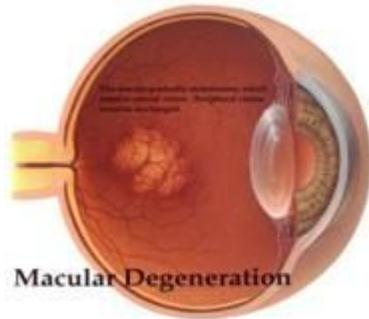


Age-Related Macular Degeneration (AMD)

What is AMD?



Age-related macular degeneration (AMD) is a disease associated with aging that gradually destroys sharp, central vision. Central vision is needed for seeing objects clearly and for common activities of daily living such as reading and driving.

AMD affects the macula, the part of the eye that allows you to see fine detail. AMD causes no pain.

In some cases, AMD advances so slowly that people notice little change in their vision. In others, the disease progresses faster and may lead to a loss of vision in both eyes. AMD is a leading cause of vision loss in patients 60 years of age and older.

AMD occurs in two forms: dry and wet.

Where is the macula?

The macula is located in the center of the **retina**, the light-sensitive tissue at the back of the eye. The retina instantly converts light, or an image, into electrical impulses. The retina then sends these impulses, or nerve signals, to the brain.

What is dry AMD?



Dry AMD occurs when the light-sensitive cells in the macula slowly break down, gradually blurring central vision in the affected eye. As dry AMD gets worse, you may see a blurred spot in the center of your vision. Over time, as less of the macula functions, central vision is gradually lost in the affected eye.

The most common symptom of dry AMD is slightly blurred vision. You may have difficulty recognizing faces. You may need more light for reading and other tasks. Dry AMD generally affects both eyes, but vision can be lost in one eye while the other eye seems unaffected.

One of the most common early signs of dry AMD is drusen.

If you have vision loss from dry AMD in one eye only, you may not notice any changes in your overall vision. With the other eye seeing clearly, you still can drive, read, and see fine details. Sometimes, you may notice changes in your vision only if AMD affects both eyes. If blurriness occurs in your vision, see an eye care professional for a comprehensive dilated eye exam. Ninety percent of all people with AMD have the dry form of AMD.

What is Wet AMD?



Wet AMD occurs when abnormal blood vessels behind the retina start to grow under the macula. These new blood vessels tend to be very fragile and often leak blood and fluid under and within the macula. Damage to the macula occurs rapidly.

With wet AMD, loss of central vision can occur quickly. An early symptom of wet AMD is that straight lines appear wavy or distorted. If you notice this condition or other changes to your vision, contact your eye care professional at once. You need a comprehensive dilated eye exam.

Who is at risk for AMD?

The greatest risk factor is age. Although AMD may occur during middle age, studies show that people over age 60 are clearly at greater risk than other age groups. For instance, a large study found that people in middle-age have about a 2 percent risk of getting AMD, but this risk increased to nearly 30 percent in those over age 75 years.

Other risk factors include:

- **Smoking.** Smoking may increase the risk of AMD.
- **Obesity.** Research studies suggest a link between obesity and the progression of early and intermediate stage AMD to advanced AMD.
- **Race.** Caucasians are much more likely to lose vision from AMD than African Americans.
- **Family history.** Those with immediate family members who have AMD are at a higher risk of developing the disease.
- **Gender.** Women appear to be at greater risk than men.

Can my lifestyle make a difference?

Your lifestyle can play a role in reducing your risk of developing AMD.

- Eat a healthy diet high in green leafy vegetables and fish.
- Do not smoke or stop smoking.
- Maintain normal blood pressure.
- Watch your weight.
- Exercise.

Symptoms and Detection

What are the symptoms of AMD?

Both dry and wet AMD cause no pain.

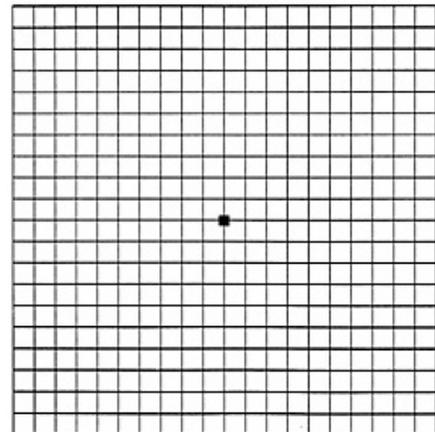
For dry AMD: the most common early sign is blurred vision. As fewer cells in the macula are able to function, people will see details less clearly in front of them, such as faces or words in a book. Vision often will improve in brighter light. If the loss of these light-sensitive cells progresses, people may see a small blind spot in the middle of their field of vision which may enlarge over time.

For wet AMD: the classic early symptom is that straight lines appear crooked. This results when fluid from the leaking blood vessels gathers and lifts the macula, distorting vision. A small blind spot may also appear in wet AMD, resulting in loss of one's central vision.

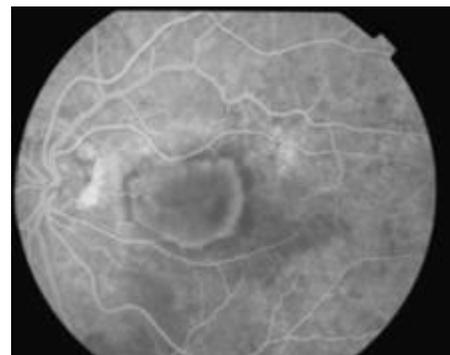
How is AMD detected?

Your eye care professional may suspect AMD if you are over age 60 years and have had recent changes in your central vision. To look for signs of the disease, he or she will use eye drops to dilate, or enlarge, your pupils. Dilating the pupils allows your eye care professional to view the back of the eye better. **DO NOT** depend on the grid displayed here for any diagnoses – check with your eye care professional.

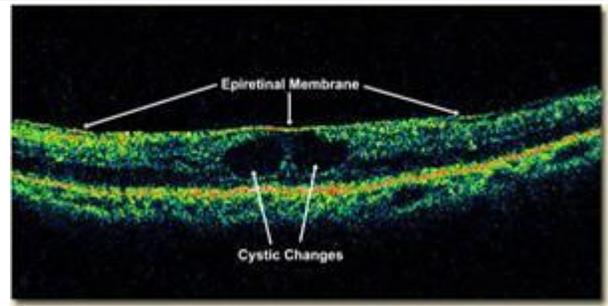
During an eye exam, you may be asked to look at an **Amsler grid**. The pattern of the grid resembles a checkerboard. You will cover one eye and stare at a black dot in the center of the grid. While staring at the dot, you may notice that the straight lines in the pattern appear wavy. You may notice that some of the lines are missing. These may be signs of AMD.



Your eye care professional may also do other tests to learn more about the structure and health of your eye. Certain tests are sometimes needed to assess the degree of damage in the retina if certain abnormalities are detected on the dilated eye exam. A **fluorescein angiogram** may be ordered at the hospital. In this test, a special dye is injected into your arm. Pictures are taken as the dye passes through the blood vessels in your retina. The test allows your eye care professional to identify any leaking blood vessels and recommend treatment.



Also, more advanced retinal imaging with **Optical Coherence Tomography (OCT)** is often recommended to visualize the cross-sectional profile of the retina.



Treatment

How is wet AMD treated?

The mainstay of treatment for wet AMD is now the injection of anti-vascular endothelial growth factor (anti-VEGF) agents into the eye. Ranibizumab (Lucentis) and aflibercept (Eylea) are anti-VEGF agents approved for use in the treatment of AMD. The injection is performed in the office and is well tolerated with topical anesthetic gel. However, these medications do not provide a cure and vision loss may progress despite treatment. Patients will often require multiple injections that may be needed as frequently as once a month, to help control the disease. With a course of anti-VEGF treatment, vision will stabilize in approximately 90-95% of patients and approximately 30-40% of patients will experience a significant improvement in vision. Treatment is very safe but it is common to have mild irritation after an injection which can be soothed with artificial tears. A bruise on the eye over the injection site may also occur. Serious adverse events such as retinal detachment or infection (endophthalmitis) are rare. Although the risk of endophthalmitis is less than 1 in 1000 injections, it can cause blindness. Symptoms of infection include vision loss, pain and redness. If you develop any of these symptoms, call your doctor immediately. Other treatment options such as thermal laser or photodynamic therapy (PDT) are rarely used anymore.

How is dry AMD treated?

Once dry AMD reaches the advanced stage, no form of treatment can prevent vision loss. However, treatment can delay and possibly prevent intermediate AMD from progressing to the advanced stage, where significant vision loss occurs.

The [Age-Related Eye Disease Study \(AREDS\)](#) found that taking a specific high-dose formulation of antioxidants and zinc significantly reduces the risk of advanced AMD and its associated vision loss. Slowing the progression of AMD from the intermediate stage to the advanced stage will save vision in many people.

Age-Related Eye Disease Study (AREDS)

What is the dosage of the AREDS formulation?

The specific daily amounts of antioxidants and zinc used by the study researchers were:

- 500 milligrams of vitamin C
- 400 International Units of vitamin E
- 80 milligrams of zinc as zinc oxide
- 2 milligrams of copper as cupric oxide

Copper was added to the AREDS formulation containing zinc to prevent copper deficiency anemia, a condition associated with high levels of zinc intake.

Who should take the AREDS formulation?

People who are at high risk for developing advanced AMD should consider taking the formulation. The AREDS formulation is not a cure for AMD. It will not restore vision already lost from the disease. However, it may delay the onset of advanced AMD. It may help people who are at high risk for developing advanced AMD keep their vision.

Can diet alone provide the same high levels of antioxidants and zinc as the AREDS formulation?

No. The high levels of vitamins and minerals are difficult to achieve from diet alone. However, previous studies have suggested that people who have diets rich in green leafy vegetables have a lower risk of developing AMD.

Can a daily multivitamin alone provide the same high levels of antioxidants and zinc as the AREDS formulation?

No. The formulation's levels of antioxidants and zinc are considerably higher than the amounts in any daily multivitamin. If you are already taking daily multivitamins and your doctor suggests you take the high-dose AREDS formulation, be sure to review all your vitamin supplements with your doctor before you begin. Because multivitamins contain many important vitamins not found in the AREDS formulation, you may want to take a multivitamin along with the AREDS formulation. For example, people with osteoporosis need to be particularly concerned about taking vitamin D, which is not in the AREDS formulation.

How can I take care of my vision now that I have AMD?

Dry AMD. If you have dry AMD, you should have a comprehensive dilated eye exam at least once a year. Your eye care professional can monitor your condition and check for other eye diseases. If you have intermediate AMD in one or both eyes, or advanced AMD in one eye only, your doctor may suggest that you take the AREDS formulation containing the high levels of antioxidants and zinc.

Because dry AMD can turn into wet AMD at any time, you should get an Amsler grid. Use the grid every day to evaluate your vision for signs of wet AMD. This quick test works best for people who still have good central vision. Check each eye separately. Cover one eye and look at the grid. Then cover your other eye and look at the grid. If you detect any changes in the appearance of this grid or in your everyday vision while reading the newspaper or watching television, get a comprehensive dilated eye exam.

Wet AMD. If you have wet AMD and your doctor advises treatment, do not wait. Studies show that people who smoke have a greater risk of recurrence than those who do not. In addition, check your vision at home with the Amsler grid. If you detect any changes, schedule an eye exam immediately.

What can I do if I have already lost some vision from AMD?

If you have lost some sight from AMD, do not be afraid to use your eyes for reading, watching TV, and other routine activities. Normal use of your eyes will not cause further damage to your vision.

If you have lost some sight from AMD, ask your eye care professional about low vision services and devices that may help you make the most of your remaining vision. Ask for a referral to a specialist in low vision.