5.0 ENDOCRINOLOGY

5.1 DIABETES MELLITUS

Last Revised: October 2014 Last Reviewed: December 2014

DM Type 1	Applicant	Class 1			Class 2	Class 3
		SG 1	SG 2	SG 3		
CD	x	x	x	x	x	x
NCD						
WR						
WNR	x	x	x	x	x	x
LBFS						
EXCEPTIONS						
LIMDU/PEB	Required for Diabetes Type 1 (NO waivers all DIF)					

DM Type 2	Applicant	Class 1			Class 2	Class 3
		SG 1	SG 2	SG 3		
CD	x	x	x	x	x	x
NCD						
WR				x	x	x
WNR	x	x*	x*			
LBFS				x	x	x
EXCEPTIONS	*DM 2 in sustained remission (A1C <6.5) due to *lifestyle changes only* are WR for all SG.					
LIMDU/PEB	Not required for Type 2 (may be requested by Code 53HN)					

AEROMEDICAL CONCERNS: Alterations in blood glucose levels may result in neurologic and ophthalmologic conditions (neuropathy, headache, confusion, syncope, vision changes, etc.) causing both subtle and sudden incapacitation. Long-term complications of diabetes mellitus (DM) also include renal and cardiovascular disease, with older diabetics having similar risks of cardiovascular events as non-diabetics with established coronary artery disease. Deployment frequently decreases glycemic control secondary to uncontrolled diet, long work hours and environmental stressors.

REMEMBER: IF THE ESTABLISHMENT OF THE DIAGNOSIS AND ACHIEVEMENT OF MAINTENANCE PHASE OF TREATMENT WILL TAKE GREATER THAN 60 DAYS, A GROUNDING PHYSICAL IS REQUIRED AT THE TIME OF DIAGNOSIS AND THEN A LOCAL BOARD OF FLIGHT SURGEONS IS NOT APPROPRIATE TO BE CONVENED.

ICD-9 Code/DIAGNOSIS
250.03 Diabetes Mellitus 1
250.02 Diabetes Mellitus 2
250.0d Diabetes Mellitus – Diet controlled

DIAGNOSIS/DEFINITIONS:

Diabetes Mellitus (DM):

1) FBG ≥ 126 mg/dL OR
2) 2 hr PG on OGTT ≥ 200 mg/dL OR
3) Hgb A1C ≥ 6.5%.

Alternatively random BG ≥ 200 mg/dL + symptoms of hyperglycemia.

For 1-3, diagnosis should be confirmed by repeat testing unless results from 2 different tests are both diagnostic (e.g. FBG ≥126 with A1C ≥6.5). While least convenient/readily available, OGTT appears to be the most sensitive screening test.

SERVICE MEMBER MUST COMPLETE PRIOR TO INITIATING ALL WAIVERS

- Released from *Family medicine, Internal Medicine, or Endocrinology* care with recommendation of return to flight status and no restrictions **documented** on last clinical note (electronic or paper).
- Completed *Diabetic Nurse Education and Nutrition consultation* and provide end of care summary- Completed *Ophthalmology/Optometry* consultation with dilated diabetic eye exam
- Consultant's *recommendation for follow on care* **documented** on last clinical note (electronic or paper).
- Provide administrative information to FS/AME to include command UIC, command address, personal address, phone number, designator, flight hours (total and last 6 months), primary aircraft flown, and years of service.

STANDARDS & REQUIREMENTS TO BE MET PRIOR TO SCHEDULING WAIVER EXAM WITH FLIGHT SURGEON

- **PHYSICAL STANDARDS**: BP <140/90, accurate height/weight for baseline BMI
- **LABORATORY LEVELS**: HgbA1C (required x 2 at least 3 months apart). For DM2 on medication: <7%. For DM2 with lifestyle changes only: <6.5%.
Avg Fasting blood glucose (assessed 4x/year at a minimum) < 120; Improving Lipid profile with a goal LDL of <100; TSH (normal), UA (normal)
- **SPECIAL TEST STANDARDS/FINDINGS/LEVELS**: For DM2 only. Markers to distinguish type 1 from type 2 DM (pancreatic autoantibodies (e.g. islet-cell antibodies [ICA] or glutamic acid decarboxylase [GAD65]), insulin and c-peptide levels) *if indicated*
- **MEDICATIONS**: On stable dose of medication (if required) for 30 days.
NOTE: Class I and Class II: *Metformin* **only** approved anti-diabetic medication. Class III: Additional medications considered on case-by-case basis (FS to discuss with NAMI), however all injectable medications are disqualifying and LIMDU+/- PEB is indicated.
Member should be asymptomatic (if any symptoms were present) and laboratory data as outlined above should be within parameters for at least 3-6 months prior to submitting a waiver request

AEROMEDICAL SUMMARY REQUIRED DOCUMENTATION BY FLIGHT SURGEON

Diagnosis:
How Condition Was Diagnosed/Treated:
Past Medical History:
Social And Family History: SH: Include comment on diet and physical activity, FH: Attention to endocrine diseases, malignancy, and cardiovascular disease
Military/Occupational History: Include most recent deployment
Physical Exam: Vitals, Neurologic exam (includes microfilament assessment for peripheral neuropathy), Eye exam, Skin, Cardiac, Waist circumference (measured at iliac crest)
Labs and X-ray Data: FBG, HgbA1C, Complete Metabolic Panel, Lipid Profile (goal LDL <100), TSH, UA, Urine microalbumin: urine creatinine ratio (goal <300)
Medications: Previous (prior 6 months) and current medications/dosages
Consults: Document review and completion of all required consultations.

FOLLOW-UP REQUIREMENTS (UNLESS STATED OTHERWISE IN WAIVER LETTER)

Type 2 Diabetes Mellitus

1. Annual Submission: Annual Physical - FS documents level of control and compliance, as well as BMI and waist circumference compared to baseline (generally WNR if current BMI >baseline or noncompliance)
2. Specialist Evaluation: Minimum of annual Endocrinology, Internal Medicine, or Family Medicine evaluation in addition to annual dilated diabetic eye exam
3. LABS: HgbA1c (DM2 on medication: <7%, Lifestyle changes only <6.5%), FBG avg <120 (assessed 4x/year at a minimum), Lipids (DM2: goal LDL <100); FBG, Complete Metabolic Panel, Lipid Profile (goal LDL <100), TSH, UA, Urine microalbumin: urine creatinine ratio (goal <300)
4. Medications: Report any medication changes or dosage adjustments

WORKUP/DISPOSITION:

DM - Confirm Diagnosis of Type 2/exclude Type 1 DM (take clinical picture into account, some cases require specialized testing). Ensure above waiver requirements are met.

Applicants (all flying classes): HgbA1C <5.7% - CD/WR/annual submission as above; HgbA1C >5.7%- CD, WNR

Designated (all flying classes): CD/WR/all flying class/SG, MINIMUM of annual assessment for DM submission includes FBG and HgbA1C. Specific recommendations for annual submission will be detailed in BUMED/NAMI waiver letter.

References:

[1] Considerations for Deployment of Service Members with Diabetes. Shwayhat and Gaydos. Federal Practioner. 2013
[2] DoDINST 6130.03 (2011)
[3] Diagnosis and Classification of Diabetes Mellitus. American Diabetes Association Position Statement. Diabetes Care. 2011 Jan; 34 Suppl 1:S1-2
[4] Haffner SM et al. N Engl J Med. 1998;339(4):229.

5.2 GOUT

Last Revised: April 2014 Last Reviewed: July 2014

Changes include clarification on medication use, removal of temporary SG3 restriction for first 3 months, and increased initial required workup.

	Applicant	Class 1			Class 2	Class 3
		SG 1	SG 2	SG 3		
CD	x	x	x	x	x	x
NCD						
WR		x	x	x	x	x
WNR	x					
LBFS				x	x	x
EXCEPTIONS						
LIMDU/PEB	Not required					

AEROMEDICAL CONCERNS: Gout may present as an acute, severely painful arthritis without warning. Untreated, chronic arthritis may develop leading to pain, joint deformity and decreased function. It is often associated with other disqualifying conditions such as atherosclerosis/coronary artery disease, diabetes, hypertension, and renal disease, to include renal stones.

REMEMBER: IF THE ESTABLISHMENT OF THE DIAGNOSIS AND ACHIEVEMENT OF MAINTENANCE PHASE OF TREATMENT WILL TAKE GREATER THAN 60 DAYS, A GROUNDING PHYSICAL IS REQUIRED AT THE TIME OF DIAGNOSIS AND THEN A LOCAL BOARD OF FLIGHT SURGEONS IS NOT APPROPRIATE TO BE CONVENED.

ICD-9 Code/DIAGNOSIS
274.9 Gout

SERVICE MEMBER MUST COMPLETE PRIOR TO INITIATING WAIVER

- For complicated or *recurrent* gout flares, patient must be evaluated and released from Rheumatologist or Internist care with recommendations for return to flight status with no restrictions as well as plan for follow on care **documented** on last clinical note (electronic or paper).
- Email or provide administrative information to include command UIC, command address, personal address, phone number, designator, flight hours (total and last 6 months), primary aircraft flown, and years of service.

STANDARDS & REQUIREMENTS TO BE MET PRIOR TO SCHEDULING WAIVER EXAM WITH FLIGHT SURGEON

- **CURRENT PHYSICAL LIMITATIONS**: None
- **LABORATORY LEVELS**:
  1. Serum Uric Acid. If obtained during initial symptoms flare, repeat 2-4 weeks after resolution. If xanthine oxidase inhibitors are prescribed, include level on therapy
  2. Basic Metabolic Panel/Chem 7. Patients with impaired renal function require commentary and further evaluation.
  3. Urinalysis. Patients with acidic urine (pH <5.5), proteinuria or microscopic hematuria require commentary and further evaluation (see separate ARWG topics).
  4. Fasting blood glucose or Hemoglobin A1C
  5. Fasting lipid profile (within last year)
  6. CBC with differential and Liver associated enzymes (required if taking allopurinol)

- **RADIOLOGY FINDINGS**:
    1. KUB to evaluate for renal stones. Any calcifications/abnormalities consistent with stones on KUB or patients with gout and microscopic hematuria require a CT (renal stone protocol). Confirmed stones requires full workup and separate waiver.
    2. Radiographs of affected joints (as clinically indicated)
- **SPECIAL TEST STANDARDS**: Results from joint aspiration (if obtained)
- **MEDICATIONS**: Medications considered for waiver include:

Allopurinol is preferred first line treatment for aviators requiring uric acid lowering. Alternatively febuxastat is considered on a case-by-case basis in situations which require uric acid lowering therapy but allopurinol is contraindicated or not tolerated.

NSAIDS (specifically ibuprofen, naproxen) are also waiverable for rare gout attacks or for prophylaxis while titrating uric acid lowering therapy. Indomethacin and systemic steroid (e.g. prednisone) use should only be under the supervision of the flight surgeon and requires grounding during and for 2 weeks after medication use. "As needed" prescriptions without evaluations and chronic indomethacin use will not be waived. Oral or systemic corticosteroids should be reserved for polyarticular joint involvement or impaired renal function and generally should be avoided in aviation personnel. If needed, short (less than 2 weeks) treatment generally results in low risk of adrenal suppression and stim testing afterwards is not routinely required. Recurrent steroid use is not authorized. Cox-2 inhibitors (e.g. Celecoxib) are not preferred for this indication and unlikely to be approved.

Probenecid use is generally not used but will be considered for waiver when properly prescribed by a rheumatologist.

Although low (<1.2mg) dose colchicine use is generally well tolerated and is useful for gout prophylaxis while titrating uric acid lowering therapy, currently it requires grounding and is not authorized for any DIF at this time. Waivers considered once discontinued.

AEROMEDICAL SUMMARY REQUIRED DOCUMENTATION BY FLIGHT SURGEON

Diagnosis:
Clinical Presentation:
Past Medical History/Prior Waivers:
Social And Family History: SH: Include comment on diet, EtOH and physical activity FH: Attention to endocrine disease, renal disease including stones, and cardiovascular disease
Military/Occupational History: Assess risk for lead exposure
Physical Exam: Vitals (attention to BP), Skin (rash, tophi), MSK/Joint (tophi, pain, ROM), Cardiac, Waist circumference (measured at iliac crest)
Labs And X-ray Data: comment on abnormal findings
Consults:
Medications: Review medications for potentially gout exacerbating medications. Comment on indications for uric acid lowering therapy.
Recommendation:

FOLLOW-UP REQUIREMENTS

Submission: Annual Physical: FS documents level of control and compliance with lifestyle changes/medications, including frequency of symptoms, in last year and total number of flares since diagnosis.
Specialist Evaluation: Generally not required if low frequency of attacks (<2/year)
LABS: Serum uric acid, Basic Metabolic Panel/Chem 7. Consider CBC and Serum transaminases if on uric acid lowering medications.
Medications: Report any medication used in last year, changes or dosage adjustments.

APPENDICES

COMORBID CONDITIONS:

Nephrolithiasis occurs with a much higher frequency in patients with a history of gout compared to the general population and increases in risk with serum uric acid levels. In healthy patients without a history of gout, average annual incidence of gout is 0.5 % in persons with a uric acid level between 7 and 8.9 mg/dL and 4-5%/year in those with a level of 9 mg/dL or greater. Flight surgeons should consider several comorbid conditions when first evaluating a patient with gout. In addition to screening for aeromedically disqualifying conditions such as stones, hypertension, and metabolic syndrome, assessment for chronic kidney disease, dyslipidemia and excessive alcohol intake represents an important opportunity for change.

TREATMENT

Lifestyle modifications, to include limited dietary purine intake, should be suggested for all patients. Indications for uric acid lowering pharmacotherapy include established diagnosis of gouty arthritis with tophus or tophi on clinical exam or imaging and frequent attacks (≥2/year). Therapy should also be considered in patients with CKD stage 2 or worse or past urolithiasis, though this is based on expert opinion only. Although not routinely done until after a flare resolves, allopurinol can be started during an acute gout flare if concurrently taking anti-inflammatory medication. Patients already on allopurinol should not discontinue the medication during an acute gout flare. Typical starting dose is 50-100mg daily. Allopurinol should be titrated up in increments of 50-100mg every 2-5 weeks to achieve a target serum uric acid concentration <6 mg/dl. Note: 50% of gout patients will require an allopurinol dose of greater than 300mg to reach the serum uric acid goal of less than 6. Temporary prophylaxis with low dose NSAIDS (or colchicine while grounded) can be used to prevent precipitation of gout flare while titrating allopurinol doses. The estimated incidence of allopurinol hypersensitivity syndrome is approximately 1:1,000 in the US. Patients with Asian ethnic backgrounds may have higher risk.

References:

[1] Campion EW, Glynn RJ, DeLabry LO. Asymptomatic hyperuricemia. Risks and consequences in the Normative Aging Study. Am J Med. 1987;82:421–6.

[2] Khanna D et al. 2012 American College of Rheumatology guidelines for management of gout. Part 1: systematic nonpharmacologic and pharmacologic therapeutic approaches to hyperuricemia. Arthritis Care Res (Hoboken). 2012 Oct;64(10):1431-46.

[3] Khanna D et al. 2012 American College of Rheumatology guidelines for management of gout. Part 2: therapy and anti-inflammatory prophylaxis of acute gouty arthritis. Arthritis Care Res (Hoboken). 2012 Oct;64(10):1447-61.

[4] Kramer HJ, Choi HK, Atkinson K, Stampfer M, Curhan GC. The association between gout and nephrolithiasis in men: The Health Professionals' Follow-Up Study. Kidney Int 2003;64:1022-6.

[5] Liu D, et al. A practical guide to the monitoring and management of the complications of systemic corticosteroid therapy. Allergy Asthma Clin Immunol. 2013 Aug 15;9(1):30.

[6] Neogi T. Clinical practice: gout. N Engl J Med 2011;364:443–52.

[7] Pak, CYC: Etiology and treatment of urolithiasis. Am J Kidney Dis 1991 18: 624–637

5.3 HYPERTHYROIDISM

Last Revised: April 2014 Last Reviewed: July 2014

Changes: Acceptable treatments for Naval aviation personnel are highlighted/clarified. Guidance on low TSH with normal T4/T3 provided.

	Applicant	Class 1			Class 2	Class 3
		SG 1	SG 2	SG 3		
CD	x	x	x	x	x	x
NCD						
WR	x*	x	x	x	x	x
WNR						
LBFS						
EXCEPTIONS	*Applicants must be euthyroid for 12 months prior to application and have no evidence of ophthalmopathy. **NOTE**: Treatment of Grave's with thionamides without radioactive iodine ablation/thyroidectomy is WNR all DIF.					
LIMDU/PEB	Required if service member elects treatment with thionamide medications.					

AEROMEDICAL CONCERNS: Cardiac manifestations (palpitations, arrhythmias) may cause sudden incapacitation. Fatigue is a common manifestation, and neurocognitive effects such as impaired attention and memory, and psychiatric symptoms, such as irritability and anxiety, may result in subtle incapacitation. Patients with thyroid ophthalmopathy may have difficulty with eye movements and corneal damage or optic neuropathy can also occur.

REMEMBER: IF THE ESTABLISHMENT OF THE DIAGNOSIS AND ACHIEVEMENT OF MAINTENANCE PHASE OF TREATMENT WILL TAKE GREATER THAN 60 DAYS, A GROUNDING PHYSICAL IS REQUIRED AT THE TIME OF DIAGNOSIS AND THEN A LOCAL BOARD OF FLIGHT SURGEONS IS NOT APPROPRIATE TO BE CONVENED.

ICD-9 Code/DIAGNOSIS
242.03 Hyperthyroidism
241.0 Thyroid Nodule
241.1 Multinodular Goiter, non-toxic
240.9 Goiter, unspecified
242.9 Thyrotoxicosis without mention of goiter or other cause

SERVICE MEMBER MUST OBTAIN/COMPLETE PRIOR TO INITIATING WAIVER

- *Endocrinologist* end of care summary documenting complete resolution of symptoms and stable euthyroid status, with recommendation of return to flight status with no restriction. If *Endocrinologist* recommends restrictions, note must include documentation of physical and/or mental limitations and expected duration (permanent vs temporary).
- *Endocrinologist* recommendation for follow on care **documented** on last clinical note.
- Surgery/Procedure Note (if performed).
- Copies of PEB (if indicated, e.g. service member undergoes treatment with thionamides).
- Provide administrative information to Flight Surgeon that includes command UIC, command address, personal address, phone number, designator, flight hours (total and last 6 months), primary aircraft flown, and years of service.

STANDARDS & REQUIREMENTS TO BE MET PRIOR TO SCHEDULING WAIVER SUBMISSION EXAM WITH FLIGHT SURGEON

- **LABORATORY LEVELS**: Two sequential sets of serum TSH and free T4 values in normal range (drawn 4-6 weeks apart)
- **SPECIAL TEST STANDARDS**: RAIU (radioactive iodine uptake) study required for all overt hyperthyroidism cases unless contraindicated (e.g. pregnancy, nursing). TSH receptor antibody testing may be substituted if RAIU unable to be obtained. Ophthalmology/optometry consultation is required in Graves' Disease to exclude ophthalmopathy.
- **MEDICATIONS**: On *stable* dose of levothyroxine (if required) for minimum of 60 days. NOTE: Levothyroxine is only approved form of replacement medication (if required). Current use of thionamide drugs (propylthiouracil or methimazole) is disqualifying for general duty and will not be granted waivers for aviation duty.

AEROMEDICAL SUMMARY REQUIRED DOCUMENTATION BY FLIGHT SURGEON

Diagnosis:
How Condition Presented/Was Diagnosed/Treated:
Past Medical History:
Social And Family History:
Aviation History:
Physical Exam: Attention to Neurologic, Ocular, Neck, Cardiac
Labs And X-ray Data: ECG, CBC, Complete Metabolic Panel, RAIU (radioactive iodine uptake) result(required in cases of biochemical hyperthyroidism), thyroid antibody results (if obtained), thyroid ultrasound report (if obtained), pathology report (if obtained)
Medications: Previous (prior 6 months) and current medications/dosages.
Consults: Endocrinology notes required.

FOLLOW-UP REQUIREMENTS

Submission: Annual Physical documenting continued clinical and chemical euthyroidism
Specialist Evaluation: Minimum of annual Endocrinology or Internal Medicine evaluation (submit all notes from past year)
LABS: TSH, fT4 (obtained annually at a minimum)
Medications: Report any medication changes or dosage adjustments

APPENDICES

TREATMENT: There are three primary forms of therapy: medical treatment with thionamides; thyroid ablation with radioactive iodine; and surgery (thyroidectomy). The best treatment strategy will depend on the etiology of the hyperthyroidism and may vary from patient to patient. While patients have the right to choose their treatment, patients should NOT be considered world-wide deployable while taking thionamide medications and a medical board is indicated. Thionamides may cause side effects incompatible with aviation duties to include vertigo, drowsiness, liver dysfunction as well as agranulocytosis and requires close laboratory monitoring and clinical follow-up which may not be possible in an operational setting. Relapse rates once discontinued are high. For Graves' disease, only surgery or ablation is compatible with return to duties involving flying. While complete remission with radioactive iodine ablation is high, most will go on to require long-term thyroid hormone supplementation. A small number of cases will also require eye surgery.

CLINICAL PRESENTATION/DIAGNOSIS: Although hyperthyroidism can affect nearly all organ systems and lead to a variety of manifestations, neuropsychiatric and cardiovascular effects are the most relevant to the aeromedical physician. Behavior and personality changes

may include subtle irritability and restlessness or overt emotional lability, anxiety, or psychosis. Cardiovascular symptoms are often related to the potentiation of the sympathetic nervous system and include tachycardia, dysrhythmias, and systolic hypertension with widened pulse pressure. Weight loss and energy supplements may contain substances that interfere with normal thyroid function and in some cases contain thyroid hormone. Smoking cessation increases probability of remission. Smoking is a risk factor for Graves' ophthalmopathy.

Biochemical hyperthyroidism is defined as a low/suppressed TSH with either an elevated freeT4 or T3. For patients with biochemical hyperthyroidism, workup should include 24-hour radioiodine thyroid uptake study to determine the etiology (Graves', thyroiditis, nodule, etc.). This study and antibody testing is best left to endocrinologists and should not be routinely ordered by the flight surgeon. Persistent (>6-12 weeks) low TSH with normal freeT4 and T3 (subclinical hyperthyroidism) is also CD and requires a waiver with close follow-up. The need for further testing and treatment in such instances should be determined on a case-by-case basis. *Contact NAMI Internal Medicine for guidance* if needed.

5.4 HYPOTHYROIDISM

Last Revised: April 2014 Last Reviewed: July 2014

Includes clarifications on Subclinical Hypothyroidism and guidance on elevated TSH with normal T4/T3 provided.

	Applicant	Class 1			Class 2	Class 3
		SG 1	SG 2	SG 3		
CD	x	x	x	x	x	x
NCD						
WR	x	x	x	x	x	x
WNR						
LBFS						
EXCEPTIONS						
LIMDU/PEB						

AEROMEDICAL CONCERNS: The insidious onset of many signs and symptoms of hypothyroidism reduces the aviator's ability to recognize abnormalities. It can foster complacency or an unwillingness to seek medical advice until performance is significantly degraded. Fatigue, lethargy, muscle weakness, decreased cognitive function, motor weakness, delayed reflexes, bradycardia, first degree heart block, cardiomegaly, pericardial effusion, depression, sensorineural hearing loss and anemia are all complications relevant to aviation. The flight surgeon must know and observe their aviators for the subtle onset of any of these signs and symptoms.

REMEMBER: IF THE ESTABLISHMENT OF THE DIAGNOSIS AND ACHIEVEMENT OF MAINTENANCE PHASE OF TREATMENT WILL TAKE GREATER THAN 60 DAYS, A GROUNDING PHYSICAL IS REQUIRED AT THE TIME OF DIAGNOSIS AND THEN A LOCAL BOARD OF FLIGHT SURGEONS IS NOT APPROPRIATE TO BE CONVENED.

ICD-9 Code/DIAGNOSIS
244.8 Acquired hypothyroidism (iatrogenic)
245.0 Acute thyroiditis
245.1 Subacute thyroiditis
245.2 Hashimoto's thyroiditis
245.9 Thyroiditis, unspecified

SERVICE MEMBER MUST OBTAIN/COMPLETE PRIOR TO INITIATING WAIVER

- *Endocrinologist/Internist/Family Medicine specialist* end of care summary documenting complete resolution of symptoms (if applicable) and stable euthyroid status, with recommendation of return to flight status with no restrictions **documented**. If *Endo/IM/FP* recommends restrictions, note must include documentation of physical and/or mental limitations and expected duration (permanent vs temporary).
- *Endo/IM/FP* recommendation/plan for follow on care **documented** on last clinical note.
- Surgery/Procedure Note (if performed).
- Provide administrative information to Flight Surgeon that includes command UIC, command address, personal address, phone number, designator, flight hours (total and last 6 months), primary aircraft flown, and years of service.

STANDARDS & REQUIREMENTS TO BE MET PRIOR TO SCHEDULING WAIVER SUBMISSION APPOINTMENT WITH FLIGHT SURGEON

- **LABORATORY LEVELS**: For biochemically hypothyroid patients and those on thyroid hormone replacement therapy, two sequential sets of serum TSH and free T4 values in normal range (drawn 4-6 weeks apart) are required prior to waiver consideration. For asymptomatic patients not on hormone replacement therapy who have normal freeT4and TSH greater than the upper limit of normal but less than 10 mIU/L, waiver will be considered after 4-6 weeks showing stable TSH/freeT4 levels. Thyroglobulin(TG) and/or Thyroid peroxidase (TPO) antibody testing may help guide decisions to start levothyroxine but should generally be reserved for patients with abnormal TSH in whom replacement medication may not be used (i.e. subclinical hypothyroidism)
- **MEDICATIONS**: On *stable* dose of levothyroxine (if required) for minimum of 60 days. NOTE: Levothyroxine is ONLY approved form of replacement medication (if required) for Navy Aviation.

AEROMEDICAL SUMMARY REQUIRED DOCUMENTATION BY FLIGHT SURGEON

Diagnosis:
How Condition Presented/Was Diagnosed/Treated:
Past Medical History:
Social And Family History:
Aviation History:
Physical Exam: Attention to Vitals, Skin/Hair, Neurologic, Ocular, Neck, Cardiac
Labs And X-ray Data: ECG, CBC, Complete Metabolic Panel required. Thyroid ultrasound report NOT routinely required, but include if obtained.
Medications: Previous (prior 6 months) and current medications/dosages.
Consults: Endocrinology, Internal Medicine, or Family Medicine consultation required.

FOLLOW-UP REQUIREMENTS

Submission: Annual Physical documenting continued clinical and chemical euthyroidism
Specialist Evaluation: Minimum of annual Endocrinology Internal Medicine, or Family Medicine evaluation for first 2 years after diagnosis. After 2 years, uncomplicated patients with stable TSH and levothyroxine dosage may be followed by FS only.
LABS: TSH, freeT4 (obtained annually at a minimum)
Medications: Report any medication changes or dosage adjustments

APPENDICES

DIAGNOSIS/DEFINITIONS:

Overt Primary Hypothyroidism: Elevated TSH (usually >10 mIU/L) with subnormal freeT4.
Central Hypothyroidism: Low, "inappropriately normal" or minimally elevated TSH with subnormal freeT4.
Subclinical Hypothyroidism: TSH >upper reference limit (usually 4-10 mIU/L) with normal freeT4, stable over several weeks (minimum 4-6).
NOTE: This is a biochemical diagnosis: TSH must be abnormal. Aviators with symptoms of hypothyroidism (fatigue, weight gain, constipation, hair/skin changes, etc.) who are *definitively* biochemically normal (TSH<2.5mIU/L, normal fT4) do NOT have subclinical hypothyroidism and further thyroid testing (e.g. ultrasound, antibody testing) is generally unnecessary and may be harmful. Other etiologies of their symptoms should considered (iron deficiency, sleep disorders, adrenal insufficiency, emotional stress, etc.). Antibody testing/imaging may be helpful in borderline elevated TSH values, with treatment often started in patients with positive antibodies and elevated TSH due to higher risk of progression. *Initiating treatment in biochemically normal*

aviation personnel with thyroid hormone replacement is not authorized and will not be considered for waiver.

MANAGEMENT/DISPOSITION:

- ***Elevated TSH + low freeT4, with or without symptoms***: Consultation, further evaluation and treatment generally indicated, grounding for all DIF until asymptomatic and biochemically normal.

- Elevated TSH (>10 mIU/L) + normal freeT4, with or without symptoms: Consultation, further evaluation and treatment generally indicated, grounding for all DIF until asymptomatic biochemically normal.

- Elevated TSH(4.2-10 mIU/L) + normal freeT4 + symptoms c/w hypothyroidism: Consultation, further evaluation and treatment may be indicated, grounding for all DIF until asymptomatic.

- Elevated TSH(4.2-10 mIU/L) + normal fT4 + NO symptoms c/w hypothyroidism: Further evaluation and treatment may be indicated, not grounding (LBFS authorized) while undergoing evaluation. Initial close monitoring (TSH/fT4 every 3-6 months) needed with AMS and submission for waiver required for final disposition by NAMI.

- Transient (<4-6 weeks): TSH elevation with normal freeT4 and no symptoms that then returns to normal is NCD and does not require waiver submission.

5.5 MALE HYPOGONADISM

Last Revised: April 2014 Last Reviewed: July 2014

Includes current or recent use of testosterone supplementation

	Applicant	Class 1			Class 2	Class 3
		SG 1	SG 2	SG 3		
CD	x	x	x	x	x	x
NCD						
WR		x	x	x	x	x
WNR	x					
LBFS	***Temporary upchits and LBFS are NOT authorized.***					
EXCEPTIONS						
LIMDU/PEB						

AEROMEDICAL CONCERNS: Hypogonadism is associated with decreased muscle mass and strength, anemia, and possibly depressed mood. Use of testosterone supplementation has a high potential for abuse, may cause non-physiologic hormone shifts, and may increase risk of BPH/Prostate Cancer, cardiovascular events, and erythrocytosis. Long term safety in aviation population is currently unknown.

REMEMBER: A GROUNDING PHYSICAL IS REQUIRED AT THE TIME OF DIAGNOSIS AN THEN A LOCAL BOARD OF FLIGHT SURGEONS IS NOT APPROPRIATE TO BE CONVENED.

ICD-9 Code/DIAGNOSIS
257.2 Hypogonadism (male)

SERVICE MEMBER MUST COMPLETE & ENSURE DOCUMENTATION AVAILABLE PRIOR TO INITIATING WAIVER

- Evaluation to include diagnosis and workup to be performed by a Board Certified *Endocrinologist* skilled and knowledgeable in the evaluation pituitary hormones. A recommendation of return to flight status and no restrictions should be **documented** on last clinical note (electronic or paper).
- *Endocrinologist* recommendation for follow on care **documented** on last clinical note (electronic or paper).
- Service member to email or provide FS administrative information to include command UIC, command address, personal address, phone number, designator, flight hours (total and last 6 months), primary aircraft flown, and years of service.

STANDARDS & REQUIREMENTS TO BE MET PRIOR TO SCHEDULING WAIVER EXAM

- **CURRENT PHYSICAL LIMITATIONS:** None
- **LABORATORY LEVELS-SPECIAL TEST STANDARDS:** Copies of all laboratory testing with dates/times and reference values required. Optimal testing conditions must exist for hormonal tests to be accurately sampled. Specifically, these tests must be obtained at 0800 while fasting for 12 hours, with no sexual activity or exercise or nipple stimulation for 48 hours prior to sampling. Minimum workup required ***prior to*** any medication prescription/use:
- Serum TOTAL Testosterone (8 AM), a minimum of TWO (three is preferred) readings below the lower limit of normal for the used lab (most labs 280–300 ng/dl (9.8–10.4 nmol/liter (should be “distinctly subnormal”). Total testosterone is preferred first line screening test. Free testosterone should be measured ONLY IF total testosterone is borderline AND altered SHBG suspected; must be measured using a validated equilibrium dialysis method.

- FSH and LH should be measured if truly hypogonadal. In cases of secondary hypogonadism, i.e. low or normal FSH and LH (most patients), pituitary function assessment (8AM serum cortisol, TSH, freeT4, IGF-1), and serum prolactin, iron saturation and ferritin are required. Hematocrit (HCT) recorded at baseline and 6 months post-treatment. For males ≥50 yo (≥40 yo if African American or family history of prostate CA) also require Initial International Prostate Symptom Score (IPSS), PSA and DRE, again after 6 months post-treatment.
-**RADIOLOGY FINDINGS:** MRI of the pituitary is required for all cases of confirmed Secondary Hypogonadism
-**MEDICATIONS:** On stable dose of prescription testosterone for 90 days. Both topical and injectable formulations will be considered depending on therapeutic ranges/clinical effect of therapy. Confirmation of normalized/ therapeutic levels is required prior to waiver request.

AEROMEDICAL SUMMARY REQUIRED DOCUMENTATION

Diagnosis:
Clinical History/How Condition Was Diagnosed:
Past Medical History:
Social And Family History: Include reproductive history.
Military/Occupational History:
Aviation History:
Physical Exam: Vitals, body habitus, neck and waist circumference, weight, BMI. GU exam including testicular size(cm or mL), body hair distribution, presence or absence of gynecomastia, prostate exam
Labs And Imaging Data: Summarize above findings.
Medications: Current dosage and frequency.
Consults:
Recommendation:

FOLLOW-UP REQUIREMENTS

Submission: Annual Physical: FS documents continued control of symptoms with medication and assesses for symptoms of OSA
Specialist Evaluation: Minimum of annual Endocrinology evaluation.
LABS: Serum testosterone level (approximately ≥350 ng/dL to ≤750 ng/dL) on therapy (measured midway between injection doses or anytime with topical doses). Annual HCT within aviation standards (suspend treatment if HCT >54). For males ≥50 yo (≥40 yo if African American or family history of prostate CA) also require Initial International Prostate Symptom Score (IPSS), PSA and DRE.
Medications: Report any medication changes or dosage adjustments

APPENDICES

DISCUSSION:

A variety of herbal and nutritional supplements are available on the market and may interfere with normal pituitary-gonadal hormonal physiology/testing. Direct to consumer marketing of prescription testosterone can make accurate diagnosis difficult and has resulted in a marked increase in inappropriate prescriptions. Male hypogonadism requires both a good clinical history and properly done laboratory workup. Initiation of treatment prior to a completed evaluation may interfere with testing results. Flight Surgeons and consultants should be made aware of the required workup and are discouraged from making this diagnosis and initiating potentially lifelong treatment prior to proper evaluation. Once initiated, discontinuation can result in symptoms due a potential prolonged recovery period of the pituitary-gonadal axis after

suppression with supplementation. Patients should be counseled that testosterone supplementation may result in infertility issues.

Symptoms and signs are nonspecific and modified by age, comorbid illness, severity and duration of androgen deficiency, variation in androgen sensitivity, and previous testosterone therapy. They are based on *expert opinion* from clinical experience (no studies to validate). Although low testosterone levels have been shown to correlate with central adiposity, it is unclear whether this relationship is causal.

5.6 PITUITARY TUMORS

Last Revised: April 2014 Last Reviewed: July 2014

Changes Include: Clarification in workup and management is provided based on tumor size and functionality. Non-functioning microadenomas causing no local effects can be considered for waiver in applicants and dispositioned with a LBFS for designated.

	Applicant	Class 1			Class 2	Class 3
		SG 1	SG 2	SG 3		
CD	x	x	x	x	x	x
NCD						
WR	x*	x	x	x	x	x
WNR						
LBFS						
EXCEPTIONS						
LIMDU/PEB	Required for all macroadenomas and those treated with surgery					

*Restrictions in eligibility apply (see Appendix below)

AEROMEDICAL CONCERNS: The complications of pituitary tumors of aeromedical significance generally center around the following main factors: 1) size of the tumor and whether it causes or has potential to impact anatomic adjacent anatomic structures; 2) risk of tumor hemorrhage (apoplexy) resulting in sudden visual field deficits and hormonal dysfunction; 3) metabolic effects of hormone excess or deficiency; 4) side effects or complications from treatment. Local effects from the larger tumors can also cause local hemorrhage (apoplexy), headache, cranial nerve palsies, and visual field defects. Pituitary carcinomas are associated with a poor prognosis. Hypersectretion and hyposecretion of pituitary hormones may result in disqualifying conditions discussed elsewhere (e.g. hypothyroidism, hyperthyroidism, diabetes mellitus). Surgical treatments may result in neurologic complications and side effects of medications used to treat certain pituitary tumors may cause headache, dizziness, sedation, as well as psychological effects (psychosis, impulsive behavior) causing safety of flight issues. ***REMEMBER: IF THE ESTABLISHMENT OF THE DIAGNOSIS AND ACHIEVEMENT OF MAINTENANCE PHASE OF TREATMENT WILL TAKE GREATER THAN 60 DAYS, A GROUNDING PHYSICAL IS REQUIRED AT THE TIME OF DIAGNOSIS AN THEN A LOCAL BOARD OF FLIGHT SURGEONS IS NOT APPROPRIATE TO BE CONVENED.***

ICD-9 Code/DIAGNOSIS
227.3 Benign neoplasm of pituitary

SERVICE MEMBER MUST COMPLETE PRIOR TO INITIATING WAIVER

For Microadenomas (<10mm in maximal dimension)
- Completed *Endocrinology* evaluation with recommendation of return to flight status and no restrictions **documented** on last clinical note (electronic or paper).
- Endocrine evaluation must obtain following LABS: fasting glucose, serum prolactin, thyroid stimulating hormone (TSH), free T4 (FT4) and insulin like growth factor type I (IGF1). If triad of impaired fasting glucose, body mass index >29, and hypertension (BP > 140/90) co-exist, 24 hour collection of urine for free cortisol also required.

For Macroadenomas (>10mm in maximal dimension)
- Six month grounding period for observation
- Completed *Endocrinology* evaluation with recommendation of return to flight status and no restrictions **documented** on last clinical note (electronic or paper).

- Endocrine evaluation must obtain following LABS: fasting glucose, serum prolactin, insulin like growth factor type I (IGF1), follicle stimulating hormone (FSH), luteinizing hormone (LH), thyroid stimulating hormone (TSH), free T4 (FT4), 8 AM total testosterone (or estradiol in females), fasting morning cortisol, and chemistry panel.
NOTE: A fasting morning cortisol <12 mcg/dL requires a Cortrosyn stimulation test (250 mcg). Peak cortisol at 30 or 60 minutes must be > 18 mcg/dL.
- Neurosurgery evaluation with recommendation of return to flight status and no restrictions documented on last clinical note (electronic or paper)
-Completed Ophthalmology/Optometry consultation with visual field testing and dilated eye exam with recommendation of return to flight status and no restrictions documented on last clinical note (electronic or paper).

For Pituitary Surgery
- Six month post-operative grounding period for observation
- Follow-up at 6 weeks and 6 months with evaluations by neurosurgery, optometry or ophthalmology, endocrinologist
- Testing six months post-operative and annually must include the following LABS: Fasting glucose, serum prolactin, insulin like growth factor type I (IGF1), thyroid stimulating hormone (TSH), free T4 (FT4), follicle stimulating hormone (FSH), luteinizing hormone (LH), testosterone or estradiol (females), cortisol, chem 10 , and Cortrosyn stimulation test (250mcg) with peak at 30 or 60 minutes >18 mcg/dL.
- Provide administrative information to FS/AME to include command UIC, command address, personal address, phone number, designator, flight hours (total and last 6 months), primary aircraft flown, and years of service.

STANDARDS & REQUIREMENTS TO BE MET PRIOR TO SCHEDULING WAIVER EXAM WITH FLIGHT SURGEON

- **LABORATORY LEVELS:** Laboratory values listed above should be within normal limits. Ongoing but stable abnormalities of pituitary function (e.g. prolactin elevation) should be discussed with NAMI prior to submitting a waiver request. ****It must be emphasized that optimal testing conditions must exist for hormonal tests to be accurately sampled**. Specifically, these tests must be obtained at 0700 while fasting for 12 hours, with no sexual activity or exercise or nipple stimulation for 48 hours prior to sampling.***
- **MEDICATIONS:** A summary of the medications used during evaluation/treatment should be provided to the Flight Surgeon. For prolactinomas, no waivers are granted for use of bromocriptine; use of cabergoline may be **considered** on a case-by-case basis for waiver after a 6 month observation period. No waivers are granted for any other medications used for suppression or replacement of pituitary hormones.

AEROMEDICAL SUMMARY REQUIRED DOCUMENTATION BY FLIGHT SURGEON

Diagnosis:
How Condition Was Diagnosed:
Treatment Summary:
Past Medical History:
Social And Family History: FH: Attention to endocrine diseases and malignancy
Military/Occupational History: Attention to radiation exposures
Physical Exam: Vitals, Full Neurologic exam, Eye exam
Labs And X-ray Data: Results of MRI of sella turcica and required labs
Medications: Previous (prior 6 months) and current medications/dosages
Consults: FS to document all required consultations completed and reviewed.

FOLLOW-UP REQUIREMENTS

Submission: Annual Endocrinology follow-up with FS summary. Medical and/or surgical therapy should be considered if significant tumor growth, threat to vision (or invasion of) local structures, the appearance of hormonal excess or deficiencies.
Specialist Evaluation: Minimum of annual Endocrinology follow-up. Macroadenomas and those treated with surgery require neurosurgical evaluation and visual field evaluation by optometry or ophthalmology.
LABS: Based on tumor type and behavior on follow-up.
Minimums required based on diagnosis:

Microadenomas: prolactin, insulin like growth factor type I (IGF1), thyroid stimulating hormone (TSH) and free T4 (FT4)
Macroadenomas: full pituitary hormonal evaluation to include fasting glucose, serum prolactin, insulin like growth factor type I (IGF1), follicle stimulating hormone (FSH), luteinizing hormone (LH), thyroid stimulating hormone (TSH), free T4 (FT4), testosterone (or estradiol in females), cortisol, and chemistry panel, Cortrosyn stimulation test. Peak cortisol at 30 or 60 minutes must be >18 mcg/dL
IMAGING: MRI of sella turcica annually up to 5 years, then periodic if stable
MEDICATIONS: Report any medication changes or dosage adjustments. No waivers are granted for any other medications used for suppression or replacement of pituitary hormones.

APPENDICES

WAIVER DISPOSITIONS ELABORATED

Applicants: may be considered for waiver ONLY if they meet all of the following criteria:

1. Maximal dimension <10 mm by MRI of the sella turcica (preferably performed at a military MTF and read by a neuroradiologist).
2. No imaging evidence of compression of local anatomic structures.
3. No evidence on history or physical examination of multiple endocrine neoplasia type 1a).
4. The tumor is established as non-functional with appropriate tests performed by an endocrinologist trained and skilled in hormonal testing.
5. Applicants with tumors that do not meet the above four criteria will NOT be considered for waiver.

Designated: Designated aviators with a pituitary adenoma that meets all four of the following criteria are considered disqualified:

1. Maximal dimension <10 mm by MRI of the sella turcica (preferably performed at a military MTF and read by a neuroradiologist).
2. No imaging evidence of compression of local anatomic structures.
3. No evidence on history or physical examination of multiple endocrine neoplasia type 1a).
4. The tumor is established as non-functional with appropriate tests performed by an endocrinologist trained and skilled in hormonal testing.

BUT, may be granted clearance by a Local Board of Flight Surgeons. Designated aviators with pituitary tumors that do not meet all four of the above criteria may not be granted clearance by a Local Board of Flight Surgeons but may be considered for waiver. Waivers for designated aviators with pituitary tumors are considered based upon the following:

- ***Functional microadenomas*** may be considered for waiver based on tumor type, therapeutic options, complications and side effects of therapy, among other factors. No waivers are granted for use of bromocriptine; cabergoline may be considered for waiver. *No waivers are granted for any other medications used for suppression or replacement of pituitary hormones.*

This includes but is not limited to Cortisol, Growth hormone, and Vasopressin (antidiuretic hormone).

- ***Macroadenomas*** are usually not considered for waiver. Exceptions are those aviators with pituitary macroadenomas that have demonstrated all six of the following characteristics:

1. Regression or response to medical therapy.
2. Long history of presence (>5yrs) without growth.
3. No evidence of compromise of other pituitary hormones.
4. No evidence of anatomic complication or compression.
5. Normal visual field examination by optometry or ophthalmology.
6. An extensive (6 month) grounding period of observation.

DISCUSSION:

In pooled autopsy studies pituitary adenomas have been found in 1.5-27% of subjects who otherwise had no indication of pituitary dysfunction suggesting that the rate of occurrence in the general population is higher than previously thought. Tumors are classified as those discovered incidentally – when no pre imaging suspicion existed – and those discovered clinically due to patient presentation. They are further categorized as functional if they secrete excess hormones or nonfunctional if they are do not secrete excess hormones or secrete hormones that are inert. Finally, pituitary adenomas are categorized by size; those less than 10 mm in maximal dimension are termed microadenomas and those greater than or equal to 10 mm in maximal dimension are termed macroadenomas. The size of the tumor and whether it has hormonal effects have the greatest established impact on its prognosis.

Most pituitary tumors are microadenomas that either secrete prolactin or are nonfunctional, do not grow, and otherwise are of no clinical consequence. As a general rule virtually all prolactinomas respond to dopamine agonist therapy and will regress in dimension over time without causing complications. For most patients the side effects of dopamine agonist therapy regress over 8 weeks after initiation of therapy. Other treatments aside from surgery are available for pituitary tumors. The type of treatment and the success rates of treatment depend on the size of the tumor and the type of tumor. An endocrinologist is the best subspecialist to evaluate and treat pituitary adenomas.