

Understanding

Eye conditions related to diabetes



RNIB Supporting people
with sight loss



The ROYAL COLLEGE of
OPHTHALMOLOGISTS

Contact us

We're here to answer any questions you have about your eye condition or treatment. If you need further information about eye conditions related to diabetes or on coping with changes in your vision, then our Helpline is there for you.

Just give us a call on **0303 123 9999** or email us at **helpline@rnib.org.uk** and we'll be happy to speak with you.

RNIB's Understanding series

The Understanding series is designed to help you, your friends and family understand a little bit more about your eye condition.

The series covers a range of eye conditions, and is available in audio, print and braille formats.

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What is diabetes?

Diabetes is a condition where your body is not able to use glucose properly.

Glucose, a type of sugar, is produced by your body when you eat something. Glucose goes into your blood and is converted into energy. A hormone called insulin allows this to happen.

When your body doesn't make enough insulin or when the insulin doesn't work as well as it should, then the glucose stays in your blood instead of being used up as energy.

Diabetes can cause health problems in several ways and your eyes are one part of your body that can be affected.

Nearly one person in 25 in the UK has diabetes.

What are the different types of diabetes?

If your body isn't able to produce insulin, this is called **type 1** diabetes. This normally develops at a young age, before your 30s, and most people will need to control this type of diabetes by using insulin injections. For this reason, type 1 diabetes is sometimes called insulin-dependent diabetes.

If your body doesn't make enough insulin or your body doesn't use insulin properly, this is called **type 2** diabetes. This type of diabetes normally develops later in life, typically over the age of 40 for most people, but it can start happening from the age of 25. If you're from a South Asian or African-Caribbean background, you're at a higher risk of developing type 2 diabetes from the age of 25.

Type 2 diabetes is often managed by changing your diet and exercising. Some people may need to use tablets to control this type of diabetes. Although some people with type 2 diabetes may still need to use insulin injections, type 2 diabetes is sometimes called non-insulin dependent diabetes.

Some women who are in their second or third trimester of pregnancy can develop a type of diabetes called **gestational diabetes**. In most cases, this diabetes goes away after pregnancy. However, having gestational diabetes increases your chances of developing type 2 diabetes later in life.



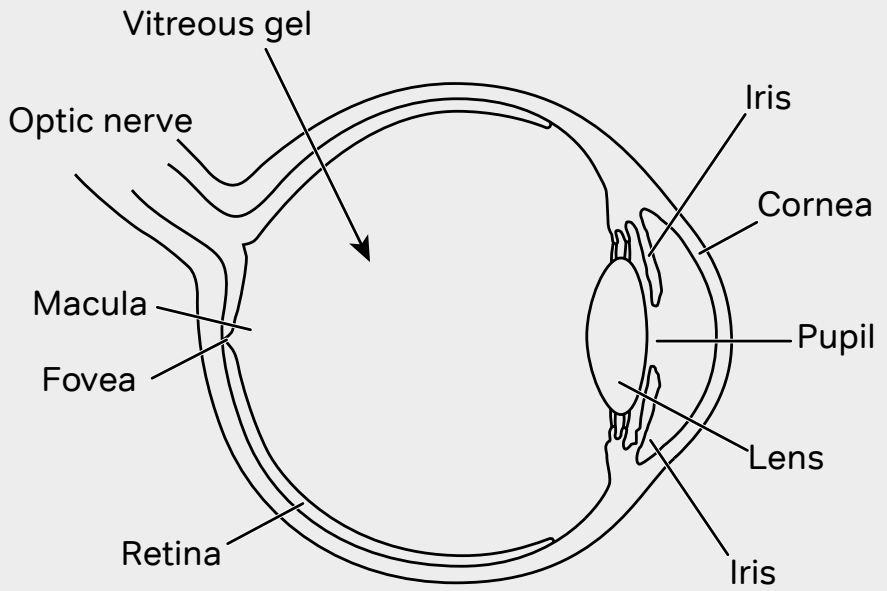
How your eye works

When you look at something, light passes through the front of your eye and is focused by the cornea and lens onto your retina.

The retina is a delicate tissue that is sensitive to light. It converts the light into electrical signals that travel along the optic nerve to your brain. The brain interprets these signals to 'see' the world around you.

The retina is supplied with blood by a delicate network of blood vessels. These blood vessels can be damaged by diabetes.

Light entering your eye is focused onto a tiny area of your central retina called the macula. This highly specialised area of your retina is about the size of a pinhead. The macula is vital because it lets you recognise colours and see the fine detail needed to carry out activities such as reading and writing. The rest of your retina, called the peripheral retina, gives you peripheral vision (also known as side vision).



How can diabetes affect my vision?

It's possible that your diabetes won't cause any changes to your vision. However, diabetes can affect your eyes in a number of ways:

- The changes in blood sugar levels caused by diabetes can affect the lens inside your eye, especially when your diabetes isn't controlled. These changes can result in your vision blurring, which can change from day to day, depending on your blood sugar levels.
- Diabetes can cause the lens in your eye to become cloudy. This condition is known as a cataract. This happens because the high sugar levels found in the fluid around the lens causes the lens to swell with more water than usual. The lens then focuses light differently on the retina at the back of the eye, and this may cause your spectacle prescription to change as your cataract develops. If you have diabetes, you're more likely to develop a cataract, and at an earlier age too, when compared to people without diabetes.

- Some people with diabetes develop glaucoma, an eye condition that can cause damage to the optic nerve. This is often because of raised pressure inside the eye.
- When diabetes affects the network of blood vessels supplying the retina at the back of the eye, this is called diabetic retinopathy. Diabetes can cause the blood vessels to become blocked, to leak or to grow incorrectly. There are different types of diabetic retinopathy, and it can be worse for some people than for others, depending on the severity of the changes to the blood vessels.

Not everyone who has diabetes develops an eye condition.

What are the types of diabetic retinopathy?

There are different types of retinopathy: background retinopathy, proliferative retinopathy, and maculopathy.

The type of diabetic retinopathy you have depends on how badly your blood vessels are affected by your diabetes.

Background diabetic retinopathy

Background retinopathy does not usually affect your sight. You develop this condition when the capillaries (the very small blood vessels) in your retina become blocked, causing them to swell. These swellings are known as microaneurisms. A microaneurism may haemorrhage (leak blood). It may also leak a fluid called exudate. These changes don't cause sight problems immediately, but your eyes will need to be monitored carefully to make sure your retinopathy doesn't become worse.

Proliferative diabetic retinopathy

Your retinal blood vessels enable oxygen to reach your retina so that it can work properly. If background retinopathy gets worse, many of the retinal blood vessels become damaged or blocked. When these changes affect a large area of your retina, blood supply to the retina is reduced. This is called ischaemia and it means that areas of your retina become starved of the oxygen they need.

The body tries to fix this by growing new blood vessels on the retinal surface or into the vitreous gel. Unfortunately, these new vessels are weak and they bleed very easily, which may result in haemorrhages over the surface of the retina or into the vitreous gel. These types of haemorrhages can reduce or totally obscure your vision in the affected eye, as light entering your eye is blocked by the blood.

With time, the blood may be reabsorbed into your body and your vision may improve. But there is a chance that these haemorrhages will keep happening, and the blood may not be completely reabsorbed. This can lead to a permanent loss of sight.

Large haemorrhages can lead to scar tissue forming. This can pull on and distort the retina as it shrinks. This type of advanced diabetic eye disease can result in the retina becoming detached, bringing with it a risk of serious sight loss.

Only five to 10 per cent of people with diabetes develop proliferative diabetic retinopathy. It is more common in people with type 1 diabetes than in those with type 2.

Diabetic maculopathy and diabetic macular oedema

When the macula is affected by your retinopathy, you are said to have diabetic maculopathy. This means that your central vision, which is required for seeing fine detail and colour, will be blurred. This will make things like reading, writing and seeing detail difficult. If there is a leakage of fluid from the blood vessels near the macula, this fluid can build up and cause macular swelling. This is called diabetic macular oedema and it can cause vision to be blurred and distorted, as well as making colours appear washed out.

How can I reduce the risks?

You can reduce your risk of developing retinopathy, or help to stop it from getting worse, by:

- Controlling your blood glucose level (also known as blood sugar level).
- Tightly controlling your blood pressure.
- Controlling your cholesterol levels.
- Keeping fit and maintaining a healthy weight.
- Giving up smoking. Nerve damage, kidney and cardiovascular disease are more likely in smokers with diabetes. Smoking increases your blood pressure and raises your blood sugar level, which makes it harder to control your diabetes.
- Getting regular retinal screening. The most effective thing you can do to prevent sight loss due to diabetic retinopathy is to go to your retinal screening appointments. Early detection and treatment can stop you from losing sight. If you're pregnant and have gestational diabetes, you will have retinal screenings more often during your pregnancy and after your baby is born.

There are some risk factors that you cannot control:

- How long you've had diabetes. The longer you've had diabetes, the more likely you are to develop some form of retinopathy.
- Your age. You're more likely to develop diabetes as you get older.
- Your ethnicity. If you or your family are from India, Pakistan, Bangladesh or Sri Lanka (South Asian communities), your risk of getting diabetes is more than six times higher. If you or your family are African-Caribbean, you're three times more likely to get diabetes. The factors behind this aren't fully understood but are thought to involve insulin problems, genes, diet and lifestyle.
- Pregnancy. This is a particular risk if you are already diabetic or have had gestational diabetes before.

For detailed information on how to reduce your risk of diabetic complications, visit Diabetes UK's website at [diabetes.org.uk](https://www.diabetes.org.uk).

Why are regular eye examinations and screening tests so important?

If your diabetes is well controlled, you're less likely to have problems, or they may be less serious. However, some people with diabetes do have serious sight loss because of their retinopathy.

Annual diabetic eye screening

Most of the eye problems caused by diabetes can be treated, but it is vital that these problems are picked up as soon as possible, as any treatment you're given is more effective when given early.

If you have diabetes, your GP or hospital clinic should arrange for you to have a retinal screening every year. You'll have a detailed eye examination at a specialist screening centre or at your GP surgery.

At this appointment, the technician puts eye drops into your eyes to dilate (widen) your pupils. This allows the technician to have a good view of your retina. The technician takes a picture of your retina using a digital retinal camera. The photo is then sent to a specialist diabetic eye grader, who will see if there are

any changes caused by diabetes. If the diabetic eye grader sees any problems in the pictures, you may be called back into the hospital for tests and possibly treatment.

This regular annual screening is essential as you may not be aware that there is anything wrong with your eyes until it's too late.

Screening helps to prevent blindness in the majority of the people at risk. If you've not had this type of test, ask your GP or diabetic clinic as soon as possible.

You should also go for regular eye examinations with your optometrist (also known as an optician). Your diabetic eye screening test doesn't replace your regular eye examination with your optometrist. Some changes in your vision may simply be a problem that can be sorted out with glasses. The optometrist will check your glasses prescription and the health of your eyes. Some optometrists will take a photograph of the back of your eyes as part of your regular eye examination. However, this photograph does not replace your retinal screening appointment.



It is very important to turn up to your diabetic eye screening appointment, and to attend your regular eye examination with your optometrist.

What can be done about diabetic retinopathy?

If your sight is at risk from retinopathy and it has been picked up early enough, you will be given laser treatment.

Laser can be used in two ways:

Localised laser treatment

When only a small part of your retina is affected by retinopathy, you will be given a localised laser treatment. The laser seals your blood vessels. This stops them from bleeding and helps to reduce swelling. The treatment normally only takes a few minutes and can help with small areas of retinopathy and maculopathy. You don't usually notice changes in your vision after this procedure because only a small patch of your retina is treated with the laser.

Pan-retinal laser treatment

When new blood vessels begin to grow (a development known as neo-vascularisation), a bigger area of your retina may need to be treated by laser when compared to localised laser treatment. Treating more of your retina stops it from producing the growth factors that make new blood vessels develop. When the treatment is successful, the new blood vessels get smaller and disappear over a few months.

How is laser treatment carried out?

As laser treatment is performed at an outpatient clinic, you won't need to stay in hospital. You'll be given eye drops to dilate your pupils, so your eye specialist can look into your eyes more easily.

Your eye is then numbed with anaesthetic drops and a small contact lens is put on the surface of your eye to keep it open. During the treatment, you'll be asked to move your eyes in certain directions. You'll be able to do this easily with the contact lens in place. Ask your ophthalmologist (also known as a hospital eye doctor) how long each session of laser surgery is likely to last. Some people need more than one treatment session.

Is laser treatment painful?

Localised laser treatment does not usually cause discomfort because it doesn't take long and only treats a small area of your retina. Pan-retinal treatment can be uncomfortable, so you may be given painkillers as well as eye drops before the treatment. It is alright to take pain relief, so don't be afraid to tell your eye specialist if the treatment hurts or if you found a previous session of laser treatment painful.

Does laser treatment have any side effects?

No treatment is possible without some side effects. However, you will put your vision at greater risk by not having the laser treatment.

The short-term effects of laser treatment happen because of the brightness of the laser beam. It can reduce your vision for an hour or two after the treatment. You may also temporarily lose a little of your central vision or see small black spots, all of which should get better with time.

As local treatment only treats a very small area of your retina, it doesn't affect your vision as much. In some cases, it may not affect it at all.

The more extensive pan-retinal treatment can have more lasting effects on your vision. After the laser treatment, because a large area of retina has been affected by laser, your vision may be very different:

- your peripheral vision may be quite poor
- your colour perception and your night vision may be affected
- occasionally, your central vision may not be as good as before, so reading may be more difficult.

When new blood vessels are first picked up, your vision may be very good and you may not notice any changes to the way you see. This is because, initially, the new vessels can have very little effect on your sight.

You may feel that the pan-retinal laser has made your sight much worse. The problem is that, if left untreated, the new vessels will soon bleed and cause a more serious loss of vision. The laser treatment is the best option for preventing this.

It's important to remember that laser treatment aims to prevent your vision from getting worse. It cannot make your vision better. **However, if you do not have laser treatment, you may end up losing a lot more of your sight.**

Ask your ophthalmologist to talk you through your treatment plan, the advantages and disadvantages of the treatment and its possible side effects, temporary or permanent, for your vision.

If you drive and have had laser treatment in both eyes (or if you're sighted in only one eye and have had laser treatment), you must inform the Driver and Vehicle Licensing Agency (DVLA). They may ask that you have a detailed eye examination to make sure your peripheral and central vision is good enough for safe driving.

What if my eye becomes painful after treatment, or if my vision gets worse?

After a long laser treatment session, you may have a headache. You can take over-the-counter painkillers, which should help.

However, if the pain is severe, or if your eyesight gets worse, you should contact your ophthalmologist immediately. If this is not possible, go straight to the Accident and Emergency (A&E) department at your nearest hospital.



What is the treatment for diabetic macular oedema?

Diabetes can cause macular swelling or oedema. The macula is a tiny part of the retina at the back of your eye. Fluid can build up and collect on or under your macula, which leads to oedema. Diabetic macular oedema may make your central vision distorted or blurry and, in time, it may give you a blank patch in the centre of your vision.

When the macular oedema doesn't affect the centre of your macula (called the fovea), laser treatment can reduce the swelling and prevent any further blurring. But if the oedema affects the fovea, then it can't be treated by laser. Instead, the eye may be treated with an anti-vascular endothelial growth factor (anti-VEGF) injection.

Anti-VEGF drugs stop any new blood vessels from growing and can help to improve your vision by reducing your macular oedema. There are a number of anti-VEGF treatments available, but only some are licensed for use in people who have macular oedema caused by diabetes.

The anti-VEGF drug is injected through the white of your eye into the vitreous gel inside your eye. You may need more than one injection over a number of months to get the best effect. Anti-VEGF treatment is given when your macula has swollen to a certain size. This means your treatment may depend on how swollen your macula is. Your ophthalmologist will be able to tell you whether or not your macular oedema can be treated by anti-VEGF injections on the NHS.

Sometimes, if your macular oedema doesn't get better with anti-VEGF treatments, you may be given a different treatment which involves the injection of a steroid implant into your eye. The implant slowly releases small amounts of steroid into your eye to help control the swelling. The implant can stay in your eye for up to three years. This treatment is only available if you've already had a cataract operation, and if your macular oedema hasn't responded to the anti-VEGF injections. Your ophthalmologist will be able to tell you whether your macular oedema can be treated with this implant on the NHS.

When do I need vitrectomy surgery?

Inside your eye, there is a clear gel called the vitreous gel. If you have a bleed running from your retina into the vitreous gel, your vision will become cloudy. Often, this blood is reabsorbed by your body and your vision gets better on its own over a few months without the need for any surgery. However, if this doesn't happen, vitrectomy surgery will be necessary.

Vitrectomy is also carried out if scarring on your retina causes a retinal detachment. Surgery to reattach your retina is always needed to help prevent serious sight loss.

In vitrectomy surgery, your cloudy vitreous gel is removed and replaced with a clear liquid, which usually helps to improve your vision immediately.

If you have a haemorrhage on your retina or into your vitreous gel, your vision may be severely affected very quickly, which can be a shock. Your ophthalmologist may advise you to wait for up to six months before carrying out a vitrectomy, and this might be frustrating. However, over this period of time, your ophthalmologist will monitor how your bleeding changes, to see if there are any new bleeds, and whether your bleeding has begun to be reabsorbed, thereby improving your vision. Your ophthalmologist will carry out your vitrectomy surgery when it is needed, and when the benefits of surgery outweigh the risks involved.

A vitrectomy is a specialised and complicated operation and your ophthalmologist should discuss the advantages and disadvantages of the procedure with you before scheduling the surgery.

Important points to remember

- Always go to your annual diabetic eye screening appointment.
- Have regular eye examinations with your optometrist. If you have diabetes, you'll receive eye examinations for free.
- Don't wait until your vision has become worse to have an eye test.
- Early diagnosis of diabetic retinopathy is vital. Although your vision appears to be good, there may be changes in your eyes that need treating. Most sight loss from diabetes is preventable if treatment is given early. The earlier the treatment, the more effective it is.
- Speak to someone at your diabetic eye clinic or to your optometrist if you notice changes to your vision – it may not mean you have diabetic retinopathy. It may simply be a problem that can be corrected with glasses.
- Most sight-threatening diabetic problems can be managed by laser treatment if it is done early enough.
- Don't be afraid to ask questions or say that you're worried about your treatment.
- Good control of your blood sugar levels, blood pressure and cholesterol reduces the risk of diabetes-related sight loss.

- Always go to your diabetic clinic or GP surgery for your diabetes health checks, where your blood pressure and cholesterol will be looked at.
- Smoking increases your risk of diabetes-related sight loss. Your GP can tell you about NHS Stop Smoking services in your area.

Monitoring blood glucose levels

Testing your blood glucose level at home helps you to manage and control your diabetes. Most people use a blood glucose meter to keep a check on their blood glucose levels. By pricking the side of your finger and placing a drop of your blood onto a testing strip, you can then put the strip in your meter, which will display your blood glucose level on a screen.

If you have a sight problem, you may find some meters difficult to read. However, you can now get easy to see meters and talking meters. Up to date details of meters are on the Diabetes UK website at **diabetes.org.uk**, or you can call the Diabetes UK Careline on **0345 123 2399** for more details. The line is open from Monday to Friday, 9am to 7pm.

If it's difficult to read your meter at home, tell your GP, diabetic nurse, or someone at your eye clinic. You need to be able to monitor your diabetes at home to best look after yourself and your vision. If you are having problems, then your diabetic nurse needs to work with you to make sure that you can use your blood glucose meter properly.



Coping

It's completely natural to be upset when you've been diagnosed with a diabetic eye condition, and it's normal to find yourself worrying about the future and how you will manage with a change in your vision.

It can sometimes be helpful to talk over these feelings with someone outside of your circle of friends or family. At RNIB, we can help with our telephone Helpline and our Sight Loss Counselling team. Your GP or social worker may also find a counsellor for you if you feel this might help.

Your eye clinic may also have a sight loss adviser (also known as an Eye Clinic Liaison Officer or ECLO), who can be on hand to provide you with further practical and emotional support about your eye condition.

Further help and support

If your diabetes-related eye condition is picked up and treated early, you may not experience much of a change to your vision. You can carry on with everyday activities such as reading, watching television and using the computer – these things will not make your sight worse.

If you do have some sight loss, there are a lot of things you can do to make the most of your remaining vision. This may mean making things bigger, using brighter lighting or using colour to make things easier to see. We have a series of leaflets with helpful information on living with sight loss, including how to make the most of your sight. You can find out more about our range of titles by calling our Helpline.

You should ask your ophthalmologist, optometrist or GP about low vision aids and getting a low vision assessment. During this assessment with an optometrist, you'll be able to discuss the use of magnifiers and aids to help you to see things more clearly.

You should also ask your ophthalmologist whether you're eligible to register as sight impaired (partially sighted) or severely sight impaired (blind). Registration can act as your passport to expert help and sometimes to financial concessions. Even if you aren't registered, a lot of this support is still available to you.

Local social services should be able to give you information on staying safe in your home and getting out and about safely. They should also be able to offer you some practical mobility training to give you more confidence when you are out.

If you have questions about anything you've read in this publication, please get in touch with us.

Our Helpline is your direct line to the support, advice and services you need. Whether you want to know more about your eye condition, buy a product from our shop, join our library, find out about possible benefit entitlements, or be put in touch with a trained counsellor, we're only a call away.

It's also a way for you to join RNIB Connect, our community for anyone affected by sight loss. RNIB Connect is free to join and you'll have the chance to meet other people with similar experiences in our helpful, welcoming and supportive community.

Give us a call today to find out how we can help you.

RNIB Helpline

0303 123 9999

helpline@rnib.org.uk

We're ready to answer your call Monday to Friday 8am to 8pm and Saturday 9am to 1pm.

You can also get in touch by post or by visiting our website:

RNIB

**105 Judd Street
London WC1H 9NE**

rnib.org.uk

Other useful contacts

Diabetes UK

Diabetes UK Careline:

0345 123 2399

diabetes.org.uk

Driver and Vehicle Licensing Authority (DVLA)

Drivers' Medical Enquiries
Swansea SA99 1TU

0300 790 6806

www.dvla.gov.uk

We value your feedback

You can help us improve this publication by letting us know what you think about it. Please complete and return this form to:

RNIB
Eye Health Information
London
WC1H 9NE

You can also email us at
eyehealth@rnib.org.uk

Please include your contact details if you're requesting information.



1. Where did you receive your copy of this publication?

2. Did you find the information easy to read and understand? Please give details of anything you feel could be improved.

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3. Is there any information you would have found helpful, that was missing?



4. Do you have any other comments about this publication or any aspect of your contact with RNIB?

Information sources

RNIB and The Royal College of Ophthalmologists do all we can to ensure that the information we supply is accurate, up to date and in line with the latest research and expertise.

This publication uses information from:

- The Royal College of Ophthalmologists' guidelines for treatment
- clinical research and studies obtained through literature reviews
- specific support groups for individual conditions
- medical text books
- RNIB publications and research.

For a full list of references and information sources used in the compilation of this publication, email eyehealth@rnib.org.uk.

About The Royal College of Ophthalmologists

The Royal College of Ophthalmologists champions excellence in the practice of ophthalmology and is the only professional membership body for medically qualified ophthalmologists.

The College is unable to offer direct advice to patients. If you're concerned about the health of your eyes, you should seek medical advice from your GP or ophthalmologist.

rcophth.ac.uk

If you or someone you know is living with sight loss, we're here to help.

RNIB Helpline
0303 123 9999
helpline@rnib.org.uk

Ask RNIB is the simple and easy way to find the answers to your questions online – try it today at **rnib.org.uk/ask**

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