

## 12.0 OPHTHALMOLOGY

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## 12.0 OPHTHALMOLOGY

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\*July 2018 updates include:

- 12.9 - Corneal Collagen Cross-Linking (CXL) treatment information added
- 12.15 - Class I aviators now allowed to have CRS at any DOD refractive surgery center, with DON centers still preferred however; clarified misc items
- 12.16 - Added monovision as a contact lens modality not allowed
- 12.21 - Added corneal scar ICD-10 codes and a note about glare testing
- 12.22 - Minor edits for clarification

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## 12.1 CATARACT

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**AEROMEDICAL CONCERNS:** Cataracts reduce visual acuity (VA). When the cataract involves the visual axis, visual acuity is most affected in bright sunlight, and in conditions of glare at both day and night.

**WAIVER:** The condition is considered disqualifying. Once vision has deteriorated to less than 20/20 correctable or the patient has a positive Glare test (i.e. loss of best corrected visual acuity with off axis light), the aviator should be grounded until successful surgical removal of the cataract. Waiver to SG1 may be considered after surgery provided the visual acuity (VA) returns to 20/20 corrected, is within refraction limits, and the Glare test is negative (normal).

### INFORMATION REQUIRED:

1. Eye doctor consultation is required for initial waiver request.
2. Because of the potential for deterioration, ophthalmologic follow-up may be needed every 6 months until surgery is deemed necessary.
3. Prior to and after surgery, a Mentor Brightness Acuity Test (BAT, a glare-testing device) should be performed with VA documented for each eye separately at the low, medium and high settings.
  - a. If a BAT is unavailable, an acceptable alternative is an off axial point source of light (i.e. transilluminator).
    - i. Performed monocularly with best correction in place if required, hold a transilluminator off axis below the line of sight and note any degradation on the distance visual acuity chart compared to the patient's best corrected visual acuity.
4. Underlying pathology such as Wilson's disease, diabetes, hypoparathyroidism, etc. may be considered by the eye care specialist during the workup evaluation.

**TREATMENT:** Surgery with an intraocular lens (IOL) implant usually provides a sufficiently acceptable VA result for military flying duties. Consultation with the NAMI Eye Dept (phone: 850-452-2933 or email: [usn.pensacola.navmedotcnamefl.list.nami-ophthal@mail.mil](mailto:usn.pensacola.navmedotcnamefl.list.nami-ophthal@mail.mil)) prior to surgery is recommended.

**DISCUSSION:** The visual effect of a cataract depends on its size and encroachment on the visual axis, and the proximity to the nodal point. A posterior subcapsular cataract can have a devastating effect on vision. Two or three episodes of serious dehydration can increase the risk of developing a cataract 21 fold. Surgical success of greater than 90% in achieving a 20/40 best corrected VA after 1 year has been reported. At this time, the Navy does not restrict personnel with IOLs from certain types of high performance/ejection-seat aircraft.

**ICD-10 CODES:**

H25.019 Cortical age-related cataract, unspecified eye  
H25.049 Posterior subcapsular polar age-related cataract, unspecified eye  
H25.9 Unspecified age-related cataract  
H26.049 Anterior subcapsular polar infantile and juvenile cataract, unspecified eye  
H26.059 Posterior subcapsular polar infantile and juvenile cataract, unspecified eye  
H26.109 Unspecified traumatic cataract, unspecified eye  
H26.31 Drug-induced cataract, right eye  
H26.32 Drug-induced cataract, left eye  
H26.33 Drug-induced cataract, bilateral  
H26.40 Unspecified secondary cataract  
Q12.0 Congenital cataract  
Q12.8 Other congenital lens malformations  
Q12.9 Congenital lens malformation, unspecified  
Z98.41 Cataract extraction status, right eye  
Z98.42 Cataract extraction status, left eye

## 12.2 COLOR VISION ABNORMALITIES

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**AEROMEDICAL CONCERNS:** Color vision is required to accurately identify warning lights and color visual displays in the cockpit, airfield and shipboard lighting, colored smoke in combat, ground target identification, and aircraft formation lights. Interactions with other optical devices, such as laser eye protection glasses and protective visors may worsen color vision problems. For testing purposes, proper instructions and lighting are critical to accurate results. Best corrected spectacles are recommended, but no tinted or colored lenses may be worn during testing, as that will decrease the sensitivity of the test for detecting color vision deficiency.

**WAIVER:** Applicants: the condition is CD and waivers are typically not considered for applicants that cannot pass the required color vision tests. Certain non-aircrew positions require adequate color vision, including ATC, UAV, and sonar display operators (anti-sub aircraft). Waivers have been granted for Aeromedical and other Class II aircrew applicants on a case-by-case basis. Designated: Waivers for designated personnel with a change in color vision may be considered on a case-by-case basis.

### COLOR TESTS:

1. Pseudo-Isochromatic Plates (PIP) are considered a primary test of color vision.  
Approved: **Ishihara 38-plate edition, Pseudoisochromatic Ishihara Compatible (PIPIC) 24-plate edition, ColorDx Standard 24-Plate Edition.**
  - a. Scoring: 12 (or more) of 14 correctly identified red/green numerical test plates constitutes a passing score. Passing criteria is 12 or more plates correctly read, i.e., no more than 2 errors.
  - b. Use one demonstration and 14 test plates (the orange number on page one is a demo plate only, and not a test plate, and should not be counted). **Directions:** Best corrected vision, Daylight Illuminator stand or a light source ~ 6500 degree Kelvin temperature "Daylight" fluorescent bulb, three seconds each page, no tracing allowed, random order. Regular white incandescent bulbs may not be used as they reduce the sensitivity of the test.
  - c. Other editions of pseudoisochromatic plates may not have the correct types of plates (numbers only required). Research has shown that individuals scoring 11 (or less out of 14) on the PIP test do not have normal color vision.
2. **Farnsworth Lantern (FALANT)**, The Farnsworth Lantern was designed in the 1940's to pass mildly color vision deficient individuals for Naval submarine service. Passing the FALANT does not ensure normal color vision. Original model or Optec 900 accepted.
  - a. Passing criteria for FALANT remains 9 of 9, or 16 of 18 correct responses. **Directions:** normal room lighting, best corrected vision worn, both eyes open, 8 foot test distance, random presentation of targets, two seconds each target. Prior to testing, read the instructions to the patient exactly as written on the side of the unit to ensure predictable responses, and follow all directions on the guide.
  - b. As of 01 January 2017, the FALANT will no longer be acceptable for applicants for any class, but those designated and student aviators who have passed the FALANT prior to phase-out will be grandfathered for their career, unless a documented color vision degradation is identified, which requires further evaluation to exclude progressive or acquired disease.

3. **Computerized Color Vision Tests (CCVT)** may be either used as a primary test of color vision, or may be used as a backup test for PIP or FALANT failures.

**Computerized Tests** (validated and approved):

- a. **Waggoner CCVT:** A score of “normal” or “mild” color vision deficiency in red, green or blue is acceptable for aviation. Tested binocularly (both eyes open). May test monocularly for isolating and tracking acquired color vision defects. Both desktop and tablet versions are acceptable.
- b. **Colour Assessment & Diagnosis (CAD, City University London):** A score of less than or equal to 6 CAD units for all three cone types in each eye is acceptable. This test is given binocularly (both eyes at the same time).
- c. **Cone Contrast Test (CCT, Rabin):** A score of 55 or greater in each eye is required for all three cone types. This test is given monocularly (one eye at a time).
- d. Computer tests shall be administered per manufacturer recommendations with regard to distance, lighting, screen calibration, and monocular or binocular testing. Best correction worn. Computerized tests must be utilized per manufacturer’s instructions; such as administration processes and calibration, room lighting, and screen brightness. Computer-printout grade sheets should be submitted with the physical exam, to ensure objectivity and correctness.

**INFORMATION REQUIRED:** If a designated aviator fails the PIP, and either a FALANT or computerized test (worse than mild defect), an ophthalmologic evaluation is required to screen for acquired pathology. Additionally, a practical test of color vision must be performed to demonstrate operational ability and be administered with the objective oversight of the flight surgeon, type standardization instructor, and type NATOPS officer as observers. Tests would include identification of cockpit lighting, gauges, safety indicators, cockpit display symbology, map symbology for both cockpit and actual charts (hazards/obstacles, airspace coordination areas, route markings, etc.), identification of shipboard and landing field lighting, and ALDIS lights. For Marines, smoke color identification testing is also required. A control group of two additional aviators with normal color vision is recommended for comparison. Commanding Officer endorsement is required.

**TREATMENT:** N/A.

**DISCUSSION:** Defective color vision is overwhelmingly congenital, and mainly involves red and green cones, due to X-linked genetics. Blue cones are encoded on Chromosome 7. In Caucasians, approximately 8% of males have inherited red/green color defective vision. Of males, 2% of the population have only two cones, “dichromats,” and are severely deficient. The majority of color deficient individuals have three cone types, “trichromats”, but are red or green weak. Moderate to severe color deficient individuals have increased difficulty interpreting VASI and PAPI lights correctly, as well as difficulty with navigation and shipboard lighting and colored smoke identification. Moderate and severe color deficient individuals also take a longer time to interpret color signals and targets, while also making more errors.

Blue color deficiency may be acquired by ocular diseases, including cataracts, optic neuritis, macular degeneration, central serous retinopathy, or side effects of medications or toxins.

Mild color vision deficiencies are considered acceptable for safe and effective flight. Moderate-to-severe red-green abnormalities are the most problematic for aviation, and those individuals can, unfortunately, sometimes pass the FALANT. Any degree of color vision deficiency, even mild, may be considered as a potential causal or contributing factor in mishap investigations.

**ICD-10 CODES:**

H53.50 Unspecified color vision deficiencies

H53.51 Achromatopsia

H53.52 Acquired color vision deficiency

H53.53 Deuteranomaly

H53.54 Protanomaly

H53.55 Tritanomaly

H53.59 Other color vision deficiencies

## 12.3 DECREASED VISUAL ACUITY

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**AEROMEDICAL CONCERNS:** Decreased visual acuity degrades lookout and target acquisition.

**WAIVER:** A waiver unaided 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 (including best corrected visual acuity). Visual acuity and refractive error standards are generally not waived for applicants of any class.

A waiver for best corrected visual acuity less than standards is typically not waived in designated individuals, and generally not waived for applicants of any class.

### Class I Service Group Requirements

Category	Unaided Visual Acuity	Refractive Limits	NATOPS Restrictions
<b>SG1</b>	20/100 or better each eye	None	None
<b>SG2</b>	20/200 or better each eye	None	* Restricted from shipboard landings including VSTOL * Helicopters are OK
<b>SG3</b>	20/400 or better each eye	None	* Dual Controlled only * Requires SG1 or 2 onboard * Pilot in Command is included * Flying with students prohibited

Consider whether a waiver is actually required. An aviator whose uncorrected vision is worse than 20/400 will need a waiver to fly in any Service Group. A clear justification is required, including primary type of aircraft in which he or she will be flying and the number of hours in that type of aircraft.

### **CLASS III CRITICAL FLIGHT DECK PERSONNEL VISION STANDARDS**

**RECOMMENDATIONS:** Though the discretion rests solely with the unit's CO to waive standards below 20/20 and 40 seconds of arc of stereopsis per MANMED, NAMI generally recommends critical flight deck personnel have at least 20/25 in one eye and at least 20/30 in the other, and no less than 100 arc seconds of stereopsis to be considered by the CO for a waiver of standards in a mission essential person with a safe work record.

### **INFORMATION REQUIRED:**

1. Optometry or ophthalmology consults for any waiver request for excessive refractive error.
2. Ophthalmology consult required for cases of decreased visual acuity not due to simple myopia, hyperopia, astigmatism or presbyopia (i.e., optic neuritis, significant corneal scarring, significant cataracts, CSCR, etc.)
3. Obtain dilated retinal evaluation at corrections greater than -8.00 diopters.

4. Progressive astigmatism should be evaluated to exclude keratoconus.

**TREATMENT:** Correction with spectacles within the limits set by MANMED Chapter 15. Contact lenses are permissible for aviation personnel after optometry examination, but spare clear spectacles must be carried in flight and the aviator must demonstrate 20/20 with contact usage. Corneal surgical procedures other than that which is allowed by [Chapter 12.15](#) are CD, with waivers generally not recommended.

**DISCUSSION:** Myopia is usually a progressive condition, stabilizing around age 30. Significant myopia is complicated by considerable visual distortion at the periphery of corrective lenses. Individuals with significant myopia may see halos or flares around bright lights at night and are more at risk for night blindness. Elongated globes are at an increased risk of retinal detachment and lattice degeneration. Whenever a prescription is changed, aircrew should be warned about transient visual distortion and counseled on the period of adjustment. 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 II, III, and IV personnel since the entry requirements for Class I pilots 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%.

**ICD-10 CODES:**

H54.61 Unqualified visual loss, right eye, normal vision left eye  
H54.62 Unqualified visual loss, left eye, normal vision right eye  
H52.10 Myopia, unspecified eye  
H52.11 Myopia, right eye  
H52.12 Myopia, left eye  
H52.13 Myopia, bilateral  
H52.00 Hypermetropia, unspecified eye  
H52.01 Hypermetropia, right eye  
H52.02 Hypermetropia, left eye  
H52.03 Hypermetropia, bilateral  
H53.00x Amblyopia



## 12.4 DEFECTIVE DEPTH PERCEPTION/STEREO-VISION/STEREOPSIS

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**AEROMEDICAL CONCERNS:** Although many visual cues regarding the relative positions of objects in space (depth perception) are monocular, binocular stereo-vision is the best sense for depth perception at distances of less than 200 meters. The binocular visual reflex of stereopsis is also an important indicator of normal visual acuity, ocular alignment, and neurological function of the visual pathway. Defective stereopsis may make certain piloting duties such as formation flying and aerial refueling more difficult and unsafe.

**WAIVER:** Waivers are typically not recommended for any candidate or designated Class I or IV duty involving actual control of aircraft. Class II and III personnel must meet standards for depth perception except when remarked as "not required" under types of aviation duty specified under MANMED Articles 15-87 through 15-99. Though generally not considered, waivers for certain Class II and III will be viewed case-by-case. Certain Class III members (i.e. maintainers, flight deck personnel) do not require waiver submission through NAMI, but by authority of local command (details in MANMED).

### CLASS III CRITICAL FLIGHT DECK PERSONNEL VISION STANDARDS

**RECOMMENDATIONS:** Though the discretion rests solely with the unit's CO to waive standards below 20/20 and worse than 40 seconds of arc of stereopsis per MANMED, NAMI generally recommends critical flight deck personnel have at least 20/25 in one eye and at least 20/30 in the other and no less than 100 arc seconds of stereopsis to be considered by the CO for a waiver of standards in a mission essential person with a safe work record.

### INFORMATION REQUIRED:

- Valid tests of stereopsis include:
  - Armed Forces Vision Tester (AFVT)** [passing is lines A through D]
  - Stereoacuity Plates** used with polarized viewers such as the Stereo Optical, Titmus Optical **Stereo Fly**, or **Randot**. A randomized version of these tests should be used. Passing is 40 seconds of arc, with no head or test book movement, performed with good lighting.
  - Verhoeff Stereopter:** tested at 1m, eight correct of eight random presentations for passing grade, with no head movement of the patient
- A pass of any one test meets the stereopsis standard. The tests must be administered and results recorded as specified in MANMED and elsewhere in the ARWG. [See Applicant and Designated Aviation Vision Standards Chart \(Appendix A\)](#).
- Recent loss of stereopsis in a designated Class I naval aviator is usually due to a change in refraction or onset of presbyopia, but may also be a sign of cataract, macular or optic nerve disease, or new motility disturbance, requiring ophthalmologic or optometric evaluation. New failures to meet the stereopsis standard must be evaluated by an eye doctor to include completion of the [ocular motility worksheet \(See Appendix B\)](#).

**TREATMENT:** Correct any underlying refractive error or eye disease.

**DISCUSSION:** Defective stereopsis is typically innate and due to abnormal visual development prior to the age of 9. Causes of defective stereopsis include abnormal ocular muscle balance,

amblyopia, anisometropia, microtropia, and monofixation syndrome. The Verhoeff Stereopter tests stereovision in real space, and all eight tests must be correct for a passing score.

**ICD-10 CODES:**

H53.33 Simultaneous visual perception without fusion

H53.32 Fusion with defective stereopsis

## 12.5 HISTORY OF STRABISMUS SURGERY

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**AEROMEDICAL CONCERNS:** Single, fused/stereoscopic, simultaneous binocular vision in all fields of gaze is a requirement for safe and effective flight duties. Congenital or acquired defects of ocular alignment as well as any surgery to correct ocular misalignment can cause mild to severe degradations to binocular vision and acuity and be a grave hazard in aviation.

**WAIVER:** History of strabismus surgery is considered disqualifying for all aviation duty. A waiver typically will not be considered for an SNA applicant, due to the risk of progressive degradation to alignment even decades later. A waiver for aviation duty other than an SNA applicant may be considered on a case-by-case basis. Waiver consideration is no sooner than six months after a successful and stable strabismus surgery if post-operatively, the member otherwise meets the visual standards appropriate for his or her duty.

### INFORMATION REQUIRED:

1. Submission must include an [ocular motility worksheet \(see Appendix B\)](#) completed at the time of waiver request by a provider qualified to measure all required data.
2. Include copies of all eye exams and operative report(s) with AMS.

**TREATMENT:** Strabismus surgery involves enhancing or retarding the action of one or more extraocular muscles in either or both eyes. An extraocular muscle tendon may be shortened (resection) to strengthen its action, or the insertion of the muscle moved posteriorly on the globe (recession) to weaken its action. Adjustable sutures may be employed to fine tune ocular alignment in the perioperative period. A spacer may be inserted in the muscle tendon with unusual forms of vertical muscle surgery. In general, vertical muscle strabismus surgery is more complex and problematic than horizontal muscle surgery for simple eso- or exotropia.

**DISCUSSION:** Ocular misalignment is always the consequence of disease and never a normal finding. Surgery on extraocular muscles is imprecise and has a risk of regressing to the original state of misalignment or progressing in effect and causing sequential overcorrection. Multiple surgeries are frequently necessary for congenital misalignment. Scarring of the globe and adnexa after muscle surgery may lead to restricted ocular movements. Vertical muscle surgery often causes or does not fully correct cyclotorsional misalignment.

Realignment of the eyes with muscle surgery does not resolve the underlying disorder in congenital misalignments and while peripheral binocular function may be partially enhanced, normal central binocular stereopsis is rarely achieved. Even after satisfactory surgical alignment in congenital esotropia, residual comorbidities such as latent nystagmus and dissociated vertical deviations are often seen. The desirable cosmetic result after strabismus surgery is 10 or fewer prism diopters of misalignment, since this relatively small degree of heterotropia is not noticeable to casual observation of the eyes. Asymptomatic vision (i.e. normal acuity without diplopia complaints) with tropia less than 10 prism diopters, meets the NOHOSH standard for Class II and III.

“NOHOSH” stands for “No obvious heterotropia or symptomatic heterophoria.” “Obvious heterotropia” is visually noticeable misalignment of the two eyes in primary, straight-ahead gaze (with no head turn or tilt) or gross misalignment during motility testing in the cardinal fields of gaze. “Symptomatic heterophoria” is complaints of intermittent diplopia while alert and performing tasks such as night-driving, night-flying, scanning for air-traffic in hazy skies, etc.

Symptomatic heterophoria is not intermittent double vision normally associated with extreme fatigue or alcohol intoxication.

**ICD-10 CODES:**

H50.89 Other specified strabismus

H50.9 Unspecified strabismus

## 12.6 EXCESSIVE PHORIAS

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**AEROMEDICAL CONCERNS:** Excessive phorias are frequently associated with defective stereopsis and/or diplopia complaints, especially when fatigued. This is particularly hazardous when it occurs during a critical phase of flight. Excessive phorias may lead to symptomatic diplopia with helmet-based cuing systems, or stereoscopic aircraft monitors.

Asymptomatic vision (i.e. normal acuity without diplopia complaints) with tropia less than 10 prism diopters, meets the NOHOSH standard for Class II and III. "NOHOSH" stands for "No obvious heterotropia or symptomatic heterophoria." "Obvious heterotropia" is visually noticeable misalignment of the two eyes in primary, straight-ahead gaze (with no head turn or tilt) or gross misalignment during motility testing in the cardinal fields of gaze. "Symptomatic heterophoria" is complaints of intermittent diplopia while alert and performing tasks such as night-driving, night-flying, scanning for air-traffic in hazy skies, etc. Symptomatic heterophoria is not intermittent double vision normally associated with extreme fatigue or alcohol intoxication.

**WAIVER:** CD for SNA, Class I, and Class IV aviators. Waivers typically will not be considered.

### INFORMATION REQUIRED:

1. Evaluation by a qualified optometrist or ophthalmologist is necessary.
2. The consult should address any history of diplopia or previous eye surgery, and include all applicable studies requested on the accompanying [ocular motility worksheet \(see Appendix B\)](#)
3. Phorias should be measured at far and near distances with best correction. Note, there is only a standard for phorias at far distance; however, the eye doctor will evaluate both near and far phorias during the work up for a waiver.

See [Applicant and Designated Aviation Vision Standards Chart \(Appendix A\)](#).

### ICD-10 CODES:

H50.51 Esophoria

H50.52 Exophoria

## 12.7 RETINAL DETACHMENT

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**AEROMEDICAL CONCERNS:** A detached or torn retina can lead to visual impairment, the degree of which depends on the part of the retina involved and the success of timely surgery. Some retinal repairs involve injecting gas into the eye (pneumatic retinopexy), which will restrict the patient from air transport for some time afterward, until cleared by the retinal surgeon. Routine exposure to slow-onset G forces has not been shown to increase the risk of retinal detachment.

Small atrophic peripheral holes generally do not require treatment, but should be monitored for progression or subretinal fluid development over time by annual dilated examinations ([see section 12.20 for further details on retinal holes](#)).

**WAIVER:** Waivers will typically not be considered in applicants for retinal detachments involving intraocular repairs, vitrectomy, pneumatic retinopexy, or sclera buckles. Applicants with small peripheral tears and/or detachments treated successfully with laserpexy may be considered on a case-by-case basis after six months with stable follow-up examinations. Waivers in other designated classes will be considered on a case-by-case basis after a minimum of three months post-operatively. Annual dilated exams will be required for any waiver for retinal tear, treated holes, or detachment. **A Grounding physical is required to be submitted upon diagnosis due to the post-operative observation period of greater than 60 days.**

**INFORMATION REQUIRED:** Please submit all relevant eye examinations and operative reports to include a Humphrey Visual Field, detailed retinal drawings or photos, motility exam (if scleral buckling is performed), and glare testing (see details in [cataract section, 12.1](#)) if a pneumatic retinopexy (air injection) or vitrectomy is performed.

**TREATMENT:** Surgical intervention is required in most cases. The best approach will be determined by the surgeon and may consist of one or more of the following techniques: cryotherapy, laser retinopexy, pneumatic injection, scleral buckling, or vitrectomy.

**DISCUSSION:** Visual acuity and visual field loss, changes in refractive error, motility disorders, recurrent detachments, detachment in the fellow eye, and cataracts are frequent sequelae for retinal detachments. Detachments involving the macula have the highest impact on central vision impairment. Annual follow-up is required for the duration of military service and recommended after separation from service.

### ICD-10 CODES:

H33.001 Unspecified retinal detachment with retinal break, right eye  
H33.002 Unspecified retinal detachment with retinal break, left eye  
H33.003 Unspecified retinal detachment with retinal break, bilateral  
H33.8 Other retinal detachments

## 12.8 GLAUCOMA & OCULAR HYPERTENSION

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**AEROMEDICAL CONCERNS:** Glaucoma is an optic-nerve disease characterized by a combination of two or more of the following: elevated intraocular pressures, visual field loss, and/or progressive cupping of the optic nerve. It may be associated with increasing age, a family history of glaucoma, racial predilection, underlying eye conditions associated with elevated pressures, or trauma to the involved eye.

Open angle glaucoma is the most common type and is usually asymptomatic, even as vision loss is occurring slowly. Gradual, almost imperceptible loss of peripheral visual field is typically the earliest clinical manifestation, with loss of central vision occurring only in the most advanced later stages of the disease. Elevated eye pressure is not always present in patients losing vision from open angle glaucoma. Roughly a third of those presenting with glaucoma have intraocular pressures (IOPs) measured at less than 22 mmHg and some will continue to lose vision even with a lowering of their IOP with eye drops or surgery.

Acute angle glaucoma is much less prevalent and presents in a much different manner than the open angle variety, with symptoms such as acute onset of eye pain, decreased vision, and halos around lights. Signs may include a red eye with a hazy cornea and a mid-dilated, poorly reactive pupil.

Any glaucoma requires referral to the eye clinic with an acute angle attack requiring emergency referral to an ophthalmologist to reduce the risk of swift and severe vision loss. Both types of glaucoma are considered disqualifying because the risk of loss of vision and peripheral visual fields is incompatible with flight duties.

Ocular hypertension (i.e. elevated pressure measurements of the eye, without visual field loss, or optic nerve cupping) is not equivalent to the actual diagnosis of "glaucoma". In fact, most people with elevated pressure measurements >22 mm Hg never develop vision loss. This population, nonetheless, is at higher risk of developing glaucoma so this condition is considered disqualifying.

**WAIVER:** For the purposes of Naval Aviation, any IOP consistently (on at least 2 different exams on different days) and accurately measured above 22 mmHg by contact tonometry (applanation tonometer or Tonopen), is considered disqualifying whether or not the diagnosis is simply ocular hypertension or glaucoma. Large optic nerve cupping alone is not disqualifying, if all other glaucoma screening tests and intraocular pressures are normal. If a patient has a thicker than average cornea that gives a falsely elevated IOP with no other signs of glaucoma, NAMI may elect to recommend a waiver for routine basis as opposed to annual.

Any diagnosis of glaucoma is considered disqualifying regardless of IOP. A patient with borderline findings that is worked up with extra testing to rule out glaucoma is often labeled a "Glaucoma Suspect" -- this is not considered disqualifying, though patients are encouraged to undergo ongoing screening evaluations by an ophthalmologist or credentialed optometrist every six to eighteen months.

**Designated:** Waivers are considered on a case-by-case basis.

**Applicants:** Waivers will typically not be considered for actual glaucoma, or ocular hypertension (IOP > 22 mm Hg when corrected for corneal thickness with pachymetry measurements).

## **INFORMATION REQUIRED:**

### **Initial Evaluation:**

A complete eye exam that includes the following:

1. IOP by Goldmann applanation tonometer or Tonopen or iCare
2. Central Corneal Thickness (pachymetry)
3. Fundus examination (to include comment on the cup-to-disc ratios and description of the nerves)
4. Automated visual field testing (30-2 or 24-2 SITA, standard or fast protocols are acceptable, ensure reliability of the test, and repeat any abnormal field examinations, submit ALL testing)
5. Slit lamp examination
6. Gonioscopy grading reports on the angles of the eye
7. Retinal nerve fiber layer analysis (i.e. ocular coherence tomography or OCT) is required.

### **Annual Waiver Evaluation:**

-A statement regarding side effects of the ocular medications.

-A complete eye exam that includes all of the above except:

1. Central corneal thickness
2. Gonioscopy, except if clinically indicated by the eye care professional.

### **TREATMENT:**

The following are acceptable topical agents and non-invasive treatments:

1. Prostaglandin analogs, are the initial treatment of choice due to insignificant incidence of systemic side effects.
2. Beta blockers – possible side effects of reduced exercise tolerance, orthostatic hypotension and loss of G-tolerance.
3. Carbonic anhydrase inhibitors – possible side effects of tingling in hands and feet, depression, anemia and sluggishness.
4. Sympathomimetic eye drops – possible side effects of hypertension, tremors, tachycardia, headache, conjunctivitis, and anxiety.
5. Laser treatments to the angle of the eye (selective laser trabeculoplasty or SLT) may reduce the intraocular pressures for up to five years, and may reduce or eliminate the need for eye drops during this time. Re-treatment may be necessary, and routine follow-ups must be maintained.

Beta blockers and carbonic anhydrase inhibitors must NOT be used if there are any significant side effects, including any reduction in circulatory or respiratory function. The treating eye care professional must be mindful of the unique cardio-respiratory demands of the aviation environment, and may need input from the flight surgeon to tailor any medications. Patients must be instructed in proper drop protocols to reduce systemic absorption (e.g. pinching the lacrimal sac for two minutes to reduce migration to the nasal mucosa). Miotic drugs are incompatible with night operations due to the inability of the pupil to dilate to admit sufficient light.

### **DISCUSSION:**

Waivers may be considered if peripheral visual field loss is minimal, and IOP is stabilized either with an acceptable topical agent as listed above or with laser trabeculoplasty. Incisional surgery, including filtration or tube shunt surgery is usually not considered compatible with safe flight operations and waivers are typically not considered. Continuation of the waiver requires annual submission, though eye examinations are usually conducted more frequently as determined by the treating eye doctor.

### **ICD-10 CODES:**

Series H26.23x, H40.1-9xxx, H42, H44.xxx, H47.xxx



Q15.0 Congenital glaucoma  
Z83.511 Family history of glaucoma  
H40.051 Ocular hypertension, right eye  
H40.052 Ocular hypertension, left eye  
H40.053 Ocular hypertension, bilateral

## 12.9 KERATOCONUS, PELLUCID MARGINAL DEGENERATION, OR CORNEAL ECTASIAS

Last Revised: JUL 18

Last Reviewed: JUL 18

**AEROMEDICAL CONCERNS:** Keratoconus is a degeneration of the cornea leading to progressive steepening, thinning, and irregular deformation. Visual acuity may eventually be reduced to the point that vision cannot be corrected to 20/20 with spectacles or contact lenses. Other symptoms may include diplopia, haze, ghosting of images, or reduced ability to discern low contrast images.

**WAIVER:** Waivers will typically not be considered for applicants with suspected, forme fruste, frank keratoconus, or corneal disease, but may be considered in designated personnel if visual acuity is 20/20 or correctable to 20/20 with spectacles.

**Local boards of Flight Surgeons are not appropriate for this diagnosis.**

\*NOTE: SNA applicants must have corneal mapping performed (topography/Pentacam) to rule out corneal disease (forme fruste keratoconus, other ectasias or disqualifying conditions, etc.).

### INFORMATION REQUIRED FOR INITIAL AND ANNUAL SUBMISSION:

1. Current ophthalmologic/optometric exam to include:
  - a. Corneal Topography
  - b. Best corrected visual acuity (BCVA) with contact lenses (if used).
  - c. BCVA with spectacles
  - d. Slit Lamp exam findings
  - e. Pentacam scan with Belin-Ambrosio Enhanced Ectasia Display (BAD analysis) if available
    - \*\*Ensure these settings are used for the Pentacam reports and upload high-resolution color printouts of all three reports for each eye into AERO:
      - Atlas (Fixed) Scale (i.e. 39-50 Diopters fixed scale, 16 colors)
      - 1) Holladay Report
      - 2) Topometric/KC Staging report
      - 3) Belin-Ambrosio Enhanced Ectasia Display (B.A.D.) report

**TREATMENT:** Contact lenses are often necessary to achieve the best vision. Advanced disease management may include a full-thickness corneal transplant, which is typically not waived. Corneal refractive surgery is a contraindication in the presence of any keratoconus. Contact lens use in any aviator requires specific authorization on the aeromedical clearance form (up-chit). Please refer to section [12.16, Naval Aviation Contact Lens Policy](#). Other forms of treatment are available (i.e. DSAEK, Intacs) and are typically not waiverable.

Corneal Collagen Crosslinking with UV and riboflavin (CXL, KXL, C3-R, CCL) was FDA approved in April 2016 as an in-office procedure to strengthen the corneal collagen fibers to arrest the ectatic disease process of keratoconus and other corneal diseases. The eye is soaked with riboflavin (vitamin B2) for approximately 30 minutes followed by treatment with a controlled application of ultraviolet light for another 30 minutes. This procedure has shown promising results in arresting the progression of keratoconus, but is not typically expected to reverse corneal changes already present. Due to the small risk of infection, haze and corneal scarring, CXL treatment is typically reserved for progressive states of ectatic disease, i.e. greater than 1.00 Diopter increase in cylinder over two years (manifest Rx or keratometry).

Currently, a history of this procedure would not be waiverable for applicants, but will be considered on a case-by-case basis for designated members. For Class I aviators, the procedure must be performed at

a DOD surgery center. Class II-IV members may have the procedure performed at any DOD or civilian surgery center. The minimum wait time for waiver consideration is six months post-procedure. The member will typically need to be visually stable and asymptomatic to be eligible for a waiver.

Consulting the NAMI Eye Dept (phone: 850-452-2933 or email: [usn.pensacola.navmedotcnaefl.list.nami-opthal@mail.mil](mailto:usn.pensacola.navmedotcnaefl.list.nami-opthal@mail.mil)) prior to obtaining this procedure is advised. As this is a relatively new procedure in the United States, data will be gathered over time on topics including stability, regression, improvements and aeromedical safety.

**DISCUSSION:** It is very difficult to diagnose keratoconus in the early stages without corneal topography. Aviators with rapidly increasing myopia or astigmatism warrant such testing. Keratoconus is a bilateral disease, but often presents asymmetrically, only affecting one eye in early stages. The symptoms usually start in the teen years, however, it can develop later in life as well. The condition is slowly progressive in 20%-25% of cases, but stabilization can occur at any time. Pellucid Marginal Degeneration (PMD) is a similar corneal irregularity on the continuum with keratoconus, often displayed on topography by a “kissing doves” or “crab claw” pattern. Ectasia (bulging, weakening of the cornea) can also result from corneal refractive surgery, hence the grave importance of properly screening candidates prior to undergoing refractive surgery.

**ICD-10 CODES:**

- H18.601 Keratoconus, unspecified, right eye
- H18.602 Keratoconus, unspecified, left eye
- H18.603 Keratoconus, unspecified, bilateral
- H18.609 Keratoconus, unspecified, unspecified eye
- H18.611 Keratoconus, stable, right eye
- H18.612 Keratoconus, stable, left eye
- H18.613 Keratoconus, stable, bilateral
- H18.619 Keratoconus, stable, unspecified eye
- H18.621 Keratoconus, unstable, right eye
- H18.622 Keratoconus, unstable, left eye
- H18.623 Keratoconus, unstable, bilateral
- H18.629 Keratoconus, unstable, unspecified eye
- H18.711 Corneal ectasia, right eye
- H18.712 Corneal ectasia, left eye
- H18.713 Corneal ectasia, bilateral
- H18.719 Corneal ectasia, unspecified eye

## 12.10 OPTIC DISC DRUSEN

Last Revised: AUG 16

Last Reviewed: AUG 16

**AEROMEDICAL CONCERNS:** Optic Disc Drusen (ODD) is prevalent in 1% of the population. Drusen are calcified proteinaceous bodies located within the optic nerve head that may result in progressive visual field defects, and less commonly transient disturbance of visual acuity, color vision, and night vision. ODD is often found during routine exam in asymptomatic individuals and must be considered with any crowding or elevation of the optic nerve.

**WAIVER:** ODD is considered disqualifying for all aviation duty. Waivers may be considered for applicants on a case-by-case basis provided the member has no other optic nerve pathology, no significant visual field loss (mildly enlarged blind spot typically is not significant), and otherwise meets the visual standards appropriate for his or her duty. Waivers for designated members will be reviewed on a case-by-case basis.

**Local Boards of Flight Surgeons are not appropriate in this situation since waivers are considered on a case-by-case basis.**

### INFORMATION REQUIRED:

#### Initial Evaluation:

1. Ophthalmology or Optometry consultation.
2. Optic nerve head (ONH) and retinal nerve fiber layer (RNFL) analysis using Optical Coherence Tomography (OCT) is required for baseline and future monitoring.
3. If surface drusen is not visible with funduscopy, then a B-scan ultrasound (preferred) or CT to confirm the diagnosis of ODD and the absence of other conditions (e.g. papilledema) is required.
4. Optic disc/optic nerve head photos, if available, should be obtained for baseline documentation and future monitoring.
5. Automated visual field testing (Humphrey 30-2 is preferred, but 24-2 acceptable).

#### Annual Waiver Evaluation:

A complete eye exam and history performed by an ophthalmologist or optometrist to include an automated visual field test and optic nerve head/disc OCT.

#### TREATMENT:

None. No evidence or definitive studies exist at this time supporting surgical intervention.

#### DISCUSSION:

Optic Disc Drusen is typically a benign and indolent condition; however, it can produce progressive vision loss, albeit usually slowly over time. Some studies have shown up to 75% of those with ODD may develop visual field abnormalities. Defects in most studies included slightly enlarged blind spots and mild generalized constrictions, often without nerve fiber bundle defects. A more recent study with well-defined definitions of visual field defects actually found a lower prevalence of defects (5%) and a low average mean depth of the defect (-1.25 db). Most eyes with buried optic nerve head drusen do not have visual field defects and when defects are present, they are most likely to be shallow or mild. Thus if visual field defects are present in eyes with buried ODD, consideration should be given to other possible etiologies of the visual field defect, especially if severe.

Another more recent study confirms that the rate of visual field loss for ODD was very low, 1.6% per year over a three-year period. Patients with minimal or no visual field loss were younger, and patients with moderate or severe visual loss were older.

Patients with higher IOPs show a higher prevalence of visual field loss and thus, closer monitoring in this situation is recommended. Central vision may be affected with rare cases of anterior ischemic optic neuropathy or retinal bleeding from choroidal membranes. A detailed history as part of a comprehensive eye exam is essential to ensure that the individual has optimal nerve function.

The risk for sudden incapacitation from visual obscuration is extremely low, but it is important for the aviator to be educated and cognizant of the chronic threat to their peripheral vision and potential adverse effects on performance. Candid reporting of any change in visual performance by the aviator is as important as annual visual field testing to ensure the safety of flight and mission readiness.

\*\*Please note: "macular drusen" is a separate and distinct entity from "optic disc drusen." Macular drusen can occur as an early pre-cursor to age-related macular degeneration or may occur idiopathically. Typically, mild forms do not carry a significant risk of vision loss and as long as vision is unaffected (20/20, normal visual field or Amsler grid), waivers are generally recommended.

**ICD-10 CODES:**

- H4732 Drusen of optic disc
- H47321 Drusen of optic disc, right eye
- H47322 Drusen of optic disc, left eye
- H47323 Drusen of optic disc, bilateral

## 12.11 RETINAL VASCULAR OCCLUSION

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**AEROMEDICAL CONCERNS:** Symptoms vary, ranging from mild peripheral visual blurring to severe central vision loss. Onset is usually painless with rapid onset of vision symptoms within minutes to hours.

**WAIVER:** Waivers typically are not considered in applicants. Designated personnel may be considered for waiver after vision returns to class standards, and not undergoing further treatments. Annual submission will be required if a waiver is granted.

### INITIAL WAIVER:

1. All ophthalmology consultation notes from time of first diagnosis and subsequent visits documenting treatments and visual recovery to normal.
2. Retinal/Fundus photos and macula OCT, as well as fluorescein angiography (FA) if performed. Submit copies of any FA performed at the time of initial presentation, and any subsequent FA.
3. Exclusion of other pathology such as hypertension, diabetes, blood dyscrasias, multiple myeloma, and dysgammaglobulinemia is required.

### ANNUAL WAIVER:

1. Ophthalmology consultation (retinal sub-specialist preferred) required, with retinal photos, drawings and all other documentation showing stability of the disease and vision.

**TREATMENT:** Photocoagulation and/or intraocular medication injections are sometimes useful in central retinal vein thrombosis and in long-standing cases of branch retinal vein occlusion. The treating retinal specialist may consider hyperbaric oxygen treatment for retinal artery occlusion; often no good options are available. If the member no longer meets vision standards, see section [12.3, Decreased Visual Acuity](#).

**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. Central retinal artery occlusions typically lead to severe loss of vision (count fingers) and the pathognomonic “cherry-red spot” in the macula. The fovea’s lack of ganglion cells and thus no swelling and whitening due to ischemia of these cells allows the choroidal color to be visible. About 30% of normal eyes have an extra branch supplying the macula, the cilioretinal artery, and in central retinal artery occlusions in these patients, central vision may be somewhat spared. Branch retinal artery occlusions will typically only have a focal loss of their visual field.

### ICD-10 CODES:

H34.811 Central retinal vein occlusion, right eye  
H34.812 Central retinal vein occlusion, left eye  
H34.831 Tributary (branch) retinal vein occlusion, right eye  
H34.832 Tributary (branch) retinal vein occlusion, left eye  
H34.01 Transient retinal artery occlusion, right eye  
H34.02 Transient retinal artery occlusion, left eye  
H34.11 Central retinal artery occlusion, right eye  
H34.12 Central retinal artery occlusion, left eye  
H34.211 Partial retinal artery occlusion, right eye

H34.212 Partial retinal artery occlusion, left eye  
H34.231 Retinal artery branch occlusion, right eye  
H34.232 Retinal artery branch occlusion, left eye

## 12.12 UVEITIS / IRITIS

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**AEROMEDICAL CONCERNS:** Uveitis is the inflammation of any of the intraocular pigmented uveal tissues, which includes the iris, ciliary body, choroid, and posterior retinal pigmented epithelium. Anterior intraocular eye inflammation (often referred to as iritis or anterior uveitis) can result in severe eye pain, photophobia, and blurred vision. Although it is usually an isolated idiopathic condition, there may be an associated underlying auto-immune disease. Eye pain, photophobia, and chronic steroid use are incompatible with flight, and recurrent episodes are difficult to treat in the austere environments of shipboard duty or in far-afield outposts without ophthalmologic/optometric care available.

**WAIVER:** For designated aviation personnel, a waiver may be considered for iritis that resolves without complications. For applicants, waivers may be considered after 24 months from the initial episode; however, a waiver will typically not be considered for any posterior uveitis or for recurrent uveitis of any type. Any associated underlying diagnoses should be considered carefully when determining waiver potential for designated aviators.

### INFORMATION REQUIRED:

1. Ophthalmology/Optomety consult is required, with dilated fundus examination to exclude posterior disease. An iritis history is required to rule out underlying systemic or infectious etiologies.
2. Bilateral or recurrent episodes will require laboratory workup for underlying autoimmune or infectious disease.

**TREATMENT:** Treatment for uveitis depends on the portion of the uvea that is affected. Anterior uveitis is usually successfully treated with topical steroids and cycloplegics to reduce pain and ciliary body spasm. Use of topical steroids and cycloplegics for active disease is downing for flight.

**DISCUSSION:** Uveitis is an inflammation of the uveal layer inside the eye. The uvea consists of the choroid, ciliary body, and iris. It provides most of the blood supply to the retina. Uveitis may be unilateral or bilateral and occurs most frequently in people ages 20-50.

Iritis is the most common form of uveitis. These patients have an intense dull pain of the eye, perilimbal injection, and extreme sensitivity to light. The hallmark signs of anterior uveitis are a constricted pupil on the affected side, and "cells and flare" in the anterior chamber. WBC's and proteins are liberated into the anterior chamber as part of the inflammatory response. In more severe cases, patients may present with keratic precipitates (white blood cell collections on the posterior corneal surface) and posterior synechiae (iris adhesions to the anterior lens capsule). Most cases of iritis are idiopathic, but blunt trauma to the eye will frequently be associated with iritis. Iritis may also be the result of an autoimmune disorder, infection, or exposure to toxins. A single episode of monocular iritis is generally not an indication for further testing to determine a systemic cause; however, recurrent, or persistent iritis warrants further work up.

Posterior uveitis is an inflammation of the choroid and/or ciliary body (inflammation of the ciliary body, or pars planitis is often termed intermediate uveitis; however, this will be grouped with posterior uveitis for the purpose of this discussion). Patients with this type of inflammation may complain of ocular pain and/or floaters, but are often asymptomatic. Comprehensive slit lamp examination may reveal an inflammatory response ("cells and flare") in the posterior chamber. The severity of the response may result in a "snow banking" or "snowball" appearance in the inferior peripheral retina, and resultant scarring can form, leading to vision loss.

Possible underlying conditions may include:



Toxoplasmosis  
Sarcoidosis  
CMV  
Herpes Zoster  
Reactive Arthritis (Reiter's Syndrome)

Histoplasmosis  
Syphilis  
Ulcerative colitis  
Ankylosing Spondylitis

Tuberculosis  
AIDS  
Rheumatoid Arthritis  
Behcet Syndrome  
Lyme Disease

Standard lab tests include:

CBC with differential  
RF  
FTA-ABS  
CRP

ANA  
ACE  
Lyme titer (if appropriate)  
ESR

HLA-B27  
PPD  
RPR  
Chest X-Ray

**ICD-10 CODES:**

A18.54 Tuberculous iridocyclitis  
A54.32 Gonococcal iridocyclitis  
B00.51 Herpes viral iridocyclitis  
B02.32 Zoster iridocyclitis  
D86.83 Sarcoid iridocyclitis  
H20.00 Unspecified acute and subacute iridocyclitis  
H20.011 Primary iridocyclitis, right eye  
H20.012 Primary iridocyclitis, left eye  
H20.013 Primary iridocyclitis, bilateral  
H20.021 Recurrent acute iridocyclitis, right eye  
H20.022 Recurrent acute iridocyclitis, left eye  
H20.023 Recurrent acute iridocyclitis, bilateral  
H20.031 Secondary infectious iridocyclitis, right eye  
H20.032 Secondary infectious iridocyclitis, left eye  
H20.033 Secondary infectious iridocyclitis, bilateral  
H20.041 Secondary noninfectious iridocyclitis, right eye  
H20.042 Secondary noninfectious iridocyclitis, left eye  
H20.043 Secondary noninfectious iridocyclitis, bilateral  
H20.11 Chronic iridocyclitis, right eye  
H20.12 Chronic iridocyclitis, left eye  
H20.13 Chronic iridocyclitis, bilateral  
H20.21 Lens-induced iridocyclitis, right eye  
H20.22 Lens-induced iridocyclitis, left eye  
H20.23 Lens-induced iridocyclitis, bilateral  
H20.9 Unspecified iridocyclitis  
H44.131 Sympathetic uveitis, right eye  
H44.132 Sympathetic uveitis, left eye  
H44.133 Sympathetic uveitis, bilateral

## 12.13 PTERYGIUM

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**AEROMEDICAL CONCERNS:** A pterygium is an elevated wedge of fibrovascular tissue that extends onto the cornea. This should not be confused with a similar condition, pinguecula, that is only present on the conjunctiva, but not on the cornea, and is not considered disqualifying unless it interferes with blinking. The slow, progressive encroachment of a pterygium upon the cornea may lead to progressive astigmatism and refractive error that may not correct with spectacles. Pterygia may also cause irritation of the cornea and conjunctiva, resulting in complaints of a red, scratchy, dry eye. The use of UV protective lenses may reduce the likelihood of pterygium growth and irritation.

**WAIVER:** Asymptomatic pterygia up to and including 1.0 mm corneal invasion (measured from the limbal border at the slit lamp) are NCD for both applicants and designated aviation personnel, provided vision is 20/20 or corrects to 20/20 with spectacles. Designated aviation personnel with symptomatic pterygia or pterygia with greater than 1.0 mm corneal invasion are CD, but a waiver will be considered if vision is 20/20 or corrects to 20/20 with spectacles and symptoms, if present, are controlled with conservative measures such as artificial tears. If a pterygium requires surgical removal, a waiver may be considered when the member's vision has stabilized and is correctable to 20/20, post-op complaints have resolved, and the member is returned to full duty by the operating surgeon. Aviation applicants with pterygia with greater than 1.0 mm corneal invasion are NPQ with a waiver typically not recommended. Case-by-case reviews can be done for certain situations to include: larger pterygia that have a long, documented history of stability, and instances where applicants have had surgical removal.

### INFORMATION REQUIRED:

1. Ophthalmology or optometry consult to include:
  - a. Drawing, photography or clear description of the pterygium and the amount of encroachment on the cornea.
  - b. Manifest refraction documenting visual acuity of 20/20 or corrects to 20/20 with spectacles.
  - c. Documentation of any symptoms (e.g. tearing, irritation, etc.) and any treatments.
2. Post-op patients must also submit:
  - a. Operative report and if available, post-op photos.
  - b. Clearance for full duty by operating surgeon.
  - c. Post-op manifest refraction documenting visual acuity of 20/20 or corrects to 20/20 with spectacles.
  - d. Documentation of absence of post-op complications or complaints.
  - e. No longer taking steroids or other ophthalmic medications other than artificial tears.

**TREATMENT/DISCUSSION:** UV light exposure is a known risk factor for pterygia development, thus the use of UVA-UVB blocking sunglasses and hats are recommended to help prevent development or progression.

If the pterygium becomes inflamed and symptoms of dryness and irritation occurs, topical lubricants often provide relief. Occasionally, the treating eye doctor may elect to prescribe topical corticosteroids for more severe inflammation, which the patient should be grounded while on steroids for the acute issue.

Surgical excision is sometimes warranted for pterygia that induce corneal astigmatism, grow on/near the line of sight, become symptomatic due to size or location, restrict eye movement, or for cosmetic reasons. Post-operatively, pain and photophobia are the typical physical activity limiting factors, not

necessarily any anatomical healing issues. Surgical patients will be on antibiotics for a few days to weeks and topical steroids for a few weeks or months. Recurrent rates vary with the type of pterygium, operative medications used and surgical technique. Often times, recurrent pterygia can be more symptomatic and more challenging to remove.

Use of topical steroids during the early post-operative period is downing for flight (usually at least one month, often times longer). For mission essential situations, consideration for return to flight after one month while still on a prophylactic taper of steroids should be discussed with the NAMI Eye Dept (phone: 850-452-2933 or email: [usn.pensacola.navmedotcnaefl.list.nami-ophthal@mail.mil](mailto:usn.pensacola.navmedotcnaefl.list.nami-ophthal@mail.mil)) in consultation with the treating ophthalmologist.

**ICD-10 CODES:**

- H11.001 Unspecified pterygium of right eye
- H11.002 Unspecified pterygium of left eye
- H11.031 Double pterygium of right eye
- H11.032 Double pterygium of left eye
- H11.041 Peripheral pterygium, stationary, right eye
- H11.042 Peripheral pterygium, stationary, left eye
- H11.051 Peripheral pterygium, progressive, right eye
- H11.052 Peripheral pterygium, progressive, left eye
- H11.061 Recurrent pterygium of right eye
- H11.062 Recurrent pterygium of left eye

12.14 [OCULAR MOTILITY WORKSHEET](#) IS NOW LOCATED IN APPENDIX B  
AT THE END OF THIS CHAPTER

## 12.15 CORNEAL REFRACTIVE SURGERY (PRK/LASEK/LASIK/SMILE)

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Refractive surgery (PRK/LASIK/SMILE) without visually significant side effects is **not considered disqualifying (NCD) for applicants or designated members that are within the refractive parameters outlined in this chapter.** Patients whose pre-operative refractions fall outside these parameters are considered disqualified (CD), but may be considered for a waiver on a case-by-case basis, depending on aviation class / military duty status.

	Applicant	Designated Class I <sup>3</sup> , II, III, IV
<b>NCD</b>	<b>Refractive Limits (SNA):</b> <sup>1</sup> +3.00 to -8.00 SE Cylinder: ≤ 3.00D  <b>Refractive Limits (Class II, III, IV):</b> +6.00 to -8.00 SE Cylinder: ≤ 6.00D <sup>2</sup>  Pre-op anisometropia: ≤ 3.50D.	<b>Refractive Limits (LASIK/SMILE):</b> -11.50 to +6.00 SE Cylinder: ≤ 6.00D  <b>Refractive Limits (PRK):</b> No Limit (must be performed at a DoD Refractive Surgery Center)
<b>CD</b>	<b>Parameters exceeding these values are CD</b>	
<b>WR</b> (Considered on a case-by-case basis)	<b>Waiver requirements for Applicants</b> <ul style="list-style-type: none"> <li>• At least 6 months since last refractive/augmenting procedure</li> <li>• No ongoing active ophthalmologic treatment or need for ophthalmic medications (other than in notes).</li> <li>• Post-surgical refraction stable as demonstrated by two separate refractions ≥ 1 month apart differing by ≤ +/-0.50 D (sphere) and ≤ +/-0.25 D (cylinder).</li> <li>• Post-operative manifest refractive errors within applicant stds.</li> </ul> <b>Class I Applicants:</b> <ul style="list-style-type: none"> <li>• Procedures performed outside these refractive parameters</li> </ul> <b>Class II, III and IV Applicants:</b> <ul style="list-style-type: none"> <li>• Procedures performed outside these refractive parameters</li> <li>• Implantable Collamer Lenses (ICL)</li> </ul>	<b>Class I</b> <ul style="list-style-type: none"> <li>• Procedures performed outside these refractive parameters</li> </ul> <b>Class II, III and IV:</b> <ul style="list-style-type: none"> <li>• Procedures performed outside these refractive parameters</li> <li>• Implantable Collamer Lenses (ICL)</li> </ul>
<b>WNR</b>	<b>Class I Applicants:</b> <ul style="list-style-type: none"> <li>• ICLs not permissible or waivable</li> </ul>	<b>Class I</b> <ul style="list-style-type: none"> <li>• ICLs</li> </ul>
<b>LBFS</b>	<b>Not required – CRS within parameters is NCD and FS may provide upchits concurrent with initial AMS submission</b>	
<b>LIMDU/PEB</b>	<b>Corneal Refractive Surgery is an elective surgery. Without complications, these surgeries will not be grounds for LIMDU or a PEB</b>	

Notes	
<sup>1</sup> SNA applicants must have a post-operative cycloplegic refraction using 1% cyclopentolate performed at a military installation. The cycloplegic refraction is to assure $\leq +3.00$ D <b>sphere</b> only. <b>Cycloplegic cylinder (astigmatism) values are not considered, nor is a cycloplegic visual acuity required.</b>	
<sup>2</sup> Per MANMED: Programs leading to a commission typically must still adhere to the 3.00 D cylinder limit.	
<sup>3</sup> For the purposes of qualification for Class I Designated aviators, SG-1, SG-2 and SG-3 have the same requirements WRT CRS. Differing visual acuity and refractive limits still apply.	
*** For designated personnel previously enrolled in the LASIK IN DESIGNATED AVIATORS STUDY and the LASIK IN STUDENT NAVAL AVIATORS STUDY, submission of waiver renewals is no longer required as the studies are closed. Aviation personnel who currently have waiver requirements may petition NAMI Code 53HN to have their waiver removed, if they fall within the NCD refractive parameters outlined in this chapter.	*** *** *** *** ***
There must be no symptoms or conditions that would be cause for concern during flight duties, including, but not limited to: post-operative discomfort requiring ongoing care, moderate or severe dry eye requiring the use of artificial tear drops more than 4 times per day or punctal plugs, recurrent corneal erosions, or visually significant glare, haloes, or starbursts. Ongoing post-surgical complications requiring other prescription medications are considered disqualifying. *NOTE: a routine steroid taper prescribed beyond 3 months is in itself not CD. *** Topical artificial tears ( $\leq 4$ times per day), cyclosporine drops, or lifitegrast drops for mild dry eye are not disqualifying for return to flight consideration.	*** ***
Refractive stability and a satisfactory postoperative slit lamp exam are required. Glare testing with a transilluminator or a Brightness Acuity Tester (BAT) is required for any corneal haze to determine if the level of haze is visually significant or not. Members must meet their aviation class vision standards with glare/BAT testing. Trace, stable, peripheral haze that is not visually significant is NCD and does not require a waiver submission.	
** MANMED limits of $\pm 8.00$ diopters of refractive error do not apply in aviation personnel as the refractive parameters defined here for aviation personnel are more restrictive.	
The <a href="#">CRS AMS worksheet</a> is required to be submitted in AERO to NAMI Code 53HN for ALL refractive surgery procedures (both NCD and CD) once stability and required wait times to resume flight duties have been met. Include pre-operative eye exams and laser treatment reports. Re-treatment procedures shall be treated like initial surgery, and all requirements of initial surgery shall be followed.	
Post-operatively, the member must pass all MANMED vision standards for their class or applicant status. They must wear corrective lenses while flying if required to achieve the vision standard. Any procedures that fall outside of the refractive limits defined in MANMED 15-34(3)(b)(2-5), or that do not meet requirements defined in this chapter shall be considered disqualifying and submitted to NAMI for review and waiver consideration.	
<b>Active duty aviation students</b> (SNA, SNFO, etc.) must obtain specific authorization from their training command prior to any CRS. Students who undergo refractive surgery shall adhere to the same refractive parameters and timelines for resuming flight duties as their designated counterparts to return to training status as soon as practicable. Active duty aviation students authorized for CRS must undergo refractive surgery at a military refractive surgery center.	
<b>Authorized Refractive Surgery Centers for <u>DESIGNATED</u> flyers</b> <b>Class I:</b> DoN Refractive Surgery Centers as well as the refractive surgery centers at Tripler AMC, Keesler AFB, Brooke AMC and Ft. Belvoir with Navy staff are preferred, however, any DoD refractive surgery center is permissible (**NOTE: low refractive errors are better treated with a wave-front guided treatment, which is not available at some Army centers) <b>Class II/III/IV:</b> Any DoD Refractive Surgery Center	

**Notes  
(continued)**

**Civilian applicants** must meet all applicant corneal refractive surgery (CRS) parameters, and obtain PRK, LASIK/SmILE or ICL surgery at their own expense at a civilian refractive surgery center. DoD policy requires a six month minimum wait time prior to being eligible for accession. NAMI requires a military eye examination.

**Other forms of refractive surgery**, or any vision or corneal manipulation or surgery, including **RK** (radial keratotomy), **LTK** (laser thermal keratoplasty), and **ICR** (intracorneal ring), unless specifically included in this chapter are **permanently disqualifying (CD/WNR)** for all aviation duty Class I, II, III and IV personnel.

Clear/Refractive Lens Extraction (RLE) will be considered by NAMI on a case-by-case basis for designated members; applicant waivers are typically not recommended for RLE. Please contact the NAMI Eye Dept for guidance prior to RLE for any winged aviation personnel. Section [12.1 \(Cataract\)](#) has further information on approved intraocular lenses.

Ongoing orthokeratology is permanently disqualifying. Orthokeratology (“Ortho-K”, rigid contact lens corneal reshaping) is not considered disqualifying provided that it is *permanently discontinued* at least three months prior to applications, with all refractive standards met with stable topography.

**ICD-10 CODES:**

Z98.89 Other specified postprocedural states

\*CPT Codes:

PRK: S0810

S0800 for LASIK

08Q8XZZ Repair Right Cornea, External Approach (PRK or LASIK)

08Q9XZZ Repair Left Cornea, External Approach (PRK or LASIK)

**DEFINITIONS:**

- **Corneal Refractive Surgery (CRS):** A laser is used to reshape the anterior corneal surface reducing refractive error and reliance on spectacles or contact lenses. A “wavefront-guided” (WFG) or “custom” procedure uses wavefront analysis technology, and may improve the visual outcome of the procedure.
- **Photorefractive Keratectomy (PRK) or Laser-Assisted Sub-Epithelial Keratectomy (LASEK):** Laser energy is applied to the anterior corneal surface after the epithelium is temporarily displaced or removed. No stromal corneal flap is created in PRK. PRK variants include LASEK (epithelium is preserved), and Epi-LASIK (epithelial flap is created). Pain can be moderate to severe, and visual recovery can take months, but does not have the risk of flap complications, with similar visual outcomes at 6 months. LASEK and Epi-LASIK are considered PRK with regard to CRS policy and aviation qualification.
- **Laser-Assisted In Situ Keratomileusis (LASIK):** A cornea stromal flap is created with an infrared laser (“intralase”), or older technology, a metal blade keratome, after which a different excimer laser is used to reshape the exposed corneal stroma to correct refractive error. The corneal flap is then repositioned. Pain is minimal and vision recovery is much faster than PRK (2 to 4 weeks). Flap complications are rare, with no risk of haze formation, like PRK. Due to decreased aeromedical complications seen historically, “all-laser custom LASIK” is preferred, as determined by the operating surgeon and patient.

- **Refractive Lenticule Extraction or Small Incision Lenticule Extraction (ReLEx or SmILE):** A similar femtosecond laser technology used for LASIK flap creation is used to create a small intrastromal lenticule of tissue, which is removed to correct the vision. It is considered a variant of LASIK, with a much smaller, stronger, and more stable corneal incision. ReLEx/SmILE has excellent safety, efficacy, long-term stability, and often improves low contrast vision. ReLEx/SmILE is considered LASIK with regard to CRS policy and aviation qualification parameters.
- **ICL (implantable collamer lens) or pIOL (phakic intraocular lens):** During ICL surgery, a small corneal incision is made to insert an artificial lens just behind the iris, in front of the natural crystalline lens. Since no corneal tissue is removed, ICLs are often used in cases of very high refractive error and/or when the cornea is too thin to manipulate surgically with a laser for vision correction. ICLs provide fast and stable visual recovery and high quality vision. Along with other possible, but uncommon side effects, cataract development post-operatively is a rare possibility. ICLs are considered disqualifying in all classes of aviation personnel, but waivers may be considered for applicants and designated members of Classes II, III, and IV. For Class I applicants and designated Class I aviators, waivers will typically not be considered. ICLs are NCD for ground crew/maintainers.

#### **DISCUSSION:**

- The goal of corneal refractive surgery is to reduce or eliminate dependence on spectacles or contact lenses, which can be distracting and reduce performance of flight duties. Refractive surgery (LASIK/PRK) has been studied extensively in the aviation environment and has yielded highly satisfying results for vision, comfort, and performance. More than 95% of Naval Aviators reported “increased effectiveness” after undergoing refractive surgery.
- When seeking corneal refractive surgery it is incumbent upon the member and the member’s commanding officer and flight surgeon to be aware of the requirements defined in this guide, and in the Manual of the Medical Department, and to be willing to adhere to the timelines and parameters specified before being allowed to resume flight duties.
- For unusual circumstances or concerns, the NAMI Eye Department remains available for consultation through phone or email: 850-452-2933 or [usn.pensacola.navmedotcnamefl.list.nami-ophthal@mail.mil](mailto:usn.pensacola.navmedotcnamefl.list.nami-ophthal@mail.mil)

#### **AEROMEDICAL CONCERNS:**

- Corneal refractive surgery (CRS) has been evaluated by the Naval Refractive Surgery Center and yielded excellent visual results, with increased performance of aviation duties. Custom wavefront-guided treatments yield even better visual outcomes, and are preferred if possible.
- As with any surgical procedure, there are inherent risks, such as quality of vision deficits (e.g. halos and glare at night), haze, flap complications and persistent eye discomfort (e.g. dry eye or recurrent erosions). A detailed description of the rate of complications, risks, benefits, and alternatives should be discussed and consented between the patient and their refractive surgeon.
- Undergoing refractive surgery does not guarantee qualification for aviation. The member must meet pre-operative parameters in MANMED and this waiver policy guide. Post-operatively, the applicant must meet all vision standards appropriate to their aviation class.



**CRS GENERAL GUIDELINES (applicants and designated personnel):**

- Designated members who undergo refractive surgery shall be grounded at the time of surgery, but a grounding physical is not required (if not down for more than 60 days).
- Subsequent CRS re-treatments, even if considered a “touch-up,” shall be considered as a new initial surgical procedure in terms of meeting aviation class vision standards and requiring submission of the [CRS AMS template](#) in AERO. Minimum time requirements must be met to resume flight duties depending on the procedure and treated refractive error. Applicant re-treatments shall have cumulative laser values summed for determining maximum refractive parameters for considering disqualification.
- Designated members who meet NCD refractive limits and undergo successful refractive surgery without ongoing complications or significant symptoms may be returned to flight duty once cleared by a military eye care provider, and meet the timelines in the table below:

Minimum time to return to flight for designated aviation personnel	<u>LASIK, SmILE or variants</u>	<u>PRK or variants</u>
	Hyperopia $\leq +4.00$ SE: 4 weeks Hyperopia $> +4.00$ SE: 8 weeks	Hyperopia: 6 months
	Myopia: 2 weeks	Myopia $\leq -6.00$ SE: 3 months Myopia $> -6.00$ SE: 6 months

**NOTE:** Active duty applicants with normal and stable post-operative corneal refractive surgery who are applying for aviation programs (i.e. STA-21, UAV operator, NFO/SNFO to SNA transition, etc.), may be considered for accession into their chosen program at 3 months for operational and training requirements (vice the typical 6 month requirement). All pre-operative exams and operative reports, as detailed above, must be submitted to the NAMI Physical Standards Directorate (Code 53HN) as part of the initial flight physical.

- The preferred technique for CRS in aviation personnel is the All-laser wavefront-guided LASIK (“custom intralase LASIK) or SmILE, as custom treatment may increase visual acuity and ultimate vision outcome, while minimizing the risk of significant haze complications occasionally seen after PRK. LASIK/SmILE also has much reduced down time, which has a great advantage in returning the member to operational flying duties.
- LASIK/SmILE is not a requirement for flight, as not all members are candidates for these procedures after being screened by the surgeon; PRK may be the better option for certain cases. The final decision of performing PRK vice LASIK/SmILE is made by the ophthalmologist with the patient’s informed consent.
- Operational Training: Ongoing military requirements such as tear gas (CS), pepper spray, water survival training, dusty/dirty environments, etc., may have a deleterious effect upon post-surgical eyes. Recommended wait-times after surgery are outlined in the table at the end of this chapter for members with a normal post-operative course and cleared by their eye care provider.
- Deployment after CRS: Members may not deploy for at least three months after PRK and one month after LASIK surgery (per NAVMED POLICY 08-008, dtd 10 JUN 2008).

## Recommended Wait Times for Activities after Refractive Surgery

**-LASIK (Laser-Assisted In Situ Keratomileusis):** The greatest risk after LASIK is flap dislocation. Avoid activities that might cause trauma to the flap.

**-PRK (PhotoRefractive Keratectomy):** The greatest risk after PRK is corneal surface irritation and haze. During the first 3-4 months after surgery, avoid activities that might irritate the surface of your eyes, and avoid exposure to ultraviolet (UV) light by wearing sunglasses (with UVA/UVB protection) when outdoors during the day.

**-ICL (Implantable Collamer Lens):** The greatest risk after ICL is infection inside the eye. Avoid lifting or bending over, trauma to the eye, and avoid activities that increase infection risk such as swimming and gardening.

	ICL	LASIK/SmILE	PRK
<b>Showering or washing face.</b>	No restriction. Notes: You should always avoid getting water in the eyes and pat the eyes dry; do not rub the eyelids dry.		
<b>Air travel as a passenger</b>	3 days		5-7 days (after removal of bandage contact lens)
<b>Aerobic activity (walk, run, bike, exercise machines) or weight training. Notes: Avoid getting sweat, dust, or wind in eyes.</b>	2 weeks	As soon as pain and light sensitivity have resolved: 1-2 days.	As soon as pain and light sensitivity have resolved: 3-5 days.
<b>Bending over--toe touches, sit-ups</b>	2 weeks	No restriction.	
<b>Contact sports: Martial arts, basketball, boxing, wrestling</b>	1 month. Note: CRS increases lifetime risk of opening surgical wounds with trauma to the eye. Wear eye protection.		1 month.
<b>Exposure to hot tubs, pools, lakes, ocean, river</b>	1 month Note: Risk of infection from contaminated water		
<b>Wearing eye make-up, including camouflage face paint</b>	2 weeks Note: Infection risk from contaminated make-up. When make-up use is resumed, start with new, freshly opened products. Old eye makeup should be discarded.		
<b>Working in a dusty or dirty environment: outdoor rifle range, deploying to the field, gardening</b>	1 month	2 weeks	1 month
<b>CS exposure (gas chamber) or OC spray (pepper spray) exposure</b>	3 months		6 months
<b>Driving an automobile motorcycle with goggles or face shield</b>	When you meet the driving vision requirement and feel comfortable.		
<b>Wearing UV protection (sunglasses)</b>	Wear UV protection whenever practical.		Full time first month As much as possible the 2 <sup>nd</sup> -4 <sup>th</sup> months and whenever practical afterwards.

**Ask your doctor if you have questions about these or other activities.**

## 12.16 NAVAL AVIATION CONTACT LENS POLICY

Last Revised: JUL 18

Last Reviewed: JUL 18

All classes of Naval aviation personnel shall be allowed to wear contact lenses during duty involving flight when the following requirements have been met as outlined below, and allowed by local commander's policy in theater. A notation from the flight surgeon authorizing contact lens use is required on the aeromedical clearance notice (up-chit) DD2992. Contact lens use is not considered disqualifying (NCD). A waiver for their use is not required. Note: funding is typically not available for student aviators.

### REQUIREMENTS:

1. Visual requirements specific to each class and service group must continue to be met while wearing contact lenses.
2. Near visual acuity must be 20/20 in each eye. Presbyopic personnel may use spectacles over their contacts to achieve this standard.
3. There must be no symptoms incompatible with safe flight, e.g. fluctuating vision, reduction in vision at night or under glare conditions, or discomfort.
4. Must have worn contact lenses on a daily basis without complication for a minimum of two weeks before their use can be authorized on the "up-chit."
5. The prescribing eye doctor must note in the patient's record that a good fit has been achieved and that no further changes are planned.
6. Soft contact lenses (SCLs) are not to be worn overnight while in flight training or flight status unless operationally mandated. If extended contact lens wear (greater than 24 hours) is an operational requirement, lenses may be worn for a maximum of seven consecutive days. Personnel are encouraged to limit extended wear to the shortest period possible. A minimum 12 hour recovery period, during which no contact lenses are worn, shall follow each extended wear period. Rigid gas permeable lenses shall not be used overnight.
7. During aviation duties, it is the responsibility of all contact lens wearers to carry clear spectacles in a readily accessible protective case, which correct the wearer's vision to all applicable standards.
8. Follow-up examinations for personnel wearing contact lenses shall be conducted at least annually by a military optometrist or ophthalmologist.

### APPROVED CONTACT LENSES:

1. Only nationally available, FDA approved lenses and solutions are allowed.
2. FDA approved silicone hydrogel contact lenses are the most commonly prescribed soft contact lenses (SCL) for Naval aviation personnel. Rigid gas permeable lenses are permissible, but strongly discouraged. Note: Dailies (discarded after one day of wear) are okay for flight; however, they will typically not be purchased and supplied by the MTF Optometry clinic due to their higher cost.
3. The following are NOT authorized:
  - a. Bifocal/multifocal/monovision contact lenses.
  - b. Cosmetically tinted contact lenses.
  - c. Sports tinted contact lenses (e.g. amber or green).
  - d. Contact lens wear for corneal refractive therapy (Ortho-K).
4. The following are only authorized with an appropriate waiver:
  - a. Combinations of rigid and soft contact lenses.
  - b. Contact lens use for therapeutic reasons such as keratoconus or basement membrane dystrophies.

For any other questions regarding specific brands of contact lenses or waiver issues, please contact:

Phone: NAMI Eye Department at 850-452-2933

Email: [usn.pensacola.navmedotcnaefl.list.nami-ophthal@mail.mil](mailto:usn.pensacola.navmedotcnaefl.list.nami-ophthal@mail.mil)

## 12.17 ALLERGIC CONJUNCTIVITIS

Last Revised: AUG 16

Last Reviewed: AUG 16

**AEROMEDICAL CONCERNS:** The condition can cause blurred vision, ocular itching, burning, tearing/discharge, eyelid edema, and photophobia. These signs and symptoms, along with the use of medications with unacceptable side effects, have the potential for in-flight incapacitation and prolonged periods of grounding.

**WAIVER:** Chronic/perennial allergic conjunctivitis is CD for entry into the Service according to MANMED. Allergic conjunctivitis waivers are typically recommended for applicants and designated members with minimal or well-controlled symptoms on approved medications. Severe and/or uncontrolled chronic/perennial and seasonal allergic conjunctivitis are CD with waivers typically not recommended for aviation applicants. If controlled with no or mild occasional symptoms on approved meds then waiver requests generally are favorable. All forms of allergic conjunctivitis in designated personnel, if controlled with no or minimal occasional symptoms, are NCD. The member shall be grounded while symptomatic. A waiver is not required if the member is treated with an approved medication. If the condition is associated with rhinitis, see chapter 6.1, ALLERGIC/VASOMOTOR RHINITIS.

### Information Required:

1. Full history of condition including past diagnoses and treatments
2. Latest examination to include current diagnosis and prognosis and complete symptomology report with seasons specified.
3. Current medications.

**TREATMENT:** Mild symptoms of allergic conjunctivitis may be relieved by cool compresses and artificial tears to flush away the allergens. In addition to cool compresses and artificial tears, moderate to severe symptoms may require ophthalmic anti-histamines, mast cell stabilizers, or corticosteroids.

Topical ophthalmic anti-histamines/mast cell stabilizers, vasoconstrictors, decongestants, NSAIDS, and corticosteroids have minimal to no systemic effects and do not affect aeromedical concerns such as G-tolerance and fatigue. Although these ophthalmic topical treatments are NCD (approved for use in aviation personnel), the acute disease of allergic conjunctivitis is still CD and will be a “down” condition if the symptoms are not controlled.

The combination antihistamine/mast cell stabilizer drops are often a great choice for treatment. They include (not necessarily all inclusive):

- Alcaftadine (Lastacaft, Allergan)
- Azelastine (Optivar, Meda Pharmaceuticals; generic available)
- Bepotastine (Bepreve, Bausch +Lomb)
- Epinastine (Elestat, Allergan; generic available)
- \*Ketotifen (Zaditor, Alcon, generic; Alaway, Bausch + Lomb, many generics. **\*This drop is OTC**)
- Olopatadine (Patanol/Pataday/Pazeo, Alcon)
- \*\*Bepotastine (Bepreve, Bausch + Lomb) \*\*2<sup>nd</sup> gen H1-antihistamine, no mast cell stabilizer

\*NOTE: If necessary for severe seasonal allergic conjunctivitis, non-sedating oral antihistamines may also be used, see 6.1 ALLERGIC/VASOMOTOR RHINITIS for an approved list of medications.

**DISCUSSION:** Two forms of allergic conjunctivitis are quite common: seasonal (SAC) and perennial (PAC). SAC coincides with pollen blooms (e.g., ragweed, trees, grasses). PAC may occur at any time

or even year round (e.g., exposure to ubiquitous cat dander, chemicals or dust). The most effective treatment is elimination or avoidance of the potentially offending allergen, although this may not always be possible or practical. Due to the potential chronicity of allergic conjunctivitis, long-term use of medication may be necessary to keep the member asymptomatic for aviation duties, including nasal and inner ear functionality. The flight surgeon should be cognizant that the aviator or aircrew member may have residual allergy symptoms such as itchy, tearful eyes, runny nose, sneezing, scratchy throat and other allergic symptoms, which would preclude flight until effectively treated. Contact lenses may exacerbate the condition and should not be worn until the member is asymptomatic.

**ICD-10 CODES:**

H10.45 Other chronic allergic conjunctivitis

H10.10 Acute atopic conjunctivitis, unspecified eye

H10.11 Acute atopic conjunctivitis, right eye

H10.12 Acute atopic conjunctivitis, left eye

H10.13 Acute atopic conjunctivitis, bilateral

## 12.18 CENTRAL SEROUS RETINOPATHY

Last Revised: AUG 16

Last Reviewed: AUG 16

**AEROMEDICAL CONCERNS:** Central serous retinopathy (CSR) is a unilateral, localized detachment of the retina in the macular region, which may cause decreased or dim vision, distortion or miniature appearance of objects, and/or washed out color vision.

**WAIVER:** Any history of CSR is considered disqualifying (CD). Waivers will typically not be considered for applicants (CD/WNR), but may be considered for designated personnel. Evaluation by an optometrist or ophthalmologist is required with an annual submission.

**Local boards are authorized for initial cases of CSR once condition has resolved (cleared by optometry/ ophthalmology), if less than 60 days has elapsed since diagnosis, best corrected visual acuity has returned to the aviator's specific class standard, the aviator is asymptomatic to visual disturbances, and no metamorphopsias are noted on Amsler Grid testing.** Recurrent cases of CSR require a new waiver to be submitted for review and approved by NAMI for each new episode (no local boards authorized). **A grounding physical is required if more than 60 days has elapsed since diagnosis without resolution.**

### INFORMATION REQUIRED:

1. Fundus examination by optometrist or ophthalmologist
2. Amsler grid, documenting any metamorphopsia
3. Optical coherence tomography (OCT) reports
4. Humphrey Visual Field 10-2 (only required if laser treatment was performed)
5. Fluorescein angiography (optional, at the discretion of the treating ophthalmologist, submit if performed and photos available)

**TREATMENT:** CSR is self-limiting with a good prognosis for most patients. Eye exams should be performed every 4-6 weeks until the condition has resolved and vision has stabilized and returned to baseline. Ocular coherence tomography should be performed upon diagnosis and after subjective/objective findings have resolved. In certain cases, laser photocoagulation may be considered to enhance recovery, but may leave a small permanent blind spot.

**DISCUSSION:** Central serous retinopathy can be visually debilitating to a patient's central vision and results in normal to decreased visual acuity ranging from 20/20 to 20/200. This condition usually occurs in males (10:1), 20 to 50 years old, and is associated with type-A personalities and increased stress levels. Patients typically recover normal visual acuity, but a small number of patients may not return to 20/20. Resolution usually occurs over a course of 4-6 months, with continuing improvement in visual acuity over 24 months. Prognosis is worse for patients with recurrent or prolonged disease. Laser photocoagulation may be considered for occupational reasons, if CSR occurs in the contralateral eye, or if no resolution has occurred in more than 4-6 months. Laser intervention may shorten duration by up to 2 months, but typically has no effect on the final visual acuity outcome, and may cause small blind spots in the treated eye.

**NOTE:** If best corrected visual acuity (BCVA) does not return to class standards, see [12.3, Decreased Visual Acuity](#).

### ICD-10 CODES:

H35.711 Central serous chorioretinopathy, right eye  
H35.712 Central serous chorioretinopathy, left eye  
H35.713 Central serous chorioretinopathy, bilateral

## 12.19 PIGMENT DISPERSION SYNDROME

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**AEROMEDICAL CONCERNS:** Pigment Dispersion Syndrome (PDS) is a bilateral condition characterized by the liberation of pigment granules from the posterior iris, which deposit on the posterior cornea, anterior iris, and trabecular meshwork. PDS has the potential to increase intraocular pressure, leading to secondary glaucomatous damage to the optic nerve and reducing peripheral vision. The classic “triad” of PDS consists of pigment on the corneal endothelium (Krukenberg spindle), trabecular meshwork hyperpigmentation, and transillumination defects (TID) of the iris.

**WAIVER:** A diagnosis of PDS is disqualifying for aviation personnel.

Waivers are considered for designated personnel if intraocular pressure (IOP) is 22 mmHg or less in each eye when taking into account corneal thickness (corrected IOP), with no more than 4 mmHg difference between the eyes, normal visual fields (Humphrey 30-2 or 24-2 preferred), no glaucomatous changes present in the optic disc, and no treatment (pressure lowering drops/laser) is indicated. **Local boards are authorized for designated personnel with normal corrected IOP, as long as no treatment is indicated, and no signs of glaucoma are present on ophthalmologic examination (normal visual fields, normal optic nerve appearance).**

Applicants presenting with a Krukenberg spindle or trabecular meshwork hyperpigmentation, but without transillumination defects, will be considered for a waiver if the corrected IOP is 22 mmHg or below in each eye and no laser or medical treatment is indicated. Applicants with transillumination defects or a corrected IOP above 22 mmHg in either eye will typically not be considered for a waiver (CD/WNR) due to the higher risk of conversion to pigmentary glaucoma in future years.

If corrected IOP measurements are above 22 mmHg by applanation tonometry on two separate occasions, or if laser/medical treatment is required for management of PDS, then the diagnosis should be converted to pigmentary glaucoma (PG - see [Glaucoma chapter 12.8](#)).

### WAIVER INFORMATION REQUIRED:

1. Eye exam by a Navy optometrist or ophthalmologist
2. IOP measurement by applanation tonometry (Goldmann) or Tonopen or iCare
3. Central corneal thickness (CCT) measurement (Pachymetry) with estimated IOP correction [factor](#)
4. Automated visual field (24-2, 30-2 SITA acceptable)
5. Optic nerve evaluation with comment on health of neural rims, with **color** disc/optic nerve head photos uploaded into AERO
6. Slit lamp examination with comment on anterior segment findings related to PDS
7. Gonioscopy to document trabecular meshwork hyperpigmentation

**TREATMENT:** Besides annual monitoring of PDS, treatment is usually not initiated if IOP is 22 mmHg or less, and there are no signs of glaucomatous changes. However, any glaucomatous changes or elevation of IOP may cause the eye provider to recommend pressure-lowering medications or laser treatments (See Glaucoma chapter, 12.8 for more discussion on waivers for glaucoma, keeping in mind that first line and second line treatment strategies may vary with PDS/PG).

**DISCUSSION:** Pigment dispersion syndrome (PDS) is a bilateral condition that typically occurs in young adult males (2:1) under the age of 45. PDS is characterized by liberation of pigment granules



from the posterior iris, depositing in the anterior chamber structures. It can appear asymmetric between the eyes.

Deposition of this pigment occurs on the posterior corneal surface ('Krukenberg spindle' on the endothelium) and in the anterior chamber angle trabecular meshwork (TM). Pigment in the TM is deposited in a homogenous pattern, unlike other entities that can cause TM hyperpigmentation (uveitis, exfoliation syndrome, melanoma, IOL-iris chaffing). Fine pigment granules can also be seen on the anterior iris surface and the anterior lens capsule. Pigment liberation occurs as a result of the posterior pigment epithelium of the iris rubbing against the crystalline lens zonules. Slit-like transillumination defects (TID) will be seen in a radial pattern in the mid-periphery of the iris when a bright light is shown through the pupil, best seen in a very dark room in the slit lamp. Pigment liberation can also occur due to ocular trauma or surgery, but TI defects will rarely be seen. The typical patient with PDS is a young, white male who is myopic with a slightly concave iris posture. It is uncommon in persons with African or Asian ancestry, but occurs in up to 2% of the Caucasian population. It appears to have incomplete penetration by way of autosomal dominant inheritance.

PDS can lead to pigmentary glaucoma (PG), which is a type of secondary open-angle glaucoma when pigment impairs the trabecular meshwork, impeding aqueous outflow. Conversion of PDS to PG occurs in approximately 20% of PDS patients within 10 years of initial diagnosis. PG is diagnosed when the classical triad of PDS is present (Krukenberg spindle, iris trans-illumination defects, and trabecular meshwork hyperpigmentation), along with progressive optic nerve cupping, glaucomatous visual field changes and ocular hypertension. Treatment should be begun if the IOP is elevated, even without optic nerve degeneration or visual field abnormalities, to reduce the risk of future optic nerve damage and vision loss.

**ICD-10 CODES:**

- H21.231 Degeneration of iris (pigmentary), right eye
- H21.232 Degeneration of iris (pigmentary), left eye
- H21.233 Degeneration of iris (pigmentary), bilateral
- H40.1310 Pigmentary glaucoma, right eye, stage unspecified
- H40.1320 Pigmentary glaucoma, left eye, stage unspecified
- H40.1330 Pigmentary glaucoma, bilateral, stage unspecified
- H40.1390 Pigmentary glaucoma, unspecified eye, stage unspecified

## 12.20 RETINAL DEGENERATION, HYPERPIGMENTATION AND HOLES

Last Revised: JUL 18

Last Reviewed: JUL 18

**AEROMEDICAL CONCERNS:** Certain peripheral retinal degenerations and types of retinal holes are significant risk factors for retinal detachment, which can cause a painless, sudden loss of vision that may permanently impact peripheral and central vision. Retinal degenerations are commonly seen in highly myopic individuals and the increased risk of retinal detachment (RD) remains elevated even after corneal refractive surgery is performed.

**WAIVER:** Retinal holes and any peripheral retinal degeneration or defect that impairs vision, that is considered progressive, has potential to be progressive, or impairs vision is considered disqualifying (CD). Applicant waiver requests will be reviewed by NAMI on a case-by-case basis. Local boards are not authorized unless specifically stated. Comprehensive dilated eye exam notes to include drawings, pictures and comments on prognosis must accompany all waiver requests.

Note: A diagnosis of “white without pressure” is a descriptive term for the appearance of the retina and is Not Considered Disqualifying (NCD). Paving stone (Cobblestone) degeneration is a benign lesion not associated with complications and is NCD.

Guidance for designated aviation personnel and applicants are as follows:

- **Peripheral Retinal Degenerations** (i.e. Lattice degeneration, snail track degeneration) – Typically, an annual waiver with an annual Dilated Fundus Exam (DFE) is recommended in the absence of retinal detachment. NAMI may opt for a routine waiver on low risk cases. Local boards are authorized after DFE is performed to assess stability and rule out retinal detachment.
- **Peripheral Retinal Hole** –
  - o Small atrophic peripheral holes are usually innocuous and generally do not require treatment, but should be monitored for progression or subretinal fluid development over time by annual dilated examinations. If the hole is considered stable with no sub-retinal fluid and treatment is not indicated, retinal holes may typically be considered for an annual waiver with DFE (performed by optometry or ophthalmology).
  - o Some holes may require ophthalmologist consultation.
  - o Holes treated with laserpexy (laser retinopexy) may be considered for an annual waiver with DFE after one month follow-up time has elapsed and the surgeon has determined stability. **Local boards, in this situation, are authorized after ophthalmology determines fitness for full duty.**
- **Choroidal Nevus** – Typically a benign retinal entity with a low possibility of malignant transformation. Routine monitoring is required to discover any changes in a timely manner. Choroidal nevi are typically CD/WR, with due consideration for the presence of high risk transformation factors.
- **Congenital Hypertrophy of the Retinal Pigment Epithelium (CHRPE)** – CHRPE outside the arcades are NCD and do not require a waiver. CHRPE inside the arcades are CD but routinely waived. Waivers are typically routine with a dilated fundus exam (DFE) required to monitor for progression. Local boards are authorized for a definitive diagnosis of CHRPE.

- **Retinal Tear/Detachment** – CD, ***no local boards authorized***. See section [12.7, Retinal Detachment](#) Chapter for more information and waiver guidance for applicants and designated aviation personnel.
- **NOTE: Small, mild macular drusen in an otherwise young, healthy individual without visual disturbance, symptoms, or presence of disease on funduscopy or Optical Coherence Tomography are typically CD, with waiver recommendation for routine submission of a fundus evaluation.**

**INFORMATION REQUIRED:**

1. Eye exam with DFE by an optometrist or ophthalmologist with comment on long-term prognosis.
2. Detailed retinal drawings or photographs.
3. Other ocular tests including Optical Coherence Tomography (OCT), Fluorescein Angiography (FA), etc. if performed.

**TREATMENT:** Patient education and monitoring with a comprehensive eye exam, including dilated fundus examination, is the most common course of action for patients with peripheral retinal degenerations and retinal holes. Patients with certain types and locations of retinal holes should be further evaluated with scleral depression to ensure the stability of the hole and determine presence or absence of shallow retinal detachment. Most small, stable holes are monitored annually, but may require prophylactic laser treatment to reduce the risk of future detachment. Patients should be aware of the symptoms of retinal detachment, including an increase of flashing lights, floaters, or blurry or obscured areas of vision beginning in the periphery. The patient should be educated to return to the clinic for a repeat dilation immediately if they experience these symptoms.

**DISCUSSION:** Peripheral retinal degenerations (specifically lattice and snail-track degenerations) are vitreoretinal changes in the retina and overlying vitreous usually located in the far periphery. The involved retina thins and becomes fibrotic, resulting in vitreous pockets (lacuna) forming above the affected areas of the retina. Lattice degeneration is clinically prevalent in 10% of patients and is usually non-pigmented, but may become hyperpigmented in 30% of cases. Half the cases of lattice are bilateral, symmetrical, and refractive error does not play an important factor in the development (seen in 15% of high myopic patients). Snail track lesions occur in up to 80% of eyes with lattice degeneration and can be associated with myopia. Although 30% of retinal detachment patients have a predisposed peripheral retinal degeneration, the clinical rate of detachment is only 0.5%. Asymptomatic, low risk lattice degeneration should not be treated with laserpexy. For lattice lesions at higher risk for tears and detachments, prophylactic therapy generally should be instituted to reduce that risk.

Thinning of the retina may lead to the formation of atrophic holes or retinal breaks in 25% of patients, but the frequency of retinal detachment as a result of retinal holes is low (3-14%). Most atrophic holes do not require any treatment since they are not associated with vitreous traction.

Retinal ‘white without pressure’ (WWOP) is an optical phenomenon in which vitreous traction changes the retinal coloration upon examination. WWOP is usually bilateral and observed in 5% of patients over 20 years of age, but roughly 66% in patients over 70 (30% of the total population). White without pressure is an incidental finding and there is no associated risk of retinal holes, tears, or breaks with this condition.

**ICD-10 CODES:**

- H33.321 Round hole, right eye
- H33.322 Round hole, left eye

H33.323 Round hole, bilateral  
H35.40 Unspecified peripheral retinal degeneration  
H35.431 Paving stone degeneration of retina, right eye  
H35.432 Paving stone degeneration of retina, left eye  
H35.433 Paving stone degeneration of retina, bilateral  
H35.411 Lattice degeneration of retina, right eye  
H35.412 Lattice degeneration of retina, left eye  
H35.413 Lattice degeneration of retina, bilateral  
D31.30 Benign neoplasm of unspecified choroid  
D31.31 Benign neoplasm of right choroid  
D31.32 Benign neoplasm of left choroid  
D49.81 Neoplasm of unspecified behavior of retina and choroid  
Q14.1 Congenital malformation of retina  
H35.9 Unspecified retinal disorder

## 12.21 CORNEAL DYSTROPHIES AND DEGENERATIONS

Last Revised: JUL 18

Last Reviewed: JUL 18

### **Aeromedical Concerns:**

Corneal dystrophies and degenerations are corneal disorders that negatively impact vision and increase the risk of recurrent corneal erosions. These opacifying conditions can adversely affect flight performance and safety, and need to be thoroughly documented and monitored to ensure they do not negatively impact vision.

### **Waiver:**

1. A diagnosis of any corneal dystrophy/degeneration is considered disqualifying (CD) for all aviation personnel. Applicant waivers will be considered based on the classification of the dystrophy/degeneration, a thorough eye examination by an eyecare provider, and a detailed patient history. Waivers will typically not be considered for applicants with history of corneal surgery to treat the dystrophy/degeneration, with a history of longstanding recurrent corneal erosions due to the degeneration or dystrophy, or with a diagnosis of a progressive type of dystrophy/degeneration.
2. In designated aviators, waivers will be considered for those who meet vision standards with manageable symptoms.
3. Corneal opacities that are old, small, peripheral, and asymptomatic are NCD.

\*NOTE: Central corneal scarring requires glare testing as specified in the [cataract section, 12.1](#). Small areas of mild peripheral corneal scarring do not require glare testing if judged by the examining eye doctor to be visually insignificant.

### **Information Required:**

1. All eye exams concerning the diagnosis of a corneal dystrophy/degeneration.
2. All treatments done to resolve the condition (include medications and surgical treatments).
3. All pertinent tests performed by the eye doctor.

**NOTE:** For waiver continuances, the current exam with all relevant tests is required.

### **Treatment:**

Treatment options are varied based on classification of the dystrophy/degeneration. Management and treatment options can include the use of artificial lubrication, hypertonic solutions and ointments (muro-128), topical steroids, bandage contact lenses, or surgical intervention. Close coordination between the eye doctor and the flight surgeon is required.

### **Discussion:**

**Corneal dystrophies** consist of a group of progressive non-inflammatory corneal disorders, which tend to be bilateral. These opacifying disorders can have a negative impact on vision. They also increase the risk of recurrent corneal erosions. They tend to present centrally and are generally genetically determined. The onset, signs, impact on vision, and treatment options will vary depending on the corneal layer affected by the dystrophy.

In contrast, **corneal degenerations** tend to have less impact on ocular function and vision. They tend to increase in prevalence with age. It is thought they are exaggerated from inflammatory and other harmful environmental conditions. Degenerations are not inherited and can be either bilateral or unilateral. Many times they will be associated with neovascularization. They tend to involve the

peripheral cornea before the central cornea. The impact on vision and treatment options will vary depending on the corneal layer affected by the degeneration.

**ICD-10 Codes:**

- H18.40 Unspecified corneal degeneration
- H18.469 Peripheral corneal degeneration, unspecified eye
- H18.49 Other corneal degeneration
- H18.51 Endothelial corneal dystrophy
- H18.52 Epithelial (juvenile) corneal dystrophy
- H18.53 Granular corneal dystrophy
- H18.54 Lattice corneal dystrophy
- H18.55 Macular corneal dystrophy
- H17.11 Central corneal opacity right eye
- H17.12 Central corneal opacity left eye
- H17.811 Minor opacity of cornea right eye
- H17.812 Minor opacity of cornea left eye
- H17.821 Peripheral opacity of cornea right eye
- H17.822 Peripheral opacity of cornea left eye
- H17.89 Other corneal scars and opacities
- H17.9 Unspecified corneal scar and opacity

## 12.22 RECURRENT CORNEAL EROSION

Last Revised: JUL 18

Last Reviewed: JUL 18

### **Aeromedical Concerns:**

Recurrent corneal erosion (RCE) is a disorder resulting in the improper or insufficient adhesion of the corneal epithelium to the epithelial basement membrane. RCE is characterized by the repeated breakdown of epithelium. RCE can cause moderate to severe eye pain, often with sudden onset, that typically occurs at night while sleeping. Photophobia, lacrimation, and conjunctival injection are typical associated findings. Corneal scarring, which has the potential to cause significant visual complications, can occur. All of these signs and symptoms can result in significant interruption of flight duties. RCE can be caused by corneal refractive surgery (CRS), trauma, or corneal dystrophy (rare).

### **Waiver:**

A diagnosis of RCE is considered disqualifying (CD) for all aviation personnel. Waivers will be considered for applicants with RCE due to trauma or corneal refractive surgery. Waivers will typically not be considered for applicants with RCE resulting from sight threatening corneal dystrophies or degenerations. Waivers will be considered for designated personnel with RCE of any etiology on a case-by-case basis.

### **Information Required:**

#### **Initial Waiver:**

1. Past eye exams with a diagnosis of a RCE.
2. Documentation of medications and surgical treatments.

#### **Waiver Continuance:**

1. Current eye exam by eye doctor.
2. Comment by flight surgeon on current symptoms or lack thereof.

### **Treatment:**

Treatment options are varied based on size, location, and recurrence rate. Initial treatment options include the use of artificial tears, hypertonic solutions and ointments (muro-128), topical steroids, amniotic membrane grafts, and low-dose oral doxycycline. Epithelial debridement, phototherapeutic keratectomy (PTK), alcohol delamination, corneal stromal micro-puncture, or diamond burr keratectomy may be utilized if no response is demonstrated to initial therapy. Treatments beyond artificial tears and ointments are typically downing for flight.

### **Discussion:**

Recurrent corneal erosions are extremely painful and have a major impact on vision and flying duties. RCE can take weeks to months to fully heal. Artificial tears and hypertonic solution usage can significantly reduce the risk for future erosion episodes. In order to decrease the risk of further injury or impedance of healing, patients with RCE should be educated on proper nighttime instillation of artificial tears, without opening eyes, if awakened by an episode.

### **ICD-10 Codes:**

H18.831 Recurrent erosion of cornea, right eye  
H18.832 Recurrent erosion of cornea, left eye  
H18.833 Recurrent erosion of cornea, bilateral  
H18.839 Recurrent erosion of cornea, unspecified eye

# AVIATION PHYSICAL STANDARDS FOR APPLICANTS MAR 2021 (USN/USMC)

BLOCKS ON DD 2808	ITEM	SNA	SNFO	SNFS, SNAP, SNAEP, SNAO, SNAPA (Aeromedical)	AIRCREW (Fixed Wing)	AIRCREW (Rotary Wing)	AIR TRAFFIC CONTROLLER	UAV/UAS	
73	SLIT LAMP/TOPO	<b>REQUIRED</b> <sup>Note4</sup>	<b>SLIT LAMP REQUIRED, TOPOGRAPHY NOT REQUIRED</b>						
61	DVA	≤ 20/40 <sup>0</sup> and correctable to 20/20 10/10 Goodlite	No limit <u>uncorrected</u> <b>Correctable to 20/20<sup>0</sup> Snellen OR 20/20<sup>-3</sup> (7/10) correct on AFVT or Magnetic Non-Memorization Chart (Goodlite Chart)</b>			≤20/100 Correctable to 20/20-0 Snellen OR 20/20 7/10 on AFVT or Goodlite Chart	No limit uncorrected <b>Correctable to 20/20<sup>0</sup> Snellen OR 20/20<sup>-3</sup> (7/10) on AFVT or Magnetic Non-Memorization Chart (Goodlite Chart)</b>		
62	Ref. error	<b>Manifest</b> (Note 1)	-1.50 to +3.00 All Meridians	≤ +/-8.00 All Meridians	No limits (Note 3)	<b>No Limit</b>			
		<b>Cyclo</b> (Note 1)	-1.50 to +3.00 Sphere Only	<b>Not Required</b>					
	Cylinder	<b>Manifest</b> (Note 1)	Max Cylinder ≤1.00	Max Cylinder ≤3.00	<b>No Limit</b>				
	Anisometropia (Manifest)		≤3.50D in any Meridian	≤3.50D in any Meridian	<b>No Limit</b>				
63	NVA	≤ 20/40, corrects to 20/20	Corrects to 20/20			≤ 20/100, corrects to 20/20	Corrects to 20/20		
64	Phorias	Phorias	NOTOSP / NOHOSH: No Obvious herteroTropia Or Symptomatic heteroPhoria					Phorias	
	Eso	≤ 6	Numerical Values not Required					≤ 6	
	Exo	≤ 6						≤ 6	
	Hyperphoria	≤ 1.5						≤ 1.5	
	NPC		<b>Not Required</b>						
66	Color Vision	<u>PIP = 12/14</u> ; <u>CCVT (Waggoner)</u> = normal or mild performed binocularly; <u>CCT (Rabin)</u> = score of ≥55 on all 3 cone types in each eye							
67	Depth Perception (Note 2)	<b>Required</b>	Not Required			<b>Required</b>	Not Required	<b>Required</b>	
68	Field of Vision	<b>Required</b>							
69	Night Vision	NIBH= Not Indicated By History							
70	Intraocular Tension (IOP)	≤ 22mmHg in each eye. Difference in IOPs between eyes ≤ 4mmHg. If out of standards by NCT, retest with TAP							

**Notes:** (1) SNA refractive error (RE) shall not exceed -1.50 D or +3.00 D in any meridian. SNAs must have vision of 20/20<sup>0</sup> Goodlite OD & OS, uncorrected or corrected (manifest). There is NO standard for Cylinder or VA on cyclo refract. SNFO RE shall not exceed +/-8.00D in any meridian or 3.50D anisometropia.

(2) Verhoeff : 8/8 to pass. If failed one or more, must repeat 2 series of 8 and candidate must have 16/16 correct in order to pass. AFVT: A-D to pass. Anything less than A-D=Fail. Other acceptable tests: Titmus or Randot Stereo 40 seconds to pass. If glasses required patient must wear them for testing and "with Rx" should be documented.

(3) AEROMEDICAL OFFICER – civilian applicants must meet refraction standards for commissioning (≤ +/-8.00 D Spherical Equivalent).

(4) SNA applicants must have corneal mapping performed (topography or Pentacam) to rule out ectatic disease (i.e. keratoconus): If irregular pattern or the INFERIOR: SUPERIOR (I/S) ratio in central 6 mm of cornea (3mm above, 3 mm below center) is > 1.5, submit to NAMI for review.

**ALSO REFER TO THE ARWG, SECTION 12.15, FOR REFRACTIVE SURGERY POLICY.**



# AVIATION VISION STANDARDS, DESIGNATED PERSONNEL MAR 2021

## (USN/USMC)

Block # DD 2808	ITEM	Service Group I (Pilot)	Service Group II (Pilot)	Service Group III (Pilot)	NFO/ Aeromedical Officers	Aircrew- Fixed Wing	Aircrew- Rotary Wing	Air Traffic Controller	UAV/UAS
61	Uncorrected Distance VA	≤20/100	≤20/200	≤20/400	No limit	No limit	20/100 or better	No limit	No limit
61	Corrected Distance VA (Note 1)	20/20 <sup>-0</sup> Snellen OR 10/10 letters on AFVT or Goodlite Chart			Correctable to 20/20 <sup>-0</sup> Snellen OR 20/20 <sup>-3</sup> (7/10) on AFVT or Magnetic Non-Memorization Chart (Goodlite Chart)				
62	Refractive Error	No limit							
63	Uncorrected Near VA	No limit					20/100 or better	No limit	
63	Corrected Near VA	20/20 <sup>-0</sup> Snellen OR 10/10 letters on AFVT			Correctable to 20/20 <sup>-0</sup> Snellen OR 20/20 <sup>-3</sup> (7/10) on AFVT				
64	Phorias	Phorias			NOTOSP / NOHOSH: No Obvious herteroTropia Or Symptomatic heteroPhoria				Phorias
	Eso	≤ 6			Numerical Values Not Required				≤ 6
	Exo	≤ 6							≤ 6
	Hyper	≤ 1.5							≤ 1.5
66	Color Vision	<b>Required</b> (Note 2)							
67	Depth Perception	Required (Note 3)			Not required		Required (Note 3)	Not required	Required (Note 3)
68	Field of Vision	<b>Required</b>							
69	Night Vision	NIBH= Not Indicated By History							
70	Intraocular Tension (IOP)	≤22mmHg in each eye. Difference in IOPs between eyes ≤4mmHg. If out of standards by NCT, retest with TAP							

- (1) On Corrected Distance Visual Acuity 7/10 for other than pilots is passing only when using AFVT or Goodlite 20/20 line. If using Snellen, BVAT or any other form of VA chart, one must get 20/20 – 0 to be physically qualified.  
Goodlite letters = non-memorization, randomizable magnetic or digital chart with 10x10 grid of 20/20 letters (Sloan letter crowded eye chart).
- (2) Passing scores: PIP = 12/14; CCVT (Waggoner) = normal or mild deficiency performed binocularly; CCT (Rabin) = score of 55 on all 3 cone types performed monocularly; FALANT (after 1/1/17 FALANT will not be acceptable for applicants but will only be done for members currently on a color vision waiver that they only can pass FALANT): 9/9 to pass, if failed one or more, must repeat 2 series of 9 and candidate must have 16/18 correct in order to pass.
- (3) Verhoeff: 8/8 to pass. If failed one or more, must repeat 2 series of 8 and member must have 16/16 to pass. For AFVT, A-D to pass. For Titmus or Randot, 40 sec to pass. NAMI recommendation is to still have AFVT or Verhoeff performed first, and recommend having Optometrist test for Titmus or Randot to ensure validity of test.

# APPENDIX B: OCULAR MOTILITY WORKSHEET

## OCULAR MOTILITY WORKSHEET

\* instructions on the back of this form \*

1. Pertinent History			
2. Distant Visual Acuity OD 20/ OS 20/	3. Manifest Refraction OD _____ Corrected to 20/ OS _____ Corrected to 20/		
4. Cycloplegic Refraction (as needed) OD _____ 20/ OS _____ 20/	5. Habitual Rx OD _____ OS _____ Prism (if any in specs): _____		
6. Correction used for remainder of examination      Habitual      Manifest      None			
7. Cover Test (Tropias) Far      R	L	Alt Cover Test (Phorias) Far      R	L
# in P.D.			
8. Extraocular Motility	9. Maddox Rod or Von Graefe Prism Diopters	10. Stereopsis (Verhoeff or Randot or Titmus) Arcseconds	
11. Worth 4 Dot @ 20 feet	12. Vectograph (if available)	13. Red Lens Test	
14. 4 <sup>A</sup> Base Out (microstrab)	15. Other Test Results		
16. Impression:		17. Is patient NOHOSH? Yes      No	
18. Provider	19. Provider Phone Number/Email	20. Date	
21. Patient Name		22. DOD ID#	
23. Rank/Rate	24. Unit/Address		

# INSTRUCTIONS FOR OCULAR MOTILITY WORKSHEET

*IF YOU HAVE ANY QUESTIONS PLEASE CALL THE NAMI EYE DEPT AT 850-452-3227/2933.*

**PERTINENT HISTORY:** i.e. “scored 7 esophoria on AFVT” or “strabismus surgery age 6 years.”

**REFRACTION:** SNAs and SNA applicants need a cyclopentolate 1% cycloplegic refraction recorded, all others require a manifest refraction only. SNAs and SNA applicants who see less than 20/20 unaided also require a manifest refraction recorded.

**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** prism diopter values. 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** prism diopter 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. Neither the device nor the patient should move during the test. Randot or Titmus stereo testing acceptable, do not allow head movement. Report in Arcseconds.

**WORTH 4 DOT:** Perform at **both** distance and near. Report “fusion,” “diplopia,” or “suppression OD (or) OS.”

**VECTOGRAPH:** (If available) 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. If not available, put “Not Available”.

**RED LENS TEST:** (If available – Required for USAF) Test all 9 positions of gaze, just like the cover test. Report any diplopia. If no diplopia is reported, state so.

**4<sup>A</sup> BASE OUT TEST:** Prism introduced over either eye to look for suppression. Can augment the diagnosis of microstrabismus. This test is not always applicable and may be left blank if not used.

**NOHOSH = No Obvious Heterotropia or Symptomatic Heterophoria.** Answer this question if the subject is NPQ (Not Physically Qualified for SNA (Student Naval Aviator), but would consider applying for the SNFO (Student Naval Flight Officer) program.

**PROVIDER PHONE NUMBER/EMAIL:** Indicate **both** DSN (military overseas) and commercial.

## **Acronyms/definitions:**

NAMI: Naval Aerospace Medical Institute (Pensacola, FL)

AFVT: Armed Forces Vision Tester

SNA: Student Naval Aviator

SNFO: Student Naval Flight Officer

Verhoeff: Specialized manual stereo-vision tester.

NOHOSH: No Obvious Heterotropia or Symptomatic Heterophoria