

# Age-Related Macular Degeneration

## Making a Difference Today

As you grow older, you may some day notice your vision becoming blurry or distorted. Straight lines appear wavy, and it becomes more difficult to recognize familiar faces. These signs may point to age-related macular degeneration, or AMD, the leading cause of blindness and vision impairment among older Americans.

AMD is a form of neurodegeneration that affects the light-sensitive nerve cells in the retina at the back of the eye. AMD causes nerve cells in the macula, the central region of the retina, to break down, and abnormal deposits accumulate beneath the retina. In about 10 percent of cases, the condition worsens as abnormal blood vessels grow underneath the retina. Blood may leak from these vessels and cause a macular scar to form; this destroys central vision for reading and driving. Many elderly people with AMD become socially isolated from friends and family and can no longer participate in the activities they once enjoyed.

An estimated 1.75 million Americans 40 or older have advanced AMD, and several million more are at risk. With the country's population rapidly aging, the number with the severe, advanced form of AMD is expected to rise to nearly 3 million by 2020 unless better preventive treatments emerge. The latest available economic data compiled in 2003 found that, taken together, AMD and all other forms of visual disorders and disabilities cost the United States about \$70 billion.

### Research Breakthroughs

Thanks to work supported by the National Institutes of Health (NIH), scientists have made rapid advances in understanding AMD and are beginning to develop new treatments for it. Getting older remains the strongest risk factor, but scientists now know that AMD results from a complex interaction among genetic and environmental factors. Smoking increases the risk. In addition, Caucasian people and those who are overweight or have a family history of AMD disease are at greater risk of developing AMD.

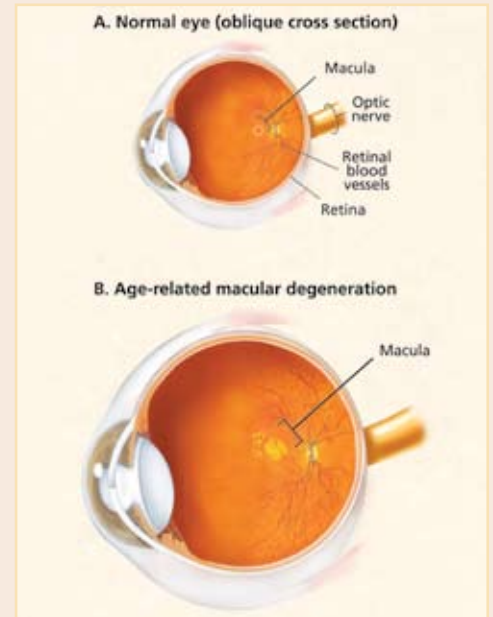
One recent NIH study, conducted at the National Eye Institute, found that supplementing the diet with high levels of antioxidants and zinc reduced patients' risk of developing the advanced form of AMD disease by about 25 percent.

The first drug to treat AMD was approved by the US Food and Drug Administration in 2000. When this drug is activated by the application of laser light, it eliminates the faulty blood vessels underneath the retina and reduces further loss of vision. Doctors also may treat the disease directly with laser surgery, destroying new blood vessels and sealing leaks.

### Promising Strategies

These treatments are most effective when used to treat certain vessel growth patterns. Unfortunately, this means they may be inappropriate for half those with the most serious cases. Even when effective, repeat treatments are often needed. Furthermore, current therapies do not reverse the disease, but only slow its progression. Fortunately, scientists are taking advantage of recent advances that have pinpointed a gene that contributes to the development of many AMD cases. This will lead to better ways to study the disease and to diagnostic tools that identify those at risk earlier. Government-supported research in this rapidly developing field is also leading to novel treatment approaches for AMD, such as gene silencing and gene therapy, and is aiding the development of new drugs that can help more people.

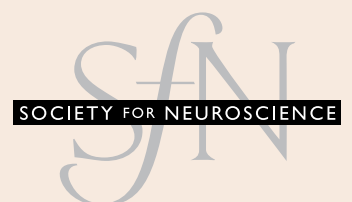
For more information please e-mail [brss@sfn.org](mailto:brss@sfn.org).



AMD forms when light-sensitive cells in the macula break down. The small, yellow deposits shown below form at early stages. In severe cases, leaky blood vessels form behind the retina and can lead to blindness.

### Continued funding for research could lead to:

- Tools to identify people at high risk of developing the disease at an earlier stage.
- New drug treatments benefiting a greater number of people with AMD.
- Treatments that could reverse the trend of the disease and perhaps help restore vision.



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# Age-Related Macular Degeneration

## Making a Difference Tomorrow

Although current treatments help many, doctors still cannot turn back the clock once damage to the eye occurs from age-related macular degeneration, or AMD. And as the US population ages, the number of those seeking treatment for this isolating condition will rise. Did you know that:

- 200,000 new cases of the most severe form of AMD are diagnosed each year.
- Nearly 3 million Americans are expected to have advanced AMD in 2020.

Already, funding from the National Institutes of Health (NIH) has led to important breakthroughs in the understanding and treatment of AMD, and continued support could lead to exciting advances benefiting the growing number of AMD sufferers.

### Research Brings Hope for the Future

In 2005, several government-supported laboratories simultaneously identified a genetic abnormality that accounts for up to 50 percent of AMD cases. These findings also point to an important role for inflammation in the progression of the disease, the focus of ongoing research. With this information, scientists will be able to develop better tools to study the disorder, and doctors could one day identify sooner those who might develop AMD.

Other research funded by NIH has advanced new kinds of treatments, including gene silencing, in which tiny fragments of genetic material block the production of unwanted proteins. Based on earlier work with animal models, two groups of researchers are now conducting clinical trials of gene silencing techniques targeting the production or activity of VEGF, a protein that encourages the growth of the new blood vessels that cause vision loss in advanced AMD.

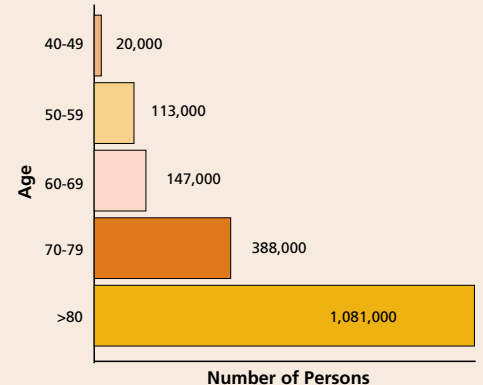
In addition, initial trials of a gene therapy technique, in which a desired gene is injected into the eye, show this treatment may be effective in stopping the progression of the disease.

Researchers hope that some day ongoing work on regenerating nerve cells, treatments targeting inflammation, and new drugs that act on VEGF will give more patients treatment options and even improve vision in advanced cases of the disease. AMD research is advancing quickly, and continued government support could lead to a better understanding of how the disease progresses, diagnostic tools that identify those at risk of developing the disease earlier, and to new treatments.

### Hope for Other Diseases

Scientists have found important similarities between deposits that form in the eye in AMD and deposits in the brain in age-related neurodegenerative diseases such as Alzheimer's and Parkinson's. The deposits are found in some types of kidney disease as well. Because the effects of treatments are easier to visualize in the eye, studies of AMD may lead to improved treatment of these other diseases. AMD is one of many diseases that will benefit from continued research into the mechanisms of inflammation. Additional NIH funding for basic research stands to aid Americans suffering from a wide variety of conditions.

Breakdown by age of the prevalence of advanced AMD in the United States



The graph above shows the breakdown by age of the 1.75 million cases of advanced AMD among those 40 and older in the United States. With the rapid aging of the population, it is estimated that there will be almost 3 million cases of advanced AMD by 2020.

### Already research has led to:

- An understanding of what major risk factors contribute to AMD.
- The approval of drugs used to treat AMD.
- The identification of a gene that contributes to nearly 50 percent of AMD cases.

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