

Patient information from the BMJ Group

Glaucoma

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Glaucoma

Glaucoma is when the main nerve behind your eye (the optic nerve) is damaged by too much pressure within the eye. It causes poor eyesight in one eye or both your eyes. Finding out you have glaucoma can be a shock. But there are good treatments for glaucoma that can slow down or even stop any further damage to your eyes.

We've brought together the best research about glaucoma 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.

There are several different types of glaucoma. This information is for adults with long-term glaucoma (chronic glaucoma). This kind of glaucoma is sometimes called open-angle glaucoma.

What is glaucoma?

Glaucoma is when the main nerve behind your eye, the optic nerve, is damaged from having too much pressure inside your eye. This damage causes poor eyesight.

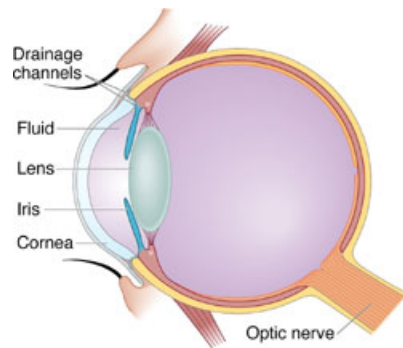
Glaucoma affects your eyesight very gradually. Many people don't notice it at first. You may have had glaucoma for years without knowing it. The damage to your optic nerve and your eyesight is permanent, but treatment can stop it getting any worse. ^[1] ^[2]

Your eye is like a small balloon filled with fluid. The fluid is watery and made by a small gland inside your eye.

Normally, extra fluid drains away through channels. But if you have glaucoma, these channels are blocked.

The fluid builds up inside your eye, increasing the pressure and eventually damaging your optic nerve. ^[3] Doctors call this ocular hypertension. To find out more, see [High pressure inside the eye](#) .

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The fluid builds up inside your eye, increasing the pressure and eventually damaging your optic nerve.

But you can have glaucoma even when the pressure inside your eyes is normal. This may happen if your optic nerves are more sensitive to pressure than usual. Up to 4 in 10 people with glaucoma have normal levels of pressure in their eyes.^[1] This kind of glaucoma is called normal-tension glaucoma.

We don't know for certain what causes glaucoma. But we know you're more likely to get glaucoma if:

- The pressure inside one or both of your eyes is very high. You need some pressure to keep your eyeball in its correct shape. But too much pressure can damage your optic nerve and your eyesight. About 1 in 10 people over 40 have [high pressure inside their eyes](#), although not all of them get glaucoma.^[4] Your eye doctor or optician can measure the pressure inside your eyes with a simple test
- Someone in your family has glaucoma^[4]
- You have a black African heritage^[5]
- You are over 40. The chances of getting glaucoma increase with age. About 1 or 2 in 100 people over age 40, and 5 in 100 people over age 70, have glaucoma^[6]
- You have [diabetes](#) or [high blood pressure](#), or you have taken [steroids](#) for a long time.^[7]

What are the symptoms of glaucoma?

At first, glaucoma doesn't cause any symptoms. Then it starts to affect your eyesight, but only slowly. You may not notice your eyesight getting worse for many years.

Glaucoma can eventually cause blindness, although most people with glaucoma don't go blind. Glaucoma does not hurt.

The poor eyesight starts with small blind spots at the edge of your vision. They are easy to miss, and many people don't notice them. Without treatment, the blind spots get slowly

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bigger until you can see only things that are directly in front of you. It can feel like you're looking down a tunnel. ^[12]

Also, some people with severe glaucoma: ^[13]

- Can't see properly when moving from a lighter to a darker room
- Can't judge the height of steps and curbs, so they may trip over frequently.

About 20 in 100 people with glaucoma already have badly damaged eyesight before they are diagnosed. ^[14]

About 90 in 100 people with glaucoma are diagnosed by their eye doctors after routine eye tests. ^[15] ^[16] Experts say you should have regular check-ups as you get older, especially if you are black, or if someone in your family has glaucoma. ^[17]

The information here is about long-term (chronic) glaucoma. A second kind of glaucoma, called acute glaucoma, comes on suddenly and is very different. Your eyes quickly become painful and red, and you may get a severe headache and sickness. Your vision becomes blurred and you may notice haloes (rings) around lights. Acute glaucoma is an emergency. If you get these symptoms, see a doctor straight away. You need urgent treatment.

How common is glaucoma?

Glaucoma is common.

In the UK, between 1 in 100 and 3 in 100 people over 40 have glaucoma. ^[18] It's more common in people over 70. ^[18]

Simply having high pressure inside the eyes, without having glaucoma (that is, with no damage to the optic nerve), is also common, affecting about 10 in 100 people over 40. Some experts think treating high pressure can help prevent glaucoma, but there hasn't been enough research to be certain. For more about this condition, see [High pressure inside the eye](#) .

What treatments work for glaucoma?

It's important to get treatment for your glaucoma, and to stick with it. If you don't, your eyesight could get slowly worse. Treatment can help preserve your eyesight for many years.

- There are three types of treatment for glaucoma: eye drops, laser treatment, and surgery. Your eye doctor (ophthalmologist) will help you decide which treatment is best for you.

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- The aim of treatment is to reduce the pressure inside your eye to a level that doesn't damage your optic nerve any further. This level is different for different people.
- Special eye drops are good at reducing the pressure inside your eye. In theory, this should protect your optic nerve and your eyesight. But there hasn't been enough research for us to be certain that this works.
- Laser treatment, when combined with eye drops, reduces the pressure inside your eye and helps stop your eyesight from getting worse.
- Surgery can reduce the pressure inside your eye, and may help to preserve your eyesight. But surgery can cause side effects, including **cataracts**. Some people end up with worse eyesight after surgery than they had before.

The National Institute for Health and Care Excellence (NICE) has produced guidelines for doctors on how glaucoma should be treated (<http://www.nice.org.uk>).

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 glaucoma

Treatments that are likely to work

- [Eye drops](#)
- [Laser treatment plus eye drops](#)

Treatments that work but whose harms may outweigh benefits

- [Eye surgery](#)

What will happen to me?

Once you have glaucoma, you will always have it. Treatments can't cure glaucoma, but they can keep it under control. Without treatment, your glaucoma will slowly get worse. Your eyesight may get slowly worse too. Over many years, untreated glaucoma can make you go blind.

Treatment reduces the pressure inside your eye, and helps stop any further damage to your optic nerve. Treatments for glaucoma can't restore your eyesight to normal. But they can help preserve it for many years, even a lifetime. Most people with glaucoma do not go blind.

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The better your eyesight is to start with, the easier it is to protect it.^[19] So, the best thing you can do is to get your eyes tested regularly and go for treatment early.^{[20] [21]} Experts advise that if you have a relative with glaucoma and you are over 40 you should get tested for glaucoma once every two years.^[22]

Glaucoma is a long-term disease. You may need treatments and regular check-ups for many years.

Treatments:

Eye drops

In this section

Eye drops for glaucoma contain medicine to reduce the pressure inside your eyes. There are several different types and we don't know for certain which works best. You may need to try more than one type of eye drop before you find one that works.

You may need to use two or more types of eye drop to control the pressure inside your eyes. You get eye drops on prescription from an eye doctor (an ophthalmologist). Here are some of the eye drops he or she is likely to prescribe (and their common brand names):

- betaxolol (Betoptic)
- brimonidine (Alphagan)
- carteolol (Teoptic)
- dorzolamide (Trusopt)
- latanoprost (Xalatan)
- levobunolol (Betagan)
- metipranolol (Minims)
- pilocarpine (Pilogel)
- timolol (Timoptol)
- travoprost (Travatan).

Most people start with eye drops called **beta-blockers** (such as betaxolol, carteolol, or timolol) or **prostaglandin analogues** (such as latanoprost and travoprost). Some eye drops combine two types of drug, usually timolol plus another drug. Examples include

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Ganfort (bimatoprost with timolol), Xalacom (latanoprost with timolol), and Cosopt (dorzolamide with timolol).

A summary of five studies (called a [meta-analysis](#)) showed that if the pressure in your eye is raised, eye drops can help preserve your eyesight and stop you getting glaucoma.

^[23] The summary found that, in a period of five to 10 years, eyesight became worse in:

- 7 in 100 people who used eye drops.
- 13 in 100 people who didn't use eye drops.

But in one study eye drops didn't help in this way. ^[24]

A more recent summary looked at 10 studies. It showed that people with glaucoma or raised eye pressure who'd had treatment with eye drops had about half the chance of getting problems with their eyesight, compared to people who didn't have treatment. ^[25]

Eye drops can also help preserve your eyesight if you have glaucoma. ^[23] They seem to work best when combined with laser treatment. ^[26]

You'll probably benefit from using eye drops even if the pressure inside your eye is normal. ^[23] ^[27]

When you put the drops in, some of the medicine gets into your bloodstream and can cause side effects. Closing your eye or pressing lightly on your tear duct for at least a minute after you put the drops in should help. Your tear duct is at the inside corner of each eye, nearest your nose. Your eye doctor, optician, or pharmacist can show you how to do this.

If you have a lung disease such as [asthma](#), [chronic bronchitis](#), or [emphysema](#), some eye drops can make your symptoms worse. You shouldn't use beta-blockers such as betaxolol, carteolol, levobunolol, metipranolol, or timolol if you have any of these conditions. ^[28]

If you're using dorzolamide you may get a burning or stinging feeling in your eyes. ^[24] If you're using latanoprost eye drops, you might notice your eye colour getting darker. ^[29]

Side effects sometimes make it hard to stick with your treatment. But it's important to keep up with it. If you have problems with the treatment you're using, talk to your eye doctor (ophthalmologist), who may be able suggest a different treatment. ^[30]

Laser treatment plus eye drops

In this section

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If you have this kind of treatment, your eye doctor will use a laser to make the excess fluid drain away from your eye. This can relieve the pressure caused by a build-up of fluid. This treatment is simple and painless. The doctor numbs your eye with a drop of local anaesthetic, then puts a special lens against your eye. The laser goes through the lens to the tissue that drains fluid from the eye, allowing the fluid to drain away more effectively. ^[31]

Most people who have laser treatment need to continue with their eye drops. Studies show that together, these treatments can stop your eyesight getting worse.

In one high-quality study (called a **randomised controlled trial**), eyesight got worse after an average of six years in: ^[32]

- 45 in 100 people with glaucoma who had laser treatment plus eye drops
- 62 in 100 people who had no treatment.

Another high-quality study found that laser treatment plus eye drops preserves eyesight better than eye drops alone. ^[26]

Experts think that the effects of laser treatment can wear off with time. But there hasn't been enough research to say for sure whether this is true.

Eye surgery

In this section

If other treatments don't work, your eye doctor (ophthalmologist) may suggest an operation to improve the drainage inside your eye. This relieves the pressure, and is meant to stop your glaucoma getting any worse. The most common operation for glaucoma is called a trabeculectomy. It takes about an hour, and can be done under **local anaesthetic** or **general anaesthetic**. You'll probably go home the same day.

The research comparing surgery with other treatments for glaucoma is mixed. Overall, the results suggest that surgery can work as well as laser treatment or eye drops. ^[33]
^[34] ^[35]

Your doctor may suggest surgery if you have glaucoma, even if the pressure inside your eye is already normal. We don't know for certain if this works.

Studies have found that trabeculectomy increased the risk of **cataracts**. ^[34] ^[23] ^[27] If you have cataracts, the lens of your eye becomes cloudy and you may need further surgery.

Surgery also carries the risk of other side effects, including: ^[36]

- Infections

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- A blockage in the new drainage system inside your eye that has been made by surgery
- A blind spot in the middle of your vision, making it hard to see things directly in front of you. This side effect is rare and only happens to people with severe glaucoma
- The possibility that the pressure inside your eye might get too low. If this happens, you may need another operation.

Further informations:

High pressure inside the eye

High pressure inside the eye is also called ocular hypertension. It can cause glaucoma, but doesn't always. That may be because some people's optic nerves can stand higher pressures than others. The increased pressure doesn't cause any symptoms. Most people find out they have ocular hypertension after a routine eye check-up. Your eye doctor or optician diagnoses ocular hypertension with a simple test called tonometry.

About 10 in 100 adults over 40 have ocular hypertension.^[8] However, only about 10 in 100 people with ocular hypertension go on to get glaucoma.^[9] So experts disagree about whether or not to treat the high pressure when it's not causing damage to the optic nerve.

A lot of research has been done on whether to treat this high pressure, but the results are mixed. We haven't yet judged these studies using the same scientific standards that we use to judge other studies. But we are including details because you may have questions about these treatments.

A summary of five high-quality studies (called randomised controlled trials) suggests that if you've got ocular hypertension, using prescription eye drops can cut your risk of glaucoma by about half, over five years.^[10] These eye drops contain medicine to bring down the pressure in your eye.

But another study found that treating ocular hypertension with eye drops did not help stop glaucoma.^[11] Between 10 in 100 and 20 in 100 of the people in this study went on to get glaucoma, whether they used eye drops or a dummy treatment (called a placebo). The study lasted five years.

If you have ocular hypertension, you should discuss the pros and cons of treatment with a doctor who specialises in conditions affecting the eye (an ophthalmologist). Your decision will probably depend on your personal circumstances, including:

- How high the pressure is, and whether it affects one or both of your eyes

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- Your background risk of glaucoma, including your age, your family history and your ethnic background
- How you feel about using eye drops every day for many years
- How you feel about the possibility of side effects from treatment.

Glossary:

gland

A gland is any group of cells in the body that makes and releases something for use by another part of the body. For example, the thyroid gland makes a hormone called thyroxine. This acts on receptors within cells. By acting on the receptors it gives the cells a message to speed up their metabolism and work harder.

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'.

steroids

Steroids are a type of chemical. Your body naturally produces steroids, which play a part in many of its processes. For example, steroids are involved in how your immune system, reproductive system and metabolism work. Steroids can also be given as medicines and are used for a number of different conditions: including asthma, rheumatoid arthritis and eczema. Corticosteroids are not the same as the steroids used by some body builders and athletes. Those steroids are called 'anabolic steroids'.

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.

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.

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.

meta-analysis

A meta-analysis puts together the results of a number of studies. A meta-analysis is used if individual studies are too small for any definite conclusions to be drawn about a treatment. Pooling together results from a number of studies may help say for sure what the effects of the treatment are.

asthma

Asthma is a disease of the lungs. It makes you wheeze, cough and feel short of breath. Asthma attacks are caused by inflammation and narrowing of your airways, which makes it hard for air to pass in and out of your lungs.

bronchitis

Bronchitis is inflammation of one or both of the major airways (called bronchi) that lead in and out of your lungs.

emphysema

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Emphysema is a long-term disease of the lungs. The walls of the air sacs (alveoli) in the lungs become thin and less elastic. This makes it harder for oxygen to get in your blood and carbon dioxide to get out of your body. It makes you cough and feel short of breath. Smoking is the most common cause of emphysema.

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.

general anaesthetic

You may have a type of medicine called a general anaesthetic when you have surgery. It is given to make you unconscious so you don't feel pain when you have surgery.

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