Healthy Vision

Watch out for your vision.

NIH National Eye Institute

Watch out for your vision!

The National Eye Institute (NEI) conducts and supports research that leads to sight-saving treatments and plays a vital role in reducing vision loss and blindness. NEI is part of the National Institutes of Health (NIH), an agency of the U.S. Department of Health and Human Services.

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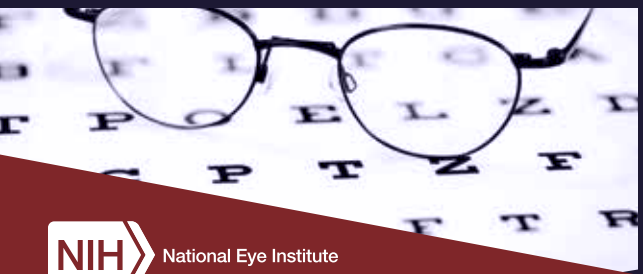
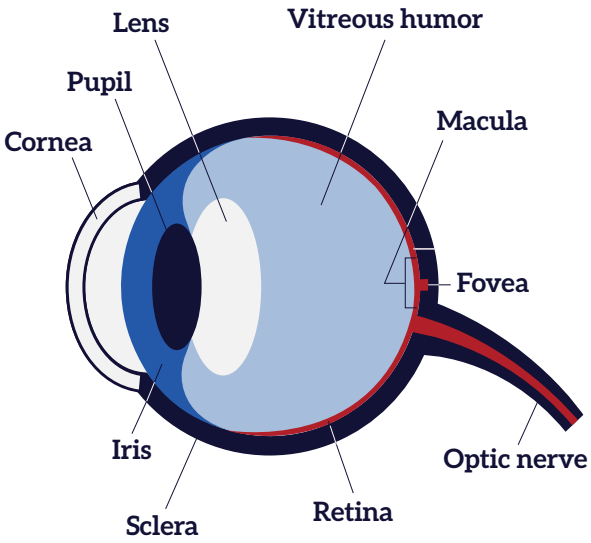


Your vision is very important.

Every year, millions of people have problems with their vision. Some of these problems cause permanent vision loss, even blindness. Some groups, such as Hispanics/Latinos and African Americans, are at a higher risk for vision loss because of their increased risk of diabetes, high blood pressure or high cholesterol. As people age, their risk also increases for eye diseases and conditions such as age-related macular degeneration, cataract, diabetic retinopathy, dry eye, glaucoma, and low vision.

But there are steps you can take to protect your vision. This booklet discusses the importance of early detection of eye disease in adults and offers general information on eye health for you and your family.

We often don't appreciate what we have until it's gone.



How we see

The eye has many parts that help create vision. For you to be able to see, light first passes through the **cornea**, the clear, dome-shaped surface that covers the front of the eye. The cornea bends, or refracts, the light entering the eye. Then, the **iris** (the colored part of the eye) adjusts the size of the **pupil**, the opening that controls how much light enters the eye. Behind the pupil is the **lens**. This clear part of the eye further focuses the light, onto the **retina**. The retina is a thin, delicate, light-sensitive tissue that has special **cells (photoreceptors)** that convert light into electrical signals. These electrical signals are processed and then travel from the retina to the brain via the **optic nerve**, which is made up of more than 1 million nerve fibers. We "see" with our brain, but our eyes start this complex process by collecting visual information.

Comprehensive dilated eye exams

Having regular, comprehensive dilated eye exams can help prevent vision loss. Early detection and timely treatment of eye diseases can help save your sight. In many cases, a comprehensive dilated eye exam is the only way to detect eye diseases that can cause blindness.

When was the last time you had an eye exam?

What is a comprehensive dilated eye exam?

A comprehensive dilated eye exam includes:

Pupil dilation:

An eye care professional places drops in your eyes to dilate, or widen, the pupils. The eye care professional then uses a special magnifying lens to examine your retina and look for signs of damage or other problems, like diabetic retinopathy or age-related macular degeneration. A dilated eye exam also lets the eye care professional see whether there is damage to the optic nerve, which happens to people who have glaucoma. After the exam, your close-up vision may be blurry for several hours.

Tonometry:

Tonometry is a test that helps detect glaucoma by measuring pressure within the eye. Your eye care professional may direct a small puff of air onto your eye or may gently place a pressure-sensitive tip near or against your eye. He or she may also insert numbing drops in your eye to perform this test. Having elevated eye pressure may be a sign of glaucoma.

Visual Field Test:

A visual field test measures your side, or peripheral, vision. This test helps your eye care professional determine whether you have lost side vision, a sign of problems affecting the optic nerve such as glaucoma.

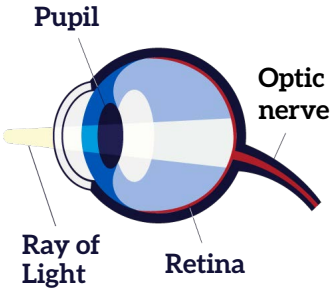
Visual Acuity Test:

A visual acuity test is an eye chart that measures how well you see at different distances.

Eye Health Tip:
Know your family's eye health history!

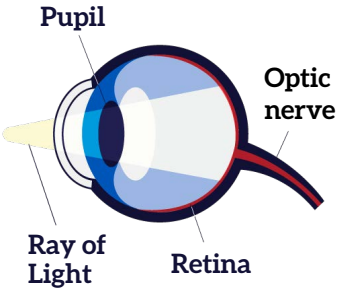
We get our eye color from our parents, but did you know that many eye diseases can run in families, too? Talking to your family members about their eye health can help you find out if you are at higher risk for eye disease. If you learn that eye diseases run in your family, talk to your eye doctor.

Undilated pupil



Portion of the retina that can be seen through an **undilated pupil**.

Dilated pupil



Portion of the retina that can be seen through a **dilated pupil**.

Diseases and conditions that can affect your vision

There are many eye diseases and conditions that can affect your vision. Some of the most common are described below. Always remember, it's important to talk with your eye care professional if you are having problems with your vision.

Diabetic eye disease

Everyone who has diabetes is at risk of developing diabetic eye disease. The longer a person has diabetes, the higher the chance that he/she will develop diabetic eye disease.

What is diabetic eye disease?

Diabetic eye disease refers to a group of eye conditions that people who have diabetes can develop. If not treated, all of these conditions can cause severe vision loss or even blindness.

Diabetic eye disease may include:

- Diabetic retinopathy
- Cataracts
- Glaucoma

Cataract and glaucoma can also affect many people who don't have diabetes.

Diabetic Retinopathy

What is diabetic retinopathy?

Diabetic retinopathy is the most common diabetic eye disease. It is caused by changes in the blood vessels of the retina. In some people with diabetic retinopathy, the blood vessels of the retina can swell and leak fluid. In other people, new, abnormal blood vessels can grow on the surface of the retina. These changes can cause vision loss or blindness. Nearly half of all people who have diabetes will develop some degree of diabetic retinopathy in their lifetime.

What are the symptoms?

Often, there are no symptoms or pain at the beginning of the disease, and it is possible your vision won't change until the disease has advanced.

Blurry vision can occur when the **macula**—the portion of the retina that provides sharp, central vision—swells from the leaking fluid. This condition is called **macular edema.** If new blood vessels grow on the retina, they can bleed inside the eye, blocking vision. Even in advanced cases, the disease can progress for a long time without symptoms. This is why it is so important to get an eye exam at least once a year if you have diabetes.

How can it be treated?

There are many different treatment options for diabetic retinopathy. In some types of treatment, your eye doctor will inject corticosteroids or other medicines directly into your eye. Other types of treatment, like focal/grid laser surgery and scatter laser treatment, use strong beams of light to reduce swelling and stop blood vessels from leaking.

However, treatment is often unable to restore vision that has already been lost. So, the best way to prevent vision loss from diabetic retinopathy is through early detection and treatment.

Can diabetic retinopathy be prevented?

Not completely, but you can significantly reduce your risk. If you control your diabetes (your blood sugar levels), you can often delay the onset and progress of diabetic retinopathy and reduce the need for treatment.

Other studies have shown that controlling high blood pressure and high cholesterol can reduce the risk of vision loss. Controlling these factors will help your overall health and help protect your vision.

Glaucoma

What is glaucoma?

Glaucoma is a group of diseases that can damage the optic nerve and cause vision loss or blindness. However, you can protect your eyes against severe vision loss with early diagnosis and treatment.

Glaucoma can occur in one or both eyes. The most common form of this disease is open-angle glaucoma. Open-angle glaucoma happens when pressure builds up in the eye and the optic nerve is damaged.

Who is most likely to develop glaucoma?

Although anyone can develop glaucoma, high-risk groups include:

- African Americans ages 40 and older
- People over age 60, especially Hispanics/Latinos
- People with a family history of glaucoma

What causes it?

When you have glaucoma, fluid in the eye drains too slowly. When the fluid builds up, the pressure within the eye increases. If this pressure isn't controlled, it can damage the optic nerve and other parts of the eye, causing vision loss. This is why controlling pressure in the eye is important.

Although having increased eye pressure means you are at risk for developing glaucoma, it does not mean you have the disease. A person has glaucoma only if the optic nerve is damaged.

Not everyone with increased eye pressure will develop glaucoma. Some people can tolerate increased eye pressure better than others. Developing glaucoma depends on how much pressure your optic nerve can tolerate without being damaged. This amount is different for everyone. In addition, glaucoma can develop even without increased eye pressure. This is why getting a comprehensive dilated eye exam is so important. An eye exam can help your eye care professional determine what amount of pressure is normal for your eye.

What are the symptoms?

At first, there are no symptoms. Your vision remains normal and you feel no pain. But if the disease progresses without treatment, little by little, you will lose your side vision. That is, you will be able to see the objects in front of you clearly, but not those to the side and out of the corner of your eye. It may seem as if you are looking through a tunnel. With time, your straight-ahead, or central, vision may decrease until no vision is left.

How can it be treated?

Although open-angle glaucoma cannot be cured, it can usually be controlled. The most common treatment options include medications, such as prescription eye drops or pills, or laser or conventional surgery.

Eye Health Tip:
Eat right to protect your sight.

It's true: carrots **are** good for your eyes! Eating plenty of fruits and vegetables — especially dark leafy greens like spinach, kale, or collard greens — is important for keeping your eyes healthy. Research also shows that eating fish high in omega-3 fatty acids — like salmon, tuna, and halibut — can help protect your vision.

Age-related macular degeneration

What is age-related macular degeneration?

Age-related macular degeneration is a common eye disease related to aging that affects central vision. If you have age-related macular degeneration, doing tasks that require straight-ahead vision, like reading and driving, may be difficult. Age-related macular degeneration affects the macula, the small, sensitive portion of the retina that provides sharp, central vision.

Who is most likely to develop this disease?

You are at higher risk for developing age-related macular degeneration if you are over age 60. In some people, age-related macular degeneration progresses slowly and doesn't noticeably affect their vision as they age. In others, this disease progresses quickly and can cause vision loss in one or both eyes.

How can it be treated?

Research studies have shown that certain vitamins and minerals can help delay the progress of age-related macular degeneration in some patients. Those with the advanced form of AMD may be treated with injections, photodynamic therapy, and laser surgery.

Vision affected by cataract

Cataract

What is cataract?

A cataract is the clouding of the lens of the eye. The lens is located behind the iris and pupil; it focuses light onto the retina, which is at the back of the eye. The retina transforms this light into nerve signals and sends them to the brain. To produce a clear image, the lens must remain transparent. A cataract can occur in one or both eyes.

Who is most likely to develop this disease?

If you are over age 60 or have diabetes, you are at higher risk for developing a cataract.

How can it be treated?

Cataracts are treated with surgery. During the procedure, the surgeon removes the cloudy lens and, in most cases, replaces it with a clear, artificial lens. This surgery has a high rate of success in restoring vision.

Common vision problems

Refractive errors such as **myopia**, **hyperopia**, **presbyopia**, and **astigmatism** are common types of vision problems. Most people have one or more of these types of vision problems, and they are easily corrected with eyeglasses or contact lenses. Some people choose to have refractive surgery.

What is myopia (nearsightedness)?

If you have myopia, objects that are close to you are easy to see, but those that are far away look blurry. Myopia occurs when the eyeball is too long to let light focus clearly on the retina. There are different degrees of myopia, from mild to severe. The higher degree of myopia you have, the blurrier you will see far-away objects and the closer you will need nearby objects to be to see them clearly.

What is hyperopia (farsightedness)?

If you have hyperopia, objects that are far from you are easy to see, but those that are close look blurry. Hyperopia occurs when the eyeball is too short to let light focus clearly on the retina.

What is presbyopia?

If you have presbyopia, your ability to focus has lessened because of age. Most people are between ages 40 and 50 when they first notice that they are losing the ability to see nearby objects or read. The print in a book or newspaper is “too small” to read.

People with presbyopia need to hold objects farther from their eyes to be able to read them clearly. Meanwhile, their ability to see far-away objects remains normal.

What is astigmatism?

If you have astigmatism, you have a common eye irregularity that prevents the eye from focusing clearly. This occurs when the surface of the cornea is oval-shaped rather than perfectly round. The cornea plays an important role in how the eye focuses. Astigmatism rarely occurs on its own; it nearly always occurs with either myopia or hyperopia.

Eye Health Tip:
Be cool and wear your shades.

Sunglasses look great, but they also have an important job to do: protecting your eyes from the sun’s ultraviolet (UV) rays. When shopping for sunglasses, look for ones that block out 99 to 100 percent of both UV-A and UV-B radiation.

How to talk with your eye care professional

Patients are encouraged to actively participate in their own health care. You and your eye care professional can work together to improve your eye health and overall quality of life. Having good communication is an important part of this relationship.

Here are a few questions you can ask your eye care professional to get the conversation started:

- Am I at risk for developing an eye disease?
- What can I do to protect my vision?
- Where can I get help if my vision is already affected?
- Where can I find support to cope with my vision problems or vision loss?

Understanding your eye care professional's responses is key for ensuring good communication. Here are some suggestions:

- If you do not understand your eye care professional's responses, keep asking questions until you do.
- Take notes or ask a friend or family member to do it for you. You can also use a recording device to help you remember what your eye care professional said.
- Ask your eye care professional for written instructions.
- If you receive a diagnosis, ask your eye care professional for a handout with information about the condition.
- If you are still having a difficult time understanding your eye care professional's responses, ask him or her where you can get more information.

- If English is your second language, ask for information in your native language. You may also ask for an interpreter or translator who can also help you understand what the eye care professional is saying.

Eye Care: Myths and Facts

Myth: Reading in dim light can harm your eyes.

Fact: Although reading in dim light can make your eyes feel tired, it is not harmful.

Myth: Using a computer or a monitor can harm your eyes.

Fact: Although using a monitor is associated with eye fatigue, it does not harm your eyes.

Myth: If you use your eyes too much, they will wear out.

Fact: Eyes can't be worn out. You can use them as much as you want.

Myth: Sitting too close to the TV is bad for your eyes.

Fact: There is no scientific evidence indicating that sitting too close to the TV is bad for your eyes.

Myth: If you need eyeglasses, your eyes aren't healthy.

Fact: Needing eyeglasses has nothing to do with the health of your eyes. You simply have a variation in the normal size or shape of the eye or a change that often occurs with age.

Myth: People do not get eye diseases until they are in their 40s or 50s.

Fact: Eye disease can happen at any time. As we age, our eyes are more prone to disease.

Myth: If you eat a lot of carrots, your eyes will be healthy and you'll have good vision.

Fact: Good nutrition is important for your health in general, including your eyes. Carrots have vitamin A, which is needed in small quantities for good eye function. A balanced diet contains all the vitamin A that a person needs. Too much vitamin A could be harmful. Eating a diet rich in fruits and vegetables, particularly dark leafy greens such as spinach, kale, or collard greens is important for keeping your eyes healthy, too. Research has also shown there are eye health benefits from eating fish high in omega-3 fatty acids, such as salmon, tuna, and halibut.

Eye Health Tip:
Give your eyes a rest.

If you spend a lot of time at the computer or focusing on another specific thing, you may sometimes forget to blink — and that can tire out your eyes. Try the 20-20-20 rule: Every 20 minutes, look away about 20 feet in front of you for 20 seconds. This can reduce eyestrain and help your eyes feel better at the end of the day!

Glossary

Age-related macular degeneration
An eye disease that causes the loss of central vision (the vision we use to see straight ahead). It is the most common reason for vision loss among older adults in the United States.

Astigmatism
A common irregularity of the eye that prevents the eye from focusing clearly. This irregularity occurs when the surface of the cornea is oval-shaped rather than perfectly round.

Cataract
A clouding of the lens of the eye. People with cataract see as if through a haze. During a safe and successful surgery, the cloudy lens is replaced with an artificial lens.

Cornea
The clear, dome-shaped surface that covers the front of the eye. It protects the eye and helps focus light on to the retina.

Diabetes
A group of chronic diseases that result in too much sugar in the blood, which can cause vision loss.

Diabetic retinopathy
The most common diabetic eye disease caused by damage to the blood vessels in the retina. This eye disease is caused by diabetes and can result in vision loss or blindness.

Eye care professional
An ophthalmologist or optometrist.

Glaucoma
A group of diseases that can damage the optic nerve and cause vision loss and blindness. Glaucoma affects peripheral, or side, vision.

Hyperopia (or farsightedness)
When objects that are far can be seen more clearly than objects that are near. It occurs when the eyeball is too short.

Iris
The colored part of the eye that controls the amount of light that enters the eye.

Lens
The clear part behind the iris that helps focus light onto the retina and allows the eye to focus on objects near and far.

Macula
The small, sensitive portion of the retina that provides sharp, central vision.

Macula edema
Occurs when fluid from damaged blood vessels leak within the macula. This fluid causes the macula to swell and vision to become blurry.

Myopia (or nearsightedness)
When objects that are close can be seen more clearly than objects that are far. It occurs when the eyeball is too long.

Ophthalmologist
A medical doctor who diagnoses and treats all eye diseases and disorders, performs surgery, and prescribes eyeglasses and contact lenses.

Optic nerve
A bundle of more than 1 million nerve fibers that transmit visual messages from the eyes to the brain.

Optometrist
A primary eye care provider who diagnoses and treats most eye diseases and disorders, and who prescribes eyeglasses and contact lenses.

Photoreceptors
Cells in the retina that convert light into electrical impulses and transmit these messages to the brain.

Presbyopia
A loss in the eye's ability to focus because of age.

Pupil
The opening at the center of the iris that controls how much light enters the eye.

Retina
The light-sensitive tissue that lines the back of the eyeball and sends electrical impulses to the brain through the optic nerve.

Additional resources

If you have been diagnosed with one of the eye diseases mentioned in this booklet and would like more information, contact:

National Eye Institute
National Institutes of Health
2020 Vision Place
Bethesda, MD 20892-3655
301–496–5248
Email: 2020@nei.nih.gov
You can also visit our website: www.nei.nih.gov

American Academy of Ophthalmology
P.O. Box 7424
San Francisco, CA 94120-7424
415–561–8500
www.aao.org

American Optometric Association
243 N. Lindbergh Boulevard
St. Louis, MO 63141–7881
1–800–365–2219
www.aoa.org

Centers for Medicare & Medicaid Services
7500 Security Boulevard
Baltimore, MD 21244
1–800–Medicare (1–800–633–4227)
www.cms.gov

Prevent Blindness
211 West Wacker Drive
Suite 1700
Chicago, IL 60606
1–800–331–2020
Email: info@preventblindness.org
www.preventblindness.org

Additional online resources:

Centers for Disease Control and Prevention–A-Z Index
A tool to find specific information quickly
www.cdc.gov/az/a.html

healthfinder
A guide to reliable health information
www.healthfinder.gov

MedlinePlus
Information on health from the National Library of Medicine
National Institutes of Health
www.medlineplus.gov

For more information about NEI, contact:

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