNS: Fracture and migration of retained hardware when stressed, weakening of the bony structures, and failure to heal the condition for which the hardware was placed are all safety of flight and mission completion concerns.

WAIVER: Retained staples, wires, screws, etc., are considered disqualifying until reviewed by USAAMA. Waivers are normally not required for retained hardware provided: (1) It does not traverse a joint. (2) It is not located in the spine. (3) It is not intramedullary within major long bones (i.e., radius, ulna, humerus, femur, or tibia). (4) It does not constitute replacement arthroplasty. (5) It is asymptomatic without tenderness, overlying skin irritation, or pain with ambient temperature change. Waivers for any of these above 5 conditions have occasionally been recommended but are granted on a case-by-case basis. Retained bioelectric devices (implanted bone and nerve stimulators) imply the persistence of a disqualifying condition and are considered disqualifying with waiver unlikely. If the device has been "curative", then it is no longer required and should be removed unless it is determined that removal may be detrimental.

INFORMATION REQUIRED: Orthopedic consultation and x-rays (actual films required). Occasionally an in-cockpit evaluation may be required to access the aviator's ability to perform rapid egress.

TREATMENT: Removal may be a consideration when the retained hardware is associated with the problems noted above.

DISCUSSION: Often the underlying orthopedic condition is disqualifying and of greater concern. Pedicle screws, Harrington rods, circlage wires and fixation plates too frequently become broken as a result of "metal fatigue" over time, often with disastrous neurologic consequences.

RHEUMATOID ARTHRITIS (ICD9 714.0)

AEROMEDICAL CONCERNS: Pain and stiffness can be a distraction in flight. Patients tend to "gel" when in one position for a long time and this could impair emergency egress on the ground. Cervical spine involvement could lead to quadriplegia after violent movements of the neck, exposure to high Gz or ejection. The requirement for maintenance therapy and specialist review may make worldwide mobility difficult.

WAIVER: Waiver may be possible for asymptomatic aircrew with normal function.

INFORMATION REQUIRED: Rheumatological consultation should include cervical x-rays in full extension and full flexion to exclude cervical spine subluxation.

TREATMENT: Treatment with first line drugs such as salicylates and second line drugs such as chloroquine may rarely be considered for waiver provided there are no side effects. Patients who have a good result from synovectomy and those requiring joint replacement may be considered on an individual basis. Gold therapy has been waivered once the course of therapy has been completed. High dose NSAIDs, prednisone and Methycholine are not waiverable medications and use of these medications imply that the disease process is beyond what is considered waiverable.

DISCUSSION: Rheumatoid arthritis occurs in 1% to 3% of white adults. The peak incidence is 35-55 for females and 40-60 for males. There is sudden onset with anorexia, weight loss, fever, fatigue and malaise in 10-20% and insidious onset in the remainder. There is involvement of the cervical spine in 80% of cases, often asymptomatic, with about 25% having atlantoaxial joint subluxation and up to 86% having radiological evidence of instability of the cervical spine. Up to half will have no symptoms referable to their necks. Sudden onset of quadriplegia and death have been reported although both are rare. In addition to the dangers of flying at high Gz and of ejection, patients with rheumatoid arthritis must have their neck x-rayed at full flexion and extension to identify any instability before any general anesthetic. Rheumatoid nodules are present in 20% of cases, mainly on the elbow or extensor aspect of the forearm. There is pericardial effusion in 55% of patients with nodular disease (and 15% of those without). A nonspecific (usually aortic) valvulitis has been reported in up to 30% of cases at postmortem. Anemia is common although the most common cause is drug toxicity. Of all cases, 30% will progress to severe disability, 10% will have no disability and the remainder will usually progress on a spectrum between the 2 extremes on a course of remissions and exacerbations. Between 10-15% will progress relentlessly but 10% of cases will have only one attack of the disease. Poor prognosis is related to insidious onset, early involvement of large joint, early extra-articular manifestations of the disease and persisting active disease without remission for more than 1 year. The measurement of conserved sequence in the third allelic hypervariable region of the major histocompatibility complex class II beta chain (DR4/Dw4, DR4/Dw14, DR1/Dw1), defective sulfoxidation capacity in combination with rheumatoid factor may be of assistance in determining which patients will develop bone erosion. In one study, 92% of patients with early symmetrical rheumatoid arthritis who had all 3 of these factors, developed erosive bone lesions within 4 years compared to 62% of those patients with 2 risk factors and 7% of those with only one risk factor.

SPINAL FRACTURES (ICD9 805)

AEROMEDICAL CONCERNS: An unstable spine can result in sudden spinal cord injury. Fractures that do not heal or result in significant loss of vertebral body height are more readily de-stabilized in response to additional stressors produced by ejections, hard helicopter landings, high gravitational stressors, etc. Spinal fractures may be associated with spinal cord, nerve root or plexus injuries. Post-traumatic syringomyelia can have an unpredictable course with the potential for sudden deterioration.

WAIVER: Spinous process fractures not involving the lamina, pedicle or body are not considered disqualifying. Cervical: A 6-month grounding is required for patients with small anterior chip fracture or less than 25% compression. At 6 months, if the patient is pain-free, has full ROM, no instability on lateral views, and has no radicular symptoms, he will be considered for non-ejection-seat aircraft. At 12 months, if all the above criteria are still met, this restriction can be removed. Cervical spine fractures with more than 25% compression or with evidence of instability on lateral views or with radicular symptoms will rarely be considered for waiver. Thoracic: A three month period of grounding for single fracture with less than 50% compression or wedge with no scoliosis on AP views is required. At 3 months, if patient is pain-free and with no instability, consider waiver for non-ejection-seat aircraft and at 12 months no restrictions. Thoracic spine fractures with more than 50% compression or with evidence of scoliosis or more than one compression can only be considered a waiver on a case-by-case basis. Lumbar: A three month period of grounding for a single fracture less than 50% compression or wedge with no scoliosis on an AP view is required. At 3 months, if pain free, no instability or spondylolysis or spondylolisthesis and no radicular pain, consider waiver for non-ejection-seat aircraft and at 12 months no restrictions. If more than 50% compression, or with instability on x-ray or with radicular symptoms or associated HNP, a waiver can be considered only on a case-by-case basis.

ICD9 Code	Condition
805.00	Fracture of Cervical spine, closed, without spinal injury
805.2	Fracture of Thoracic spine, closed
805.4	Fracture of Lumbar spine, closed

INFORMATION REQUIRED: Orthopedic or neurosurgical consultation, x-rays and MRI scan of regional neuroanatomical structures may be required.

TREATMENT: Stable fractures without neurologic injury respond well to conservative management. Those injuries requiring surgical decompression and/or stabilization usually leave the member with permanent disabilities incompatible with return to aviation duties.

DISCUSSION: In C-spine injuries, the key question in returning to flight status is stability of the spine. Often, bony injuries heal with no residual instability. Ligamentous injuries, in contrast, may heal with various degrees of instability. Early on, instability may be detectable by obtaining lateral views in flexion and extension of the C-spine. Chronic instability results in degenerative changes such as disc space narrowing and asymmetry. Also, osteophytic changes and foraminal narrowing are seen in the oblique views. The common wedge or chip fracture often seen at the C4-6 level, with no instability noted, has an excellent prognosis. Lumbar compression/wedge fractures generally heal with no instability. Purely ligamentous injuries of the L spine are uncommon however, there is potential for degenerative disc disease which could lead to herniation. Spinal compression fractures are a common ejection injury (20 - 30% of ejections) with most fractures occurring between T9 and L1. For this reason, all survivors of ejections should undergo complete spine x-rays. Finding a compression fracture on x-ray often raises the question of age of the fracture. Widening of the paraspinous line on x-ray and symptoms appropriate to the location of the identified fracture are indicative of an acute injury. A radioisotope bone scan may remain "hot" for up to two years post-compression fracture. Once healed, the damaged area does not appear to be unduly susceptible to repeat fracture.

SPONDYLOLISTHESIS (ICD9 756.12)

AEROMEDICAL CONCERNS: Spondylolisthesis is unlikely to cause incapacitation in flight but, if symptomatic, will cause considerable distraction. Theoretically, spondylolisthesis could cause severe problems on ejection.

WAIVER: Asymptomatic Grade I spondylolisthesis without spina bifida is considered qualified. Asymptomatic cases or patients who have had successful surgery may be considered for waiver on a case-by-case basis. Higher grades of spondylolisthesis or symptomatic Grade I are considered disqualified, exceptions to policy or waivers rarely considered.

INFORMATION REQUIRED: An orthopedic, neurologic, rheumatology or physical medicine consultation for initial waiver of rated aviators is required to exclude other causes of backache.

TREATMENT: Education in proper body mechanics and use of the back. A program of daily back exercises. Spinal fusion may be appropriate in certain cases.

DISCUSSION: Aircrew who have frequent symptoms should not continue to fly. Further slipping of the vertebra (usually L5) can occur with exposure to excessive gravitational forces, ejection or even during normal activities on the ground.

SPONDYLOLYSIS (ICD9 721.90)

AEROMEDICAL CONCERNS: This condition usually is a cause of low back pain but may also cause radiculopathy secondary to accumulation of fibrocartilage at the site of defect in pars interarticularis. Distracting pain and nerve root impairment are incompatible with safe flight operations.

WAIVER: Considered disqualifying with no waiver for initial flight applicants but may be waivered if asymptomatic in designated members.

INFORMATION REQUIRED: Specialty consultation (orthopedic, neurosurgical or neurologic), x-rays and, where appropriate, CT and MRI scans are required for initial consideration for waiver.

TREATMENT: Conservative treatment may achieve temporary relief of symptoms; however, upon resumption of vigorous physical activities, symptoms usually return. Eventually fusion and nerve root decompression may be required.

DISCUSSION: The defect in the pars interarticularis (neck of the "Scotty dog") may be acquired from acute trauma, or more commonly, may result from chronic stress (stress fracture). Rarely is it of congenital origin. These occur primarily at L5-S1 and somewhat less at L4-L5. There is an inherited proclivity for the condition (dominant transmission) with an incidence that increases with age up to the end of the fourth decade. It exists in about 5% of the general population but is much higher in certain races (Japanese, Eskimo) where it may be as high as 45%. Instability of the posterior spinal elements is associated with the development of spondylolisthesis which is frequently progressive. This condition is likely to be accelerated by the physiological stresses of military flight activities.

OTORHINOLARYNGOLOGY WAIVERS

ACOUSTIC NEUROMA (ICD9 225.1)

AEROMEDICAL CONCERNS: Progressive hearing loss, tinnitus, trigeminal hypesthesia, imbalance, and occasionally true vertigo have all been attributed to acoustic neuromas. However, the onset is not normally acute. Following surgery, total hearing loss, labyrinthine dysfunction, and facial nerve weakness or paralysis can be present on the side of surgery.

WAIVER: A request for waiver may be submitted 6 months after successful removal of the tumor provided the sequelae are within acceptable limits. Specifically, the tumor must have been 2.5 cm diameter or less; unilateral, postoperative vertigo must have completely resolved; and any damage to cranial nerves should allow full eye movement without strabismus or tracing deficit and acceptable mask sealing. Psychomotor performance should be within normal limits for aircrew members.

INFORMATION REQUIRED: A complete AMS with ENT, audiology (to include speech discrimination in each ear), neurology and neurosurgery evaluations are required. Surgical and pathology reports are also required..

FOLLOW-UP: Annual ENT evaluation is required.

TREATMENT: Surgical excision is compatible with waiver in selected cases.

DISCUSSION: Acoustic neuromas have a peak incidence between 40 and 50 years. The majority are schwannomas arising from the superior vestibular division of the eighth nerve, usually extending from the internal auditory canal into the cerebellopontine angle as they enlarge. In patients with neurofibromatosis, neuromas can occasionally be bilateral. Acoustic neuromas are virtually always benign. Operative morbidity is related to the size of the tumor, and hearing is often affected. Up to 50% of patients will have no useful hearing in the involved ear after surgery. Other cranial nerves also may be damaged during surgery (i.e., trigeminal and facial). Facial paralysis may make wearing of an oxygen mask difficult, may result in speech problems, and can cause eye symptoms due to inability to close the eyelids.

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 possibly causing significant periods of down time and, thus, reduced operational effectiveness. The reduced sense of smell could be hazardous in the cockpit. Congestion and swelling of the nasal passages could interfere with the movement of air and result in airway compromise, discomfort, the use of medications with unacceptable side effects (i.e., drowsiness), ear and sinus barotrauma with potential for in-flight incapacitation.

WAIVER:

Initial Class 1A/1W Applicants:
Mild seasonal allergic rhinitis with symptoms less than 30 days a year and treated with short acting decongestants, antihistamines or intranasal steroids will be recorded as *information only*. Exception to policy must be requested for initial flight applicants who have been treated for greater than 30 days per year, or used systemic or topical steroids, prolonged antihistamine use, mast cell stabilizer therapy, immunotherapy, or have a history of sinus surgery to include polyp removal.

Initial Classes 2, 3 & 4 Applicants:
Uncomplicated perennial or seasonal allergic rhinitis is not disqualifying and will be recorded as *information only*. Uncomplicated means treatment less than 30 days a year.

Rated Aviation Personnel (All Classes):
Rated aircrew members will require a waiver if the condition is controlled by immunotherapy; or chronic (>30 days per year) use of a non-sedating antihistamine, as long as there are no significant adverse effects. (See Medications APL) Rated aircrew whose condition is controlled by intranasal steroids alone do not require a waiver and will be classified as *Information only*.

INFORMATION REQUIRED: All requests for waiver should include:

- Brief AMS – to include major symptoms, duration and frequency of symptoms, medications or treatments used in the past, environmental triggers (e.g. animals, pollens, cold, altitude changes, etc.), and any smoking history
- Allergy skin testing
- ENT and allergy evaluations in cases of prolonged or moderate-to-severe symptoms should be included if consultation was requested.

FOLLOW-UP: None required unless symptoms worsen with significant impact on aircrew readiness.

TREATMENT:

- *Antihistamines* — Fexofenadine (Allegra), and Loratadine (Claritin), (all other antihistamines are Class 4-non-waiverable, including Cetirizine (Zyrtec)). This is the recommended first line treatment for mild disease.

- *Cromolyn sodium (Nasalcrom)* — This is effective, but requires frequent (qid) dosing.

- *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. (See Medications APL)

- *Intranasal Anticholinergics* — Ipatropium 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.

- *Immunotherapy* — may be used while the aviator remains on flight status provided he (or she) remains relatively 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. (AR 40-8, Temporary Flying Restrictions due to Exogenous Factors, paragraph 4 b, August 1976) 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 medicated 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. Total IgE or eosinophil counts are not good screening tests and therefore are not recommended. Nasal smears are also dependent on good technique in obtaining, staining, and interpretation and are not recommended for diagnosis.

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.

CHOLESTEATOMA (ICD9 3853.0)

AEROMEDICAL CONCERNS: Hearing loss and risk of recurrence, with the possibility of labyrinthine involvement, and even intracranial extension, in the more advanced cases.

WAIVERS: A history of cholesteatoma is disqualifying. It must be surgically removed before a waiver can be considered. Since the recurrence rate is approximately 35%, initial waivers are for one year only, with a mandatory ENT consultation before the waiver can be continued. Persistence of cholesteatoma after surgery would be cause for waiver denial.

INFORMATION REQUIRED: A current ENT and audiology evaluation are necessary, even if the surgery was in the distant past. At the time of initial submission, the operative report should be included; since cholesteatomas can vary hugely in extent and effect, the report will be of great help in deciding waiverability. Since cholesteatoma surgery usually involves the mastoid, there is risk to hearing, balance, and facial nerve function. Any impairment in these areas should be addressed in the waiver request. Post-op hearing that is below standards will also require a waiver. (See Hearing Loss APL).

FOLLOW-UP: An ENT evaluation is required annually. An audiology evaluation may be required if hearing is below standards.

TREATMENT: Surgical removal.

DISCUSSION: Given the relatively high recurrence rate, it is important that every attempt is made to assure that there is no residual disease. Recurrent or continuous drainage following surgery may indicate the presence of cholesteatoma residue, and is not waiverable. Occasionally, the surgeon will plan (or advise) a re-exploration of the ear at a specific time in the future, usually 12-18 months. Every attempt should be made to have this done as the chance of residual disease is significant.

DISORDERS OF THE SALIVARY GLANDS (ICD9 527)

AEROMEDICAL CONCERNS: Pain or discomfort often result from retained salivary stones, especially after eating or drinking. Tumors may interfere with oxygen mask fit.

WAIVER: Following successful treatment of salivary stones or tumors, a waiver may be granted provided there is no facial deformity or nerve damage that would interfere with flight duties.

ICD9 Code	Condition
5270	Atrophy
5271	Hypertrophy
5272	Sialoadenitis

INFORMATION REQUIRED: A complete AMS is required along with copies of all pertinent consultations, plus CT/MRI reports (and films, if available); if surgery has been done, copies of the operative and pathology reports; if malignant, an oncology evaluation as well.

TREATMENT: Stone or gland excision (partial or total) is compatible with waiver, as are most cases of benign tumor removal; extensive surgery for malignancy may not be waiverable, so each case of malignancy will be considered in detail by USAAMA before a recommendation can be made.

DISCUSSION: Mixed tumors (pleomorphic adenomas) comprise 65% of all salivary gland tumors; only a small number of these (5-6%) are malignant. The great majority of salivary tumors (85%) occur in the parotid gland, and 60% of these are the benign mixed type. Another benign tumor, the Warthin's tumor, accounts for 7% of parotid neoplasms, while malignant tumors (in descending order of frequency: mucoepidermoid carcinoma, malignant mixed tumor, acinous cell, adenoid cystic, and squamous cell carcinomas) and other rare lesions account for the remaining 33%. Benign mixed tumors have a recurrence rate of approximately 2%, usually due to incomplete removal or seeding at the time of removal. Malignant tumors have a much higher rate of recurrence. With adenoid cystic carcinoma, 40% have metastasized by the time of diagnosis; 5-year survival is 45-82%, depending on the study, falling to as low as 13% at 20 years. The corresponding figure for adenocarcinoma is 49-75% at 5 years, with a drop to 41-60% at 10 years. The 20-year survival figures are not readily available.

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 audiology evaluation indicates no underlying pathology, and binaural speech recognition score is 84% or higher. Aircrew members with a recognition score of less than 84% may receive a waiver, but are generally handled on a case-by-case basis. Patients who are H4 profile will inevitably be disqualified.

HEARING STANDARDS

Acceptable audiometric hearing levels for Army aircrew members and ATC

Class	500 Hz	1000 Hz	2000 Hz	3000 Hz	4000 Hz	6000 Hz *
1/1A	25	25	25	35	45	45
2/3/4	25	25	25	35	55	65

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 and acoustic reflex threshold testing, speech reception threshold testing, and 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). Significant hearing loss may require ENT evaluation and/or an in-flight evaluation. An in-flight evaluation may be obtained through the US Aeromedical Consultation Service or may be conducted locally. The in-flight evaluation consists of doing a speech audiometry (using common aviation terms) while exposed to in-flight conditions of noise and normal flight conditions in the individual's primary aircraft (if this is a solo- aircraft, a dual-aircraft with similar noise level should be chosen). An individual with normal hearing should also be tested at the same time to verify the accuracy of testing and all microphones and headsets should be tested prior to testing. Note: A list of common aviation terms is available upon consultation with USAAMA. **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*.

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 shift at 1000 Hz, 2000 Hz, 3000 Hz, and 4000 Hz will require a complete audiometric assessment to include: air conduction, speech audiometry, and tympanometry.

TREATMENT: Patients with conductive hearing loss may be helped by the use of hearing aids for ground duties in nonhazardous noise. The use of a hearing aid in flight is not recommended 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 progression.

MENIERE'S DISEASE / VERTIGO (ICD9 3860 / 7804)

AEROMEDICAL CONCERNS: Incapacitating vertigo may occur suddenly in flight, a potentially catastrophic occurrence. Attacks may be precipitated by stress and fatigue. A fluctuating hearing loss usually accompanies the labyrinthine symptoms, and may progress over a period of time to a significant and permanent impairment.

WAIVER: Due to the unpredictable and sudden nature of the vertigo episodes in many patients, and the tendency for the condition to become bilateral, waivers are very rarely granted for a diagnosis of Meniere's Disease. Other causes of vertigo may be waiverable, hence the importance of gathering as much diagnostic information as possible.

INFORMATION REQUIRED: ENT and audiology evaluation to confirm diagnosis and to rule out other pathology. Not all vertigo is Meniere's and causes which are self-limiting and non-recurrent may well be waiverable once symptoms have abated. A neurology consultation can be of great help in making or ruling out specific diagnoses.

TREATMENT: Treatment with low sodium diet, HCTZ, stress management, and vestibular sedatives such as diazepam may diminish symptoms but the underlying condition persists, and is very unlikely to be waiverable. Surgery (labyrinthectomy, endolymphatic sac drainage or decompression, or vestibular nerve section) is of variable effectiveness. Surgery may diminish or even abolish some of the more severe symptoms, but generally the patient is left with some vestibular dysfunction, so waiver remains highly unlikely.

DISCUSSION: The cause of symptoms in Meniere's Disease is an increase in pressure of the endolymph within the labyrinth. The reason for this increase is not known, although theories abound. The average age of onset is in the forties, with a range between 20 and 60, which includes virtually all military aviation personnel. The disease is progressive in approximately 10% of patients, with a relentless worsening of the vertigo episodes and hearing loss. Medical treatment is usually of no help, and surgery is often the only option. The other 90% can expect some symptomatic relief from medical therapy and, on occasion may show spontaneous long-term remission, although the underlying pathology is not actually altered by medical therapy. One should therefore be reluctant to say that a case of Meniere's is cured or "burned out", even in the face of a prolonged symptom-free interval. Other vertigo-producing labyrinthine disorders, such as vestibular neuronitis and Benign Paroxysmal Positional Vertigo (BPPV) are not nearly as likely as Meniere's Disease to be recurrent, and recovery is usually complete, so a waiver for these conditions is far more likely. A precise diagnosis is not always possible in cases of vertigo, but if a waiver is sought, the more specific a diagnosis one has, the easier it is to determine waiverability.

NASAL POLYPS (ICD9 471)

AEROMEDICAL CONCERNS: Sinus barotrauma with potential for in-flight incapacitation and prolonged periods of grounding.

WAIVER: Initial flight applicants with nasal polyps are not granted exception to policy. An aircrew member may be considered for waiver. Waivers are considered if the condition is controlled with intranasal steroids or cromolyn (long term usage of nasal steroids is expected and accepted).

INFORMATION REQUIRED: Complete AMS is required. Nasal polyps (either past history of, or current diagnosis of) require sinus x-rays, ENT evaluation, and all surgical reports. If polyps are actually present, a **sinus CT** is usually necessary to diagnose accompanying sinus disease.

TREATMENT: Resection of nasal polyps is advisable in most cases; this is a must if a waiver is to be considered, with one exception: If polyps are very small and in no way blocking the middle meatus according to the ENT consultant, then a waiver may be recommended even without surgery.

DISCUSSION: Nasal polyps have poorly understood etiology and tend to be recurrent and many involve concurrent allergy. Sinus polyps alone are not disqualifying, but the underlying diseases which lead to their formation are invariably disqualifying. Sinus mucus retention cysts are often mistakenly called "polyps", and these cysts are not disqualifying unless they are close to the sinus ostium. X-rays revealing a very large cyst should be sent to the designated USAAMA ENT consultant for a decision as to the need for drainage or removed.

OTOSCLEROSIS / STAPEDECTOMY (ICD9 387.9 / 19.19)

AEROMEDICAL CONCERNS: The inability to clearly hear cockpit radio transmissions and warning tones can have a significant impact on flight safety.

WAIVER: Waivers will be considered depending on the degree of hearing loss and functional capability. Waivers following surgical treatment of conductive hearing loss may or may not be granted, depending on the final hearing result and the nature of the surgery. However, a stapedectomy done to treat otosclerosis is disqualifying and must be waivered. Aircrew with severe conductive loss attributed solely to otosclerosis, and who elect to have surgery, should have a permanent tissue seal covering the inner ear fenestra inserted before prosthesis placement to prevent perilymph fistula. Full evaluation is required following surgery for otosclerosis and also following spontaneous perilymph fistula, whether surgically repaired or not. Aviators are grounded for six months following stapedectomy, then a waiver to dual-pilot status may be considered. Dual-pilot status is recommended for 2.5 years before waivering to unrestricted full flying duties. Bilateral stapedectomy is not waiverable. Initial flight applicants with a history of stapedectomy are considered disqualified, no exception to policy granted.

INFORMATION REQUIRED: ENT and audiology evaluations, to include speech reception thresholds and speech discrimination scores. Stapedectomy requires surgical report. Wearers of hearing aids will require an in-flight hearing evaluation without the aid to demonstrate the ability of the subject to communicate adequately (testing in a multiplace aircraft will suffice for testing of aviators normally assigned to single seat aircraft, provided ambient noise levels are similar).

TREATMENT: Conductive hearing loss may well be improved with amplification (hearing aid) if surgical treatment is not a reasonable alternative; benefits from amplification for neurosensory losses are variable, but often beneficial; the use of hearing aids in flight, however, is not advocated due to possible interference with wearing of the helmet, and the apparent lack of benefit in the noisy cockpit environment. Aircrew with hearing loss will often do well in the cockpit with proper helmet fitting and careful adjustment of radio volumes. Hence, the in-flight hearing test is performed without the hearing aid. As a general rule, the use of hearing aid in-flight is not recommended; the headsets have volume controls.

DISCUSSION: Persons with conductive hearing loss usually hear relatively well in noisy backgrounds, while those with sensorineural loss are more often handicapped when there is significant background noise such as in the cockpit. Therefore, aeromedical decisions should be based on evaluation of hearing on the ground and in the cockpit, especially if the loss is severe enough to warrant use of a hearing aid or aids on the ground. Unilateral hearing losses present few operational problems, but new or progressive unilateral losses can have significant medical implications, and an ENT consultation is necessary to rule out such conditions as acoustic neuroma or atypical Meniere's. Stapedectomies present problems because the operation creates an opening into the labyrinth, and involves the placement of a prosthesis in most cases. There is a risk of postoperative perilymph fistula, as well as subsequent shifting of the prosthesis, both of which can result in sudden attacks of vertigo. The post-op waiting period allows for healing which reduces the chances that barotrauma (or an over enthusiastic Valsalva maneuver) will cause a perilymph leak.

OVAL / ROUND WINDOW FISTULA (ICD9 386.42 / 396.41)

AEROMEDICAL CONCERNS: A perilymph fistula can result in either the sudden onset of sensorineural hearing loss, or a rapidly progressive loss, with or without episodic vertigo. It may mimic Meniere's Disease.

WAIVER: A history of fistula is disqualifying with no exception to policy for initial flight applicants. All aviation personnel with a unilateral healed fistula will require a period of six months grounding for observation. Bilateral healed fistula, while rare (with no record on file at USAAMA), will require evaluation by the designated Army Aeromedical ENT Consultant.

INFORMATION REQUIRED: A complete AMS is required along with copies of all records involving the initial clinical presentation, as well as all ENT consults, notes, tests, operation reports, etc. Audiologic and vestibular test results are of particular interest.

TREATMENT: Initial treatment is conservative with avoidance of lifting and straining, or exposure to significant barometric pressure changes, especially ones that might require a Valsalva maneuver. If hearing and vestibular symptoms don't improve, and certainly if they worsen, exploratory tympanotomy is indicated. If a fistula is present, it can be surgically sealed.

DISCUSSION: While fistulae may occur spontaneously, most are associated with head injury or barotrauma, especially in the active duty population. They may also occur as a result of Q-tip misadventure, or improper cerumen irrigation technique. As surgery does not always seal the fistula, and recurrence is possible, various waiting periods are prescribed for different classes of personnel. The longest period is for Army aviators, as there is a considerable safety issue should acute vertigo occur during flight.

PSYCHIATRIC WAIVERS

INTRODUCTION

A mental health evaluation should reflect a detailed history of illness from initiation until the present time. It should cover precipitating events, signs, symptoms, and pertinent family, social, and medical history. Any other information such as legal history or educational background that may have bearing on the case should be included. Substance and alcohol use history is required in all cases. Physical exam results and any other pertinent studies should also be included in the evaluation.

At initial presentation of the illness, the patient undergoes a mental status examination that should be summarized in the evaluation along with the current status of the patient. The evaluation should also include the results of psychological testing as indicated by the parameters of the case, for example, neuropsychiatric testing for cognitive deficits.

The mental health evaluation should also include a diagnostic impression based on criteria from the current version of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, (DSM-IV) and Axes I-V of the Multiaxial Evaluation System. Recommendations for clinical follow-up/therapy and results should also be reported. Issues of risk to aviation safety, prognosis, and limitations to deployability must also be addressed.

The following policies outline each chapter of the DSM-IV, which should be used as a reference for diagnostic criteria and coding. With sufficient information, the Aeromedical Consultants Advisory Panel (ACAP) can make decisions that preserve resources, maximize safety, and expedite case disposition.

AEROMEDICAL ADAPTABILITY (AA)

AEROMEDICAL CONCERNS: Unsatisfactory AA (formerly ARMA) may be a manifestation of underlying psychiatric disease or personality trait not considered compatible with aviation duties.
(See AR 40-501 for more information.)

WAIVERS: Trained aircrew with an unsatisfactory AA will be referred to the aviation unit commander or civilian employee supervisor for administrative evaluation for nonmedical disqualifications and determination of fitness to retain the aircrew member's aeronautical rating or military status (see AR 600-105). Initial flight applicants with an unsatisfactory AA will not be granted an exception to policy. Reversal of this disqualification at a later date is very difficult. However, if the patient demonstrates over a period of 2-3 years substantial personality maturation in terms of ability to sustain the stressors of the aviation environment, work in harmony with other members, and stabilize his personal life and turmoil, then the individual, with strong recommendations from local command and the local flight surgeon, may be considered for reversal of an unsatisfactory AA. An evaluation by a psychiatrist or psychologist, preferably a designated Army aeromedical psychiatrist or psychologist, may be required. Such patients may also be referred to NAMI, Pensacola, FL, or AMCS, Brooks AFB, TX. Contact USAAMA for further information.

INFORMATION REQUIRED: Requests for waiver will include a complete AMS to include the results of any psychiatric and psychological consultation or testing (if appropriate) and a recommendation from the aviation unit commander or civilian supervisor. All legal issues such as sexual or racial discrimination or harassment must receive appropriate administrative action including UCMJ and/or IG determination before a final medical recommendation can be made.

FOLLOW-UP: N/A

TREATMENT: If an underlying psychiatric disorder exists, treatment would correspond to the particular diagnosis. Treatment does not apply if the underlying reason for the unsatisfactory AA is other than psychiatric.

DISCUSSION: An unsatisfactory AA is not a DSM diagnosis. It is a consensus of opinion endorsed by the Commander, USAAMC, that after thorough investigation involving the unit flight surgeon and aviation chain of command (military) or supervisory chain (civilian), certain behavior or conduct is unadaptable or unsuitable for Army aeronautics. If a FEB is sufficient to decide disposition of the aircrew member, an unsatisfactory AA must not be used. Rated aviators will not normally be considered for a waiver of an unsatisfactory AA unless overwhelming evidence and support exist from command as well as the local flight surgeon.

ADJUSTMENT DISORDERS

AEROMEDICAL CONCERNS: Adjustment Disorders are characterized by the development of clinically significant emotional or behavioral symptoms in response to an identifiable psychological stressor. Fitness for flight status will be determined by the severity and the required treatment.

WAIVER: Complete recovery without chronicity or medications supports waiver consideration. A mild Adjustment Disorder with complete recovery can be considered "Information Only."

DSM-IV CODES:

309.xx Adjustment Disorder (*Specify if:* Acute/Chronic):
- .0 With Depressed Mood
- .24 With Anxiety
- .28 With Mixed Anxiety and Depressed Mood
- .3 With Disturbance of Conduct
- .4 With Mixed Disturbance of Emotions and Conduct
- .9 Unspecified

(For diagnostic criteria, see DSM-IV, page 623.)

INFORMATION REQUIRED: Complete AMS with psychiatric and psychological evaluation as indicated, to include present functioning.

TREATMENT: As psychiatrically indicated.

DISCUSSION: Most individuals with Adjustment Disorder experience full recovery; however, some progress to chronicity and would thus be considered for permanent disqualification. A severe Adjustment Disorder with violence, suicidality, or other significantly deviant behavior requires review for waiver.

SUBSTANCE-RELATED DISORDERS: ALCOHOL ABUSE OR DEPENDENCE

AEROMEDICAL CONCERNS: Ethyl alcohol has a depressant effect on brain mechanisms. Subtle performance effects such as procedural errors, decreased reaction time, and inattentiveness can occur even after low doses. More importantly, it can cause and potentiate disorientation, including production of positional alcohol nystagmus and vertigo, and can also impair the ability to suppress inappropriate vestibular nystagmus. This susceptibility exists long into the "hangover" period. Ingestion of alcohol causes reduced G_z 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: Exception to policy is not recommended. Waiver is possible if the patient: (1) Maintains a positive attitude and unqualified acknowledgment of the alcohol disorder. (2) Successfully completes the appropriate treatment program (Level II or III). (3) Remains abstinent for 90 days without need for medication. (4) Maintains satisfactory participation with documentation in an organized alcohol recovery program (AA, Rational Recovery, etc.), 3-5 times per week. 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 Level II or III treatment are rarely granted by PERSCOM.

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

(For diagnostic criteria, see DSM-IV, page 175.)

INFORMATION REQUIRED: (1) Complete flight physical, CBC, and LFTs. (2) A complete 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. (3) Copy of ADAPCP outpatient (Level II) or inpatient (Level III) (or civilian equivalent) treatment summary. (4) FS and ADAPCP Clinical Director's statement to document aftercare including AA attendance. (5) Chain-of-command recommendations through general 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 first 12 months and then every 3 months for remaining 2 years. (2) ADAPCP Clinical Director, monthly for 3 years with documentation of AA (or equivalent) attendance. (3) Annual submission of the flight surgeon's recommendations, ADAPCP counselor's recommendations, documentation of AA attendance, and a letter of support from the aviation unit commander are also required.

TREATMENT: ADAPCP Level II outpatient program or Level III inpatient program.

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

ALCOHOL-RELATED DISORDER, NOS

AEROMEDICAL CONCERNS: While a single incident of alcohol misuse (mild or minimal alcohol-related problem) is not of significant concern, it may be an indication of an underlying alcohol abuse or dependence.

WAIVER: Waivers are not required for alcohol misuse. This information will be filed as *information only* and exceptions to policy for initial flight applicants may be granted provided the required information described below is complete and indicative of no underlying disorder. Local full flying duties (FFD) may be granted pending USAAMA review.

DSM-IV CODE:

291.9 Alcohol-Related Disorder, NOS

INFORMATION REQUIRED: Submission of an AMS to include: completion of an alcohol education program, such as ADAPCP Track I or equivalent and a favorable recommendation from the program director; a letter of recommendation and support from the immediate aviation chain of command; and the flight surgeon's recommendations and a summary of findings, i.e., the absence of any significant underlying psychological or psychiatric disorders or evidence of lasting or residual health impairment and significant work, social, or family dysfunction.

FOLLOW-UP: The local flight surgeon will continue to reevaluate the individual at 2-month intervals for the first year after return to full flying duties and then annually in conjunction with annual FDME.

TREATMENT: An alcohol education program is generally adequate therapy.

DISCUSSION: The Alcohol-Related Disorder, NOS category is for disorders associated with the use of alcohol that are not classifiable as Alcohol Dependence, Alcohol Abuse, Alcohol Intoxication, Alcohol Withdrawal, Alcohol Intoxication Delirium, Alcohol Withdrawal Delirium, Alcohol-Induced Persisting Dementia, Alcohol-Induced Persisting Amnestic Disorder, Alcohol Induced Psychotic Disorder, Alcohol-Induced Mood Disorder, Alcohol-Induced Anxiety Disorder, Alcohol-Induced Sexual Dysfunction, or Alcohol-Induced Sleep Disorder.

Alcohol-related incidents such as driving under the influence (DUI) and public intoxication resulting in unusual, bizarre, or violent behavior or any other alcohol-related misbehavior, which in the opinion of the commander or the flight surgeon deserves attention, must be viewed with caution because of the potential for creating unusual stress on the aviator. These stressors may arise from pending legal action, command pressure, marital discord, or even self-generated pressures. Local DNIF is appropriate pending completion of evaluations and will allow the aviator time to cope with these demands. Note: Non-alcoholic beer is considered and alcoholic beverage. The 12-hour "bottle-to-throttle rule applies to drinking Non-alcoholic beer.

ANXIETY DISORDERS

AEROMEDICAL CONCERNS: Anxiety disorders may produce symptoms that are distracting in flight and occasionally result in autonomic symptoms such as hot flashes, sweating, nausea, and vomiting, as well as various mental deficiencies. Panic attacks can occasionally produce sudden incapacitation. Anxiety can be a manifestation of unconscious fear of flying.

WAIVERS: Panic Disorder/Post-Traumatic Stress Disorder (PTSD)/Generalized Anxiety Disorder (GAD)/Obsessive-Compulsive Disorder (OCD) are considered disqualifying for all aviation-related duties. Waiver may be requested when the aviator is asymptomatic and off medications for one year. Waiver may not be granted for true panic disorder. Specific Phobias and Social Phobias are considered medically disqualifying only if they impact on flight performance or flight safety. Acute stress, which can manifest itself with mild anxiety symptoms, would be considered *information only* with treatment and complete resolution.

DSM IV CODES:

300.01 Panic Disorder Without Agoraphobia
300.21 Panic Disorder With Agoraphobia
300.22 Agoraphobia Without History of Panic Disorder
300.29 Specific Phobia (*Specify type:* Animal Type/Natural Environment Type/Blood-Injection-Injury Type/Situational Type/Other Type)
300.23 Social Phobia (*Specify if:* Generalized)
300.3 Obsessive-Compulsive Disorder (*Specify if:* With Poor Insight)
309.81 Post-Traumatic Stress Disorder (*Specify if:* Acute/Chronic) (*Specify if:* With Delayed Onset)
308.3 Acute Stress Disorder
300.02 Generalized Anxiety Disorder
293.89 Anxiety Disorder Due to . . . (Indicate General Medical Condition) (*Specify if:* With Generalized Anxiety/With Panic Attacks/With Obsessive-Compulsive Symptoms)
___.__ Substance-Induced Anxiety Disorder (Refer to Substance-Related Disorders for substance-specific codes) (*Specify if:* With Generalized Anxiety/With Panic Attacks/With Obsessive-Compulsive Symptoms/With Phobic Symptoms) (*Specify if:* With Onset During Intoxication/With Onset During Withdrawal
300.00 Anxiety Disorder NOS

(For diagnostic criteria, see DSM-IV, page 393.)

INFORMATION REQUIRED: Psychiatric and psychological evaluation and testing if necessary, treatment summary, and Medical Board reports if indicated.

FOLLOW-UP: Psychiatric follow-up for anxiety disorders is at the discretion of the treating mental health provider. After one year, if patient is off medications and symptom-free in a full-duty status, he should receive a psychiatric evaluation to verify that there has been no recurrence for inclusion with the waiver request. Further therapy will be at the discretion of the treating psychiatrist or psychologist.

TREATMENT: Medication is incompatible with flying status. Behavior therapy including relaxation, biofeedback, and anxiety management is permitted in a flying status if the symptomatology is so mild that it does not meet the criteria for Panic Disorder, PTSD, GAD, or OCD. Of course, medication and behavioral therapy may be used while the aviator is grounded.

DISCUSSION: Patients with PTSD, Panic Disorder, and GAD may complain of palpitations, dizziness, headaches, shortness of breath, tremulousness, and impaired concentration and memory. OCD patients complain of obsessional thoughts and/or compulsive rituals that interfere with functioning. Long-term prognosis is controversial; however, over 50 percent may recover within a year with appropriate treatment. Panic Disorder has a high rate of recurrence and is associated with increased mortality from cardiovascular disease and suicide. Acute Stress Disorder that continues beyond one month would be reclassified as PTSD.

ATTEMPTED SUICIDE

AEROMEDICAL CONCERNS: There is a risk that a person with suicidal ideation may attempt suicide in an aircraft and even jeopardize the safety of others. Aircraft have occasionally been the selected means of suicide in civil aviation, but there are no known Army aviation accidents where suicide was confirmed.

WAIVER: "Suicide attempt" itself is a behavior, not a DSM-IV psychiatric diagnosis. Waivers are based on the psychiatric diagnosis of which the suicide attempt is a manifestation. If the suicide attempt is the manifestation of a Personality Disorder, the patient is considered having an unsatisfactory Aeromedical Adaptability (AA). If the suicide attempt was a manifestation of an Adjustment Disorder, the aircrew member would be considered qualified *information only* when the Adjustment Disorder resolved.

INFORMATION REQUIRED: Individuals with suicidal ideations and attempts require a psychiatric and psychological evaluation and psychiatric hospitalization if warranted.

TREATMENT: Treatment is based on the individual's psychiatric diagnosis. However, suicide attempts associated with most Axis I and Axis II diagnoses other than Adjustment Disorder or V codes are incompatible with aviation duty.

FOLLOW-UP: Follow-up psychiatric care is at the discretion of the treating mental health provider, and the frequency should be clearly stated in the psychiatric evaluation or hospital discharge summary.

DISCUSSION: Of those who make a suicidal gesture, 66 percent are involved in acute personal crisis and many will have ingested alcohol within 6 hours of the attempt. Within one year, 20-25 percent will repeat the attempt and 2 percent will be successful. There is an underlying personality disorder in 20-25 percent of cases. In those who go on to successful suicide, 70 percent confide their intentions to someone before doing so. Risk factors include living alone, recent stress or loss, being male (especially over 45 years of age), heavy drinking, and a family history of alcohol dependence, mental illness, or suicide.

DELIRIUM, DEMENTIA, AND AMNESTIC AND OTHER COGNITIVE DISORDERS

AEROMEDICAL CONCERNS: Impaired cognitive performances due to organic conditions render individuals unfit for flight.

WAIVERS: Conditions that are temporary and completely reversible with treatment would be considered for waivers.

DSM-IV CODES: For the appropriate codes and diagnostic criteria, see DSM-IV, page 123.

INFORMATION REQUIRED: Complete AMS including complete physical and lab findings and psychiatric and psychological evaluations documenting full recovery, including a neuropsychological assessment as indicated.

FOLLOW-UP REQUIREMENTS: As medically indicated.

TREATMENT: As medically and psychiatrically indicated.

DISCUSSION: See Neurology policy for information concerning Cognitive Disorders due to head injury.

DISORDERS USUALLY FIRST DIAGNOSED IN INFANCY, CHILDHOOD, OR ADOLESCENCE

AEROMEDICAL CONCERNS: The majority of these disorders do not apply to the adult aviator population. However, childhood and adolescent learning disorders and attention deficit and disruptive behavior disorders may have adult manifestations that could bring to question the ability to be on flight status.

WAIVERS: Waivers can be considered if medication, such as Ritalin, is not needed to maintain adequate performance and if behavioral characteristics do not hinder flight performance or flight safety.

DSM IV CODES: For the appropriate codes and diagnostic criteria, see DSM-IV, page 37.

INFORMATION REQUIRED: Complete AMS to include psychiatric, psychological, and educational evaluation as indicated.

TREATMENT: Many of the conditions are not amenable to treatment and/or require continuous treatment.

DISCUSSION: As an awareness of residual adult effects becomes evident after disorder is recognized, questions concerning these conditions will increase.

DISSOCIATIVE DISORDERS

AEROMEDICAL CONCERNS: These disorders feature a disruption of integrated functions of consciousness, memory, and identity or perception of the environment. This characteristic of Dissociative Disorders disqualifies for flight status.

WAIVER: Dissociative Disorders are chronic, unpredictable, and difficult to treat. Waiver is not considered.

DSM-IV CODES:

300.12 Dissociative Amnesia
300.13 Dissociative Fugue
300.14 Dissociative Identity Disorder
300.6 Depersonalization Disorder
300.15 Dissociative Disorder NOS

(For diagnostic criteria, see DSM-IV, page 477.)

INFORMATION REQUIRED: Complete AMS with psychiatric and psychological evaluations.

TREATMENT: As psychiatrically indicated.

DISCUSSION: Treatment is often long-term, and effects of dissociative disorders bar any consideration for flight status.

EATING DISORDERS

AEROMEDICAL CONCERNS: Eating disorders can cause potentially life-threatening metabolic alkalosis, hypochloremia, and hypokalemia, which can have drastic implications for aviation safety. Anxiety and depressive symptoms are common, and suicide is a risk.

WAIVERS: Eating Disorders (Anorexia, Bulimia, and Eating Disorders NOS) are disqualifying for all aviation duties. Reports of PEB and MEB, if available, are required. Many of the soldiers with these disorders will be discharged via a PEB medical board due to lack of treatment options within the military. Waiver may be considered on a case-by-case basis if the patient is off medication, symptom-free, and fully functional in an alternate duty assignment for one year. These patients must meet the minimum aviation weight standards.

DSM-IV CODES:

307.50 Eating Disorder
307.51 Bulimia
307.1 Anorexia Nervosa

(For diagnostic criteria, see DSM-IV, page 539.)

INFORMATION REQUIRED: Submit a full AMS to include: Psychiatric and psychological evaluation, copy of MEB if applicable, and flight surgeon's narrative outlining any social, occupational, administrative, or legal problems of the patient.

FOLLOW-UP: Follow-up psychiatric care is at the discretion of the treating mental health provider, but should involve at least monthly follow-up during the first year of treatment.

TREATMENT: Treatment is very difficult and involves intensive, long-term therapy, group therapy, and possibly pharmacotherapy, all of which are incompatible with aviation duty.

DISCUSSION: Relapse rate is high. With long-term follow-up treatment of anorexia, 40 percent of patients recover, 30 percent improve, and 30 percent are chronic. Anorexia is potentially fatal in 5-12 percent of cases. Bulimia is often associated with alcohol abuse.

IMPULSE CONTROL DISORDERS

AEROMEDICAL CONCERNS: Stereotyped or impulsive behavior may lead to aviation safety problems. These disorders involve an inability to resist acting on an impulse that can be dangerous to oneself or others and that is characterized by a sense of pleasure when gratified.

WAIVERS: Impulse Control Disorders (Intermittent Explosive Disorder, Kleptomania, Pathological Gambling, Pyromania, Trichotillomania) are considered permanently disqualifying with no waiver recommended. These aviators are also considered unsatisfactory AA. These cases are handled on a case-by-case basis and questions should be referred to the designated Army aeromedical psychiatric or psychological consultant or USAAMA.

DSM IV CODES:

312.30 Impulse-Control Disorder NOS
312.31 Pathological Gambling
312.32 Kleptomania
312.33 Pyromania
312.34 Intermittent Explosive Disorder
312.39 Trichotillomania

(For diagnostic criteria, see DSM-IV, page 609.)

INFORMATION REQUIRED: Psychiatric evaluation and flight surgeon's narrative outlining any social, occupational, administrative, or legal problems of the patient are required.

FOLLOW-UP: Follow-up psychiatric care is at the discretion of the mental health provider.

TREATMENT: Psychotropic medications used with Intermittent Explosive Disorder and Trichotillomania are incompatible with aviation duty. Pathological Gambling and Kleptomania are generally treated with behavior therapy.

DISCUSSION: Differential diagnosis should include substance abuse, temporal lobe epilepsy, head trauma, Bipolar Disorder (manic), and Personality Disorder (antisocial). The diagnosis is usually not made if the behavior occurs only in the context of another Axis I or Axis II disorder such as Schizophrenia, Bipolar Disorder, or Adjustment Disorder.
Specific true examples of failed impulse control resulting in compromises to aviation and subsequent FEB action include: flying under bridges or wires at high speeds, making dive bombing runs on civilian automobiles or other civilian activities, spotlighting automobiles at night, and various deliberate and unauthorized deviations from the flight plan. Occasionally, failure of impulse control will result in an unsatisfactory AA. If actions are due to immaturity of the aviator, this unsatisfactory AA may be reversed once the individual has demonstrated mature behavior while performing normal (non-flying) duties for a 2-3 year period of observation. Recommendations from the local chain-of-command are required.

MENTAL DISORDERS DUE TO A GENERAL MEDICAL CONDITION NOT ELSEWHERE CLASSIFIED

AEROMEDICAL CONCERNS: Almost the entire spectrum of psychiatric disorders may be manifestations of primary medical conditions. Disqualification from flying would be due to the underlying medical condition.

WAIVERS: Waiver would depend on the specific medical condition, the course of the medical condition, and residual effects on patient's personality or emotional state. Consideration for waiver would also depend on severity of the disorder and the required course of treatment.

DSM-IV CODES:

293.89 Catatonic Disorder Due to (*Indicate the General Medical Condition.*)

310.1 Personality Change Due to (*Indicate the General Medical Condition.*) (*Specify type:* Labile Type/Disinhibited Type/Apathetic Type/Paranoid Type/Other Type/Combined Type/Unspecified Type)

293.9 Mental Disorder Due to (*Indicate the General Medical Condition.*)

(For diagnostic criteria, see DSM-IV, page 165.)

INFORMATION REQUIRED: Complete AMS including psychiatric and psychological evaluation.

TREATMENT: As medically and psychiatrically indicated.

DISCUSSION: Waivers would rest with the stated medical condition. Waivers would need to be considered for medical condition and the resulting mental condition. The condition could be mild depression that does not necessitate medication or could be as complex as a permanent change in the patient's personality or one that incurs cognitive deficits.

MOOD DISORDERS

AEROMEDICAL CONCERNS: Mood disorders are associated with decreased concentration, inattention, indecisiveness, fatigue, insomnia, agitation, and psychosis, all of which are incompatible with aviation duties. Risk of suicide is 15 percent, highest of all mental disorders. There is a strong association with substance abuse.

WAIVERS: Major Depression/Dysthymia/Depressive Disorder NOS: Disqualifying for all aviation duties. Waiver may be requested when individual is asymptomatic and off medications for one year in a full-duty status. Further recurrences are disqualifying with permanent termination of flying duties. Bipolar Disorder: Disqualifying for all aviation duties. The aviator should be referred to PEB for determination of general duty/retention.

DSM IV CODES:

Depressive Disorders:
296.xx Major Depressive Disorder,
.2x Single Episode
.3x Recurrent
300.4 Dysthymic Disorder (*Specify:* Early Onset/Late Onset *and* with atypical features.)
311 Depressive Disorder NOS

Bipolar Disorders:
296.xx Bipolar I Disorder
.0x Single Manic Episode (*Specify if:* Mixed)
.40 Most Recent Episode Hypomanic
.4x Most Recent Episode Manic
.6x Most Recent Episode Mixed
.5x Most Recent Episode Depressed
.7 Most Recent Episode Unspecified
296.89 Bipolar II Disorder *Specify (current or most recent episode):* Hypomanic/Depressed
301.13 Cyclothymic Disorder
296.80 Bipolar Disorder NOS
293.83 Mood Disorder Due to . . . (*Indicate the General Medical Condition*) (*Specify type:* With Depressive Features/With Major Depressive-Like Episode/With Manic Features/With Mixed Features)
___.__ Substance-Induced Mood Disorder (*Refer to Substance-Related Disorders for substance-specific codes*) *Specify type:* With Depressive Features/With Major Depressive-Like Episode/With Manic Features/With Mixed Features. (*Specify if:* With Onset During Intoxication/With Onset During Withdrawal)
296.90 Mood Disorder NOS

(For diagnostic criteria, see DSM-IV, page 317.)

INFORMATION REQUIRED: Submit an AMS with the following information: Psychiatric evaluation, psychological testing results, treatment summary, and PEB or MEB reports if applicable.

FOLLOW-UP: Psychiatric follow-up is at the discretion of the mental health provider. Mood Disorders are generally seen at least monthly while on limited duty. After the one-year period, if off medications, symptom-free, and in a full-duty status, the patient will require a psychiatric evaluation verifying no recurrence of symptoms for inclusion with the waiver request.

TREATMENT: Psychotropic medications and psychotherapy for depressive/manic symptoms are not compatible with aviation duties.

DISCUSSION: Fifteen percent of depressed patients eventually commit suicide. Fifty to seventy-five percent of affected patients have a recurrent episode. Acute major depression is treatable in 80 percent of patients. Twenty to thirty percent of Dysthymic patients develop subsequent depression or mania.

OTHER CONDITIONS THAT MAY BE A FOCUS OF CLINICAL ATTENTION

AEROMEDICAL CONCERNS: These are conditions or problems that may become the focus of clinical attention, i.e., Partner-Relational Problems. There may or may not be an associated mental disorder. These problems may be of such severity that impairment in functioning requires grounding.

WAIVER: A waiver is considered for individuals who resolve the problem and return to full functioning without medication.

DSM-IV CODES: (For diagnostic codes and criteria, see DSM-IV, page 675.)

INFORMATION REQUIRED: Complete AMS with psychiatric, psychological, social work, or other evaluations as indicated.

TREATMENT: As indicated.

DISCUSSION: Most of these problems resolve satisfactorily and should have no permanent impact on flight status. However, chronicity, need for medication, and other major indications could lead to permanent disqualification.

PERSONALITY DISORDERS

AEROMEDICAL CONCERNS: Maladaptive personality traits may lead to flight safety problems. Aeromedical Adaptability involves a person's coping mechanisms, personality style, and defense mechanisms that may impact on the ability to undergo training, safety in aviation environments, and the ability to interact in a harmonious way with other crew members. Certain personality traits may produce thrill-seeking behavior, conflicts with authority, emotional lability, questionable judgment, poor impulse control, or inflexibility incompatible with the rigors of aviation duty.
Personality Disorders exhibit an enduring pattern of inner experience and behavior that deviates markedly from expectations of the individual's culture, is pervasive and inflexive, stabilizes over time, and leads to distress or impairment. This leads to difficulty conforming, being a team member, and making rational decisions.

WAIVERS: Personality Disorders are considered disqualifying; no waiver is recommended. Maladaptive traits that impact on aviation performance are also considered disqualifying; no waiver is recommended. Reversal of this disqualification at a later date is very difficult. However, if the individual demonstrates (over a period of 2-3 years) substantial personality maturation in terms of ability to sustain the stressors of the aviation environment, work in harmony with other members, and stabilize his personal life and turmoil, then the individual, with strong support from the chain-of-command and the flight surgeon, may be considered for reevaluation by a psychiatrist or psychologist, preferably the designated Army aeromedical psychiatrist or psychologist. Such patients may also be referred to NAMI, Pensacola, FL, or AMCS, Brooks AFB, TX. Contact USAAMA for further information.

DSM IV CODES:

301.0 Paranoid Personality Disorder
301.20 Schizoid Personality Disorder
301.22 Schizotypal Personality Disorder
301.7 Antisocial Personality Disorder
301.83 Borderline Personality Disorder
301.50 Histrionic Personality Disorder
301.81 Narcissistic Personality Disorder
301.82 Avoidant Personality Disorder
301.6 Dependent Personality Disorder
301.4 Obsessive-Compulsive Personality Disorder
301.9 Personality Disorder NOS

(For diagnostic criteria, see DSM-IV, page 629.)

INFORMATION REQUIRED: Complete AMS including a psychiatric and psychological evaluation. Psychological testing for complete documentation is encouraged. The diagnosis is largely based on a history of pervasive behaviors or traits characteristic of the person's recent and long-term functioning (since early adulthood) that cause social or occupational impairment or subjective distress. Psychiatric and psychological evaluation that may include psychological testing is required to clarify suitability for general and special duty.

FOLLOW-UP: Further evaluations are at the discretion of the treating psychiatric team.

TREATMENT: Treatment is often long-term and involves intensive psychotherapy, which is not available in the military sector of care. Depending on the severity of the Personality Disorder, returning to flying duties is highly improbable.

DISCUSSION: The stress of military life frequently exacerbates maladaptive behavior, and the diagnosis becomes apparent in the operational environment.

SCHIZOPHRENIA AND OTHER PSYCHOTIC DISORDERS

AEROMEDICAL CONCERNS: Symptoms of aeromedical concern include eccentric behavior, illogical thinking, hallucinations, social withdrawal, and a risk of suicide. Recurrence is abrupt, unpredictable, and incapacitating in aviation.

WAIVERS: Schizophrenia, Schizophreniform Disorder, Schizoaffective Disorder, Delusional Disorder, Brief Psychotic Disorder Without Marked Stressors, and Psychotic Disorder NOS: Disqualifying for aviation; no waivers granted. Should be referred to PEB/MEB for fitness for general duty/retention. Brief Psychotic Disorder With Marked Stressors (Brief Reactive Psychosis): Considered disqualifying for all aviation duties. Waiver may be requested when asymptomatic and off medications for one year in a Full-Duty status. These cases are handled on a case-by-case basis depending on the prognostic factors of the case. Substance-Induced Psychotic Disorder with clear evidence from the history, physical examination, or laboratory findings that the disturbance is etiologically related to medication use: Not considered disqualifying when resolved, as long as the "substance" inducing psychosis was not alcohol or illicit drugs. Psychotic Disorder Due To General Medical Not considered disqualifying when the general medical condition is resolved and if the precipitating organic factors are identified and considered not likely to recur. (Physical illness or other disorders causing persistent delirium are permanently disqualifying and should be referred to PEB/MEB.)

DSM IV CODES:

295.xx Schizophrenia:
295.30 Paranoid Type
295.10 Disorganized Type
295.20 Catatonic Type
295.90 Undifferentiated Type
295.60 Residual Type
295.40 Schizophreniform Disorder (*Specify:* Without Good Prognostic Features/With Good Prognostic Features)
295.70 Schizoaffective Disorder (*Specify type:* Bipolar Type/Depressive Type)
297.1 Delusional Disorder (*Specify type:* Erotomanic/Grandiose/Jealous/Persecutory/Somatic/Mixed/Unspecified)
298.8 Brief Psychotic Disorder (With Marked Stressor(s)/Without Marked Stressor(s)/With Postpartum Onset)
297.3 Shared Psychotic Disorder
293.xx Psychotic Disorder due to . . . (*Indicate the general medical condition.*):
293.81 With Delusions
293.82 With Hallucinations
___.__ Substance-Induced Psychotic Disorder (*Refer to Substance-Related Disorders for substance-specific codes.*) (*Specify:* With Onset During Intoxication/With Onset During Withdrawal.)
298.9 Psychotic Disorder NOS

(For diagnostic criteria, see DSM-IV, page 273ff.)

INFORMATION REQUIRED: Complete AMS to include psychiatric and psychological evaluation, psychological testing if necessary, and copy of PEB/MEB if applicable.

FOLLOW-UP: Psychiatric follow-up is at the discretion of the treating psychiatrist. The majority of these disorders require PEB/MEB due to their incompatibility with general duty.

TREATMENT: Antipsychotic medications and close psychiatric follow-up care are incompatible with aviation duty.

DISCUSSION: Increased vulnerability to stress is considered lifelong in these disorders. In Schizophrenia, one-third will lead somewhat normal lives; one-third will continue to have significant symptoms; one-third require frequent hospitalization and chronic care. Fifty percent of schizophrenics will attempt suicide; ten percent will succeed.

SEXUAL AND GENDER IDENTITY DISORDERS

AEROMEDICAL CONCERNS: Generally, these do not impact on a person's aviation performance. However, the social consequences of some of the paraphilias, such as exhibitionism and transvestic fetishism, may impact aviation performance. Some patients exhibit questionable judgment, and certain legal ramifications may cause the person to be inattentive to detail and thus become a safety risk.

WAIVERS: Sexual disorders are considered disqualifying if they impact on aviation performance. If a person becomes dysfunctional due to a sexual disorder, refer to PEB/MEB review. Many cases are handled by administrative disposition due to the legal implications and impact on good order and discipline.

DSM IV CODES:

Sexual Desire Disorders:
302.71 Hypoactive Sexual Desire Disorder
302.79 Sexual Aversion Disorder

Sexual Arousal Disorders:
302.72 Female Sexual Arousal Disorder/Male Erectile Disorder

Orgasmic Disorders:
302.73 Female Orgasmic Disorder
302.74 Male Orgasmic Disorder
302.75 Premature Ejaculation

Sexual pain Disorders:
302.76 Dyspareunia Not Due to a General Medical Condition
306.51 Vaginismus Not Due to a General Medical Condition

Sexual Dysfunction (Due to a General Medical Condition):
625.8 Female Hypoactive Sexual Desire Disorder
608.89 Male Hypoactive Sexual Desire Disorder
607.84 Male Erectile Disorder
625.0 Female Dyspareunia
608.89 Male Dyspareunia
625.8 Other Female Sexual Dysfunction
608.89 Other Male Sexual Dysfunction
___.__ Substance-Induced Sexual Dysfunction
302.70 Sexual Dysfunction NOS (*Refer to Substance-Related Disorders for substance-specific codes.*)

Paraphilias:
302.4 Exhibitionism
302.81 Fetishism/
302.89 Frotteurism/302.2 Pedophilia
302.83 Sexual Masochism
302.84 Sexual Sadism
302.3 Transvestic Fetishism
302.82 Voyeurism
302.9 Paraphilia NOS

Gender Identity Disorders:
302.xx Gender Identity Disorder
.6 in Children
.85 in Adolescents or Adults
302.6 Gender Identity Disorder NOS
302.9 Sexual Disorder NOS

(For diagnostic criteria, see DSM-IV, page 493.)

INFORMATION REQUIRED: Psychiatric and psychological evaluation with statements from the flight surgeon and commander regarding the individual's aviation performance.

FOLLOW-UP: Psychiatric follow-up is at the discretion of the mental health provider in those cases in which treatment is deemed necessary

TREATMENT: The treatment of sexual desire/aversion/arousal/pain/orgasm disorders generally involves behavioral techniques that should not preclude aviation duty. Use of medication is incompatible with aviation duty. Treatment of paraphilias is less successful, but the same rules apply.

DISCUSSION: Paraphilic activity often has a compulsive quality. Patients may repeatedly engage in deviant behavior, and this behavior increases when the patient feels stressed, anxious, or depressed. The legal consequences generally preclude treatment within the military.

SLEEP DISORDERS

AEROMEDICAL CONCERNS: Problems initiating or maintaining sleep or sleeping excessively can lead to degradation of performance. Daytime drowsiness or somnolence can interfere with psychomotor performance and flying safety. Physical and mental changes are usually insidious, and there is often an association with an underlying psychiatric disorder or other pathology. Complications of Sleep Apnea are cardiac arrhythmias and hypertension. Automatic behavior, intellectual decline, and lapses of memory have been reported in Narcolepsy and Sleep Apnea.

WAIVERS: Sleep Disorders that cannot be treated by short-term surgical or medical means will not be considered for waivers. Disorders that resolve with treatment could be considered for waivers. A waiver may be considered after full recovery for those transient cases related to life crises, medical conditions, or obesity. Patients with restless extremity syndrome (RES) may be considered for waiver if the cause has been defined and permanently cured, and the sleep disorder secondary to the syndrome has resolved. Successful waiver is unlikely in other cases of Hypersomnia.

DSM-IV CODES:

Primary Sleep Disorders:
307.42 Primary Insomnia
307.44 Primary Hypersomnia (*Specify if:* Recurrent)
347 Narcolepsy
780.59 Breathing-Related Sleep Disorder
307.45 Circadian Rhythm Sleep Disorder
(*Specify type:* Delayed Sleep Phase Type/Jet Lag Type/Shift Work Type/Unspecified Type)
307.47 Dyssomnia NOS

Parasomnias
307.47 Nightmare Disorder
307.46 Sleep Terror Disorder
307.46 Sleepwalking Disorder
307.47 Parasomnia NOS

Sleep Disorders Related to Another Mental Disorder
307.42 Insomnia Related to . . . (*Indicate the Axis I or Axis II Disorder*)
307.44 Hypersomnia Related to . . . (*Indicate the Axis I or Axis II Disorder*)

Other Sleep Disorders:
780.xx Sleep Disorder Due to
.52 Insomnia Type
.54 Hypersomnia Type
.59 Parasomnia Type
.59 Mixed Type
___.__ Substance-Induced Sleep Disorder (*Refer to Substance-Related Disorders for substance-specific codes*)
(*Specify type: Insomnia Type/Hypersomnia Type/Parasomnia Type/Mixed Type*)
(*Specify if:* With Onset During Intoxication/With Onset During Withdrawal)

(For diagnostic criteria, see DSM-IV, page 551.)

INFORMATION REQUIRED: Complete AMS including Sleep Disorder work-up with polysomnography as needed.

FOLLOW-UP: Follow-up treatment is at the discretion of the treating clinician. Waivers are unlikely to be given to those that need any significant follow-up other than routine annual FDME and close questioning of the individual.

TREATMENT: Some of the Sleep Disorders such as Sleep Apnea and Sleep Disorder due to a General Medical Condition can be cured and would allow return to flight status. Drug therapy is incompatible with flying status.

DISCUSSION: Sleep Disorders are increasingly recognized and directly impact performance. Diagnosis and treatment are becoming more sophisticated and available. Of those cases referred to a sleep clinic, 51 percent suffered from hypersomnia, of whom 43 percent had Sleep Apnea; 25 percent, Narcolepsy; and 9 percent idiopathic CNS Hypersomnia. There is evidence of autosomal transmission of a recessive trait for Narcolepsy, which increases in prevalence from 6.7

per million to 1 in 10,000. Of all patients with Narcolepsy, 80 percent develop their symptoms by 35 years of age. Cataplexy will ultimately develop in 85 percent of patients with Narcolepsy.

SOMATOFORM AND FACTITIOUS DISORDERS

AEROMEDICAL CONCERNS: These disorders have a chronic course and patients make repeated visits to physicians due to multiple physical or somatic complaints. Patients with factitious disorders may seriously injure themselves (injecting feces, swallowing ground glass, injecting insulin) and are at extreme risk in the aviation environment. In the aviation community, somaticizing may mask an unconscious fear of flying.

WAIVERS: These disorders are disqualifying: no waiver is recommended. They should be referred to PEB/MEB for review for retention. Waivers may be considered for those rare cases that are successfully treated provided they remain asymptomatic and off medications for one year in a full-duty status. An unconscious fear of flying is a disqualifying condition but may be waiverable with successful treatment and if the aviator remains asymptomatic for one year.

DSM IV CODES:

Somatoform Disorders:
300.81 Somatization Disorder
300.81 Undifferentiated Somatoform Disorder
300.11 Conversion Disorder (*Specify type:* With Motor Symptom or Deficit/With Sensory Symptom or Deficit/With Seizures or Convulsions/With Mixed Presentation)
307.xx Pain Disorder (*Specify if* Acute/Chronic)
.80 Associated with Psychological Factors
.89 Associated with Both Psychological Factors and a General Medical Condition
300.7 Hypochondriasis (*Specify if:* With Poor Insight)
300.7 Body Dysmorphic Disorder
300.81 Somatoform Disorder NOS

(For diagnostic criteria, see DSM-IV, page 445.)

Factitious Disorders:
300.xx Factitious Disorder
.16 With Predominantly Psychological Signs and Symptoms
.19 With Predominantly Physical Signs and Symptoms
.19 With Combined Psychological and Physical Signs and Symptoms
300.19 Factitious Disorder NOS

(For diagnostic criteria, see DSM-IV, page 471.)

INFORMATION REQUIRED: Psychiatric and psychological evaluation, copy of Medical Board if applicable, and flight surgeon's narrative outlining any social, occupational, administrative, or legal problems of the patient.

FOLLOW-UP: Follow-up psychiatric care is at the discretion of the treating mental health provider.

TREATMENT: Treatment offers little hope of return to flight status in Factitious Disorders. These patients are rarely motivated for psychotherapy, and generally change physicians when confronted. The psychotropic medications used in Somatoform Disorders are incompatible with aviation status.

DISCUSSION: Fifteen to thirty percent of patients with hypochondriacal disorders have physical problems. Thirty percent of Conversion Disorders have associate physical illness. Factitious Disorders have a high risk of substance abuse over time. Somatization and Hypochondriasis may be seen as a behavioral manifestation of an unconscious fear of flying.

SUBSTANCE-RELATED DISORDERS: SUBSTANCES OTHER THAN ALCOHOL

AEROMEDICAL CONCERNS: Various substances other than alcohol include amphetamines, cannabis, cocaine, hallucinogens, inhalants, nicotine, opiods, phencyclidine, sedative, anxiolytics, and other or unknown substances. Polysubstance dependence is also possible. Any dependence or abuse of substances can have effects on the brain that can compromise performance through various mechanisms.

WAIVERS: Past experimental use and a confirmed attitude against current or future use may be considered for exception to policy. Drug abuse or dependence at any time is disqualifying, and exception to policy is not recommended. Waiver is rare but depends on class of drug and treatment.

DSM-IV CODES:

For a listing of Substance-Related Disorders, see DSM-IV, pages 16-19.

For diagnostic criteria of Substance-Related Disorders, see DSM-IV, page 175ff.

INFORMATION REQUIRED: (1) Complete flight physical, CBC, and LFTs. (2) A complete 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. (3) Copy of ADAPCP outpatient (Level II) or inpatient (Level III) (or civilian equivalent) treatment summary. (4) FS and ADAPCP Clinical Director's statement to document aftercare including AA attendance. (5) Chain-of-command recommendations through general officer.

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 first 12 months and then every 3 months for remaining 2 years. (2) ADAPCP Clinical Director, monthly for 3 years with documentation of AA (or equivalent) attendance. (3) Annual submission of the flight surgeon's recommendations, ADAPCP counselor's recommendations, documentation of AA attendance, and a letter of support from the aviation unit commander are also required.

TREATMENT: ADAPCP Level II outpatient program or Level III inpatient program.

DISCUSSION: Although waivers would usually be remote, there could be scenarios where waivers might be considered. For example, an aviator addicted to antihistamines with detoxification and successful abstinence could be granted a waiver depending on the external medical and psychosocial context.

PULMONARY DISEASE WAIVERS

ASTHMA (ICD9 493.9)

AEROMEDICAL CONCERNS: Asthma symptoms can rapidly progress from minimal to totally disabling. Exposure to smoke or fumes can provoke an attack in susceptible individuals. Exercise, breathing of dry air, and +Gz exposure can stimulate bronchospasm in those with hyperreactive airways. Seventy percent of asthmatics also suffer from recurrent sinusitis and allergies. Airway obstruction during ascent to altitude may lead to rupture of an alveolus resulting in pneumothorax, pneumomediastinum, or air embolism with resultant complications and possible incapacitation.

WAIVER: A reliable diagnosis of asthma (to include reactive airway disease, exercise-induced bronchospasm or asthmatic bronchitis) at any age is considered disqualifying. Exception to policy may be granted to initial flight applicants with the last episode prior to age 12 provided a complete evaluation is normal. (See below) Any episode after the age of 12 is considered disqualifying for entry to flight training, even if very mild. Waivers are possible for designated aircrew with mild exercise-induced asthma which is controlled by cromolyn sodium. Waiver for any other therapeutic use of these agents is not recommended. Methacholine challenge testing may be indicated in those individuals with a questionable history of wheezing. Any response to Methacholine challenge testing is considered aeromedically significant. Methacholine challenge testing is not indicated in those individuals with an unquestionable history of asthma and evidence by PFT of airway disease, as it can precipitate status asthmaticus.

INFORMATION REQUIRED: Internal medicine and/or pulmonology consultation to include complete pulmonary function testing (PFT) with airway mechanics is necessary for initial waiver requests. Abnormal PFTs must document effect of a post-PFT bronchodilator.

FOLLOW-UP: All medications that the individual requires for control of symptoms must be listed on the SF-88 along with their frequency of use.

TREATMENT: Any bronchospasm treatment regimen is considered disqualifying for all aviation duties. Orally inhaled cromolyn sodium may be used to prevent or minimize mild exercise-induced asthma with waiver.

DISCUSSION: Reliable diagnosis depends on a substantiated history of cough, wheeze and/or dyspnea, an increase in FEV1 >15% after administration of an inhaled bronchodilator, and/or airway hyperreactivity demonstrated by an exaggerated decrease in airflow induced by a standard bronchoprovocation challenge such as methacholine inhalation or demonstration of exercise-induced bronchospasm. Attacks can be exacerbated by breathing cold and dry air, by respiratory infections and exercise. Of childhood asthmatics, 50-55% will achieve prolonged remission, but more than half will eventually relapse. The mean age of recurrence is 32.5 years compared to nearly 50 years for those patients who develop asthma as an adult. Reasons for permanent disqualification from flying include persistent, marked bronchial hyperreactivity, frequent episodes of asthma and inadequate control with drugs. The Air Force reports that 25% of the medevacs from Desert Storm were for asthma. Mild asthmatics can remain symptom-free for long periods and then suddenly have a severe exacerbation of the condition when exposed to a triggering event.

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (ICD9 496)

AEROMEDICAL CONCERNS: Chronic obstructive pulmonary disease (COPD) results in reduction in maximum oxygen uptake and exercise tolerance . Cerebral hypoxia can adversely affect psychomotor skills, memory, judgment and cognition. Decrements in judgment and the ability to perform complex tasks are also caused by carbon dioxide retention which can occur in COPD. Sudden incapacitation, even death as a result of pneumothorax and fatal air embolism, can occur if bullae rupture.

WAIVER: Waivers may be considered for designated aviators only on a case-by-case basis if: (1) There is no cardiovascular decompensation; (2) Exercise tolerance is unimpaired; (3) The patient does not require medications; and (4) There are no bullae evident.

INFORMATION REQUIRED: Internal medicine or pulmonology consultation is required, to include chest x-ray and/or CT to exclude bullae, and complete PFT including bronchodilator challenge. Cardiology consultation may be required if there is evidence of RVH.

FOLLOW-UP: Annual PFT with internal medicine or pulmonology consultation is normally required.

TREATMENT: The use of steroid inhalers either alone or in concert with beta agonists or cholinergic antagonists is considered disqualifying and waiver is rarely granted. Treatment of reversible airway obstruction by immunotherapy is considered waiverable. The expense and questionable effectiveness of immunotherapy for COPD, however, makes this option less attractive. Use of cromolyn sodium is not normally waiverable in this condition. Annual influenza immunization, pneumovax, and treatment aimed at smoking cessation and weight loss (if overweight) are encouraged.

DISCUSSION: The lower limit of oxygenation needed to permit adequate cerebral oxygenation is PaO2>65 mm Hg at sea level. With extreme COPD, obesity or tight-fitting clothing can reduce lung volumes leading to hypoventilation and ventilation/perfusion imbalance. Patients with COPD are also at increased risk of acute chest infections, complicating care in the operational setting. Symptoms will be expected when the forced expiratory volume at 1 second (FEV1) reaches 50% of that predicted by sex and age. While the normal FEV1 declines at about 30 ml/year, the reduction in smokers can reach 90 ml/year. Of all COPD patients, up to 50% will have persistent, productive cough; up to 25% will be moderately disabled with recurrent chest infections and increasing absences from work; and up to 25% will be severely disabled within 10 years.

PNEUMOTHORAX (ICD9 512.8)

AEROMEDICAL CONCERNS: Pneumothorax may cause acute chest pain and shortage of breath in flight, worsening as ambient pressure falls. Tension pneumothorax may cause hypoxia arising from ventilation/perfusion imbalance and mediastinal shift may cause cardiovascular embarrassment. Spontaneous pneumothorax is the result of some underlying pulmonary disorder (COPD, bullae, bronchiolitis, emphysema, asthma, sarcoidosis, histoplasmosis, etc.) which places an individual at higher risk of morbidity as well as recurrence of pneumothorax.

WAIVER: Previous history of a spontaneous pneumothorax is disqualifying for initial flight applicants. Exception to policy is not recommended. Single instance of spontaneous pneumothorax requires no waiver, but must be grounded locally for at least 2 months or until complete recovery, normal PFTs, and no underlying pathology is present. Waiver may be possible for patients with recurrent spontaneous pneumothorax after surgical pleurodeisis and a satisfactory period of postoperative observation of 6 months. Chamber flight before return to flying duties is no longer required.

INFORMATION REQUIRED: Chest x-ray and thin cut CT scan should demonstrate full lung expansion, normal PFTs, and no pathology exists which could predispose to recurrence. Thoracic surgery consultation may be required, especially in recurrent cases.

FOLLOW-UP: Recurrence of pneumothorax requires resubmission for waiver and an evaluation as above.

TREATMENT: All recognized forms of surgical treatment are compatible with waiver. There is a substantial failure rate after chemical pleurodeisis and chemical pleurodeisis is not an acceptable treatment.

DISCUSSION: Over 90% of patients presenting with spontaneous pneumothorax are under 40 years old with 75% being less than 25. In women, there is sometimes a relationship to menstruation. Onset of spontaneous pneumothorax is accompanied by chest pain in 90% of cases and by dyspnea in 89%. Tension pneumothorax develops in 5% and hemopneumothorax in 2.5%. Recurrence rates in patients who have not had definitive treatment has been reported from 5-60% with most in the first year. In one series of patients followed for 10 years without surgery, ipsilateral recurrence followed in 50% of which 62% happened in the first 2 years. Another study reported recurrence of 30% after a first spontaneous pneumothorax, 50% after a second episode and 80% after a third. The contralateral risk was reported as 10%. The recurrence rates after surgery depend on the procedure used. After thorascopic pleurodesis, it can be as high as 16% while fibrin pleurodesis has been reported to have a recurrence rate of 4%. Surgical pleurodeisis/pleurectomy has a 1% recurrence. A recent USAF review of patients exposed to chamber flight before return to flying duties revealed that none was eliminated, and there was no prediction of later recurrence, so this test has been discontinued.

SARCOIDOSIS (ICD9 135)

AEROMEDICAL CONCERNS: The protean manifestations of sarcoidosis can involve almost any organ system. Cardiac sarcoidosis, while uncommon, is associated with restrictive cardiomyopathy, ECG abnormalities such as ectopy and atrioventricular blocks, and sudden death. Patients with pulmonary infiltration may have symptoms of restrictive lung disease which are distracting in flight. Uveitis can cause permanent visual damage. Nervous system involvement, with associated seizures, can also occur. Hypercalcemia can predispose the aircrew member to renal stones.

WAIVER: All forms of sarcoidosis are disqualifying. Initial flight applicants with either a history of or an active case of sarcoid have not been granted an exception to policy. Persistent, widespread pulmonary shadowing on x-ray or abnormal pulmonary diffusion, and/or evidence of myocardial involvement (e.g., fixed thallium defect, significant arrhythmia, or wall motion abnormalities on ECHO) are all considered permanently disqualifying, no waiver recommended. Aircrew members may be recommended for waiver if in remission for at least 1 year with normal work-up. (See below)

INFORMATION REQUIRED: A complete AMS is required. Node biopsy in those cases with enlarged superficial nodes is required from the time of the acute phase of the illness. Internal medicine/Pulmonary medicine consultations are required. Recent PA and lateral chest x-ray, CBC with sedimentation rate, liver function tests, serum electrolytes, serum calcium and phosphorous, 24-hour urinary calcium, pulmonary function testing (PFT) with diffusion studies (e.g., DLCO), thallium AGXT, 24-hour Holter monitor, ophthalmology consultations (including slit lamp examination), and neurology consultation are required at the time of waiver request. The Holter tape and thallium GXT tracings and scans should be forwarded to the USAAMA for review. All cases with possible systemic or cardiac sarcoid should be referred to the USAAMA for further evaluation.

FOLLOW-UP: Annual internal medicine or pulmonary medicine consultation, PA and lateral chest x-ray, ECG, CBC, and PFTs with diffusion studies are required. Further work-up is at the discretion of the USAAMA. Reactivation of the disease will require a complete work-up as above and resubmission for waiver.

TREATMENT: Most cases of asymptomatic sarcoidosis with symmetrical hilar adenopathy and no parenchymal infiltrates will spontaneously remit without treatment. Use of corticosteroids is controversial in these cases but has been advocated for all extrapulmonary sarcoidosis or in patients with symptomatic pulmonary sarcoidosis.

DISCUSSION: The incidence is highest in the 20 - 35 age group. Up to 50% present with abnormal radiographic findings (usually bilateral enlargement of hilar nodes) or nonspecific respiratory symptoms; between 10 and 50% will have erythema nodosum (with females predominating); 15 to 25% will have uveitis; 30% of Europeans and up to 80% of African-Americans will have enlargement of superficial nodes; the spleen is palpable in 10 to 25% with massive splenomegaly in 3%; up to 30% of cases with acute sarcoidosis will have abnormal thallium scans suggesting myocardial involvement; and liver biopsy will show sarcoid granulomas in 70% of cases without evidence of altered liver function. Nervous system involvement is demonstrable in 10% but may be subclinical in a greater percentage. Osteolytic or osteosclerotic bone lesions are also present in 10% of cases. Most cases (80%) with hilar nodes resolve spontaneously within 2 years, but there is a 5-10% chance of developing progressive pulmonary fibrosis and a 6-7% eventual mortality in those with radiologically evident pulmonary sarcoidosis. The presence of ocular involvement or chronic tonsillitis has been reported to be associated with a worse prognosis. High levels of serum interferon-gamma (IFNg) before treatment are associated with a more favorable prognosis. Healed myocardial granulomas may lead to arrhythmias, and patients in remission who have had myocardial involvement remain at risk for sudden death. MRI scan may eventually prove to be the method of choice for identifying cardiac sarcoid granulomas.

UROLOGY WAIVERS

CYSTIC AND CONGENITAL ABNORMALITIES OF THE KIDNEY

AEROMEDICAL CONCERNS: Polycystic disease (ICD9 753.12) may be associated with hypertension, Berry aneurysms, renal stones, infection, hematuria, GI symptoms and mitral valve prolapse. Simple retention cysts in the renal cortex may be susceptible to trauma. Medullary sponge kidneys (ICD9 753.17) can be associated with hematuria and formation of calculi. Large polycystic kidneys are not compatible with high performance flying because "G" forces cause the kidney to pull on the pedicle which may result in bleeding.

WAIVER: Exception to policy for initial flight applicants is rarely granted. A waiver is possible for all other classes of flight status in most cases provided adequate renal function and no symptoms are present.

INFORMATION REQUIRED: Nephrology consultation is required. Approximately 20% of polycystic disease may have a coexisting Berry aneurysm. Appropriate imaging studies of the head (MRI or MRIA) need to be completed prior to waiver consideration.

FOLLOW-UP: Annual nephrology or urology consultation to insure stable disease. Periodic CT of the kidney may be required to confirm lack of progression of the disease.

TREATMENT: Will vary depending on the patient's present condition and diagnosis.

DISCUSSION: The majority of patients with polycystic disease present with evidence of impaired renal function between the ages of 30 and 50. Approximately 10-40% of these patients will have Berry aneurysms and 9% will die of intracranial hemorrhage. More than 60 % of patients with PKD will have hypertension. Upper urinary tract infections are common, especially in women. Unilateral renal agenesis with a normal functioning kidney is waiverable. Medullary sponge kidney and hereditary megacalycosis are also waiverable.

HEMATURIA (ICD9 599.7)

AEROMEDICAL CONCERNS: Hematuria is a symptom and may point to an underlying condition that is disqualifying.

WAIVER: Significant renal function impairment, significant polycystic kidney disease, or anemia secondary to hematuria are generally not favorably considered for waiver. Restrictions may be necessary for aviators who have recurrent, microscopic hematuria precipitated by exposure to high "G" forces. Waiver is not required for microscopic hematuria with less than 5 red cells per high power field (rbc/hpf).

INFORMATION REQUIRED: Aviators whose urinalysis (UA) repeatedly (on 3 or more UAs taken at weekly intervals following a 24-48 hour period of no exercise) shows more than 5 rbc/hpf require a urology consultation. Note: A negative screening urinalysis is considered a negative microscopic for purposes of this APL. This evaluation should include an IVP with or without a cystoscopy. A nephrology consultation and possible renal biopsy may be indicated in certain cases. An exercise history may be all that is needed to identify a case of "exercise-induced" hematuria. A urological work-up is needed to rule out serious conditions such as neoplasms or easily treatable conditions. Hematuria associated with 2+ or 3+ proteinuria should always be assumed to be of glomerular or interstitial origin. This will require an internal medicine or nephrology evaluation.

FOLLOW-UP: No follow-up is required for those aircrew members with less than 5 rbc/hpf. Annual urology evaluation may be required for all other aircrew members. Other follow-up requirements are based upon the underlying medical condition.

TREATMENT: Depends completely upon the underlying medical condition.

DISCUSSION: One study reported the results of renal biopsy in a large number of cases of asymptomatic hematuria as follows: glomerulonephritis - 77%; pyelonephritis - 1%; normal kidney - 20%. Of those patients who have membranoproliferative glomerulonephritis with mesangial deposits of IgA, 60% will have raised serum IgA levels. Patients with IgA nephropathy (Berger's Disease) will need regular follow-up. Renal insufficiency develops in about 25% of these patients.

PROSTATITIS (ICD9 601.0)

AEROMEDICAL CONCERNS: The symptoms of acute prostatitis (ICD9 601.0), which include severe perineal discomfort, backache, urgency, and frequency of micturition can be extremely distracting in the cockpit. Similarly, the backache from chronic prostatitis (ICD9 601.9) can be an irritant in flight. The side effects of some forms of medication are not compatible with flying.

WAIVER: Patients with acute prostatitis should be grounded until symptoms have resolved. An acute episode does not require a waiver unless it becomes recurrent or chronic. Waiver is possible for patients with chronic prostatitis. DNIF is still recommended for flare-ups of symptoms.

INFORMATION REQUIRED: Urology consultation.

FOLLOW-UP: Annual urology consultation is required in the event of recurrence or if chronic in nature.

TREATMENT: Waivers may ben granted for patients on DOXICYCLINE, TRIMETHOPRIM/SULPHAMETHOXAZOLE, CARBENICILLIN, and CIPROFLOXIN.

DISCUSSION: Some patients with prostatitis are very sensitive to the effects of alcohol although the mechanism for this is unclear. Personnel on medication should be warned to restrict their alcohol intake while on treatment. They should also avoid spicy foods. Patients with chronic prostatitis, with symptoms of pain and discomfort, often respond to short courses of anti-inflammatory agents (i.e., ibuprofen/naproxen). The side effects of nitrofurantoin relevant to aviation include an acute pulmonary reaction with cough, dyspnea and chest pain, a chronic reaction with similar symptoms but with a more insidious onset, and occasionally, nystagmus, vertigo and dizziness. Trimethoprim can rarely cause hallucinations, ataxia, vertigo, apathy or depression. Ciprofloxin can cause tremor, light-headedness, confusion, lethargy, drowsiness, insomnia, blurred vision, changes in color perception and headache. The reported incidence of headaches is 1.2% with other CNS side effects arising in 0.4% of cases. Photosensitivity has also been reported with the use of quinolones.

PROTEINURIA (ICD9 791.0)

AEROMEDICAL CONCERNS: Proteinuria is a symptom of potential underlying medical conditions which are considered disqualifying. Significant renal disease may lead to chronic fatigue, near syncope, or loss of consciousness. The active duty aviation environment (heat, dehydration, prolonged duty) may exacerbate such conditions.

WAIVER: Mild proteinuria with no underlying renal pathology is routinely recommended for waiver. Significant proteinuria often is associated with immune-mediated glomerular diseases or metabolic disorders with glomerular involvement such as diabetes mellitus. Waiver for these diseases is usually based upon the stability of the disease and the lack of significant symptoms as well as the lack of environmental exacerbation of the condition.

INFORMATION REQUIRED: Trace proteins and 1+ protein found on routine urinalysis require little more than repeating under favorable conditions. If proteinuria on dipstick is persistent upon repeated testing, obtain a 24-hour urine collection for quantitative assessment of protein excretion. For any determinations greater than 200 mg./24 hr., a more thorough nephrology/urology consultation is required. Renal biopsy may also be required.

FOLLOW-UP: Dependent upon the underlying medical condition. An annual 24-hour urine protein may be required to monitor progression of disease.

TREATMENT: As appropriate for the underlying medical condition.

DISCUSSION: Urine contaminated by semen will often produce false positive proteinuria. Proteinuria should also be interpreted with consideration of the urine specific gravity since a proteinuria of 1+ in a diluted urine may indicate a considerable protein loss.

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 Class 1A/1W Applicants:
A history of kidney stone is disqualifying. Exceptions to policy are sometimes granted for initial flight applicants and require the information listed below.

Initial Class 2, 3, & 4 Applicants:
A history of kidney stone is disqualifying on initial physical. Waivers are possible and require 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 a normal metabolic work-up, no waiver is generally required and 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, a waiver may be requested granted the metabolic condition can be controlled with approved medication. Difficulty in controlling a metabolic abnormality may result in a permanent disqualification.

INFORMATION REQUIRED:

- Renal Stone Worksheet—urinalysis should be negative for hematuria, granular casts, or proteinuria.
- Urine Culture and sensitivity- reflecting no bacterial growth
- CBC with differential
- Initial AMS requires:
  - One set of blood chemistries collected when asymptomatic
  - 24-hour urine chemistry
  - IVP (after stone passage/removal)
  - 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 no longer 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 will be 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 resolve

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-forth 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 and retreatment.

REFERENCES:

American Urological Association, Clinical Practice Guidelines, Management of Ureteral Calculi, 1997
www.auanet.org- Go to Publications/Catalog and click on "Clinical Practice Guidelines"

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.

Menon M, Parulkar B, Drach G: Urinary Lithiasis: Etiology, Diagnosis, and Medical Management, Campbell's Urology, 7th Edition, Chapter 91, 2661-2734

RENAL STONE WORKSHEET

*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 Results: Pre (if available)_____

Post (required)_____

Stone Analysis (if available): _____

AEROMEDICAL TECHNICAL BULLETINS

This Aeromedical Technical Bulletin is under revision.

(Older versions should be used with discretion as much of the information is out of date.)

ATB: AEROMEDICAL GRADED EXERCISE TEST (AGXT)

1. The indications for the Aeromedical Graded Exercise Test (AGXT), also called graded exercise treadmill (GXT), are described in AR 40-501, Standards of Medical Fitness, paragraph 4-15, August 1995, and APLs on Abnormal Cardiovascular Testing and the Cardiovascular Screening Program. The guidelines for performing an aeromedical GXT are outlined below to apply a uniform standard in the performance and interpretation of this test on aircrew members.

2. Prior to the AGXT, the aircrew member should be briefed by the local flight surgeon as to the indications for the test, the procedure, and the significance of the results. The patient should sign an informed consent statement.

3. The following conditions should be assured prior to testing:

   a. Minimum of four hours fasting prior to test.
   b. No tobacco or caffeine products one hour prior to test.

4. The aeromedical GXT must be a maximal effort, limited only by symptoms, exhaustion or objective signs (medically significant ectopy, dysrhythmia, or blood pressure response). Exercise should not be halted on attainment of a predicted maximal heart rate.

5. A final report of the AGXT including patient's activity level and attained workload should be forwarded along with the FDME and /or AMS to CDR, USAAMC, ATTN: MCXY-AER, Fort Rucker, AL 36362-5333, for review and disposition. Actual tracings do not need to be sent and if required will be requested by USAAMA.

6. A copy of Aeromedical Graded Exercise Test Report Form (enclosure 1) and Letter to the Attending Physician (enclosure 2) of this ATB should be forwarded with the patient to the attending physician conducting the AGXT.

7. Aeromedical standards for interpretation of treadmill exercise tests in Army aircrew members.

   a. Baseline: The location of three consecutive coplanar ST segments, measured 80 milliseconds after the "J" junction, following 30 seconds of standing hyperventilation. This baseline may be on, above, or below the PQ segment, but must be parallel to it.
   b. Abnormal: 1.0 or more millimeters of ST depression in three (3) consecutive coplanar complexes, measured 80 milliseconds after the "J" junction, irrespective of slope. If abnormal, apply follow-up guidelines from the Abnormal Cardiac Function Testing APL

Aeromedical Graded Exercise Test Report Form

Patient Name:			SSAN:	DATE:
Rank:	Age:	Gender:	Race:	HT/WT (in/lbs)
Medications:			Facility:	
LDL:	HDL:	Chol/HDL ratio:	Tot Chol:	FRI:

Bruce Protocol

Pre-Exercise:	Sitting Heart Rate: Hypervent HR:	Sitting BP Hypervent BP:	Resting EKG Analysis
	Supine HR:	Supine BP:	

	Minutes	MPH	%Grade	Heart Rate	BP	**Comments** (Sxs, EKG Changes, etc.)
EXERCISE	0	1.7	10			
	1					
	2					
	3	2.5	12			
	4					
	5					
	6	3.4	14			
	7					
	8					
	9	4.2	16			
	10					
	11					
	12	5	18			
	13					
	14					
	15	5.5	20			
Post Exercise	Immediate	-	-			
	2	-	-			
	5	-	-			
	8	-	-			

ANALYSIS

Total Exercise Time:	Max. BP:
Peak Exercise Heart Rate:	
Total Mets:	

Reason for Termination:

( ) Exhaustion ( ) Chest Pain/Angina ( ) Dysrhythmia
( ) ST Seg changes ( ) Hypertensive BP Response ( ) Fatigue
( ) Jt/Muscle Pain ( ) Poor Conditioning ( ) Other

Physician Intrepretation:

( ) Normal ( ) Abnormal

Comments:

Physician Stamp: Physician Signature:

ENCL 1 ATB 11-01

AGXT: Letter to the Attending Physician

TO: ATTENDING PHYSICIAN

FROM: FLIGHT SURGEON

SUBJECT: Aeromedical Graded Exercise Test

1. A graded exercise test has been requested by the US Army Aeromedical Center on this US Army aircrew member to explore the possibility of aeromedically significant coronary disease and other cardiac abnormalities. Please follow the definitions and diagnostic criteria listed below in the interpretation of this test. Since this study has occupational medicine importance, these criteria are intended to yield maximal sensitivity. Please do not apply other criteria.

2. The following conditions should be assured prior to testing:

    a. Minimum of four (4) hours fasting prior to test.
    b. No tobacco or caffeine for one (1) hour prior to test.

3. The aeromedical GXT must be a maximal effort, limited only by symptoms, exhaustion or objective signs (medically significant ectopy, dysrythmia or blood pressure response). Exercise should not be halted on attainment of a predicted maximal heart rate.

4. Determination of abnormal exercise tolerance tests for US Army aircrew members:

    a) Baseline: The location of three (3) consecutive coplanar ST segments, measured 80 milliseconds after the "J" junction following 30 seconds of standing hyperventilation. This baseline may be on, above, or below the PQ segment, but must be parallel to it.

    b) Abnormal: 1.0 or more millimeters of ST depression in three (3) consecutive coplanar complexes, measured 80 milliseconds after the "J" junction, irrespective of slope. Other causes for an abnormal result include: atrial flutter or fibrillation, supraventricular or ventricular tachycardia (three or more consecutive premature beats including multifocal atrial tachycardia), supraventricular or ventricular pairs (couplets), multiform ventricular premature ectopy, ventricular premature R wave on preceding T wave, or hypotensive response of any degree.

ATB: DEPTH PERCEPTION TESTING

(DD Form 2808, Block 67. 'DEPTH PERCEPTION')

Important notes concerning the new DD Form 2808.

The new DD Form 2808 has a pre-printed 'AFVT' in block 67. Although this is convenient for entering in the results of the Armed Forces Vision Tester (AFVT) depth perception test, it is not intended to exclude other authorized depth perception testing, such as the OPTEC 2300, the Random Dot (RANDOT) Circles Test or the Titmus Graded Circles Stereoacuity Test. If you do not use the AFVT, line through the pre-printed entry and record the test used with the proper score. If you use the AFVT and then also use another depth perception test, record the AFVT in block 67 and then record the additional depth perception test findings in block 60 (Other Vision Test) or block 73 (Notes).

Purpose/Indications.

Mandatory for all FDMEs. This measures fine depth perception through the ability to fuse stereoscopic targets**.**

Equipment.

AFVT (Armed Forces Vision Tester) or OPTEC 2300
- or -
RANDOT (Random Dot Circles Test) **-** with polarized glasses (included with test)
- or -
Titmus (Titmus Graded Circles Stereoacuity Test) - with polarized glasses (included with test)

Set-Up.

AFVT (Armed Forces Vision Tester) or OPTEC 2300:

- Patient seated comfortably at the AFVT (or OPTEC 2300).
- Patient wears habitual spectacle prescription (if applicable).
- May test without prescription but, if fails, retest with prescription.
- Test emulates distance test (optical infinity).
- Refer to manual for correct settings for model being used.

RANDOT (Random Dot Circles Test) **or** the Titmus (Titmus Graded Circles Stereoacuity Test):

- Patient wears habitual spectacle prescription (if applicable).
    - May test without prescription but, if fails, retest with prescription.
- Polaroid spectacles worn (over habitual prescription if also worn).
- Test distance is 40 cm (16 inches).
- Provide adequate light but avoid reflections from the test's surface.
- Hold test upright to maintain the proper axis of polarization.
- Do not permit the patient's head to tilt during testing.

Step-By-Step Procedure.

AFVT (Armed Forces Vision Tester) or OPTEC 2300:

- Refer to manual for correct settings for model being used.
- Group A is for demonstration purposes ONLY and should not be used as part of the actual test (see manual).
- Group B is at the level of the new overall standard of 40 seconds of arc; there are three presentations of five circles each within Group B.

- Patient identifies the circle within each presentation that appears 'closest'.
- Patient must correctly identify all presentations within Group B to pass.
- You may test beyond Group B if desired but it is not necessary.
- Record as "AFVT Group B – 40 arc sec PASS" or words to that effect.
- If fails any in Group B, retest using RANDOT and/or Titmus below**.**

RANDOT (Random Dot Circles Test):

- There are ten presentations of three circles each in the RANDOT.
- You must test ALL ten presentations; do not stop after number seven.
- You must test all presentation IN ORDER; do not jump around since each level is progressively more difficult.
- Patient identifies the circle that appears 'closest'.
- Test until the patient misses two levels in a row.
- Record the last level passed successfully.
- For RANDOT, a minimum passing score is correctly identifying presentations 1 THROUGH 7 which equals 40 seconds of arc.
- Record as the number missed over the number possible.
    - For example, 'RANDOT 3/10 – 40 arc sec PASS' or words to that effect.
- If fails the RANDOT, may retest using AFVT/OPTEC 2300 or Titmus.

Titmus (Titmus Graded Circles Stereoacuity Test):

- There are nine presentations of four circles each in the Titmus.
- You must test ALL nine presentations.
- You must test all presentations IN ORDER; do not jump around since each level is progressively more difficult.
- Patient identifies the circle that appears 'closest'.
- Test until the patient misses two levels in a row (or the last presentation).
- Record the last level passed successfully.
- For Titmus, a minimum passing score is correctly identifying ALL of the presentations 1 THROUGH 9 which equals 40 seconds of arc.
- Record as the number missed over the number possible.
    - For example, 'Titmus 0/10 – 40 arc sec PASS' or words to that effect.
- If fails the Titmus, may retest using AFVT/OPTEC 2300 or RANDOT.

Refer to Eye Clinic if subject fails depth perception testing:

- misses any presentations within Group B of the AFVT or OPTEC 2300;
- or, misses any of presentations 1 through 7 of the RANDOT;
- or, misses any of the nine presentations of the Titmus.

Note: The Verhoeff Testing Apparatus is no longer authorized for depth perception testing on FDMEs. 'Grandfathering' this test may be possible but only with supplemental information from Optometry or Ophthalmology and final approval authority from Commander, US Army Aeromedical Center (USAAMC). It will in no case be 'grandfathered' for any Class 1/1A FDME.

ATB: COLOR VISION TESTING

(DD Form 2808, Block 66. 'COLOR VISION')

Important notes concerning the new DD Form 2808.

The new DD Form 2808 has a pre-printed 'PIP' and a pre-printed ' /14' in block 66. Although this is convenient for entering in the results of the Pseudo-Isochromatic Plate (PIP) color test, it is not intended to exclude other authorized color vision testing, such as the Farnsworth Lantern (FALANT) or the OPTEC-900 Color Vision Tester. If you do not use the PIP, line through the pre-printed entries and record the test used with the proper score. If you use the PIP and then also use another color vision test, record the PIP in block 66 and then record the additional color test findings in block 60 (Other Vision Test) or block 73 (Notes).

Purpose/Indications.

Mandatory for all initial FDMEs. This screens for color vision deficiencies.

Equipment.

PIP (Pseudo-Isochromatic Plates):

- Only the test which contains 14 test plates with numbers is authorized at this time (no traced lines). Most tests with 14 test plates also contain one or two 'demonstration' plates that can be seen readily, even in the presence of a color vision deficiency. Once the examinee understands the test with these demonstration plates, present the other 14 plates. Do not count the demonstration plates.
- The recommended source of illumination is the Macbeth Easel Lamp. However, the Daylight HRR Illuminator, "daylight" fluorescent bulb, other standard illuminant "C" light source, or other source providing a light source rating of C.R.I. 90 and 6200º Kelvin, may be used instead. If none of these are available, see the PIP Set-Up section below.

- or -

FALANT (Farnsworth Lantern) or the OPTEC 900-Color Vision Tester:

- The Farnsworth Lantern and the OPTEC-900 Color Vision Tester are equivalent for FDME test purposes.

Set-Up.

PIP (Pseudo-Isochromatic Plates):

- Place the light source (Macbeth Easel Lamp, Daylight HRR Illuminator, "daylight" fluorescent bulb, or other standard illuminant "C" light source) on a table or shelf so that the subject's line of sight is at right angles to the plates, and so his/her eyes are at a distance of approximately 30 inches.
- If subject wears glasses for flight, test with glasses on.
- The subject should not face an open window or other strong light. Nearby incandescent lights (those with any yellow wavelengths) should be shielded (or off) so they do not illuminate the plates. Cover any nearby windows.
- If none of the recommended light sources are available, use regular room lighting but avoid any incandescent lights (yellow wavelengths). If the examinee fails in this case, you may do any of the following:
    - Retest using the FALANT or OPTEC-900 instead
    - Retest using light reflected from the north sky (sunny day)
    - Refer to clinic that has appropriate test lighting

FALANT (Farnsworth Lantern) or the OPTEC-900 Color Vision Tester:

- Test distance is eight (8) feet with the aperture facing the subject.
- If subject wears glasses for flight, test with glasses on.

- Give the test in a normally lighted room; screen from glare; exclude sunlight. Subject should not face the source of room illumination.

Step-By-Step Procedure.

PIP (Pseudo-Isochromatic Plates):

- Examiner instructs subject to, "Please read the numbers aloud" (or words to that effect). The subject is not allowed to trace the numbers or touch the test plates.
- Examiner must show the demonstration plate(s) first, then show the remaining 14 test plates, showing each for approximately 2-4 seconds. Do not count the demonstration plate(s) in scoring.
- With the exception of always showing the demonstration plate(s) first, the examiner may change the order of the plates if there is suspicion of memorization. However, do not 'mix and match' test plates from multiple tests. (In a multiple-subject environment, do not allow those waiting to test to overhear the responses to the PIP.)
- A patient is disqualified if there are five (5) or more errors on the PIP.
- Record the results as the number MISSED over the number possible. For example, a perfect score on the PIP would be:
    - 'PIP 0/14 PASS'

FALANT (Farnsworth Lantern) or the OPTEC-900 Color Vision Tester:

- Instruct the patient that he/she will be seeing sets of two lights in combinations of the colors red, green, and/or white. The lights are oriented vertically and the subject is to respond with the colors seen in order from top to bottom.
- It is advisable to provide the subject with a 'trial set' to allow the patient to understand the test before proceeding; do not record this set.
- Present nine (9) pairs of light sets. The first set presented should be a RED-GREEN or GREEN-RED combination but the remaining eight sets should be in random order. Each set of lights should be presented for approximately two (2) seconds.
- An error is considered the miscalling of one or both of a pair of lights. If an examinee changes the response before the next light is presented, record the second response only.
- A patient is disqualified if he/she misses any of the nine (9) presentations.
    - A retest with an additional 18 light pairs is no longer authorized for FDMEs. See note at bottom of page. 'Grandfathering' this test may be possible but only with supplemental information from Optometry or Ophthalmology and final approval authority from Commander, US Army Aeromedical Center (USAAMC). It will in no case be 'grandfathered' for any Class 1/1A FDME.
- Record the results as the number MISSED over the number possible. For example, a perfect score on the FALANT or OPTEC 900 would be:
    - 'FALANT 0/9 PASS'
    - 'OPTEC-900 0/9 PASS'

Refer to Eye Clinic if subject fails color vision testing:

- misses five (5) or more of 14 test plates with PIP,
  and/or
- misses any of nine (9) test light pairs with the FALANT or OPTEC 900

Note: The FALANT / OPTEC-900 retest with an additional 18 light pairs is no longer authorized for FDMEs. 'Grandfathering' this test may be possible but only with supplemental information from Optometry or Ophthalmology and final approval authority from Commander, US Army Aeromedical Center (USAAMC). It will in no case be 'grandfathered' for any Class 1/1A FDME.

ATB: CYCLOPLEGIC REFRACTION

(DD Form 2808, Block 62. 'REFRACTION BY AUTOREFRACTION OR MANIFEST')
[Performed by an Optometrist or Ophthalmologist ONLY!]

Important notes concerning the new DD Form 2808.

Unfortunately, the new pre-printed wording of block 62, "REFRACTION BY AUTOREFRACTION OR MANIFEST" may be very confusing. It is VERY important that anyone conducting testing for any FDME understand that an 'autorefraction' of any kind is NOT authorized and should NEVER be entered on the DD Form 2808 unless it is in block 60 (Other Vision Test) or in block 73 (Notes) for reference only.

Autorefraction results should NEVER be entered into block 62!

We highly recommend lining through the entire "…BY AUTOREFRACTION OR MANIFEST" wording and utilize the blank next to the refraction to enter the type of refraction utilized. For example:

By –0.50 **S.** –0.25 **CX** 180 (type of refraction here)

↑

All 'autorefraction' entries on FDME's in block 62 will be returned as incomplete.

Purpose/Indications: Cycloplegic Refraction ("Cyclo"):

Mandatory for all Class 1/1A FDMEs. This measures a patient's refractive error in the absence of accommodation (focusing ability) which is useful in confirming the presence of latent hyperopia ("hidden farsightedness"). This is accomplished through the use of a cycloplegic topical ophthalmic solution, an anticholinergic solution that is used to block the responses of the iris sphincter muscle and the accommodative muscle of the ciliary body to cholinergic stimulation, producing pupillary dilation (mydriasis) and paralysis of accommodation (cycloplegia).

An Optometrist or Ophthalmologist must conduct the cycloplegic refraction in a very specific manner outlined under the step-by-step procedure below. Conduct the cycloplegic refraction after all other eye testing. Note that there is now additional mandatory testing with the cycloplegic refraction as outlined on the last page.

Equipment/Supplies: Cycloplegic Refraction.

- Slit lamp biomicroscope
- Facial tissue(s)
- Mydriatic spectacles (disposable sunglasses)
- Topical anesthetic: (Proparacaine Hydrochloride Ophthalmic Solution, USP, 0.5%)
- Cycloplegic agent: (Cyclopentolate Hydrochloride Ophthalmic Solution, USP, 1.0%)
- Retinoscope (for objective start point or objective verification; an autorefractor may be used for an objective start point but in no instance will any autorefraction be entered onto an exam form.)
- Phoropter
- Projected Snellen distance visual acuity chart [must be projected IAW AR 40-501, paragraph 4-12, a.(1)]. Projected sources for a cycloplegic refraction include, but are not limited to:
    - Traditional projector with screen
    - Binocular Visual Acuity Tester (BVAT), or similar system
    - Refraction system with projected image (i.e. the Marco Nidek COS-1000 Compact Ophthalmic System, the Marco Nidek EPIC-2100, or similar system)

- Method for keratometry and/or topography (for new mandatory testing)

Set-up: Cycloplegic Refraction.

- Conduct a cycloplegic refraction after completing all other eye testing and verifying any disqualifying parameters from other tests. Highly recommend a brief review of the physical exam form to ensure all other eye testing is complete and that no re-testing is necessary (i.e. meets standards). One more check in the process will only help to ensure the physical is correct when finally forwarded to Fort Rucker for review.

- Highly recommend using a slit-lamp biomicroscope to ensure patient has open anterior chamber angles before instilling any drops.

  If an angle estimation is less than 0.25:1 (or ¼:1), or a Van Herick angle estimation of '1', perform gonioscopy prior to instilling cycoplegic drops. If corneal epithelial disruption occurs with gonioscopy, confirm angles are open and have patient return in 24 hours for the cycloplegic refraction. If angles are narrow, refer to Ophthalmology for evaluation before proceeding.

- Ask patient about allergies, adverse reactions to any anesthetics (Proparacaine being utilized), or adverse reactions to any preservatives (Proparacaine is preserved with Benzalkonium Chloride, 0.01%).

Step-By-Step Procedure: Cycloplegic Refraction ("Cyclo").

- Recommend verifying anterior chamber angles (see Set-Up).
- Verify allergies and possible adverse reactions (see Set-Up).
- Give patient a facial tissue and a pair of mydriatic spectacles. Explain effects from cycloplegic drops (especially temporary loss of focus at near and light sensitivity) and ensure this will not interfere with anything of pending importance (i.e., patient has final exam that evening, patient is not performing any type of flight duties within the following 24 hours, etc.).
- Instill drops in this exact order:
  - Instill one (1) drop of topical anesthetic (Proparacaine HCl 0.5%) into each eye. RECORD THE DROP AND THE TIME (in block 60 or block 73). Wait one (1) minute. {Some think this is to make the patient more comfortable with the successive drops. Although this is a welcomed side effect, it is not the primary reason. The topical anesthetic helps ease the bonds between the corneal cell junctions which allows increased permeability of the cycloplegic agent.}
  - Instill one (1) drop of cycloplegic agent (Cyclopentolate HCl 1.0%) into each eye. RECORD THE DROP AND THE TIME (block 60 or block 73). Wait five (5) minutes.
  - Instill one (1) drop of cycloplegic agent; wait a minimum of 45 minutes. RECORD THE DROP AND THE TIME (block 60 or block 73).
- Perform a cycloplegic refraction between 45 minutes and 75 minutes after the last drop instillation (the minimum wait time of 45 minutes ensures all iris colors are in maximal cycloplegia before refraction). If the cycloplegic refraction cannot be performed between 45 and 75 minutes, there are two courses of action:
  - Instill another drop of Cyclopentolate HCl 1.0% in each eye and wait a minimum of 30 minutes more;

  -or-
  - Patient can return after a minimum of 48 hours to repeat the drop series and cycloplegic refraction.

- Enter the 'best corrected visual acuity' in block 61 next to the pre-printed "Corr. to 20/ " entries for each eye. [See *'Important Note for Eye Care Providers'* on the last page.] Be aware of patients 'memorizing' the eye chart. Many clinics are limited to only a few 20/20 lines and must be creative in randomizing the letters (reading them backwards, etc.).
- Record the cycloplegic refraction findings for each eye in block 62:
  - The 'sphere' amount in the first blank (between the pre-printed entries of "By" and "S.")
  - The 'cylinder' amount in the second blank (between the pre-printed entries of "S." and "CX"; if there is no cylinder amount, enter 'sphere', 'sph', or 'DS'.)

- The 'astigmatism axis' in the third blank (after the pre-printed entry of "CX"; if there is no astigmatism, enter a horizontal line here.)
- After the astigmatism axis, write the word 'cycloplegic' (or 'cyclo') to indicate the type of refraction conducted.

A typical cycloplegic refraction entry on DD Form 2808:

		59. RED/GREEN *(Army Only)*	60. OTHER VISION TEST **1 x Proparacaine 0.5% @ 1200** **1 x Cyclopentolate 1.0% @ 1201** **1 x Cyclopentolate 1.0% @ 1206**
61. DISTANT VISION	62. REFRACTION BY ~~AUTOREFRACTION OR MANIFEST~~		63. NEAR VISION
Right 20/**20** Corr. to 20/**20**	By **+0.25** S. **–0.25** CX **180** by **Cyclo**		
Left 20/**25** Corr. to 20/**20**	By **+0.75** S. **–0.50** CX **180** by **Cyclo**		

If you know the refraction amount is outside of qualifying standards for flight school, it is a good idea to make a note to the Flight Surgeon in block 73 or on a separate note. This should be discussed with your local Physical Exam Section and Flight Surgeon for local SOP. All Eye Care Providers and Flight Surgeons must ensure they know the most current standards for entry to flight school.

UPDATED ENTRY STANDARDS FOR CLASS 1/1A FLIGHT DUTY MEDICAL EXAMINATIONS. (as of 28 March 2002):

Hyperopia greater than **+3.00** diopters of sphere (in any meridian by transposition in either eye)
Myopia greater than **–1.50** diopters of sphere (in any meridian by transposition in either eye)
Astigmatism greater than **+/- 1.00** diopter of cylinder in either eye

Must meet above standards in both plus-cylinder and minus-cylinder formats, so transpose to ensure patient meets standards (spherical equivalent method does not apply).

For example, the cycloplegic refraction of:
-1.00 – 0.75 x 180 (in minus-cylinder format)
might appear qualified at first glance. However, after transposition into plus-cylinder format of:
–1.75 + 0.75 x 090 (in plus-cylinder format)
it is apparent that this refraction is disqualifying because the sphere amount exceeds –1.50.

Transposition Review:

1. *Algebraically sum the sphere and cylinder powers*
2. *Change the sign of the cylinder power*
3. *Change the axis by 90 degrees.*

Cycloplegic Transposition Table for Class 1 FDME [As of 28 March 2002 with release of new AR 40-501 dtd the same]

	CYL - 1.25	CYL - 1.00	CYL - 0.75	CYL - 0.50	CYL - 0.25	DS / SPH	CYL +0.25	CYL +0.50	CYL +0.75	CYL +1.00	CYL +1.25
SPH -1.75	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ
SPH -1.50	DQ	DQ	DQ	DQ	DQ	Q	Q	Q	Q	Q	DQ
SPH -1.25	DQ	DQ	DQ	DQ	Q	Q	Q	Q	Q	Q	DQ
SPH -1.00	DQ	DQ	DQ	Q	Q	Q	Q	Q	Q	Q	DQ
SPH -0.75	DQ	DQ	Q	Q	Q	Q	Q	Q	Q	Q	DQ
SPH -0.50	DQ	Q	Q	Q	Q	Q	Q	Q	Q	Q	DQ
SPH -0.25	DQ	Q	Q	Q	Q	Q	Q	Q	Q	Q	DQ
SPH 0.0/PLANO	DQ	Q	Q	Q	Q	Q	Q	Q	Q	Q	DQ
SPH +0.25	DQ	Q	Q	Q	Q	Q	Q	Q	Q	Q	DQ
SPH +0.50	DQ	Q	Q	Q	Q	Q	Q	Q	Q	Q	DQ
SPH +0.75	DQ	Q	Q	Q	Q	Q	Q	Q	Q	Q	DQ
SPH +1.00	DQ	Q	Q	Q	Q	Q	Q	Q	Q	Q	DQ
SPH +1.25	DQ	Q	Q	Q	Q	Q	Q	Q	Q	Q	DQ
SPH +1.50	DQ	Q	Q	Q	Q	Q	Q	Q	Q	Q	DQ
SPH +1.75	DQ	Q	Q	Q	Q	Q	Q	Q	Q	Q	DQ
SPH +2.00	DQ	Q	Q	Q	Q	Q	Q	Q	Q	Q	DQ
SPH +2.25	DQ	Q	Q	Q	Q	Q	Q	Q	Q	DQ	DQ
SPH +2.50	DQ	Q	Q	Q	Q	Q	Q	Q	DQ	DQ	DQ
SPH +2.75	DQ	Q	Q	Q	Q	Q	Q	DQ	DQ	DQ	DQ
SPH +3.00	DQ	Q	Q	Q	Q	Q	DQ	DQ	DQ	DQ	DQ
SPH +3.25	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ

DQ = Disqualified Q = Qualified

Important Note for Eye Care Providers

A cycloplegic refraction is NOT necessarily equal to the refraction you would give for spectacle lenses. If a patient is "on the border" of being qualified or disqualified, it is best for the Army and for the patient to use the "least amount of prescription needed to see within standards" approach.

For example, if a patient has a cycloplegic refraction that is +/- 0.25 diopters outside of standard but can still read to the $20/20^{-1}$ standard with the refraction amount that is WITHIN standards, enter the lesser amount.

Do NOT, however, try to "push" the $20/20^{-1}$ on borderline cases. These patients receive an entirely new cycloplegic exam once they come to Fort Rucker to enter flight school. If they are outside of the standard, they will be required to request an exception-to-policy which will likely be disapproved. Use your professional judgement but do not allow someone to come to flight school knowing he/she has a good chance of failing their detailed cycloplegic exam upon arrival.

Additional MANDATORY Testing With Cycloplegic Refraction:

Since the patient is dilated during a cycloplegic refraction, it is a prime opportunity to conduct a brief slit lamp exam to check any disorders of the anterior segment and optic nerve. A full dilated fundus exam (DFE) is not required but highly encouraged.

Due to the advent and popularity of refractive surgery, it is now **MANDATORY** for the Eye Care Provider conducting the cycloplegic exam to also provide the following information with all Class 1/1A FDMEs:

#1: EVIDENCE OF NO REFRACTIVE SURGERY:

- Make an entry in block 73 (NOTES) indicating that there is no evidence of refractive surgery. (Highly advise that the patient also sign an entry stating he/she has not had refractive surgery.) This can easily be made part of the local overprint to DD Form 2808.

- If patient has had refractive surgery, ensure the patient contact the US Army Aeromedical Research Lab (USAARL) at Fort Rucker to determine if there are any current research programs ongoing that may allow the patient to participate for entry into flight school.

#2: EVIDENCE OF CORNEAL CURVATURE: Provide evidence of corneal curvature with one of the following:

- Manual or Automated Keratometry readings of each eye [enter in block 60 (OTHER VISION TEST) or block 73 (NOTES); or photocopy to full-size page and attach to physical; do not staple automated strip-paper to physical as it will not likely remain attached].
- and/or Topography of each eye (attach full-size page to physical)

ATB: DA FORM 4186 USAGE

1. What is a DA Form 4186?

   DA Form 4186 is a required official means by which a flight surgeon informs an aviation commander that military and civilian personnel are medically fit to perform Army aviation duties.

2. Who needs a DA Form 4186?

   The DA Form 4186 applies to all aviation personnel, including Department of the Army civilian (DAC) pilots, civilian contractor pilots, and military and civilian air traffic controllers (ATC). It is required for all personnel who must meet Army Class 1, 1A, 2, 2S, 2F, 3, or 4 (formerly Class 2A) medical fitness standards. Aviators in non-operational positions must complete a Class 2 flying duty medical examination (FDME) and a DA Form 4186 issued annually (AR 600-105). Aviators in "simulator duty only" positions are required to maintain a current DA Form 4186.

3. Who prepares a DA Form 4186?

   Any medical or dental officer who must inform a commander of the status of an aircrew member, may prepare and sign a DA Form 4186 recommending temporary medical suspension (DNIF). A recommendation returning the aircrew member to flying duties (FFD) must be signed by a flight surgeon; aeromedical physician assistant (APA); or in the case of dental procedures, an aeromedical dentist (a dental corps officer who is a graduate of the aviation medicine basic course.) If an aeromedical dentist is not available, the flight surgeon or APA performs the evaluation and issues the recommendation.

4. When is a DA Form 4186 Issued?

   The DA Form 4186 is to be completed:

   a. At the time of periodic examination (FDME).
   b. After an aircraft mishap.
   c. When reporting to a new duty station or upon being assigned to operational flying duties. This includes changing units at the same duty station and changing from "simulator only" to full flying duties (FFD).
   d. When admitted to a medical treatment facility, sick in quarters, or entered into a drug or alcohol rehabilitation program (AR 600-85 and AR 40-8).
   e. When returned to flying status following (d) above.
   f. When treated as an outpatient for conditions or with drugs which are disqualifying for aviation duty. (See Medications APL and AR 40-8)
   g. When being returned to flying status following restriction imposed under (f) above.
   h. Other occasions, as required.

5. How is the DA Form 4186 Prepared?

The DA Form 4186 is prepared in three copies. The current DA Form 4186 form set contains four copies. The fourth (USAAMA) copy is currently not required.

TO and FROM block
Found only on the top portion of the form. These blocks contain the mailing address of the individual's commander that the DA Form 4186 is being sent TO, and the mailing address of the flight surgeon the DA Form 4186 is FROM.

The next line contains blocks one through five that contain identifying data about the examinee.

Enter the type of flying duty performed in block six. For example: Aviator, flight surgeon, APA, crew chief, aerial observer.

Section A - Qualifying action

If the examinee is qualified to perform flying duties in accordance with chapters 2 and 4, AR 40-501, the flight surgeon completes section A, Qualifying Action Recommended by Medical Authority. Indicate the reason(s) for the medical clearance recommendations in blocks 7a thru 7h.

Further explanation of each item should be explained *as appropriate* in Block 14: Remarks.

Regulations require the examinee's vision to be 20/20 both near and far or corrected to 20/20 by spectacles that are worn when performing flying duties. Check the "No" block in block eight if the examinees' vision is 20/20 uncorrected and they do not wear spectacles. Check the "Yes" block if the examinee is required to wear spectacles. Enter the effective date of the medical recommendation in block nine. Enter the date the medical clearance expires in block ten. Example 5 shows the examinee must wear glasses, the effective date of the DA Form 4186 is the 11th of December 1992, and this clearance expires the 31st of December, 1993.

Section B - Disqualifying action
Disqualifying action recommended by medical authority is completed when the examinee is found medically unfit for flying duties in accordance with chapters 2 and 4, AR 40-501, or is medically disqualified because of a temporary medical problem or medication. For a temporary disqualification seen with a typical sick call problem, mark Block 11 with a temporary medical suspension (AR 600-105). The estimated time the examinee will be grounded is entered in block 12, and the effective date of medical incapacitation is entered in block 13. The date of medical incapacitation is the date the disqualifying medical condition was diagnosed by history, examination, tests, or consultation. *It may precede* the date the DA Form 4186 was actually completed by the flight surgeon.

If the medical incapacitation is expected to last more than 365 days without waiver, termination from aviation service (permanent medical suspension) is required (AR 600-105).

Block 14 – Remarks
Use Remarks section, block 14 to communicate to the commander about special requirements of the medical recommendations. Use Block 14 for comments such as "FFD Annual FDME Completed", or if arriving at a new duty station remarks such as "FFD Current FDME on file", or "Temporary FFD 30 days pending receipt of FDME by Ft. Rucker" or "Temporary FFD 90 days pending eval of diet control of cholesterol" for those being followed for high cholesterol. It is appropriate to indicate temporary FFD while completing a Ft. Rucker directed inquiry under the status of "Disqualified for Information Only" IAW APL 21-87.

Block 15
Specify whether the examinee may perform simulator duties and/or ground run up duties. If you placed the examinee on quarters, ground run up and simulator duties would not be allowed. If your examinee has a cast, ground run-up duties might not be allowed, but simulator duties might be authorized. Generally speaking, simulator duties can be authorized anyone who can safely get into the simulator, such as uncomplicated pregnancy. Ground run-up duty is specifically authorized when controls can be safely managed despite medical restriction from flying duty.

Block 16, diagnosis code, is not used.

Type (print or stamp) the name of the flight surgeon signing the DA 4186 and making the medical recommendation in block 17. Put the signature in block 18 and the date the DA Form 4186 was signed by the flight surgeon in block 19. This date can be different than the effective date in block 9 or 13, or in section C. If the DA Form 4186 is completed by a medical officer who is not a flight surgeon or aeromedical physician assistant, the wording "flight surgeon" is to be lined out.

Section C - CERTIFICATION BY AIRCREW MEMBER.
The examinee completes Section C when informed of the recommendations contained in sections A or B of the DA Form 4186. The examinee will check the "may" or "may not" block as appropriate, sign and date the form in blocks 20, 21, and 22. If the aircrew member is not available, these blocks may be left blank. If the aircrew member refuses to sign, a notation to that effect should be made in block 14, Remarks, and his commander notified immediately.

The top copy of the DA Form 4186 is then filed in the top left hand side of the rear section of the outpatient medical record and constitutes the medical recommendation. The rest of the packet is sent to the aircrew member's commander by a distribution system agreed upon by the flight surgeon and commander(s). The most expedient means is usually hand carried by the individual.

The examinee's unit commander will complete section D by checking either the "approved" or "disapproved" block, and signing and dating the form in blocks 25 and 26. The completed form is distributed as follows:

a. Commander's Copy - Forwarded to the flight records officer for inclusion in the flight records IAW AR 95-1.
b. Individual Copy - Given to the individual for flight-line verification and personal records.
c. AAMA Copy - May be given the individual or filed in local records according to unit SOP.

6. How are the DA Form 4186 and related forms filed in the outpatient medical record?

File the most recent DA Form 4186 on the top left in the rear section of the Medical Record. If the person is granted clearance to fly, then file the most recent DA Form 4186 next, if any, that shows a medical restriction from flying. If a waiver has been granted for any cause of medical unfitness for flying, file the most recent DA Form(s) 4186 showing such waiver(s) next. File any additional DA Forms 4186 that the flight surgeon determines to be required as a permanent record next. Enter "Permanent Record" in the Remarks section. Destroy other DA Forms 4186.

7. Extensions.

The DA Form 4186 may be used by the flight surgeon to extend a currently valid medical examination clearance for a period not to exceed 30 days beyond the end of the birth month for the purpose of completing an examination begun before the end of the birth month (AR 600-105). In this case block 7(h), "Other" in section A will be checked and in block 14, "Remarks" will appear the statement "FFD - Extended 30 days to complete annual FDME." Block 10 will be dated 30 days later. Example 11 shows an extension for an October

Exception to the Extension Rule (AR 600-105). Medically disqualified aircrew members have 365 days to complete their FDME and request a waiver to continue flying duties despite the disqualification. Medical termination from aviation service is mandatory if the condition is not waiverable within 365 days (AR 600-105), or is found to be non-waiverable based on AR 40-501, policy letters (APLs) or consultation with USAAMC.

8. Alternate DA Form 4186s.

Interservice and international agreements with allies permit the use of forms equivalent to the DA Form 4186 when the patient is examined by a non-U.S. Army flight surgeon.

ATB: FIELD OF VISION TESTING

(DD Form 2808, Block 68. 'FIELD OF VISION')

Purpose/Indications.

Mandatory for all FDMEs. This screens for gross visual field defects.

Equipment.

- Occluder (and/or use palm of hand to cover respective eye).
- Examiner's fingers.

Set-Up.

- Patient removes glasses (if applicable).
- Adequate lighting.
- Ideal lighting is bright illumination between patient and examiner with dim room illumination; avoid patient facing any direct source of light.
- Examiner is 60-80 centimeters (cm) from patient.
- Examiner must have full visual fields to be able to properly conduct this test.

Step-By-Step Procedure.

- *This is a monocular test;* ensure you are testing only one eye at a time.
- Instruct the patient to cover his/her left eye first; you, as the examiner, cover your right eye (mirror-imaging patient).
- Tell the patient, "I want you to keep looking at my open eye and, without looking anywhere else, use your 'side vision' and tell me how many fingers I am holding up." (Or, words to that effect.)
- Place your closed fist in the peripheral visual field in a location where you will be able to distinguish the number of fingers exposed.
- Present one, two, or four fingers in the plane mid-way between you and the patient; the fingers should not point toward the patient and you should not wiggle or move.
- Repeat the presentation of fingers in the appropriate eight locations in the field (on each side of the four visual field meridia).
- Repeat the entire procedure for the patient's left eye.
- If the patient successfully answers all presentations within the field, record the findings for each eye even though there is no longer a separate entry block on the new DD Form 2808 for each eye.
    - For example:

      OD FTC OS FTC
      [FTC = "Full To Confrontations"]

      - or –

      Right NTC Left NTC
      [NTC = "Normal To Confrontations"]

Refer any deficiencies or abnormal findings to the Eye Clinic for verification and possible further testing.

ATB: MANIFEST/SUBJECTIVE REFRACTION

(DD Form 2808, Block 62. 'REFRACTION BY AUTOREFRACTION OR MANIFEST')
[Performed by an Optometrist or Ophthalmologist ONLY!]

Important notes concerning the new DD Form 2808.

Unfortunately, the new pre-printed wording of block 62, "REFRACTION BY AUTOREFRACTION OR MANIFEST" may be very confusing. It is VERY important that anyone conducting testing for any FDME understand that an 'autorefraction' of any kind is NOT authorized and should NEVER be entered on the DD Form 2808 unless it is in block 60 (Other Vision Test) or in block 73 (Notes) for reference only.

Autorefraction results should NEVER be entered into block 62!

We highly recommend lining through the entire "…BY AUTOREFRACTION OR MANIFEST" wording and utilize the blank next to the refraction to enter the type of refraction utilized. For example:

By –0.50 **S.** –0.25 **CX** 180 (type of refraction here)

↑

All 'autorefraction' entries on FDME's in block 62 will be returned as incomplete.

The terminology of 'cycloplegic', 'subjective', and 'manifest' can be confusing when it comes to FDME's. For standardization, this guide explains how these entries are commonly utilized:

Terminology	Class of FDME	When Indicated
'Cycloplegic'	Class 1/1A only (drops given)	Class 1/1A FDME only [See ATB-Cycloplegic Refraction]
'Subjective' or 'Manifest'	All classes except Class 1 (no drops given) (phoropter used)	Corrected vision with current glasses (HxRx) worse than $20/20^{-1}$ in either eye at distance or near.
' Hx Rx' * [Hx = 'habitual' or 'historical'] = current glasses	All classes except Class 1 (no drops given) (lensmeter used)	Corrected vision with current glasses (HxRx) at least $20/20^{-1}$ in each eye at distance and near.

* Some use the term 'manifest' to mean 'HxRx' also. See 'Notes About Manifest Refraction' on the last page of this ATB.

Purpose/Indications

Needed for all classes of FDME, other than Class 1/1A, if the patient is referred for being outside of qualification standards in blocks 61 or 63. (See referral criteria for blocks 61 and 63.) This measures a patient's refractive error without the use of a cycloplegic agent (no drops).

Equipment/Supplies

- Phoropter
- Projected Snellen distance visual acuity chart [must be projected IAW AR 40-501, paragraph 4-12, a.(1) and b.(1)]. Projected sources for a subjective or manifest refraction include, but are not limited to:
  - Traditional Projector with screen
  - Binocular Visual Acuity Tester (BVAT), or similar system
  - Refraction system with projected image (i.e. the Marco Nidek COS-1000 Compact Ophthalmic System, the Marco Nidek EPIC-2100, or similar system)

- Standard Reduced Snellen near visual acuity card (needed if uncorrected near vision is worse than 20/20–1 in either eye.)

Set-up

This is NOT for any Class 1 FDME. A subjective refraction should only be conducted after completing all other eye testing and verifying any disqualifying parameters from other tests. However, it can be done at any time in the physical exam procedure. Highly recommend a brief review of the physical exam form to ensure any other eye testing completed at that time does not require re-testing (i.e. meets standards). One more check in the process will only help to ensure the physical is correct when finally forwarded to Fort Rucker for review.

Step-By-Step Procedure

- This is NOT for any Class 1 FDME.
- Perform a subjective refraction for either distance and/or near depending on the referral criteria and findings in blocks 61 and 63.
- Enter the 'best corrected distance visual acuity' in block 61 and the 'best corrected near visual acuity' in block 63 next to the pre-printed "Corr. to 20/ " entries for each eye.
- Record the subjective refraction findings for each eye in block 62:
  - The 'sphere' amount in the first blank (between the pre-printed entries of "By" and "S."
  - The 'cylinder' amount in the second blank (between the pre-printed entries of "S." and "CX"; if there is no cylinder amount, enter 'sphere', 'sph', or 'DS'.
  - The 'astigmatism axis' in the third blank (after the pre-printed entry of "CX"; if there is no astigmatism, enter a horizontal line here.)
  - After the astigmatism axis, write the word 'subjective' (or 'subj') [or the word 'manifest' if using this term interchangeably with 'subjective'] to indicate the type of refraction conducted.
  - If the patient's best-corrected near visual acuity utilizes the same prescription as the best-corrected distance visual acuity, simply enter the word 'lens' next to the pre-printed entry of 'by' under block 63 (NEAR VISION). If the best-corrected near visual acuity utilizes an 'Add' (bifocal), enter the amount of the 'Add' ONLY which will always be a number preceded by a '+' sign.
  - If you know the refraction still does not correct patient to qualifying standards at distance and/or near, perform a full eye exam to try and determine the cause. If undeterminable, refer to Ophthalmology.

A typical ideal subjective refraction entry on DD Form 2808:

		59. RED/GREEN *(Army Only)*	60. OTHER VISION TEST
61. DISTANT VISION	62. REFRACTION BY ~~AUTOREFRACTION OR MANIFEST~~		63. NEAR VISION
Right 20/**25** Corr. to 20/**20**	By **PLANO** S. **–0.50** CX **180** by **Subj**		Right 20/30 Corr. to 20/20 by +1.00
Left 20/**30** Corr. to 20/**20**	By **+0.25** S. **–0.75** CX **180** by **Subj**		Left 20/30 Corr. to 20/20 by +1.00

REFERRAL CRITERIA – Subjective/Manifest Refraction:
Class 1/1A FDME – ALL Class 1/1A FDMEs receive a cycloplegic exam.
All other classes of FDME – refer if either eye's best corrected vision is worse than $20/20^{-1}$ at distance or near.

Notes About "MANIFEST REFRACTION"

Over time, with FDMEs, many have come to use 'manifest refraction' to identify the patient's current spectacle prescription (the glasses the patient is wearing). However, most eye care providers utilize the words 'subjective' and 'manifest' interchangeably and instead use terms such as, 'Hx Rx' or 'Spec Rx' to identify the current spectacle prescription. Therefore, ideally, if the patient meets standards in each eye with his/her current spectacle prescription, it should be entered on the physical in a clear manner as to show that the visual acuity was tested with the current spectacle prescription. This would never be entered for a Class 1/1A FDME and should be verified by subjective refraction if the prescription is older than one year.

ATB: NIGHT VISION

(DD Form 2808, Block 69. 'NIGHT VISION')

Important notes concerning the new DD Form 2808.

The new DD Form 2808 has a pre-printed '(Test used and score)' in block 69. However, there is no established test for night vision and therefore no score. This part of the physical is still conducted through history only.

Purpose/Indications.

Mandatory for all FDMEs. Determines history of night vision problems.

Equipment.

None.

Set-Up.

Patient privacy.

Step-By-Step Procedure.

- Ask the patient, "Have you ever had any night vision problems?" (or words to that effect.)
- If the response is negative, record 'NIBH' for 'Not Indicated By History'.
- Any positive responses must be referred to the Eye Clinic.

ATB: OCULAR MOTILITY

(DD Form 2808, Block 64. 'HETEROPHORIA') [As of: 1 May 2002]

Important notes concerning the new DD Form 2808.

Unfortunately, there is some confusion about the pre-printed entries in block 64. A quick comparison of the old SF 88 entries and the new DD Form 2808 entries might be useful here:

Old SF 88 Entry	New DD Form 2808 Entry	
ESO	ES°	has degree symbol; do NOT record in degrees
EXO	EX°	has degree symbol; do NOT record in degrees
R.H.	R.H.	no change
L.H.	L.H.	no change
PRISM DIV.	Prism div.	no change except from all capital letters
PRISM CONV.	Prism Conv.	no change except from all capital letters
CT	CT	no change; this is a separate, stand-alone entry even though it is som 'hidden' on the form
PC	NPR	this is a **typographic error** and should be 'NPC'
PD	PD	no change

Purpose/Indications.

Block 64. includes several sub-tests for ocular motility along with true 'heterophoria' testing, even though the title of the block is 'Heterophoria'. Therefore, each sub-test will be covered separately below.

Heterophoria Testing ['ES°', 'EX°', 'R.H.', 'L.H.']:

Mandatory for all Class 1/1A and comprehensive FDMEs. This measures the latent or relative deviation between the eyes that occurs when fusion is interrupted. A 'phoria' can be lateral ['ES' for 'esophoria' (in), and 'EX' for 'exophoria' (out)] and/or vertical ['R.H.' for 'right hyperphoria', and 'L.H.' for 'left hyperphoria' (do not use 'hypo' entries)]. A 'phoria' does not apply to one eye or the other. It is basically a resting position of the eyes. Everyone has a phoria! But, it might be so small as to come out to zero (0) on testing.

'Tropia' Testing ['CT' (then measured as 'Prism div.' or 'Prism Conv.' if needed)]:

Mandatory for all Class 1/1A and comprehensive FDMEs. A 'tropia' is a manifest deviation of ONE eye and can be lateral and/or vertical with the same prefix identifiers as a 'phoria' ['eso', 'exo', and 'hyper']. 'Tropia' is also known by the names 'heterotropia', 'strabismus', and 'squint'. A tropia applies to only ONE eye or the other at any given time. It can be constant or intermittent; unilateral or alternating. Not everyone has a tropia!

The 'CT' (Cover Test) is required for all Class 1/1A FDMEs. When the 'cover-uncover' (or 'unilateral') cover test is performed properly, this test can detect the presence of a tropia. This is important because the presence of a tropia could lead to lack of fusion, reduced or no stereopsis (affecting depth perception), suppression of vision in one eye, or diplopia (double vision). Obviously, these are all non-qualifying conditions for flight school. Passing the previous 'phoria' testing does not necessarily mean a person is without a 'tropia'. But, if a person fails the 'phoria' testing or has difficulty with it, it could be an indicator that the patient may have a 'tropia'. Do not confuse this 'cover-uncover' (or 'unilateral') cover test that tests for 'tropia' with the 'cross-cover' (or 'alternating') cover test which is utilized by Optometry/Ophthalmology to verify a 'phoria'.

This test is conducted at both distance and near. If any 'tropia' is detected, the patient must be referred to Optometry or Ophthalmology for verification and measurement of the amount of 'tropia' to be entered by the 'Prism div.' (prism divergence) and 'Prism Conv.' (prism convergence) entries. If no 'tropia' is detected, the word "Ortho" is placed next to the preprinted entry of 'CT' [one entry presumes the test was conducted at both distance and near but the proper entry

would be "Ortho @ distance and near" (or words to that effect)]. The 'Prism div.' and 'Prism Conv.' entries are left blank if no tropia detected.

NPR [(typo error on DD Form 2808 - should be 'NPC' (Near Point of Convergence)]:

Mandatory for all Class 1/1A FDMEs. This is the 'NPC' (Near Point of Convergence) test which determines the patient's ability to converge the eyes while maintaining fusion. [Note: there is a test called the 'NPR' (Near Point of Recovery) but that test is NOT utilized in any FDME.]

PD (Pupillary Distance):

This test is not utilized for FDMEs. However, it is the measurement of the patient's inter-pupillary distance and can be included if known. Otherwise, leave blank.

Equipment:

Heterophoria Testing (ES°, EX°, R.H., L.H.):

- Armed Forces Vision Tester (AFVT) or OPTEC 2300
- (Note: the 'cross-cover' (or 'alternating') cover test and/or the von Graefe method of measuring phorias should only be used for verification of 'phoria' by Optometry/Ophthalmology. Do not confuse the 'cross-cover' test with the 'cover-uncover' (or 'unilateral') cover test that detects 'tropia'.)

'Tropia' Testing (CT – Cover Test):

- Occluder (for 'cover-uncover' (or 'unilateral') cover test)
- Distance and near visual acuity charts (or appropriate targets).
- (Ideally, an appropriate target is an isolated letter on a visual acuity line that is one to two lines larger than the patient's best corrected visual acuity of the poorer seeing eye. So, if the patient is 20/20, then utilizing a 20/25 or 20/30 isolated letter at both distance and near would be ideal.)

NPR [(typo error on DD Form 2808- should be 'NPC' (Near Point of Convergence)]:

- Any instrument having an appropriate target that is one to two lines larger than the patient's best corrected near visual acuity in the poorer seeing eye; instrument or device must be easy for examiner to manipulate and not interfere with the testing method.
- Metric ruler for measuring in millimeters (mm).

Set-up.

Heterophoria Testing (ES°, EX°, R.H., L.H.):

- Patient seated comfortably at the AFVT (or OPTEC 2300).
- Test emulates distance test (optical infinity).
- Refer to manual for correct settings for model being used.

Tropia' Testing (CT – Cover Test):

- Patient wears habitual spectacle prescription (if applicable) for the distance being tested (distance spectacle prescription when testing distance; near spectacle prescription when testing near).
- Set up the target:
  - Distance (tested at 20 feet or 6 meters) – isolated letter, one to two lines larger than the visual acuity in the patient's poorer seeing eye (with correction). For FDMEs, this will almost always be a 20/25 target.
  - Near (usually tested at 16 inches or 40 cm) – reduced Snellen letter one to two lines larger than visual acuity in the patient's poorer seeing eye (with correction). For FDMEs, this will almost always be a 20/25 target. The patient may hold the target but verify the test distance.
- The examiner holds the occluder.
- Sufficient room illumination to see the patient's eye movements.
- The examiner must be in a position to be able to see the patient's eyes easily without interfering with the patient's view of the target.

NPR [(typo error on DD Form 2808 - should be 'NPC' (Near Point of Convergence)]:

- Patient wears habitual near prescription (if applicable).
- If spectacles interfere with testing, attempt testing without spectacles.
- Sufficient room illumination to see the patient's eyes and for the patient to see the target.

Step-By-Step Procedure.

Heterophoria Testing (ES°, EX°, R.H., L.H.):

- Test distance vertical phoria and lateral phoria in accordance with manual for AFVT or OPTEC 2300.
- Use associated scoring key to determine amount of phoria in prism diopters.
- Vertical phoria must be l or less. If a subject has a number other than zero in 'RH', then the 'LH' entry must be zero (and vice-versa).
- Lateral phoria must be 8 or less. If a subject has a number other than zero in 'ES', then the 'EX' entry must be zero (and vice-versa).
- Refer to the Eye Clinic if vertical phoria is greater than 1 or if lateral phoria is greater than 8.

'Tropia' Testing (CT – Cover Test):

- This is the 'cover-uncover' (or unilateral) cover test to test for 'tropia', NOT to test for 'phoria'.
- Test at distance (20 feet) and then near (40 cm).
- Cover and uncover the right eye three times while you:
  - Watch behind the occluder for eye movement
  - Watch for eye movement after occluder is removed
- Repeat for left eye.
- Repeat entire procedure for near.
- No movement detected is recorded as "Ortho" (distance and near).
- Refer to the Eye Clinic for verification if any movement detected.
- Eye Clinic will verify 'tropia' and measure to enter amount into the 'Prism div.' or 'Prism Conv.' entries.

NPR [(typo error on DD Form 2808 - should be 'NPC' (Near Point of Convergence)]:

- This is a binocular test; ensure test is performed with both eyes open.
- Start the fixation target at 40 cm from the patient and ensure he/she sees only one image at that start point before proceeding.
- Explain to the patient to tell you when the target appears 'double' or when it 'splits' into two images; further explain that it does not matter if the target appears 'blurry', only when it 'doubles'.
- Bring the fixation target toward the patient slowly to allow him/her to maintain fixation on the target.
- Observe patient's eyes until the patient reports that the target appears 'double' or 'split'; or until it is apparent that one eye loses fixation (turns in or out).
- Record this distance from the patient's eyes in millimeters (mm).
- Passing is 100 mm or less.
- If greater than 100 mm, first carefully retest with repeat explanation to the patient of reporting only when the image is 'double' or 'splits', not only when the image is 'blurry'. If still greater than 100 mm, refer to Eye Clinic for verification.

ATB: VISUAL ACUITY TESTING – DISTANT VISION

(DD Form 2808, Block 61. 'DISTANT VISION')

Purpose/Indications: Distant vision.

Mandatory for all classes of FDME. This measures the best visual acuity at distance (20 feet or 6 meters) WITHOUT any kind of correction whatsoever, followed by best-corrected visual acuity at distance WITH spectacle prescription (if the patient wears any). NO contact lenses allowed during testing and must be removed at least 24 hours prior to examination.

This measures the clarity of vision or the ability of the visual system to resolve detail at distance. A patient's visual acuity at distance depends upon the accuracy of retinal focus, the integrity of the eye's neural elements, and the interpretive faculty of the brain.

It is important to conduct distant visual acuity testing on all patients before near acuity testing. Testing for near visual acuity before distant visual acuity may disadvantage the patient, depending on accommodative (focusing) ability.

Equipment:

- Occluder (to cover one eye at a time)
- Standard **PROJECTED** Snellen Distance Acuity Chart [IAW AR 40-501, para 4-12. a.(1)]
  -or-
- AFVT (Armed Forces Vision Tester) or the OPTEC 2300 [both considered projected systems]

Set-up:

Projected Snellen Distance Acuity Chart:

- Patient is 20 feet (or 6 meters) from acuity chart with center of chart at approximately eye-level for patient (intention is not to have any extreme angle between the patient and the chart).
- Patient holds occluder and covers eye as directed by tester. Patient may use palm of hand, if necessary, but ensure patient is using the palm, not the fingers, to preclude seeing between the fingers. Patient must keep both eyes open, must not press on either eye, and must not squint.

AFVT or OPTEC 2300:

- Patient is seated comfortably at the AFVT or OPTEC 2300.
- Far letter acuity slide(s) set correctly (see manual).
- Patient must push forehead against bar for internal light to work.

Step-By-Step Procedure.

Uncorrected Distant Vision:

- TEST UNCORRECTED VISUAL ACUITY FIRST! (This is important because a patient may be able to memorize the letters on the chart with corrected vision and, intentionally or unintentionally, say aloud the smaller letters on the chart when uncorrected, whether or not actually seen by the patient.)
- Observe the patient during testing to ensure no squinting (or at least attempt to observe the patient behind the AFVT/OPTEC 2300).

- Instruct the patient to cover one eye (or occlude the non-tested eye with the appropriate buttons on the AFVT/OPTEC 2300) and direct patient not to squint. By convention, it is best to test the right eye first, then left eye for consistency.

- IMPORTANT NOTE ABOUT 20/20 DISTANT VISUAL ACUITY STANDARD FOR FDMEs! Per AR 40-501, paragraph 4-12, a (1), "…no more than 1 error per 5 presentations of 20/20 letters, in any combination, on either the Armed Forces Vision Tester (AFVT) or any projected Snellen chart set for 20 feet."
- Issue: AFVT line has 10 letters but is split into two sets of five letters positioned next to each other on the same line. You may still test the entire line, if desired, but the patient is still only required to get 4 out of 5 letters that are on a 20/20 line to be considered a 'pass' for an FDME. Therefore, entries of 20/20 or 20/20-1 are both passing entries. Most projected Snellen charts have 6 letters (some have 4, 5, 7, or 8 letters) per line. The regulation allows for presentation of 5 letters "in any combination" so you may meet the requirement. If in question, refer to the Eye Clinic for verification.

- Instruct the patient to, "read the smallest line of letters you can, without squinting" (or words to that effect).
- If the patient reads at least 4 or 5 out of 5 letters on a 20/20 line, record 20/20–1 or 20/20 for that eye, whichever is applicable. Repeat testing for other eye.
- If the patient misses two letters or more out of 5 letters on a 20/20 line, ask patient to read the next larger line of letters; continue this process until patient reads at least 4 out of 5 letters on a line of letters. Then, encourage the patient to read any letters on the next smallest line if they can. Record visual acuity based on standard methods. Repeat testing for other eye.
- For example, if patient reads the entire 20/30 line easily, but can only read two of the letters on the 20/25 line, then record the visual acuity as 20/30+2.

REFERRAL CRITERIA – Uncorrected Distant Vision:
- Class 1/1A FDME – refer if either eye is worse than 20/50 uncorrected.
- All other classes of FDME – refer if either eye is worse than 20/400 uncorrected.

Corrected Distance Vision:

- TEST CORRECTED VISUAL ACUITY AFTER UNCORRECTED.
- For Class 1/1A FDME, perform the visual acuity WITH spectacle prescription (if wears any) before instilling any drops for the cycloplegic refraction (under separate ATB) to ensure current spectacle prescription is adequate. If patient is not corrected to 20/20 (or 20/20–1), it is advisable to have the Eye Clinic refract the patient to ensure he/she is correctable to standard before the cycloplegic refraction. However, do not record these results in block 61 since all Class 1/1A FDMEs will receive a cycloplegic refraction by an Optometrist or Ophthalmologist who will enter the patient's cycloplegic refraction acuity there. Therefore, you may record the results in block 60 or block 73, if desired, but ensure these results to not get confused with the cycloplegic results! Leave the 'Corr. to 20/__' in block 61 blank if Class 1/1A FDME.
- For all other classes of FDME, repeat the distant visual acuity procedure for the right eye WITH distance spectacle correction if patient wears any (NO contact lenses!). Patient should be wearing the glasses he/she uses with aviation duties. For bifocal wearers, be certain patient is looking through the distance portion of the spectacles. For progressive bifocal wearers, also ensure patient is angled correctly for optimal visual acuity. Ensure the spectacles worn are not a "reading only" prescription before proceeding with distant visual acuity testing. If patient was at least 20/20-1 at distance without correction, this test can be skipped and a horizontal line drawn next to "Corr. to 20/--".
- Repeat procedure for the left eye for corrected distant visual acuity.

REFERRAL CRITERIA – Corrected Distant Vision:
- Class 1/1A FDME – must see Optometrist or Ophthalmologist for cycloplegic refraction.
- All other classes of FDME – refer if either eye is worse than 20/20-1 with correction.

ATB: VISUAL ACUITY TESTING – NEAR VISION

(DD Form 2808, Block 63. 'NEAR VISION')

Purpose/Indications: Near vision.

Mandatory for all classes of FDME. This measures the best visual acuity at near (14 inches, 16 inches, or 40 cm, depending on test used*) WITHOUT any kind of correction whatsoever, followed by best-corrected visual acuity at near WITH spectacle prescription (if the patient wears any). NO contact lenses allowed during testing and must be removed at least 24 hours prior to examination.

This measures the clarity of vision or the ability of the visual system to resolve detail at near. A patient's visual acuity at near depends upon the accuracy of retinal focus, the integrity of the eye's neural elements, and the interpretive faculty of the brain. Near visual acuity also depends upon the eye's ability to focus clearly for objects at closer distances (accommodation).

It is important to conduct near visual acuity on all patients after distant acuity testing. Testing for near visual acuity before distant visual acuity may disadvantage the patient, depending on accommodative (focusing) ability.

Equipment:

- Occluder (to cover one eye at a time)
- Standard **PROJECTED** Snellen Distance Acuity Chart [IAW AR 40-501, para 4-12. a.(1)]
  -or-
- AFVT (Armed Forces Vision Tester) or the OPTEC 2300 [both considered projected systems]

Set-up:

Standard Reduced Snellen Acuity Card:

- Patient is at the designated test distance from the Reduced Snellen Acuity Card (test distances may vary so ensure the test distance is correct; typically they are set for 16 inches, 14 inches, or 40 cm*). There should be adequate illumination, with the light source either above or slightly behind the patient. Care should be taken so that the light is not directed toward the patient's eyes.
- Patient holds occluder and covers eye as directed by tester. Patient may use palm of hand, if necessary, but ensure patient is using the palm, not the fingers, to preclude seeing between the fingers. Patient must keep both eyes open, must not press on either eye, and must not squint.

AFVT or OPTEC 2300:

- Patient is seated comfortably at the AFVT or OPTEC 2300.
- Near letter acuity slide(s) set correctly (see manual).
- Patient must push forehead against bar for internal light to work.

Step-By-Step Procedure.

Uncorrected Near Vision:

- TEST UNCORRECTED VISUAL ACUITY FIRST! (This is important because a patient may be able to memorize the letters on the chart with corrected vision and, intentionally or unintentionally, say aloud the smaller letters on the test when uncorrected, whether or not actually seen by the patient.)
- Observe the patient during testing to ensure no squinting (or at least attempt to observe the patient behind the AFVT/OPTEC 2300).

- Instruct the patient to cover one eye (or occlude the non-tested eye with the appropriate buttons on the AFVT/OPTEC 2300) and direct patient not to squint. By convention, it is best to test right eye first, then left eye for consistency.

- IMPORTANT NOTE ABOUT 20/20 NEAR VISUAL ACUITY STANDARD FOR FDMEs! Per AR 40-501, paragraph 4-12, a (2), "…no more than 1 error per 5 presentations of 20/20 letters, in any combination, on the AFVT or any Snellen near visual acuity card."
- Issue: AFVT line has 10 letters but is split into two sets of five letters positioned next to each other on the same line. You may still test the entire line, if desired, but the patient is still only required to get 4 out of 5 letters that are on a 20/20 line to be considered a 'pass' for an FDME. Therefore, entries of 20/20 or 20/20-1 are both passing entries. Most Snellen cards have 8 letters (some have 5, 6, or 7 letters) per line. The regulation allows for presentation of 5 letters "in any combination" so you may meet the requirement. If in question, refer to the Eye Clinic for verification.

- Instruct the patient to, "read the smallest line of letters you can, without squinting" (or words to that effect).
    - If the patient reads at least 4 or 5 out of 5 letters on a 20/20 line, record 20/20–1 or 20/20 for that eye, whichever is applicable. Repeat testing for other eye.
    - If the patient misses two letters or more out of 5 letters on a 20/20 line, ask patient to read the next larger line of letters; continue this process until patient reads at least 4 out of 5 letters on a line of letters. Then, encourage the patient to read any letters on the next smallest line if they can. Record visual acuity based on standard methods. Repeat testing for other eye.
    - For example, if patient reads the entire 20/30 line easily, but can only read two of the letters on the 20/25 line, then record the visual acuity as 20/30+2.

REFERRAL CRITERIA – Uncorrected Near Vision:
- Class 1/1A FDME - refer if either eye is worse than $20/20^{-1}$ uncorrected at near; patient requires cycloplegic exam also but must be no worse than 20/20–1 uncorrected at near.
- All other classes of FDME – refer if either eye is worse than 20/400 uncorrected.

Corrected Near Vision:

- TEST CORRECTED VISUAL ACUITY AFTER UNCORRECTED.
- For Class 1/1A FDME, there is no need to perform near visual acuity WITH spectacle prescription at all because Class 1/1A FDMEs should all have 20/20 or 20/20–1 uncorrected near visual acuity in each eye. If not, referral is necessary.
- For all other classes of FDME, repeat the near visual acuity procedure for the right eye WITH near spectacle correction if patient wears any (NO contact lenses!). Patient should be wearing the glasses he/she uses with aviation duties. For bifocal wearers, be certain patient is looking through the near portion of the spectacles. For progressive bifocal wearers, also ensure patient is angled correctly for optimal near visual acuity. If patient was at least 20/20–1 at near without correction, this test can be skipped and a horizontal line drawn next to "Corr. to 20/--".
- Repeat procedure for the left eye for corrected near visual acuity.

REFERRAL CRITERIA – Corrected Near Vision:
- Class 1/1A FDME–must see Optometrist or Ophthalmologist for cycloplegic refraction. Class 1/1A FDME's should NOT have a prescription for near visual acuity.
- All other classes of FDME – refer if either eye is worse than 20/20-1 with correction.