

R N I B

See differently

Understanding

Eye conditions related to diabetes



*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 is a type of sugar that is produced by your body when you eat foods containing carbohydrates. When your stomach breaks down these foods, glucose goes into your blood. The hormone insulin moves glucose from your blood and into cells of your body where it is used as energy.

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

Diabetes is a lifelong condition and can cause several health complications. Your eyes are one part of your body that can be affected.

Around one person in 17 is diagnosed with diabetes in the UK.

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.

If your body doesn't make enough insulin or your body can'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.

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 or in some cases, insulin injections to control this type of diabetes.

Sometimes diabetes is described according to how it's managed; "non-insulin dependent" if it's managed with lifestyle changes or tablets, and "insulin dependent" if it's managed with insulin injections.

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.

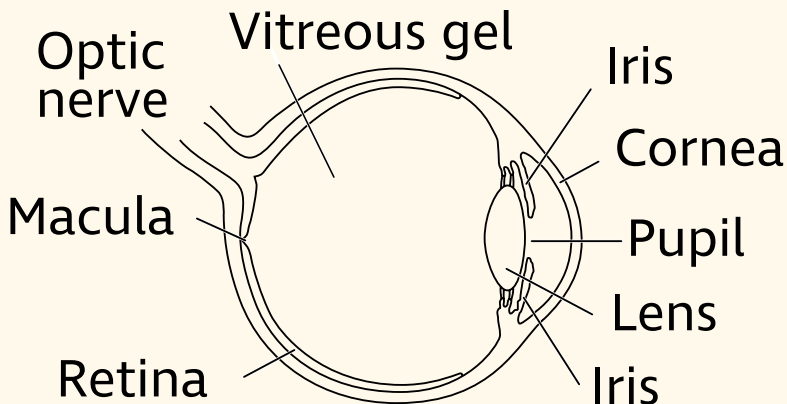
The retina is supplied with blood by a delicate network of blood vessels. These blood vessels can be damaged by diabetes.

Light entering your eye is focused onto a tiny area of your central retina called the macula. 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 throughout the day and from day to day, depending on your blood sugar levels. 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 be unstable.



- Diabetes can cause the lens in your eye to become cloudy. This condition is known as a cataract. If you have diabetes, you're more likely to develop a cataract, and diabetes can cause cataracts to develop at an earlier age. More information about cataracts can be found on the RNIB website, or by calling our Helpline.
- Some people with diabetes may develop glaucoma, an eye condition that can cause damage to the optic nerve, often due to raised pressure inside the eye. More information about glaucoma can be found on the RNIB website or by calling our Helpline.
- Over time, diabetes can affect the network of blood vessels supplying the retina at the back of the eye, affecting how the retina works. This is known as diabetic retinopathy. There are different types of diabetic retinopathy and how it can affect vision will depend on the severity of the changes to the blood vessels.
- Diabetes can also be associated with or increase the risk of other eye conditions including retinal vessel occlusion, corneal eye conditions or eye muscle problems.

Not everyone who has diabetes develops an eye condition.

What are the types of diabetic retinopathy?

Diabetes can cause blood vessels in the retina to become blocked, to leak or to grow incorrectly. The type of diabetic retinopathy you have depends on how badly your blood vessels are affected by diabetes.

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

Background diabetic retinopathy

Background retinopathy does not usually affect your sight. It occurs when the capillaries (the very small blood vessels) in your retina become weakened, causing them to develop small areas of swellings in their walls. These swellings are known as microaneurysms.

A microaneurysm 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

Blood vessels allow 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. If this happens over a large area of your retina, the 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 which stops the retina working properly.

The body tries to fix the lack of oxygen by growing new blood vessels on the retinal surface or into the vitreous gel. This is known as proliferative diabetic retinopathy. Unfortunately, these new vessels are weak and they bleed very easily. This can cause haemorrhages over the surface of the retina, causing damage to the retina. These new vessels may also bleed into the vitreous gel.

Where there are areas of damage to the retina, it won't be able to work properly. A haemorrhage into the vitreous gel 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. Over time, this can lead to a permanent loss of sight.

New blood vessels can also grow at the iris, the coloured part of your eye, which can cause your eye pressure to rise and lead to glaucoma.

If proliferative diabetic retinopathy is very severe, scar tissue may develop. 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.



New blood vessels can also grow at the iris, the coloured part of your eye, which can cause your eye pressure to rise and lead to glaucoma.

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

Diabetic maculopathy is when your macula is affected by retinopathy. It causes your central vision, which is required for seeing fine detail and colour, to be blurred. This will make things like reading, writing and seeing detail difficult. If the blood vessels near the macula are leaky, fluid can build up at the macula and cause macular swelling. This is called diabetic macular oedema (DMO) and it can cause vision to be blurred and distorted, as well as making colours appear washed out. In time, it may give you a blank patch in the middle of your vision.

How can I reduce the risks?

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

- Keeping your blood glucose or blood sugar level within normal levels.
- 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.
- Having 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.

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), or from an African-Caribbean background, you're two to four times more likely to get type 2 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

Why are regular eye examinations and screening tests so important?

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 treatment is more effective when given early. Having your eyes checked regularly and attending diabetic eye screening can pick up eye problems before it affects your sight.

Annual diabetic eye screening

If you have diabetes, your GP should arrange for you to have a retinal screening every year. You'll have a detailed eye examination at a specialist screening clinic, which may take place at your GP surgery, your local hospital, optician's practice, or another nearby clinic.

At this appointment, you'll have eye drops put into your eyes to dilate (widen) your pupils. This allows for a good view of your retina. You'll then have photographs taken of your retina using a digital retinal camera. You'll see a flash when the photos are taken but the camera won't touch your eye. You won't get the results immediately as the photographs need to be studied by someone who is trained in identifying and grading retinopathy.

If your results show no retinopathy or some background retinopathy, you'll normally be invited back for another retinal screening in a year.

If your results show signs that retinopathy could affect your sight, you may be invited back for repeat retinal screening sooner than a year, or you may be referred to an ophthalmologist (hospital eye doctor) at the hospital eye clinic for tests and possible treatment.

If you're pregnant and have gestational diabetes, you will have retinal screenings more often during your pregnancy and after your baby is born.

This regular retinal 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. Your diabetic retinal screening will only look for diabetic changes

to the back of your eyes; your regular eye examination with your optometrist can check for other eye conditions, so it's important to have both tests regularly 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?

Diabetic retinopathy can be treated with laser treatment to prevent sight threatening complications.

Laser can be used in two ways:

Localised laser treatment

Localised laser treatment may be used when only a small part of your retina is affected by retinopathy. The laser seals your blood vessels, to stop them from bleeding and help to reduce swelling. The treatment normally only takes a few minutes. You don't usually notice a worsening of 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 process known as neo-vascularisation), a larger area of your retina may need to be treated by laser. 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 ophthalmologist 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 so the correct part of your retina can be treated. You'll be able to do this easily with the contact lens in place. Ask your ophthalmologist 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, because a larger area of your retina is being treated. You may be given painkillers before the treatment. Don't be afraid to tell your ophthalmologist 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. This may mean:

- 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 or eye clinic 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?

If fluid leaks out of blood vessels near the macula, it can cause diabetic macular oedema (DMO).

If DMO doesn't affect the very centre of your macula (called the fovea), laser treatment be used to can reduce the swelling and prevent any further blurring of your vision.

The fovea is very delicate and cannot be directly treated with laser. If you have DMO affecting the fovea, then instead, your eye may be treated with an anti-vascular endothelial growth factor (anti-VEGF) injection.

Anti-VEGF drugs work by reducing leakiness of blood vessels and stopping new leaky blood vessels from growing. They can also help to improve your vision by reducing your macular oedema, by helping the fluid to be reabsorbed.

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 several months. 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. You can find out more about anti-VEGF treatment on the RNIB website or by calling our Helpline.

Sometimes, if DMO doesn't improve with anti-VEGF treatments, you may be given another 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 DMO hasn't responded to the anti-VEGF injections. Your ophthalmologist will be able to tell you whether this treatment would be suitable for you.

When do I need vitrectomy surgery?

Inside your eye, there is a clear gel called the vitreous gel. If you have a bleed 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.

However, if your vision doesn't improve, you may need to have vitrectomy surgery. In this surgery, the cloudy vitreous gel is removed and replaced with a clear liquid, which usually helps to improve your vision.

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

If you have a bleed 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

the bleeding changes, to see if there are any new bleeds, and whether your bleeding has begun to be reabsorbed.

A vitrectomy is a specialised and complicated operation and your ophthalmologist would only carry out this surgery when it is needed, and the benefits outweigh the risks involved. They should discuss the advantages and disadvantages of the procedure with you before scheduling the surgery.

Looking after your sight – Important points to remember

- Always go to your regular 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.
- 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, but could simply be a problem that can be corrected with glasses.
- 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.
- 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

Some people may need to test their blood glucose levels at home to help them manage and control their 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 sight loss, you may find some meters difficult to read. However, you can get easy to see meters and talking meters.

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.

You can contact Diabetes UK for more information on monitoring blood glucose level; their contact details are listed at the end of this information.



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 be certified or registered as sight impaired (partially sighted) or severely sight impaired (blind). Certification and registered can act as your passport to expert help and sometimes to financial concessions. Even if you aren't certified or 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
105 Judd Street
London
WC1H 9NE

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

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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.

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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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