

Patient information from the BMJ Group

Macular degeneration

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Macular degeneration

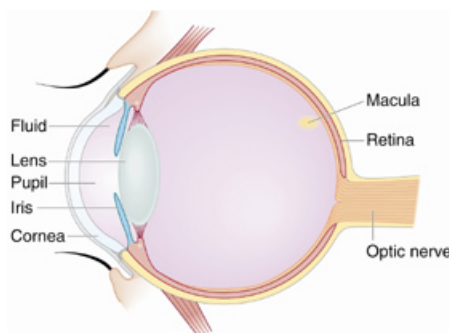
Macular degeneration is a common cause of poor eyesight in older people. It usually progresses slowly and almost never leads to total blindness. There's no cure for macular degeneration, but there are treatments that can help some people. There's also plenty you can do to make the most of the eyesight you have.

We've brought together the best research about macular degeneration and weighed up the evidence about how to treat it. You can use our information to talk to your doctor and decide which treatments are best for you.

What is macular degeneration?

If you are over 60, and your eyesight is getting patchy and blurred, you could have macular degeneration. People with macular degeneration find it harder to read, recognise people's faces, or make out fine detail.

The full name for macular degeneration in older people is **age-related macular degeneration**. It's also called AMD for short. Macular degeneration can affect younger people, but this is rare. It can also be caused by injury to the eye, **infections**, and **diabetes** (when it's called **diabetic retinopathy**). Here we deal with the disease that affects older people.



The macula is a part of your eye that helps you see things in fine detail.

The **macula** is part of your retina, the lining inside your eye that captures the images you see and sends them to your brain.

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The macula is a tiny area in the middle of the retina. It helps you see the fine detail of objects straight in front of you.

But sometimes the cells in the macula get damaged and no longer work properly. When this happens it's called macular degeneration. Eventually things in the middle of your vision may look blurred and distorted.

There are two stages of AMD: early and late.

Early AMD

In early AMD, fluffy white patches form in and around your macula. Doctors call these patches **drusen**.

The patches don't affect your eyesight, but your doctor or optician can see them during an eye examination.

Late AMD

In late AMD, your eyesight is affected. There are two types of late AMD: dry and wet.

- **Dry AMD** is more common. It affects more than 8 in 10 people who get AMD.^[1] Dry AMD progresses slowly. The fluffy white patches in your eye can gradually get bigger and join together. And the cells in the macula die. Dry AMD usually affects both your eyes. But the sight in one eye may get worse, while the other eye remains the same. You may get wet AMD.
- **Wet AMD** affects between 1 in 10 and 2 in 10 people who get AMD. It causes more rapid damage and serious sight problems than dry AMD. In wet AMD, besides the cells in the macula dying, tiny new blood vessels form at the back of your eye.^[2] The blood vessels leak blood and fluid into your eye and damage your sight even more.

Macular degeneration: why me?

We don't know why the macula sometimes stops working well as you get older. But a few things can increase the chances of this happening. You're more likely to get problems with your macula:^{[3] [4] [5] [6] [7]}

- If you smoke
- If you have high blood pressure
- If someone in your family has macular degeneration
- If you take aspirin daily. (But if you are taking daily aspirin to protect your heart, don't stop taking it without talking to your doctor).

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Some experts think macular degeneration is more common in women than in men. But we don't know for certain.

What are the symptoms of macular degeneration?

You won't notice when macular degeneration starts. But after a few years, objects in the middle of your vision will look blurred and distorted. You'll probably notice problems with reading first.

You may notice: ^[8]

- Blurry areas on a printed page of text
- Straight lines seem wavy or bent
- Things seem distorted when you look directly at them.

These problems make it harder to: ^[2]

- Read
- Drive
- Make out different colours
- Recognise people's faces
- Do fine handiwork such as embroidery or sewing.

Eventually after many years, a dark area or even a black hole can appear in the middle of your vision. You may not be able to see things that are straight in front of you.

AMD does not hurt.

How common is macular degeneration?

Macular degeneration is the most common cause of poor eyesight among older people.

In developed countries, poor eyesight from severe AMD affects: ^{[9] [10] [11] [2]}

- About 2 in 100 people over 50
- About 8 in 100 people over 65
- Up to 20 in 100 people over 85.

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What treatments work for macular degeneration?

If you have macular degeneration (also called age-related macular degeneration, or AMD), there aren't any treatments that will help you see normally again. But there are treatments that can help stop your sight getting worse, or even improve it.

Key points about treating macular degeneration

- Most treatments for late AMD are only for people with the wet form of the disease (where tiny blood vessels grow and leak in the back of the eye). Between 1 in 10 and 2 in 10 people with AMD have this kind of problem. (To learn more about the different kinds of AMD, see [What is macular degeneration?](#))
- Photodynamic treatment to destroy the new blood vessels in your eye may slow down your sight loss.
- There are some promising new treatments for wet AMD, such as pegaptanib, bevacizumab, and ranibizumab.
- High doses of vitamin C, vitamin E, beta-carotene, and zinc may help to slow down loss of sight in some people.

Which treatments work best? We've looked at the best research and given a rating for each treatment according to how well it works.

Treatment Group 1

Treatments for macular degeneration

Treatments that work

- [Ranibizumab \(Lucentis\) for wet AMD](#)
- [Pegaptanib \(Macugen\) for wet AMD](#)
- [Photodynamic treatment for wet AMD](#)

Treatments that are likely to work

- [Vitamin and mineral supplements](#)
- [Bevacizumab \(Avastin\) for wet AMD](#)

Treatments that work but whose harms may outweigh the benefits

- [Laser treatment for wet AMD](#)

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Treatments that need further study

- [Laser treatment for early AMD](#)
- [Low-power laser treatment for wet AMD](#)
- [Radiotherapy for wet AMD](#)
- [Anecortave acetate for wet AMD](#)

Treatments that are unlikely to work

- [Interferon injections for wet AMD](#)
- [Eye surgery](#)

What will happen to me?

Early macular degeneration generally gets worse slowly over five to ten years. Your eyesight will slowly get worse, especially in the middle of your vision. But you're likely to keep some of your sight.

In some people macular degeneration (also called age-related macular degeneration, or AMD) progresses quite slowly. In others it becomes worse much more quickly. But it's hard to say exactly what will happen to you. In one study, less than 1 in 5 people with early AMD progressed to the late, and more serious, form of the disease over three years. ^[12]

Late AMD stops you seeing objects in the middle of your vision properly. ^[8] But you should still be able to see things around the edge of your vision. Almost everyone with late AMD will still **see well enough to get around and look after themselves**.

Most treatments are designed to prevent or treat loss of eyesight caused by wet AMD. This is when blood vessels in the back of the eye leak and damage cells in the macula. If you already have wet AMD in one eye, you have about a 50 in 100 chance of getting it in the other eye eventually. ^[2]

There aren't many treatments for people who've got just dry AMD.

And there are no treatments that can help you see normally again. But there's lots you can do to help you cope with reduced sight and stay independent. You can use:

- Intensive lighting
- Magnifiers
- Pocket telescopes for reading approaching road signs or bus numbers

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- Software for your computer (to read out text, for example)
 - Techniques for seeing with the edge of your vision (peripheral vision).
-

Treatments:

Ranibizumab (Lucentis) for wet AMD

In this section

Ranibizumab (Lucentis) is an injection that you have in your eyeball. It is used to treat wet AMD. The drug stops new blood vessels growing at the back of the affected eye. It also dries up the blood vessels that already exist.

A study of more than 700 people showed these injections also lowered the chance of eyesight getting worse.^[13] In this study, 38 in 100 people who had a dummy treatment (a placebo) got much worse, compared to only 5 in 100 people who had Lucentis. After another year, 8 in 100 people taking ranibizumab had worse eyesight, compared with 47 in 100 people taking the placebo treatment.

Another study found that ranibizumab worked better than [photodynamic treatment](#).^[14]

Studies show that ranibizumab is unlikely to cause serious side effects that affect the whole body.^[15] But, in one study, some people got a serious eye infection after having treatment.^[13] This happened to 1 in 100 people. Another 1 in 100 people got swelling inside the eye.

The National Institute for Health and Care Excellence (NICE), which advises the government on healthcare, says ranibizumab should be available on the NHS for people with wet AMD, whose condition is showing signs of getting worse. But the NHS will only fund 14 injections of ranibizumab. The manufacturer of the drug has agreed to pay if a patient needs more than 14 injections.^[16]

Pegaptanib (Macugen) for wet AMD

In this section

Pegaptanib (Macugen) is an injection that you have in your eyeball. It is used to treat late AMD caused by tiny new blood vessels at the back of your eye (wet AMD). These blood vessels tend to leak and make your eyesight worse. Pegaptanib works by stopping these blood vessels growing.

Pegaptanib is not widely available in the UK. The National Institute for Health and Care Excellence (NICE), the government body that decides which treatments are available on the NHS, says pegaptanib doesn't work well enough to be used on the NHS. It doesn't work as well as ranibizumab (Lucentis).^[16]

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Pegaptanib injections are given every four weeks to six weeks. You get a local anaesthetic first, so the treatment shouldn't hurt.

A large study has found that these injections seem to lower the chances of your eyesight getting worse.^[17] Doctors looked at how many people's vision got much worse over a year, measured by losing more than 15 letters on an eye chart. It showed that, after a year, 45 in 100 of people who had a dummy treatment (a placebo) got much worse, compared to 30 in 100 people who had pegaptanib.

Pegaptanib doesn't seem to cause many side effects. But injections into your eye can cause swelling, pain, redness, and blurred vision.^[17] These problems usually go away after a short time.

Injections can also damage your retina or the lens in your eye, or cause a serious infection. It's possible that these things could seriously damage your sight. But they are rare.

The researchers looking at pegaptanib checked on people after two years.^[18] We don't know if there are any side effects for people who take it for longer.

You shouldn't be given pegaptanib injections if you've had a bad reaction to this treatment before. Some people have had serious allergic reactions after these injections, although this problem is rare.^[19] See your doctor straight away if your eye becomes red, sensitive to light, or painful, or if your sight changes in any way after your treatment.

Photodynamic treatment for wet AMD

In this section

Photodynamic treatment may help stop you from losing your sight. But this treatment is not suitable for everyone. It's only for people with late AMD who get new blood vessels growing at the back of the affected eye (called wet AMD). Only about 1 in 10 to 2 in 10 people with late AMD get wet AMD.^[2]

If you've got wet AMD, the new blood vessels can leak and make your eyesight worse. Photodynamic treatment destroys these blood vessels using a special dye. The dye is given through a drip (also called an intravenous infusion or IV). It's then activated by a cold laser shone into your eye. The treatment is painless and takes about 15 minutes. You may need more than one treatment.^{[20] [21]}

One summary of two good studies (called randomised controlled trials) found that photodynamic treatment helped to slow down sight loss.^[22] In one study:^[21]

- About 24 in 100 people who had photodynamic therapy had lost much of their eyesight two years later
- About 44 in 100 people who didn't have the treatment found that their eyesight got much worse.

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The people in these studies had reasonably poor eyesight to start with.

One study compared photodynamic treatment with injections of ranibizumab.^[14] The injections worked better.

Between 1 in 100 and 4 in 100 people in the studies said their eyesight got suddenly worse in the week after photodynamic treatment. Most of them recovered, but not completely.

Vitamin and mineral supplements

In this section

If your doctor thinks your eyesight could get worse quickly, they may suggest you try taking supplements containing beta-carotene, vitamin C, vitamin E, and zinc. These supplements may help to slow down the disease and the loss of sight, but only slightly.^[23] ^[24] You will have to take high doses of these supplements for many years. We don't know for certain whether they're safe.

We found one good-quality study (called a randomised controlled trial). People with early AMD in both eyes or late AMD were given supplements. The study included over 3,600 people. In people who took zinc and vitamin supplements for six years, their AMD took longer to get worse.

Some of the people in the study got side effects. About 8 in 100 people who took vitamin supplements noticed their skin going a bit yellow.^[23] People taking zinc were more likely to have infections in the parts of their body that carry urine (a urinary tract infection, or UTI).^[23] High doses of zinc can upset your stomach. For people at risk of lung cancer, taking beta-carotene may increase the risk even more.^[25] Long term use of vitamin E may increase the risk of heart failure.^[26]

There's no evidence that taking supplements prevents AMD.^[24] ^[27] ^[28]

Anecortave acetate for wet AMD

In this section

Anecortave acetate is still an experimental treatment. It's not available yet except in drug trials. The brand name is Retaane.

Anecortave acetate is a type of corticosteroid, used for treatment for wet AMD. Like some of the other treatments, it aims to stop new blood vessels growing at the back of your eye. It's given as an injection. But it's not injected into your eyeball. A curved, blunt needle is used to put the drug behind your eye. Because the drug can stay behind your eye for a long time, these injections are only given every six months.

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A large summary of studies, called a [systematic review](#), found no evidence that steroids prevent vision loss in people with wet AMD. ^[29]

Possible side effects of steroid treatment include loss of vision, abnormal vision, and cataracts. ^[29]

Laser treatment for wet AMD

In this section

In some people with late AMD, tiny new blood vessels start to grow at the back of the affected eye. When this happens it's called wet AMD. These vessels tend to leak and make your eyesight worse. Doctors can use a hot laser to destroy the new blood vessels. Laser treatment can reduce the damage to your eye or eyes and help save your eyesight. ^[30] ^[31] ^[32] ^[33] ^[34] ^[35]

Unfortunately, the new blood vessels often grow back, usually in the next three to five years.

Also, this treatment can make your eyesight suddenly worse if the laser damages healthy cells in your eye as well as the leaky blood vessels. ^[30] ^[34] You should discuss this risk with your doctor before agreeing to treatment.

This treatment is suitable for only a small number of people with severe AMD. ^[36]

Laser treatment for early AMD

In this section

In early AMD, fluffy yellow-white patches form under your macula. Doctors call these **drusen**. (The macula is the part of your retina that helps you see the fine detail of objects. The retina is the lining inside your eye that captures images you see and sends them to your brain.)

Your doctor can see the patches during an eye examination. The patches don't affect your eyesight much at first, but they increase your chances of more severe AMD later on.

Burning the patches with a hot laser may help save your eyesight or even improve it. This treatment is painless and takes less than 15 minutes. But there hasn't been enough good-quality research to be certain. ^[37] ^[38] ^[39] ^[40]

We still don't know whether laser treatment is safe or not. The laser might make tiny new blood vessels grow at the back of your eye (wet AMD). These vessels can leak, and make your eyesight suddenly worse.

Low-power laser treatment for wet AMD

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In this section

Some doctors have tried using a low-power laser to treat macular degeneration. The idea is that the laser seals off the new blood vessels that grow at the back of your eye. But the laser isn't powerful enough to damage any nearby tissue.

There isn't any good research on low-power laser treatments for wet AMD. Doctors don't usually use this treatment in countries like the UK, where other treatments are available.

The National Institute for Health and Care Excellence is the organisation that advises doctors about NHS treatments.^[41] It says that there isn't enough research to say how well low-power laser treatment works, or whether it's safe. It also says that this treatment can have side effects. Some people get bleeding in their eye.

Radiotherapy for wet AMD

In this section

Some people with late AMD get tiny new blood vessels at the back of the affected eye (wet AMD). These blood vessels tend to leak and make your eyesight worse. Doctors can use radiotherapy to destroy them. (Radiotherapy is when doctors use X-rays to kill certain cells in your body.)

We don't know yet if radiotherapy works for people with AMD. Studies including over 1,000 people have shown mixed results.^[42]

Radiotherapy may not be safe. It can damage the healthy parts of your eye including your optic nerve, and the healthy parts of your retina.^[43] Researchers don't yet know what dose of radiation to use to avoid this happening.

The National Institute for Health and Care Excellence (NICE), the government body that decides what treatments should be available on the NHS, says that you should only have radiotherapy for macular degeneration as part of clinical trial.^[44]

Interferon injections for wet AMD

In this section

Interferon (brand name Roferon) is a drug given as an injection under the skin. Researchers thought it might help people with wet AMD (when new blood vessels grow in the back of your eye). But it doesn't seem to work.^[45] ^[46]

In one good-quality study (a randomised controlled trial), people who had interferon injections for a year ended up with worse eyesight than people who had a dummy treatment (a placebo). And the treatment caused side effects. You may feel sick, dizzy, and get diarrhoea and headaches after interferon injections.

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This treatment is not used any more. Researchers are looking for other drugs to stop new blood vessels growing in your eye.

Eye surgery

In this section

AMD cannot be fixed by surgery. We found two good-quality studies (randomised controlled trials) that looked at the effects of surgery in people with wet AMD (when new blood vessels grow in the back of your eye). The people who had surgery were no better over two years than people who didn't have surgery. ^[47] ^[48] ^[49] ^[50]

Surgery may increase your risk of [cataracts](#). Your retina may also be damaged during surgery.

New blood vessels often grow back after surgery. In one study that we found, the new blood vessels had come back within two years. ^[47]

Bevacizumab (Avastin) for wet AMD

In this section

Bevacizumab (Avastin) is an injection that you have in your eyeball. It is used to treat wet AMD. The drug stops new blood vessels growing at the back of the affected eye. It also dries up the blood vessels that already exist. It is a similar drug to [ranibizumab](#).

Doctors have had some good results using bevacizumab injections to treat wet AMD. ^[51] ^[52] ^[53]

Bevacizumab isn't licensed to treat macular degeneration. Doctors are allowed to use it, but they have to explain to patients that they are using it 'off license'. That's because bevacizumab wasn't originally designed to treat macular degeneration. It was designed to treat cancer.

One good study found that bevacizumab worked better than a dummy treatment (a placebo), [photodynamic treatment](#), and [pegaptanib](#). ^[54]

Studies show that it works about as well as ranibizumab. ^[55] ^[56] ^[57]

In studies, people having injections of bevacizumab saw an improvement in their eyesight, equal to reading an extra seven letters on the vision chart used in eye tests.

Serious side effects weren't common. ^[54] ^[15] A small number of people got inflammation or bleeding in their eye.

The main difference between bevacizumab and ranibizumab is the cost. Bevacizumab is much cheaper, because it is made in bigger amounts which are then split into tiny doses for use in the eye. Because of this, some NHS organisations use bevacizumab

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instead. ^[58] The National Institute for Health and Care Excellence (NICE) is considering whether to approve this use.

Further informations:

Glossary:

infection

You get an infection when bacteria, a fungus, or a virus get into a part of your body where it shouldn't be. For example, an infection in your nose and airways causes the common cold. An infection in your skin can cause rashes such as athlete's foot. The organisms that cause infections are so tiny that you can't see them without a microscope.

diabetes

Diabetes is a condition that causes too much sugar (glucose) to circulate in the blood. It happens when the body stops making a hormone called insulin (type 1 diabetes) or when insulin stops working (type 2 diabetes).

high blood pressure

Your blood pressure is considered to be high when it is above the accepted normal range. The usual limit for normal blood pressure is 140/90. If either the first (systolic) number is above 140 or the lower (diastolic) number is above 90, a person is considered to have high blood pressure. Doctors sometimes call high blood pressure 'hypertension'.

local anaesthetic

A local anaesthetic is a painkiller that's used to numb one part of your body. You usually get local anaesthetics as injections.

placebo

A placebo is a 'pretend' or dummy treatment that contains no active substances. A placebo is often given to half the people taking part in medical research trials, for comparison with the 'real' treatment. It is made to look and taste identical to the drug treatment being tested, so that people in the studies do not know if they are getting the placebo or the 'real' treatment. Researchers often talk about the 'placebo effect'. This is where patients feel better after having a placebo treatment because they expect to feel better. Tests may indicate that they actually are better. In the same way, people can also get side effects after having a placebo treatment. Drug treatments can also have a 'placebo effect'. This is why, to get a true picture of how well a drug works, it is important to compare it against a placebo treatment.

allergic reaction

You have an allergic reaction when your immune system overreacts to a substance that is normally harmless. You can be allergic to particles in the air you are breathing, like pollen (which causes hay fever) or to chemicals on your skin, like detergents (which can cause a rash). People can also have an allergic reaction to drugs, like penicillin.

intravenous infusion

When a medicine or a fluid, such as blood, is fed directly into a vein, it's called an intravenous infusion (or IV). To give you an intravenous infusion, a nurse, technician or a doctor places a narrow plastic tube into a vein (usually in your arm) using a needle. The needle is then removed and the fluid is infused (or dripped) through the tube into the vein.

laser

A laser focuses light in a way that makes it able to cut through things. Surgeons sometimes use lasers when they need to do delicate operations.

randomised controlled trials

Randomised controlled trials are medical studies designed to test whether a treatment works. Patients are split into groups. One group is given the treatment being tested (for example, an antidepressant drug) while another group (called the comparison or control group) is given an alternative treatment. This could be a different type of drug or a dummy treatment (a placebo). Researchers then compare the effects of the different treatments.

urinary tract infection

A urinary tract infection (UTI) happens when bacteria invade the walls of your urinary tract, which includes your kidneys, bladder and urethra. An uncomplicated UTI is one that involves your bladder and urethra, but not your kidneys. A complicated UTI involves your kidneys and can be harder to treat. Doctors may refer to a kidney infection as pyelonephritis.

systematic reviews

A systematic review is a thorough look through published research on a particular topic. Only studies that have been carried out to a high standard are included. A systematic review may or may not include a meta-analysis, which is when the results from individual studies are put together.

X-ray

X-rays are pictures taken of the inside of your body. They are made by passing small amounts of radiation through your body and then onto film.

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cataract

A cataract is when your eye's lens, which is normally clear, gets cloudy. This makes your vision blurred or fuzzy, like trying to see through a fogged-up window.

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