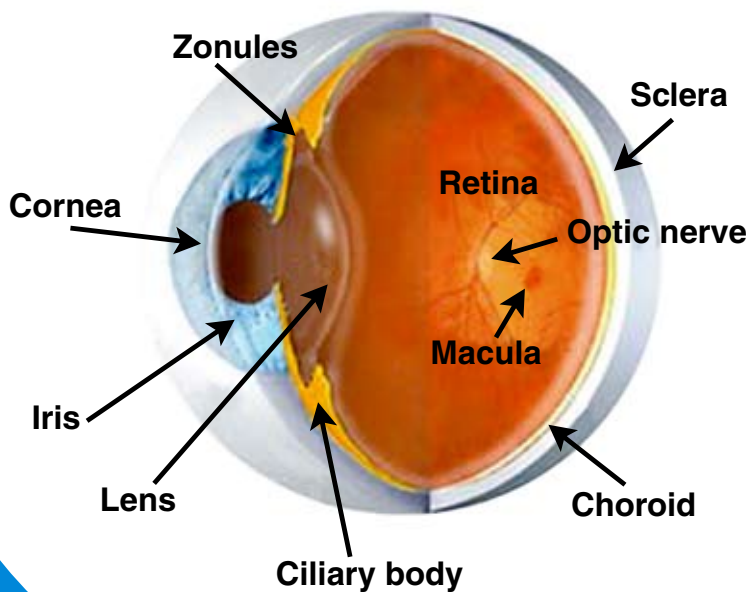


# EYE INSIGHTS

for Physicians,  
Physicians' Assistants,  
Nurse Practitioners  
and Ophthalmic Technicians

Normal Eye Anatomy



New England Ophthalmological Society

PO Box 9165

Boston, MA 02114-0041

[www.neos-eyes.org](http://www.neos-eyes.org)



# TABLE OF CONTENTS

---

<b>INTRODUCTION .....</b>	<b>2</b>
<b>ABOUT THE NEW ENGLAND OPHTHALMOLOGICAL SOCIETY (NEOS) .....</b>	<b>3</b>
<b>EPIDEMIOLOGY .....</b>	<b>5</b>
<b>IMPORTANT OCULAR SIGNS AND SYMPTOMS.....</b>	<b>6</b>
<b>“RED EYE,” CONJUNCTIVITIS OR A MORE SERIOUS PROBLEM? .....</b>	<b>10</b>
<b>TRAUMA.....</b>	<b>13</b>
<b>SOME SYSTEMIC MEDICATIONS WITH POSSIBLE OCULAR SIDE EFFECTS .....</b>	<b>14</b>
<b>IMPORTANT OPHTHALMIC CONDITIONS .....</b>	<b>17</b>
<b>SUGGESTED CHECKLIST FOR PRIMARY CARE PHYSICIANS.....</b>	<b>23</b>
<b>EYE CARE RECOMMENDATIONS AND REFERRAL GUIDELINES.....</b>	<b>24</b>

# INTRODUCTION

---

*Eye Insights* has been prepared by the New England Ophthalmological Society to alert physicians, physicians' assistants, nurse practitioners and ophthalmic technicians to most of the prevalent and serious eye diseases and conditions encountered in patients.

Many of these eye diseases and conditions are associated with systemic diseases and some may result in permanent loss of vision without early ophthalmic intervention.

The material included is not meant to be a comprehensive review of all ocular signs, symptoms, and conditions. We do hope the monograph will be of value to you in the care of your patients.

A referral list of board-certified ophthalmologists is available for your use on the New England Ophthalmological Society website, [www.neos-eyes.org](http://www.neos-eyes.org), under the membership directory.

Portions are reprinted with permission, from Trobe J.D. *The Physician's Guide to Eye Care*, 2nd Edition, San Francisco: American Academy of Ophthalmology, 2000.

© New England Ophthalmological Society 2005. This publication may not be reproduced without the permission of the New England Ophthalmological Society.

# ABOUT THE NEW ENGLAND OPHTHALMOLOGICAL SOCIETY (NEOS)

---

## NEOS HISTORY

NEOS is the oldest medical specialty society in the United States and has been in continuous existence since its founding in 1884. It was established for the study and advancement of ophthalmology and to provide for the mutual education of members, today totaling over 700 ophthalmologists (medical/surgical eye physicians) from throughout New England. The Society is dedicated exclusively to charitable, educational, and scientific medical research purposes in connection with diseases of the eye and their treatment. Its mission is to promote excellence in eye care in the New England states through education of ophthalmologists, residents, fellows, allied ophthalmic personnel and the public.

A major focus of NEOS is continual ongoing learning programs for ophthalmologists and ophthalmic personnel carried out primarily in educational sessions. Equally important are NEOS's programs to educate the public about diseases and conditions of the eye through detection, treatment, and prevention.

NEOS is accredited by the Massachusetts Medical Society (MMS) to provide continuing medical education for physicians.

## NEOS MISSION STATEMENT:

The goals of the New England Ophthalmological Society are:

The advancement of patient centered ethical standards for the delivery of eye care.

Provide effective membership communication and education through meetings and the NEOS website.

Promote public awareness of NEOS as a public foundation for education in ophthalmology and establish the NEOS as the leading New England source of information about eye care with the public and the media.

Provide adequate endowment to ensure ophthalmic education in the new millennium.

Education of ophthalmologists (medical/surgical eye physicians) as the preferred providers of comprehensive eye care.

**For more information,  
visit the NEOS website:  
[www.neos-eyes.org](http://www.neos-eyes.org)**

# EPIDEMIOLOGY

---

The number of people suffering from vision loss due to age-related diseases such as cataract, glaucoma, macular degeneration and diabetic retinopathy continues to increase. More than 119 million people over the age of 40 are at risk for developing one of these diseases.

- \* More than 20.5 million people over the age of 40 have visually significant cataracts.
- \* 2.5 million people over the age of 40 will experience irreversible vision loss due to glaucoma.
- \* 8 million Americans have moderate or advanced macular degeneration in one or both eyes, which places them at high risk for severe vision loss.
- \* 5.3 million people 18 years and older are at risk for vision loss from diabetic retinopathy in Type I and Type II diabetes.

Between 2-6% of all children are at risk for diminished sight due to amblyopia and strabismus and should be screened carefully between 3-4 years of age or sooner if indicated for these problems.

# IMPORTANT OCULAR SIGNS AND SYMPTOMS

---

**ACUTE PERSISTENT VISUAL LOSS:** Acute vision loss lasting longer than 1 hour requires immediate evaluation by an ophthalmologist. It may be due to a corneal problem, acute glaucoma, endophthalmitis, vitreous/retinal hemorrhage, retinal detachment, maculopathy, retinal artery or vein occlusion, optic neuritis, ischemic optic neuropathy or occipital cortex infarction

## **ANISOCORIA (DIFFERENCE IN SIZE OF THE PUPILS)**

**GREATER THAN 1 MM:** May be caused by cranial nerve III palsy, Horner's syndrome, Adie's syndrome, ocular trauma, inflammation, Argyll Robertson pupil, eye drops or benign idiopathic anisocoria. Scopolamine patches (for motion sickness) may cause pupil dilation in one or both eyes.

**CHRONIC PROGRESSIVE VISUAL LOSS:** May be due to refractive errors, disturbances in ocular media (cornea, lens, vitreous) or to lesions of the neural visual pathway from retina to visual cortex.

**DIPLOPIA OR DOUBLE VISION:** Binocular diplopia, present only when both eyes are open and due to ocular misalignment, is often associated with central nervous system lesions, thyroid ophthalmopathy, diabetic neuropathy and trauma. Monocular diplopia, present with one eye covered, may be due to cataract or uncorrected refractive error.

**DISTORTED VISION:** This symptom is often due to macular pathology frequently age related. Other causes of distorted vision include trauma, migraine, refractive error and central nervous system pathology. Early detection and treatment of macular degeneration may reduce the risk of severe visual loss.

**FLASHES OF LIGHT:** Retinal flashes may be associated with a partially detached vitreous body. Usually the flashes are brief and are associated with eye or head movements. Flashes may be a symptom of a retinal tear or a retinal detachment due to vitreous traction. The new

onset or sudden worsening of flashes is a basis for ophthalmologic referral within 48 hours. Flashes associated with migraine tend to last longer, have more geometric shapes and may be present with or without headache or nausea. In rare cases, these symptoms may be associated with occipital epilepsy or serious intracranial pathology.

**FLOATERS:** Described by patients as specks or strands drifting in the visual field and is predominately a complaint of the middle-aged and elderly. Floaters are usually benign. A rapid increase in their number, especially if associated with flashes of light, may represent a vitreous detachment, a retinal tear or retinal detachment, especially in patients who have a history of retinal detachment, ocular trauma, inflammation, eye surgery, high myopia or a family history of retinal detachment. Floaters may represent vitreous inflammation or hemorrhage. Vitreous hemorrhage may be associated with diabetes, hypertension, vascular occlusion and sickle cell disease.

**OCULAR PAIN:** **Pain within the eye itself** may be associated with inflammatory eye conditions, and angle closure glaucoma (see angle closure glaucoma on page 19). Pain with eye movement can be a symptom of orbital cellulitis and optic neuritis.

**Pain that comes from an ocular surface problem** may be described as foreign body sensation, burning, scratching, or transient sharp pain. Possible causes may include a corneal or conjunctival foreign body, dry eye, recurrent corneal erosion, blepharitis or misdirected eyelashes.

**Periocular pain** may be associated with minor eyelid conditions such as styes or more serious conditions such as periorbital cellulitis or abscess. It may be associated with cavernous sinus processes which are typically accompanied by cranial nerve III, IV, or VI impairment, or Horner's syndrome. Facial sinus inflammation, infection or migraine can also produce periorbital pain.

**Deep and retro-orbital processes causing pain** may not produce any external evidence.

**PROPTOSIS (EXOPHTHALMOS):** Forward displacement of the globe is most commonly caused by Grave's disease, orbital inflammations, infections and orbital tumor. Prominence of the globe caused by myopic enlargement or by eyelid retraction can be misinterpreted as proptosis. Eyelid retraction does require evaluation of thyroid function.

**PTOSIS:** Drooping of the upper eyelid may be neurogenic, such as in III nerve palsy, Horner's syndrome, or myasthenia gravis. Other common causes include stretching, weakening and disinsertion of the levator tendon in the elderly, as well as inflammation, trauma, and congenital dystrophies of the levator muscle. Children with ptosis should be referred to an ophthalmologist as soon as possible because of its frequent association with amblyopia.

**TEARING:** May be caused by ocular surface problems such as foreign bodies, dry eye syndrome, and infection and inflammations of the cornea and conjunctiva. Impairment of the nasolacrimal drainage system as with an obstruction or malposition of the lower eyelid may also cause tearing. Tearing, especially when accompanied by photophobia, may be a sign of infantile glaucoma in infants.

**TRANSIENT VISUAL LOSS:** Defined as visual loss affecting one or both eyes that persists less than 1 day most often seconds to minutes, causes may include migraine, temporary ischemia to the eye or visual cortex as with a passing embolus, or carotid artery stenosis.



**CAUTION:** EMBOLI TO THE EYE OR VISUAL CORTEX REQUIRE IMMEDIATE EVALUATION BY AN OPHTHALMOLOGIST AND OFTEN A NEUROLOGIST.

**RED EYE:** Some red eye conditions present a potential threat to vision.  
**Symptoms and signs of a dangerous red eye include:**

- \* Severe ocular pain
- \* Photophobia
- \* Persistent blurred vision

- \* Proptosis
- \* Reduced ocular movements
- \* Ciliary flush (hyperemia concentrated in the circumcorneal or limbal region) may be a sign of iritis or acute angle closure glaucoma
- \* Irregular corneal light reflection
- \* Corneal epithelial defect or corneal opacity
- \* Poorly reactive pupil
- \* Persistence or worsening of signs or symptoms
- \* Compromised host: neonate, immune suppressed patient
- \* Contact lens wearer



**CAUTION:** DO NOT USE TOPICAL ANESTHETICS, NONSTEROIDAL ANTI-INFLAMMATORY AGENTS, CORTICOSTEROIDS OR CORTICOSTEROID-ANTIBIOTIC COMBINATIONS IN TREATING A RED EYE. THESE AGENTS MAY MASK SERIOUS CONDITIONS AND CREATE OTHERS SUCH GLAUCOMA, CATARACT, INFECTION AND CORNEAL PERFORATION.

# RED EYE: CONJUNCTIVITIS OR A MORE SERIOUS EYE PROBLEM?

---



**CAUTION:** THE PRESENCE OR ABSENCE OF CERTAIN SYMPTOMS IN PATIENTS WHO PRESENT TO YOUR OFFICE WITH A RED EYE SHOULD CAUSE CONCERN FOR CONDITIONS OTHER THAN CONJUNCTIVITIS. ALL SHOULD BE REFERRED TO AN OPHTHALMOLOGIST FOR EVALUATION AND TREATMENT.

## **THE PRESENCE OF EYE PAIN SHOULD BE A RED FLAG.**

Conjunctivitis will cause burning or discomfort, but generally it will not cause severe eye pain which is deep or aching in nature. Eye pain is more common in acute glaucoma, uveitis, scleritis, and keratitis.

**VISUAL BLURRING THAT DOES NOT CLEAR** with blinking is atypical of conjunctivitis.

**PHOTOPHOBIA** is more characteristic of uveitis or serious corneal problems and should be evaluated further.

**ABSENCE OF DISCHARGE** should also alert the examiner of the possibility of a problem other than conjunctivitis.

**ANY “CONJUNCTIVITIS” WHICH PERSISTS BEYOND ONE WEEK** may herald a more serious condition.

## **WHEN EVALUATING A RED EYE, YOU MUST DIFFERENTIATE:**

### **1) CONJUNCTIVITIS (“RED EYE,” “PINK EYE”)**

**A) BACTERIAL:** Not common, purulent discharge, preauricular nodes usually not swollen, significant in newborns.

**B) VIRAL:** Common “pink eye.” History of contact with someone with URI, URI symptoms, watery discharge starts in one eye then the other eye in 2-3 days, tender or enlarged preauricular node, adenovirus as most common cause.



**CAUTION:** CONJUNCTIVITIS, ESPECIALLY VIRAL, IS CONSIDERED HIGHLY CONTAGIOUS AND MAY RESULT IN AN EPIDEMIC. ADVISE PATIENT.

CLEAN ALL EQUIPMENT AND INSTRUMENTS USED TO EXAMINE THE PATIENT AND ALL SURFACES CONTACTED BY THE PATIENT. WASH HANDS BEFORE AND AFTER EXAMINING THE PATIENT.

**2) CORNEAL ABRASION:** Foreign body sensation. Pain may be severe. History of trauma.



**CAUTION:** ANY CORNEAL DEFECT THAT PROGRESSES TO A CORNEAL OPACITY (INFILTRATE) MAY INDICATE A SEVERE INFECTION AND LEAD TO PERMANENT VISION LOSS.

**3) CORNEAL/CONJUNCTIVAL FOREIGN BODY:** Often can be visualized.



**CAUTION:** CONTACT LENS WEARERS WITH A RED EYE AND/OR EYE PAIN SHOULD STOP WEARING CONTACT LENSES AND BE REFERRED IMMEDIATELY.

**4) IRITIS:** May be monocular or binocular and frequently occurs in young patients. Photophobia and pain are often prominent symptoms. Iritis may be associated with systemic inflammatory disorders such as arthritis, ankylosing spondylitis, Reiter's syndrome, Bechet's disease, inflammatory bowel disease, and sarcoidosis, although work-up is often negative. Iritis may occur after trauma.



**CAUTION:** IRITIS IN JUVENILE RHEUMATOID ARTHRITIS PATIENTS IS OFTEN ASYMPTOMATIC REQUIRING SCREENING OF JUVENILE RHEUMATOID ARTHRITIS PATIENTS BY AN OPHTHALMOLOGIST

**5) ACUTE ANGLE CLOSURE GLAUCOMA:** Patients often present with cloudy corneas (secondary to edema), decreased visual acuity and a fixed mid-dilated pupil. It is almost always unioocular unless associated with the use of Topiramate (see page 16). Patients often have periocular pain and associated nausea. Risk factors include family history, Asian descent and farsightedness.

**6) EPISCLERITIS:** Often presents as a localized, sector-shaped area of dilated episcleral vessels which may be tender. Possible association with a systemic auto immune or viral condition, but less common than with iritis or scleritis.

**7) SUBCONJUNCTIVAL HEMORRHAGE:** May be spontaneous or associated with valsalva (cough, sneeze, vomiting and constipation), anticoagulation, severe hypertension (always check blood pressure) or trauma. Treatment-Reassurance. If associated with trauma, then an ophthalmologic evaluation may be necessary.

**8) HERPES SIMPLEX KERATITIS:** Foreign body sensation. Photophobia. May have a previous history of ocular or oral herpes. Steroids may exacerbate the infection and should not be used!

**9) HERPES ZOSTER OPHTHALMICUS:** Involvement of first or second divisions of the V cranial nerve. May directly involve the eye. May be associated with iritis, glaucoma, keratitis, etc.

**10) INFLAMED LID:** Stye, chalazion, cellulitis ( all may present with pain, tenderness, redness or swelling.)

**11) SCLERITIS:** Dull pain, redness, tender to touch. May be focal or diffuse. May be associated with rheumatoid arthritis, Wegener's granulomatosis, and other inflammatory diseases, especially when bilateral. May result in scleral thinning and perforation of eye.

**12) CORNEA EXPOSURE:** Incomplete eye lid closure and infrequent blinking associated with cranial nerve VII palsy, thyroid orbitopathy, acoustic neuroma, Parkinson's Disease, etc. Cornea exposure may cause corneal drying, punctate keratitis and corneal ulcers.

# TRAUMA

---

**REFER IMMEDIATELY IF PATIENT HAS:** Severe pain, subnormal visual acuity, irregular pupil, deformed globe, corneal or conjunctival foreign body, corneal/scleral laceration, corneal clouding, large corneal abrasion, severe lid swelling or conjunctival chemosis (swelling), proptosis, hyphema, absent red reflex, suspected intraocular foreign body, eyelid laceration that is deep or involves the eyelid margin.

**REFER WITHIN 24 HOURS IF PATIENT HAS:** Pain, photophobia, diplopia, foreign-body sensation, suspected contusion of globe, suspected orbital wall fracture, moderate eyelid or conjunctival chemosis (swelling) with normal visual acuity.

**REFER WITHIN 48 HOURS IF PATIENT HAS:** Mild contusion injury to orbital soft tissues.



**CAUTION:** CHEMICAL BURNS REQUIRE IMMEDIATE ON-SITE TREATMENT BY IRRIGATING WITH COPIOUS AMOUNTS OF WATER OR SALINE, ESPECIALLY BURNS FROM ALKALI OR ACID-CONTAINING PRODUCTS.



**CAUTION:** WHEN ENGAGED IN ANY HAZARDOUS ACTIVITY---HOME AND CAR REPAIRS, POWER TOOLS, ATHLETIC ACTIVITIES---POLYCARBONATE PROTECTIVE EYE WEAR SHOULD BE WORN.



**CAUTION:** ONE-EYED AND ESPECIALLY VISUALLY IMPAIRED INDIVIDUALS MUST PROTECT THEIR SEEING EYE AT ALL TIMES WITH POLYCARBONATE PROTECTIVE GLASSES.

# SOME SYSTEMIC MEDICATIONS WITH POSSIBLE OCULAR SIDE EFFECTS

---

**AMIODARONE:** (Cordarone®) There is a growing appreciation of potential optic nerve toxicity, which can resemble ischemic optic neuropathy. Corneal deposits are present in most patients but rarely become symptomatic. Patients should have a baseline exam and be followed at least yearly.

**ANTICHOLINERGICS:** Some patients with narrow anterior chamber angles are susceptible to angle closure glaucoma when placed on anticholinergic medications such as antidepressants, medications used for spastic gastric and urinary tract disorders, scopolamine patches for motion sickness and Parkinson's medication. Some antihistamines can have anticholinergic effects as well. Patients on these medications with a history of narrow drainage angles or symptoms of periocular pain, unreactive pupils, decreased vision, cloudy cornea or nausea should be evaluated for angle closure glaucoma. Unfortunately, most patients with narrow angles do not know they are at risk. Patients who have been diagnosed and have had a laser iridotomy are at much reduced risk from taking any of these agents. Patients should have a baseline ophthalmic examination before starting these medications. Anticholinergics may cause loss of accommodation and exacerbate near vision difficulty especially in patients under 50 years of age.

**BISPHOSPHONATES:** Pamidronate disodium (Aredia®), Alendronic acid (Fosomax®), Ibandronate, Zoledronate (Zometa®), Risedronate sodium (Actonel®), Clodronate (Bonefos®), Etidronate disodium, (Didrocal®) Olpadronate, may cause blurred vision, anterior uveitis, nonspecific conjunctivitis, episcleritis and anterior scleritis.

**CIS-PLATINUM:** (Platinol®), women over 50 maintained on 200 mg/day are at risk for retinopathy, optic neuropathy and visual cortex damage. Patients should have a baseline exam and be followed at least yearly.

**CORTICOSTEROIDS:** Any form of steroids, including inhaled or topical corticosteroids, may cause glaucoma. Lens opacification with decreased visual acuity is common with chronic use of high doses of steroids. Pseudotumor cerebri is a less common side effect. Prolonged use of steroids may require periodic eye exams with follow-up as indicated.

**CYTOSINE ARABINOSIDE:** Patients are at risk for keratitis.

**DEFEROXAMINE MESYLATE:** (Desferal®) May cause ophthalmic toxicity, including loss of color vision, visual acuity and visual field, as well as retinal pigment abnormalities.

**DIGOXIN:** (Lanoxin®) 25% of patients whose digoxin levels are in the moderately toxic range develop retinopathy. With high enough doses, patients develop symptoms of retinal toxicity with snowy, flickering or yellow orange vision.

**ETHAMBUTOL HYDROCHLORIDE:** (Myambutol®) May cause optic neuropathy with resultant loss of color vision, visual acuity, and visual field.

**HYDROXYCHLOROQUINE SULFATE:** (Plaquenil®) Retinal toxicity with permanent visual loss can occur, but is exceedingly rare at doses not greater than 6.5 mg/kg/day for less than 5 years. Current recommendation from the American Academy of Ophthalmology, in the absence of other ocular disease, includes a baseline ophthalmologic exam, then every 1-2 years for the first five years of therapy, followed by yearly or more frequent exams thereafter. If the dose is higher or there is pre-existing retinal pathology, more frequent exams may be necessary.

**ISONIAZID:** Loss of color vision, visual field, visual acuity.

**ISOTRETINOIN:** (Accutane®) May raise intracranial pressure within days of starting treatment causing optic disc edema and symptoms of blurred vision, transient vision loss and visual field loss. May also cause dry eye syndrome.

**MINOCYCLINE HYDROCHLORIDE:** (Minocin®) May cause elevation of intracranial pressure with resulting optic nerve swelling. Symptoms include blurred vision, transient visual field loss, diplopia and vertigo. (All tetracyclines and sulfa drugs may cause pseudotumor cerebri and ciliary body swelling/acute myopia).

**PHENYTOIN AND CARBAMAZEPINE:** (Dilantin®) (Tegretol®) May cause diplopia, blurred vision, nystagmus.

**TAMOXIFEN CITRATE:** (Nolvadex®) Cystoid macular edema and perimacular crystalline deposits resulting in decreased visual acuity and abnormal color vision.

**THIORIDAZINE:** (Mellaril®) Risk for retinopathy if maintained on doses above 800 mg/day. Visual loss is irreversible. Symptoms include brownish discoloration of vision, reduced visual acuity and constricted peripheral fields.

**TOPIRAMATE:** (Topamax®) May cause ciliary body swelling and effusions, resulting in BILATERAL angle closure glaucoma, acute myopia, uveitis and decreased vision. Most cases have occurred shortly after the initiation of therapy.

**VINCRIStINE:** Toxicity is dose-related, occurring after a mean total dose of 17.7 mg over a 10 week period. Findings include ptosis, diplopia, abduction deficits (i.e. the inability for the eyeball to move laterally).

# IMPORTANT OPHTHALMIC CONDITIONS

---

**ADIE'S SYNDROME:** Dilated, poorly reactive pupil due to presumed viral infection affecting the ciliary parasympathetic ganglion. Must be distinguished from IIIrd nerve palsy

## **AGE-RELATED MACULAR DEGENERATION (ARMD):**

Leading cause of blindness in older age population. Intensive research and clinical trials are now being undertaken to reduce vision loss from macular degeneration. Symptoms include distorted vision and loss of central visual acuity. The “dry” type is most common and tends to progress slowly. The “wet” type involves subretinal neovascularization, causing macular edema and hemorrhage which may progress rapidly. New treatments offer some hope for stabilizing wet macular degeneration. The findings of the 2001 Age-Related Eye Disease Study and ongoing studies show that among patients with a high risk of severe vision loss from macular degeneration, use of the study vitamin formulation reduced the risk of severe vision loss by 25% over the study period. Therefore, early diagnosis and initiation of vitamin supplementation in high risk patients has become important. Please note that the recommendation is only for high risk patients and that the vitamin formulation only reduces the risk of vision loss. The long term benefit of vitamin supplementation in mild ARMD has not been established.

Smoking more than a pack of cigarettes a day significantly increases the risk of developing macular degeneration.

Patients should only take the vitamin formulation after being examined by an ophthalmologist and after consulting with their primary care physician.

The daily ARED doses are: Vitamin C-500 mg, Vitamin E-400 mg, B-Carotene-15mg, Zinc-80mg, Copper-2mg (Copper was added during the study to prevent the Zinc-induced anemia).



**CAUTION:** SMOKERS OR PATIENTS WITH A SIGNIFICANT HISTORY OF SMOKING CANNOT TAKE SUPPLEMENTAL VITAMIN FORMULATIONS WITH BETA-CAROTENE DUE TO INCREASED RISK OF LUNG CANCER, BUT THEY CAN TAKE A SEPARATE DOSE OF THE OTHER VITAMINS, TAKING SPECIAL CARE TO EXCLUDE THE B-CAROTENE.

**AMBLYOPIA:** Most common causes are strabismus and asymmetric refractive error. Corneal or lens opacity and ptosis are other causes. Reversible cause of subnormal vision in children. Must be detected within the early years of life to restore normal vision, preferably by age 3.



**CAUTION:** IF PATIENT HAS LOST SIGHT IN ONE EYE DUE TO AMBLYOPIA OR IS VISUALLY IMPAIRED WITH VISION BELOW 20/40, THE SEEING EYE MUST BE PROTECTED AND PATIENT SHOULD BE CAUTIONED TO WEAR PROTECTIVE EYE WEAR AT ALL TIMES.

**CATARACT:** An opacity of the crystalline lens and the most common cause of visual loss in the elderly.

#### **CRANIAL NERVE III PALSY:**

Diplopia with ptosis, pupillary dysfunction and eye movement deficits alone or together. Causes may be diabetes, ischemia or **rarely, but requiring urgent diagnosis, cerebral aneurysm (may rupture) or tumor.**

#### **CRANIAL NERVE IV PALSY:**

Vertical diplopia which may be mild and most prominent in certain directions of gaze. Causes: decompensation of a congenital IV nerve lesion, ischemia and trauma.

#### **CRANIAL NERVE VI PALSY:**

Horizontal diplopia and esotropia greater looking toward side of involved muscle. Caused by ischemic, inflammatory or compressive

lesions along the course of the nerve, or increased intracranial pressure. In neurologically stable patient timely referral is necessary to determine etiology, prognosis and management.

**DIABETIC RETINOPATHY:** Diabetic retinopathy can progress to a severe stage prior to the development of visual symptoms. Laser photocoagulation surgery can reduce the likelihood of severe visual loss by 50%, but is most effective if performed before visual loss has occurred. Careful management of blood sugar levels can delay the onset of diabetic retinopathy and slow the rate of progression. Physicians should counsel diabetic patients to maintain ophthalmologic care according to the following schedule:

**TYPE I DIABETES:** Initial exam: within 5 years of onset.

Minimum follow-up: yearly.

**TYPE II DIABETES:** Initial exam: upon diagnosis.

Minimum follow-up: yearly.

**DURING PREGNANCY:** Initial exam: first trimester.

Minimum follow-up: every 3 months

## **GLAUCOMA**

### **PRIMARY OPEN-ANGLE GLAUCOMA:**

Constitutes a major public health problem because it is common and patients are asymptomatic until vision is seriously compromised. Glaucoma can occur at any age but the incidence increases with increasing age. Over 10% of all people over 90 have glaucoma.

### **HIGH RISK GROUPS FOR PRIMARY OPEN-ANGLE GLAUCOMA INCLUDE:**

- \* **INDIVIDUALS WITH A FAMILY HISTORY OF GLAUCOMA OR BLINDNESS**
- \* **PEOPLE OVER 50**
- \* **AFRICAN-AMERICANS:** Glaucoma is the most common cause of irreversible blindness in African-Americans and is 6 times more prevalent in this group than among Caucasians.
- \* **INDIVIDUALS WHO HAVE DIABETES**
- \* **INDIVIDUALS WITH SEVERE MYOPIA**
- \* **HISPANICS**
- \* **INDIVIDUALS WITH VASCULAR DISEASE**



**CAUTION:** PRIMARY OPEN-ANGLE GLAUCOMA CONSTITUTES A MAJOR PUBLIC HEALTH PROBLEM AS IT IS USUALLY ASYMPTOMATIC UNTIL THERE IS SEVERE IRREVERSIBLE LOSS OF VISION. IT IS ESTIMATED 50% OF THOSE WITH PRIMARY OPEN-ANGLE GLAUCOMA DO NOT KNOW THEY HAVE IT.

**ACUTE ANGLE CLOSURE GLAUCOMA:** Acute angle closure glaucoma occurs when the drainage channel of the eye is occluded by iris, resulting in marked elevation of intraocular pressure. Typical symptoms include eye pain, blurred vision, halos, red eye, cloudy cornea, periocular pain, headache, and nausea. A fixed, mid-dilated pupil is usually present. Most cases occur spontaneously in individuals who are at risk due to their ocular anatomy (smaller eyes). The primary risk factors for occludable angles are: family history, Asian descent and severe farsightedness. Acute angle closure can be triggered by anticholinergics, antihistamines, Topamax®, and many other medications, as well as dilating drops. Patients who will be taking these medications need a baseline ophthalmologic exam to assess for risk. Laser iridotomy alleviates the risk of acute angle closure in the majority of patients. Topamax® induced angle closure glaucoma is bilateral and does not respond to laser iridotomy.

**HORNER'S SYNDROME:** Caused by a lesion in the oculosympathetic pathway. Trauma is the most common cause. It may occur following apical lobe thoracic surgery. Acute carotid artery dissection and thoracic outlet tumors are rare but life threatening causes.

**METASTATIC TUMORS:** Metastatic intraocular tumors that may involve the uvea or retina are most common in breast, lung and hematologic cancers.

**OPTIC NEURITIS:** Autoimmune inflammation of the optic nerve that causes acute loss of vision usually in one eye, but can be binocular. Most common optic neuropathy of early adulthood. Frequent association with multiple sclerosis.

**REFRACTIVE DISORDERS:** Myopia, hyperopia, presbyopia, and astigmatism.

**RETINAL DETACHMENTS:** Urgent and referral is mandatory because the treatment is surgical. Retaining 20/50 or better visual acuity falls from 85% to below 50% if detachment has spread to the macula. Frequently preceded by peripheral flashes of light and showers of floaters.

**RETINAL VASCULAR OCCLUSION:** Usually results from thrombosis (artery or vein) or embolism. Transient monocular blindness (amaurosis fugax) is frequently associated with carotid arteriosclerosis. Vascular occlusions typically occur in patients with cardiovascular risk factors, such as hypertension and hypercholesterolemia. Venous occlusion may be associated with glaucoma and hypercoagulable states.



**CAUTION:** ARTERIAL OCCLUSIONS REQUIRE AN EMBOLIC WORK-UP AND TEMPORAL ARTERITIS WORK-UP.

**RETINOBLASTOMA:** Most common intraocular malignancy in childhood. Strabismus or leukocoria (white pupillary reflex) are principal indicators.

**STRABISMUS:** Affects 4% of all children, usually causing amblyopia and reduced stereopsis. Early detection and treatment produce a greater chance of permanent realignment and stereo vision without the development of amblyopia.

**TEMPORAL ARTERITIS (GIANT CELL ARTERITIS):** Most patients are over 70, but patients over 50 are at risk. Up to 50% of patients will have a permanent loss of vision and possible blindness if not diagnosed and treated. Ischemic optic neuropathy is most common, but retinal arterial occlusions occur as well. Once ischemic optic neuropathy has occurred in one eye, chances are 1 in 3 that the other optic nerve will be infarcted within days unless high-dose corticosteroid treatment is instituted. May present as a painless loss of vision. Sedimentation rate is frequently elevated as is the C reactive protein. Usually have associated symptoms: temporal artery pain and decreased pulsations, headache, scalp tenderness, jaw claudication, malaise, anorexia, fever, joint and muscle aches. Polymyalgia rheumatica is a frequent predisposition to temporal arteritis. A definitive diagnosis with a temporal artery biopsy is required as the treatment is the prolonged use of steroids. The monitoring of the sedimentation rate is necessary in the treatment of temporal arteritis.



**CAUTION:** A CLINICAL PRESENTATION OF TEMPORAL ARTERITIS REQUIRES IMMEDIATE TREATMENT WITH STEROIDS TO PREVENT LOSS OF VISION AND BLINDNESS. THE INITIATION OF STEROID THERAPY SHOULD NOT BE DELAYED. SHORT TERM USE OF STEROIDS WILL NOT CHANGE THE TEMPORAL ARTERY BIOPSY RESULT.

**UVEAL MELANOMA:** Most common intraocular malignancy in adults. Melanomas of the iris, ciliary body and choroid are amenable to therapies ranging from surgery to radiation plaque implants with the potential to preserve vision and save lives.

# SUGGESTED CHECKLIST FOR PRIMARY CARE PHYSICIANS, PHYSICIAN ASSISTANTS, NURSE PRACTITIONERS AND OPHTHALMIC TECHNICIANS (PAST MEDICAL HISTORY)

---

When was your last eye exam?

Have you been told you had a “lazy eye?”

Have you recently had problems with your vision?

Has anyone in your family had:

Glaucoma

Retinal detachment

Macular degeneration

Blindness from any cause

Lazy eyes

Diabetes Mellitus

Other eye or vision problems

Do you wear contact lenses?



**CAUTION:** POSITIVE RESPONSES SHOULD ALERT THE PRIMARY CARE PROVIDERS TO A POSSIBLE NEED FOR AN OPHTHALMIC EVALUATION.

# SPECIFIC RECOMMENDATIONS

---

**YEARLY EXAM** by an ophthalmologist is indicated for patients who present with:

Diabetes

Poor vision in one eye

Family history of glaucoma

Contact lens wearers

Over 65 years

Family history of poor vision, macular degeneration or retinal problems

## **ADULT REFERRAL GUIDELINES**

Age 65 or older: every 1-2 years.

Age 40-64: every 2-4 years.

Age 20-39: every 2-4 years for African-Americans due to increased risk for glaucoma. All others should have at least one exam between ages 20-30 and at least two exams between ages 30-39.

## **CHILDREN REFERRAL GUIDELINES**

All infants should be evaluated by a pediatrician or primary care physician for eye health in the nursery and again at 6 months.

All children with a family history of “lazy eye” (amblyopia), neuro-developmental delay or prematurity should have a comprehensive examination by an ophthalmologist as soon as possible and certainly by age 3 years.

Children should have a vision screening for eye health and visual acuity at ages 3, 6, 12, 14 and 18 years and referred for all ocular abnormalities to an ophthalmologist.

Children who have lost sight in one eye due to amblyopia, trauma or for any other reason must protect the seeing eye with protective eyewear at all times and wear seat belts in vehicles. Protective eye wear should be made of polycarbonate.

## DIABETIC REFERRAL GUIDELINES

Juvenile Onset: Within 5 years after onset.

Adult Onset: Upon diagnosis.  
Yearly follow-up exam.

During Pregnancy: Initial exam during the first trimester.  
Follow-up exam every 3 months.



**CAUTION:** BLURRED OR FLUCTUATING VISION  
MAY BE A SYMPTOM. TIGHT CONTROL OF BLOOD  
SUGAR IS THE BEST DEFENSE AGAINST VISION LOSS

AS DIABETIC RETINOPATHY IS INFLUENCED BY BLOOD SUGAR  
CONTROL (HB A1 C), HYPERTENSION AND HYPERLIPIDEMIA.  
TIMELY DIAGNOSIS AND TREATMENT SIGNIFICANTLY REDUCE  
VISION LOSS. A DIABETIC CAN HAVE SEVERE DIABETIC  
RETINOPATHY PRIOR TO THE DEVELOPMENT OF VISUAL  
SYMPTOMS.

# EYE CARE RESOURCE FOR UNDER SERVED PATIENTS

---

EyeCare America®, the public service foundation for the American Academy of Ophthalmology provides access to eye care for the medically underserved and those at increased risk for eye disease. There are more than 7500 volunteer ophthalmologists. Through the Seniors and Diabetes EyeCare Programs, volunteers provide comprehensive, dilated eye exams and care for up to one year, often at no out-of-pocket cost, waiving co-payments and unmet deductibles for eligible patients. Glaucoma EyeCare Program volunteers provide a glaucoma eye exam and the initiation of treatment. Patients may call one help line to be screened for eligibility for all programs. Please provide only one number to your patients. Help lines operate all day, every day, year round.

Seniors EyeCare Program                      800-222-EYES (3937)

Diabetes EyeCare Program                      800-272-EYES (3937)

Glaucoma EyeCare Program                      800-391-EYES (3937)

**For more information and valuable eye resources for the public and healthcare professionals please go to [www.neos-eyes.org](http://www.neos-eyes.org)**

# **THE NEW ENGLAND OPHTHALMOLOGICAL SOCIETY EDUCATIONAL ENDOWMENT FUND**

---

The NEOS Educational Endowment Fund was established in 1992 to assure the continuing success of the organization's programs.

If you wish to support NEOS, please write a check to the NEOS Educational Endowment Fund, P.O. Box 9165, Boston, MA 02114.

You may submit the name of a person(s) you wish to be honored or memorialized with your tax-deductible donation.

# Order Form for *Eye Insights*

Physician's Name: \_\_\_\_\_

Practice Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

**Fees**

100 or less..... \$2.00 per copy

101 to 200.....\$1.75 per copy

Over 200.....\$1.50 per copy

Quantity Requested \_\_\_\_\_ X \_\_\_\_\_ each

Total Enclosed \_\_\_\_\_

**Method of Payment:**

Visa     Mastercard     Check

*(Please make checks payable to New England Ophthalmological Society)*

Credit Card Number \_\_\_\_\_ Expiration Date \_\_\_\_\_

Please return form with payment to:

**New England Ophthalmological Society**

**PO Box 539 • Sudbury, MA 01776**

**Phone: 978-443-3826 • Fax: 978-443-5677**

Please note copies of *Eye Insights* may also be ordered  
on the NEOS website, [www.neos-eyes.org](http://www.neos-eyes.org).

**New England Ophthalmological Society**

Public Health and Education Committee

P.O. Box 539

Sudbury, MA 01776