

Diabetes and stroke

Stroke Support Helpline: **0303 3033 100**
or email: helpline@stroke.org.uk

This guide explores the link between diabetes and stroke. It has information about treatment and reducing your risk of a stroke.

How does diabetes increase your risk of stroke?

Diabetes means you have too much sugar (glucose) in your blood. This can increase the risk of a stroke, because having too much sugar in your blood damages the blood vessels.

High blood sugar levels can:

- Make blood vessels become stiff.
- Cause a build-up of fatty deposits (atherosclerosis).

This can sometimes lead to a blood clot, which can cause a stroke if blood supply to part of your brain is blocked.

How can I reduce my risk of stroke if I have diabetes?

People with diabetes may have around double the risk of having a stroke than those without diabetes.

Although having high blood sugars over a period of time puts you at risk of a stroke, you can reduce your risk in several ways.

These include:

- Taking your medication as prescribed. Your healthcare team can help you understand and take any prescribed diabetes medications correctly.
- Attending your diabetes health checks. These monitor your blood sugar, blood pressure, cholesterol and kidney function. High cholesterol and high blood pressure are also risk factors for stroke. Following any treatment needed for these conditions and managing your blood sugar can help reduce your risk of a stroke.
- Getting advice and support with healthy eating, managing your weight, being more physically active, stopping smoking and cutting down on alcohol if you drink.
- Joining a free diabetes education course to help you manage your condition.

Visit stroke.org.uk/reduce-my-risk for more information on high blood pressure, high cholesterol and making healthy lifestyle changes. You can also call our Stroke Support Helpline for printed information.

What is diabetes?

Diabetes causes your blood glucose (sugar) level to become too high. A hormone called insulin helps your body move glucose from the blood into the cells, where it can be used as energy. Diabetes develops when your body is not able to produce enough insulin, or the insulin it does produce does not work properly.

There are two main types of diabetes, both of which can increase your risk of a stroke.

- **Type 1 diabetes** means you cannot produce insulin. It often starts in childhood, but adults can get it too. It affects around 8% of people with diabetes.
- **Type 2 diabetes** means you do not produce enough insulin, or that your body cells are not responding to insulin. It is mainly an adult condition, although children and young people may be diagnosed with it too. It affects more than 90% of people with diabetes.

Gestational diabetes

Some pregnant women can get a temporary form of diabetes called gestational diabetes. It usually goes away after the baby is born, although it increases the mother's risk of developing type 2 diabetes in the future. Visit [nhs.uk/conditions/gestational-diabetes](https://www.nhs.uk/conditions/gestational-diabetes) to read more about gestational diabetes.

Who is at risk of diabetes?

Around 4.7 million people in the UK have been diagnosed with diabetes, but it's thought many others could be living with undiagnosed type 2 diabetes.

Type 1

You're more likely to develop type 1 diabetes if you have close family members with the condition. It's an autoimmune condition, where your immune system destroys insulin-producing cells in your pancreas.

Type 2

This type of diabetes is linked to living with obesity or being overweight, but you can also get it if you are not overweight. You're at higher risk of having type 2 if you have a close family member with the condition. It's more likely to start over the age of 40, but more younger people are also being diagnosed with the condition.

People from Black African, Black Caribbean, South Asian and Chinese family backgrounds are also at higher risk of developing type 2 diabetes and from a younger age (over 25).

You can try the Diabetes UK 'Know your risk' tool to learn more about your own risk of type 2 diabetes. In England, you can also join the 'Healthier You' diabetes programme for support with prevention. Visit preventing-diabetes.co.uk to learn more about the programme.

Symptoms of diabetes

Some of the most common symptoms of diabetes include:

- Feeling thirsty a lot.
- Needing to wee frequently, especially at night.
- Tiredness.
- Unexplained weight loss.
- Often having thrush (a fungal infection) or itchy genitals.
- Cuts and wounds taking longer to heal.
- Blurred vision.

Many people do not realise they have type 2 diabetes because they may have no symptoms, or symptoms may develop gradually. Type 1 diabetes symptoms are similar but usually develop more quickly.

Diagnosing diabetes

Diabetes is diagnosed by blood tests showing the amount of sugar (glucose) in your blood.

Pre-diabetes

Pre-diabetes is when your blood sugar is higher than normal, but not high enough to be diagnosed as type 2 diabetes. Pre-diabetes increases your risk of developing type 2 diabetes in future. You may be able to prevent or delay this by getting support with eating healthy food, managing your weight and being more active. Ask your GP or pharmacist for advice.

Visit the Diabetes UK website at diabetes.org.uk for more detailed information about tests, diagnosis and treatments.

Getting a diabetes diagnosis after a stroke

Because type 2 diabetes sometimes has no symptoms, you might only be diagnosed when you have tests after a stroke. Coping with this, as well as the effects of your stroke, can be difficult. As well as your stroke recovery, you may need to think about diabetes medication, monitoring blood sugar and trying to make changes to your diet. All of this can have a big emotional impact.

It can take time to adjust to the demands of managing your condition and it can feel overwhelming. Try to take it one step at a time. Speak to your doctor or nurse about how you're feeling and seek some support. You can also call our Stroke Support Helpline if you need someone to talk to or help finding sources of support.

You should have an annual diabetes health check (see **page 4**), but you can contact your GP at any time. Your pharmacist can also give advice on medication and support with healthy eating, being more physically active and stopping smoking.

Diabetes education

If you are diagnosed with type 2 diabetes, your GP can refer you for free diabetes education and support, such as a course or an app. These help you learn more about your condition and how to manage it. You might be able to meet other people with diabetes and get advice from experts. Courses may be face-to-face or online.

Diabetes UK has information about diabetes education courses at diabetes.org.uk/education

In England, you can sign up at healthyliving.nhs.uk for the NHS Healthy Living online support programme for people with type 2 diabetes.

Living with diabetes

Managing your condition

Type 1: People with type 1 diabetes are usually referred to a specialist care team. You need to replace the insulin your body cannot produce. This is usually done via insulin injections or an insulin pump. You'll also need to check your blood sugar levels regularly. It's also important to manage your diet, keep active and aim to maintain a healthy weight.

Type 2: If you are diagnosed with type 2 diabetes, you should have help from a team of healthcare professionals, including your GP. You may need medication and you will have advice about managing your diet and weight and staying active.

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For some people with type 2 diabetes, it may be possible to reach a normal blood sugar level by eating healthy food, managing your weight and being more active. If your blood sugars stay below the diabetes level for at least three months without medication, it's known as remission. You'll need advice and support with achieving this, so do not stop taking any medication without speaking to your GP first.

Health checks for people with diabetes

If you have either type of diabetes, you should have your blood sugar level checked regularly by a healthcare professional using an HbA1c test. This blood test measures your average blood sugar level over the last two to three months.

Your blood pressure, cholesterol and kidney function should also be checked at least once a year. Your annual diabetes review should also measure your weight and height to check your body mass index (BMI). You should also have a foot check and retinal eye screening check every one to two years.

Attending your check-ups and following any treatments can help prevent serious complications from diabetes, including sight loss, kidney disease and stroke. Contact your GP right away if you have any health problems in between these checks.

If you have any stroke symptoms, call **999**. See [stroke.org.uk/symptoms](https://www.stroke.org.uk/symptoms)

Quick guide to medication for type 2 diabetes

This guide can only give general information. You should always get individual advice about your own health and any treatment and medication you may need from a healthcare professional, such as a GP or pharmacist.

Many people with type 2 diabetes need medication to help them manage their blood sugar. You might need to try different doses and combinations of medications to reach your target blood sugar level. Your doctor should discuss with you the benefits and risks of your medication options, based on your individual circumstances and needs.

Like all medications, diabetes treatments can sometimes cause side effects, though not everyone will get side effects. The patient information leaflet that comes with your medication has a full list of these.

Talk to your GP or pharmacist if you have any questions. They can give advice about how to take your medication and what to do about side effects. Do not stop taking your medication without speaking to your GP.

In England, you can ask your pharmacist about the NHS New Medicines Service. This gives you three appointments to offer support with new medication and check on your progress.

Diabetes prescriptions are free of charge. In England, you need a medical exemption certificate if you're under 60.

Metformin

How it works

Metformin comes as tablets or as a liquid. It helps to lower your blood sugar levels by reducing the amount of glucose your liver releases into the body. It also helps your body to respond better to the insulin it produces.

It's usually prescribed as a first-line treatment for all people with type 2 diabetes, unless there's a reason you cannot take it. It's recommended it be used alongside SGLT2 inhibitors for most people. But it can also be used on its own or alongside other medications.

Some possible side effects

It can sometimes cause stomach upsets. To help avoid this, it's usually taken along with food and may be given in a low dose to start with and gradually increased. People starting metformin are usually given a modified-release version which can be easier on the stomach and reduce side effects.

SGLT2 inhibitors (sodium–glucose linked transporter 2)

How they work

SGLT2 inhibitors work by increasing the amount of sugar removed from the body through your wee, which helps lower blood sugar. They can also help protect your heart and kidneys and reduce the risk of serious complications such as a stroke or heart attack.

NICE treatment guidelines recommend an SGLT2 inhibitor should be offered to all people with type 2 diabetes as a first-line treatment, including for people with heart failure, cardiovascular disease, chronic kidney disease, or obesity.

You may be offered an SGLT2 inhibitor along with metformin or other diabetes medications, or on its own.

Examples include dapagliflozin, canagliflozin, empagliflozin and ertugliflozin.

Some possible side effects

These may include thrush or weeing more than usual. Diabetic ketoacidosis (DKA) is a rare side effect which can be serious and needs urgent treatment. Signs include dehydration, drowsiness, and feeling or being sick.

GLP-1 agonists (glucagon-like peptide 1 receptor agonists)

How they work

GLP-1 agonists work by increasing the levels of gut hormones called incretins, which help boost insulin production when needed and reduce blood sugar levels. They also slow digestion to keep your blood sugar levels stable after eating.

GLP-1 agonists come as an injection you can give yourself or as tablets. They may be offered alongside other diabetes medications.

Examples include dulaglutide, liraglutide and semaglutide. The semaglutide medications prescribed for diabetes are often referred to by their brand names, Ozempic and Rybelsus. There is also a medication for type 2 diabetes called tirzepatide, which is a GLP-1/GIP agonist drug often referred to by the brand name Mounjaro.

You may be offered a GLP-1 agonist for type 2 diabetes if you are living with obesity or have cardiovascular disease. GLP-1 agonists can help with weight loss, and semaglutide has been shown to help reduce the risk of stroke and heart attacks in people with cardiovascular disease who are overweight or obese.

GLP-1 agonists may also sometimes be offered to people diagnosed with type 2 diabetes under the age of 40 (early onset diabetes), alongside other medication.

Some possible side effects

These may include feeling or being sick, constipation or diarrhoea. More serious side effects may include a worsening of diabetic retinopathy (an eye condition) or acute pancreatitis.

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Sulfonylureas

How they work

This type of drug works by helping your pancreas to produce more insulin. It can be given in a low dose to start with and gradually increased. It might be used with other medications to manage blood sugar.

Examples include glimepiride, gliclazide, tolbutamide and glipizide.

Some possible side effects

These may include hypoglycaemia (low blood sugar), nausea, constipation and weight gain.

DPP-4 inhibitors (gliptins)

How they work

These drugs prevent the breakdown of a naturally occurring hormone called GLP-1 which helps the body produce insulin when blood sugar levels are high and reduce glucose being released by the liver. Gliptins keep levels of GLP-1 higher in the blood to help reduce blood sugar, but without causing low blood sugar (hypoglycaemia). They may be used with other medications.

Examples include alogliptin, linagliptin, sitagliptin, saxagliptin and vildagliptin.

Some possible side effects

These may cause headaches, indigestion and diarrhoea.

Insulin injections

Insulin is the main hormone that helps our bodies use glucose. It's the main treatment for people with type 1 diabetes, but it can also be used for type 2 diabetes if other medicines are not suitable or do not help to manage blood glucose. There are different types of insulin treatments available.

Your healthcare team will talk to you about the type of insulin they think is best for you. They will also teach you how to inject it yourself and help you with any concerns you may have.

Other medications

Less commonly used medications include:

- Acarbose slows down the absorption of carbohydrates from the gut which helps reduce a peak in blood sugar after a meal.
- Meglitinides (nateglinide and repaglinide) give a short-lived boost to insulin levels after eating.
- Pioglitazone is not usually used alone, and cannot be used by people with heart failure.

Driving and diabetes

By law, if you're taking long-term insulin, or have severe hypoglycaemia (hypos, or low blood sugar) you need to inform the DVLA (DVA in Northern Ireland). The rules are different for car and large vehicle licences, so you need to make sure you know which rules apply to you. Find out more about diabetes and driving from Diabetes UK at diabetes.org.uk/driving

See gov.uk/driving-medical-conditions for more information from the DVLA about stroke, diabetes and driving.

Where to get support and information

From the Stroke Association

Stroke Support Helpline

Our Stroke Support Helpline offers information and support for anyone affected by a stroke. This includes friends and family members.

Call us on: **0303 3033 100**

From a textphone: **18001 0303 3033 100**

Email: **helpline@stroke.org.uk**

Read our information

Log onto **stroke.org.uk**, where you can find easy-to-understand information, videos and an online community to support you. You can also call the Helpline to ask for printed copies of our guides.

Other sources of support and information

Diabetes UK

Website: **diabetes.org.uk**

Helpline: **0345 123 2399**

Provides detailed information and support to people living with diabetes, including details of local support groups and how to lead a healthy lifestyle.

Diabetes Research and Wellness Foundation

Website: **drwf.org.uk**

Tel: **0239 263 7808**

A charity that raises awareness of diabetes and provides information and support to people living with type 1 and type 2 diabetes.

Stop smoking services

NHS Better Health (England)

Website: **nhs.uk/better-health/quit-smoking**

Helpline: **0300 123 1044**

Help Me Quit (Wales)

Website: **helpmequit.wales**

Helpline: **0800 085 2219**

Stop Smoking (Northern Ireland)

Website: **stopsmokingni.info**

Quit Your Way (Scotland)

Website: **nhsinform.scot/quit-your-way-scotland**

Helpline: **0800 848484**

About our information

We want to provide the best information for people affected by stroke. That's why we ask stroke survivors and their families, as well as medical experts, to help us put our publications together.

How did we do?

To tell us what you think of this guide, or to request a list of the sources we used to create it, email us at **feedback@stroke.org.uk**

Accessible formats

Visit our website if you need this information in audio, large print or braille.

Always get individual advice

This guide contains general information about stroke and diabetes. But if you have a problem, you should get individual advice from a professional such as a GP or pharmacist. Our Stroke Support Helpline can also help you find support. We work very hard to give you the latest facts, but some things change. We don't control the information provided by other organisations or websites.

You know more than most just how shocking and confusing having a stroke is. We're here to support you and your family find the strength and determination to get back to life.

Learn more about stroke support: **stroke.org.uk**

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