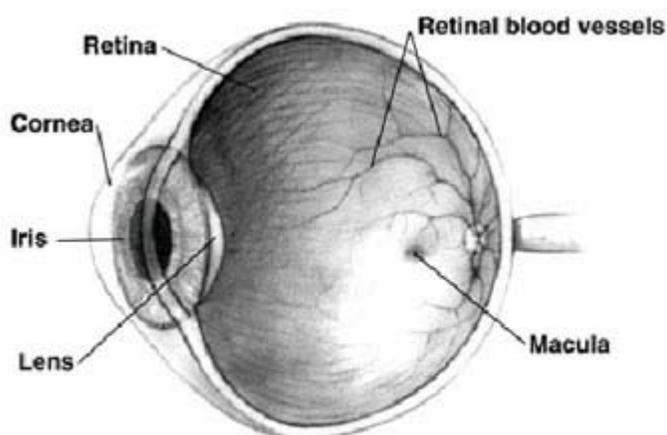


Age-Related Macular Degeneration

This pamphlet is designed to help people with age-related macular degeneration and their families better understand the disease. It describes the causes, symptoms, diagnosis, and treatment of age-related macular degeneration.

Age-related macular degeneration (AMD) is a disease that affects your central vision. It is a common cause of vision loss among people over age of 60. Because only the center of your vision is usually affected, people rarely go blind from the disease. However, AMD can sometimes make it difficult to read, drive, or perform other daily activities that require fine, central vision.



What is the macula?

The macula is in the center of the **retina**, the light-sensitive layer of tissue at the back of the eye. As you read, light is focused onto your macula. There, millions of cells change the light into nerve signals that tell the brain what you are seeing. This is called your **central vision**. With it, you are able to read, drive, and perform other activities that require fine, sharp, straight-ahead vision.

How does AMD damage vision?

AMD occurs in two forms:

Dry AMD affects about 90 percent of those with the disease. Its cause is unknown. Slowly, the light sensitive cells in the macula break down. With less of the macula working, you may start to lose central vision in the affected eye as the years go by. Dry AMD often occurs in just one eye at first. You may get the disease later in the other eye. Doctors have no way of knowing if or when both eyes may be affected.

Wet AMD--Although only 10 percent of all people with AMD have this type, it accounts for 90 percent of all severe vision loss from the disease. It occurs when new blood vessels behind the retina start to grow toward the macula. Because these new blood vessels tend to be very fragile, they will often leak blood and fluid under the macula. This causes rapid damage to the macula that can lead to the loss of central vision in a short period of time.

Who is at risk for AMD?

Although AMD can occur during middle age, the risk increases as a person gets older. Results of a large study show that people in their 50s have about a two percent chance of getting AMD. This risk

rises to nearly 30 percent in those over age 75. Besides age, other AMD risk factors include:

Gender--Women may be at greater risk than men, according to some studies.

Smoking--Smoking may increase the risk of AMD.

Family History--People with a family history of AMD may be at higher risk of getting the disease.

Cholesterol--People with elevated levels of blood cholesterol may be at higher risk for wet AMD.

What are the symptoms of AMD?

Neither dry nor wet AMD causes any pain. The most common symptom of dry AMD is slightly blurred vision. You may need more light for reading and other tasks. Also, you may find it hard to recognize faces until you are very close to them.

As dry AMD gets worse, you may see a blurred spot in the center of your vision. This spot occurs because a group of cells in the macula have stopped working properly. Over time, the blurred spot may get bigger and darker, taking more of your central vision.

People with dry AMD in one eye often do not notice any changes in their vision. With one eye seeing clearly, they can still drive, read, and see fine details. Some people may notice changes in their vision only if AMD affects both of their eyes.

An early symptom of wet AMD is that straight lines appear wavy. This happens because the newly formed blood vessels leak fluid under the macula. The fluid raises the macula from its normal place at the back of the eye and distorts your vision. Another sign that you may have wet AMD is rapid loss of your central vision. This is different from dry AMD in which loss of central vision occurs slowly. As in dry AMD, you may also notice a blind spot.



Normal Vision



The same scene as it might be viewed by a person with AMD.

If you notice any of these changes in your vision, contact your eye care professional at once for an eye exam.

How is AMD detected?

Eye care professionals detect AMD during an eye examination that includes:

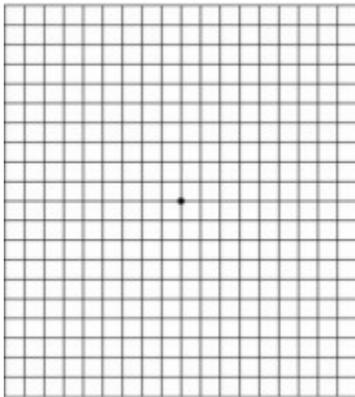
Visual acuity test: This eye chart test measures how well you see at various distances.

Pupil dilation: This examination enables your eye care professional to see more of the retina and look for signs of AMD. To do this, drops are placed into the eye to dilate (widen) the pupil. After the examination, your vision may remain blurred for several hours.

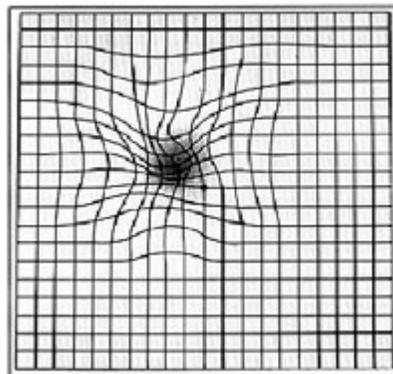
One of the most common early signs of AMD is the presence of **drusen**. Drusen are tiny yellow deposits in the retina. Your eye care professional can see them during an eye examination. The presence of drusen alone does not indicate a disease, but it might mean that the eye is at risk for developing more severe AMD.

While conducting the examination, your eye care professional may ask you to look at an **Amsler grid**. This grid is a pattern that resembles a checkerboard. You will be asked to cover one eye and stare at a black dot in the center of the grid. While staring at the dot, you may notice that the straight lines in the pattern appear wavy to you. You may notice that some of the lines are missing. These may be signs of wet AMD (See **Amsler Grid** below.)

If your eye care professional suspects you have wet AMD, you may need to have a test called **fluorescein angiography**. In this test, a special dye is injected into a vein in your arm. Pictures are then taken as the dye passes through the blood vessels in the retina. The photos help your eye care professional evaluate leaking blood vessels to determine whether they can be treated.



Amsler grid Normal



Amsler grid with AMD

On the left is what an Amsler grid normally looks like, and the illustration on the right is how it might look to someone with AMD. These grids are reduced in size; ask your doctor for a full-size grid to use at home.

How is AMD treated?

Dry AMD currently cannot be treated. But this does not mean that you will lose your sight. Fortunately, dry AMD develops very slowly. You may lose some of your central vision over the years. However, most people are able to lead normal, active lives--especially if AMD affects only one eye.

Some cases of wet AMD can be treated with laser surgery. The treatment involves aiming a high energy beam of light directly onto the leaking blood vessels. Laser treatment is more effective if the leaky blood vessels have developed away from the **fovea**--the central part of the macula. But even if the blood vessels are growing right behind the fovea, the treatment can be of some value in stopping further vision loss.

Another treatment for wet AMD is Visudyne therapy. In this procedure, a light-activated drug known as Visudyne is injected into the patient's bloodstream. Once the drug reaches the retina, it is activated by a non-thermal laser (A laser that does not burn the retina). This produces a clot that closes the abnormal vessels without causing damage to the overlying sensory retina. The abnormal blood vessel may return after several months. However, Visudyne therapy can be reapplied at up to 3 month intervals if necessary.

How is laser surgery preformed?

Laser surgery is performed in your eye care professional's office or eye clinic. Before the surgery, he or she will: (1) dilate your pupil and (2) apply drops to numb the eye. In some cases, he or she also may numb the area behind the eye to prevent any discomfort.

The lights in the office will be dim. As you sit facing the laser machine, your eye care professional will hold a special lens to your eye. You may see flashes of light.

You can leave the office once the treatment is done, but you will need someone to drive you home. Because your pupils will stay dilated for a few hours, you also should bring a pair of sunglasses.

For the rest of the day, your vision may be a little blurry. Your eye may also hurt a bit. This is easily controlled with drugs that your eye care professional can suggest.

You will need to make frequent follow-up visits. During each exam, you may have fluorescein angiography to make sure that the blood vessels are not still leaking, or that new blood vessels have not developed. If the vessels continue to leak, you might need some more laser surgery. It is important to realize that laser surgery is not a cure for AMD. It is only a treatment to help stop further vision loss. The risk of new blood vessels growing back after laser treatment is relatively high.

What research is being done?

The National Eye Institute (NEI) is the Federal government's lead agency for vision research. The NEI is supporting a number of research studies both in the laboratory and with patients to learn more about the cause of AMD. This research should provide better ways to detect, treat, and prevent vision loss in people with the disease.

There is some suggestion that certain vitamins and minerals may play a role in the treatment of AMD. This treatment needs much more research before scientists can know for sure if it is helpful. The NEI is currently sponsoring the Age-Related Eye Disease Study to provide clear information on whether vitamin or mineral supplements are of any benefit.

Scientists have begun to study the possibility of transplanting healthy cells into a diseased retina. Although this work is at a very early stage and still experimental, someday it may help people keep their vision or restore some lost vision.

What can you do to protect your vision?

Dry AMD. If you have dry AMD, you should have your eyes examined through dilated pupils at least once a year. This will allow your eye care professional to monitor your condition and check for other eye diseases as well.

You should also obtain an Amsler grid from an eye care professional to use at home. This will provide you with a quick and inexpensive test to evaluate your vision each day for signs of wet AMD. It works best for people who still have good central vision. You should check each eye

separately--cover one eye and look at the grid, then cover your other eye and look at the grid. You also may want to check your vision by reading the newspaper, watching television, and just looking at people's faces. If you detect any changes, you should have an eye exam.

Wet AMD. If you have wet AMD, it is important not to delay laser surgery if your eye care professional advises you to have it. After surgery, you will need to have frequent eye examinations to detect any recurrence of leaking blood vessels. Studies show that people who smoke have a greater risk of recurrence than those who don't.

In addition, you should continue to check your vision (at home with the Amsler grid or other methods) as described under dry AMD and schedule an eye exam immediately if you detect any changes.

What can you do if you have already lost vision to AMD?

Normal use of your eyes will not cause further damage to your vision. Even if you have lost sight to AMD, you should not be afraid to use your eyes for reading, watching TV, and other usual activities.

Low vision aids are available to help you make the most of your remaining vision. Low vision aids are special lenses or electronic systems that make images appear larger. If you need low vision aids, your eye care professional can often prescribe them or refer you to a low vision specialist.