

Type 2 Diabetes

Type 2 diabetes occurs mainly in people aged over 40. The first-line treatment is diet, weight control and physical activity. If the blood sugar (glucose) level remains high despite these measures then tablets to reduce the blood glucose level are usually advised. Insulin injections are needed in some cases. Other treatments include reducing blood pressure if it is high, lowering high cholesterol levels and also other measures to reduce the risk of complications.

What is diabetes?

Diabetes mellitus (just called diabetes from now on) occurs when the level of sugar (glucose) in the blood becomes higher than normal. There are two main types of diabetes - [type 1 diabetes](#) and type 2 diabetes.

What is type 2 diabetes?

With type 2 diabetes, the illness and symptoms tend to develop gradually (over weeks or months). This is because in type 2 diabetes you still make insulin (unlike in type 1 diabetes). However, you develop diabetes because:

- You do not make enough insulin for your body's needs; OR
- The cells in your body do not use insulin properly. This is called insulin resistance. The cells in your body become resistant to normal levels of insulin. This means that you need more insulin than you normally make to keep the blood sugar (glucose) level down; OR
- A combination of the above two reasons.

Type 2 diabetes is much more common than type 1 diabetes.

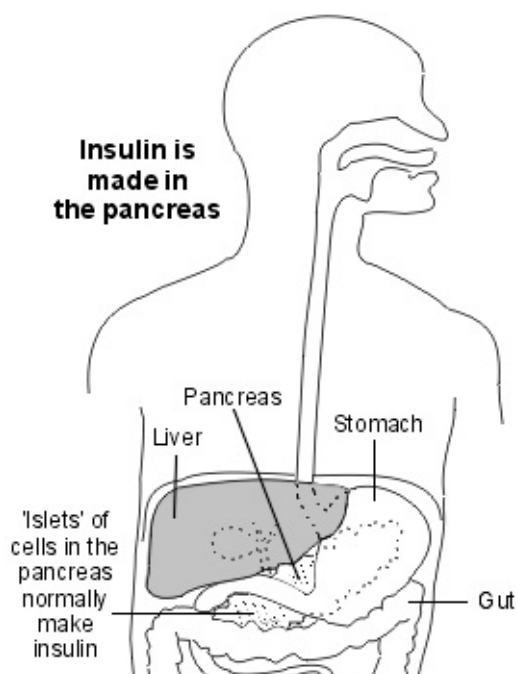
What is type 1 diabetes?

In type 1 diabetes the beta cells in the pancreas stop making insulin. The illness and symptoms develop quickly (over days or weeks) because the level of insulin in the bloodstream becomes very low. Type 1 diabetes used to be known as juvenile, early-onset, or insulin-dependent diabetes. It usually first develops in children or in young adults. Type 1 diabetes is treated with insulin injections and diet.

Understanding blood glucose and insulin

After you eat, various foods are broken down in your gut (intestine) into sugars. The main sugar is called glucose which passes through your gut wall into your bloodstream. However, to remain healthy, your blood glucose level should not go too high or too low.

So, when your blood glucose level begins to rise (after you eat), the level of a hormone called insulin should also rise. Insulin works on the cells of your body and makes them take in glucose from the bloodstream. Some of the glucose is used by the cells for energy, and some is converted into stores of energy (glycogen or fat). When the blood glucose level begins to fall (between meals), the level of insulin falls. Some glycogen or fat is then converted back into glucose which is released from the cells into the bloodstream.



Insulin is a hormone that is made by cells called beta cells. These are part of little islands of cells (islets) within the pancreas. Hormones are chemicals that are released into the bloodstream and work on various parts of the body.

The rest of this leaflet deals only with type 2 diabetes. There is a separate leaflet called **Type 1 Diabetes**.

Who gets type 2 diabetes?

Type 2 diabetes used to be known as maturity-onset, or non-insulin-dependent diabetes. It develops mainly in people older than the age of 40 (but can also occur in younger people). In the UK about one in 20 people aged over 65 and around one in five people aged over 85 have diabetes. Type 2 diabetes is now becoming more common in children and in young people.

The number of people with type 2 diabetes is increasing in the UK, as it is more common in people who are overweight or obese. It also tends to run in families. It is around five times more common in South Asian and African-Caribbean people (often developing before the age of 40 in this group). It is estimated that there are around 750,000 people in the UK with type 2 diabetes who have not yet been diagnosed with the condition.

Other risk factors for type 2 diabetes include:

- Having a first-degree relative with type 2 diabetes. (A first-degree relative is a parent, brother, sister, or child.)
- Being **overweight or obese**.
- Having a waist measuring more than 31.5 inches (80 cm) if you are a woman or more than 37 inches (94 cm) if you are a man.
- Having **impaired glucose tolerance**. (Impaired glucose tolerance means that your blood sugar (glucose) levels are higher than normal but not high enough to have diabetes.)
- Having diabetes or impaired glucose tolerance when you were pregnant.

What are the symptoms of type 2 diabetes?

As already mentioned, the symptoms of type 2 diabetes often come on gradually and can be quite vague at first. Many people have diabetes for a long period of time before their diagnosis is made.

The four common symptoms are:

- Being thirsty a lot of the time
- Passing large amounts of urine

- Tiredness
- Weight loss

The reason why you make a lot of urine and become thirsty is because glucose leaks into your urine, which pulls out extra water through the kidneys.

As the symptoms may develop gradually, you can become used to being thirsty and tired and you may not recognise that you are ill for some time. Some people also develop blurred vision and frequent infections, such as recurring thrush. However, some people with type 2 diabetes do not have any symptoms if the blood sugar (glucose) level is not too high. But, even if you do not have symptoms, you should still have treatment to reduce the risk of developing complications.

How is diabetes diagnosed?

A simple dipstick test may detect sugar (glucose) in a **sample of urine**. However, this is not sufficient to diagnose diabetes definitely. Therefore, a blood test is needed to make the diagnosis. The blood test detects the **level of glucose in your blood**. If the blood glucose level is high then it will confirm that you have diabetes. Some people have to have two samples of blood taken and may be asked to fast (this means having nothing to eat or drink, other than water, from midnight before the blood test is performed).

It is now recommended that the blood test for **HbA1c** can also be used as a test to diagnose diabetes. An HbA1c value of 48 mmol/mol (6.5%) or above is recommended as the blood level for diagnosing diabetes.

In many cases diabetes is diagnosed during a routine medical or when tests are done for an unrelated medical condition.

What are the possible complications of diabetes?

Short-term complication - a very high blood (sugar) glucose level

This is not common with type 2 diabetes. It is more common in untreated type 1 diabetes when a very high level of glucose can develop quickly. However, a very high glucose level develops in some people with untreated type 2 diabetes. A very high blood level of glucose can cause lack of fluid in the body (dehydration), drowsiness and serious illness which can be life-threatening.

Long-term complications

If your blood glucose level is higher than normal over a long period of time, it can gradually damage your blood vessels. This can occur even if the glucose level is not very high above the normal level. This may lead to some of the following complications (often years after you first develop diabetes):

- Furring or hardening of the arteries (**atheroma**). This can cause problems such as angina, heart attacks, stroke and poor circulation.
- **Kidney damage** which sometimes develops into **kidney failure**.
- **Eye problems** which can affect vision (due to damage to the small arteries of the retina at the back of the eye).
- **Nerve damage**.
- **Foot problems** (due to poor circulation and nerve damage).
- **Impotence** (again due to poor circulation and nerve damage).
- Other rare problems.

The type and severity of long-term complications vary from case to case. You may not develop any at all. In general, the nearer your blood glucose level is to normal, the less your risk of developing complications. Your risk of developing complications is also reduced if you deal with any other risk factors that you may have, such as high blood pressure.

Complications of treatment

Hypoglycaemia (which is often called a 'hypo') occurs when the level of glucose becomes too low, usually under 4 mmol/L. People with diabetes who take insulin and/or certain diabetes tablets are at risk of having a hypo. A hypo may occur if you have too much diabetes medication, have delayed or missed a meal or snack, or have taken part in unplanned exercise or physical activity.

Symptoms of hypoglycaemia include: trembling, sweating, anxiety, blurred vision, tingling lips, paleness, mood change, vagueness or confusion. To treat hypoglycaemia you should take a sugary drink or some sweets. Then eat a starchy snack such as a sandwich.

Note: hypoglycaemia **cannot** occur if you are treated with diet alone.

What are the aims of treatment?

Although diabetes cannot be cured, it can be treated successfully. If a high blood sugar (glucose) level is brought down to a normal or near-normal level, your symptoms will ease and you are likely to feel well again. You still have some risk of complications in the long term if your blood glucose level remains even mildly high - even if you have no symptoms in the short term. However, studies have shown that people who have better glucose control have fewer complications (such as heart disease or eye problems) compared with those people who have poorer control of their glucose level.

Therefore, the main aims of treatment are:

- To keep your blood glucose level as near normal as possible.
- To reduce any other risk factors that may increase your risk of developing complications. In particular, to lower your blood pressure if it is high, and to keep your blood lipids (cholesterol) low.
- To detect any complications as early as possible. Treatment can prevent or delay some complications from getting worse.

Treatment aim 1 - keeping your blood glucose level at normal levels

How is the blood sugar (glucose) level monitored?

The blood test that is mainly used to keep a check on your blood glucose level is called the **HbA1c test**. This test is commonly done every 2-6 months by your doctor or nurse.

The HbA1c test measures a part of the red blood cells. Glucose in the blood attaches to part of the red blood cells. This part can be measured and gives a good indication of your average blood glucose level over the preceding 1-3 months.

Treatment aims to lower your HbA1c to below a target level. Ideally, it is best to maintain HbA1c to less than 48 mmol/mol (6.5%). However, this may not always be possible to achieve and your target level of HbA1c should be agreed between you and your doctor. If your HbA1c is above your target level then you may be advised to step up treatment (for example, to increase a dose of medication) to keep your blood glucose level down.

Some people with diabetes check their actual blood glucose level regularly with a blood glucose monitor. If you are advised to do this then your doctor or nurse will give you instructions on how to do it.

Lifestyle - diet, weight control and physical activity

Lifestyle changes are an essential part of treatment for **all** people with type 2 diabetes, regardless of whether or not they take medication.

You can usually reduce the level of your blood glucose and HbA1c if you:

- **Eat a healthy and balanced diet.** Your practice nurse and/or dietitian will give you details on a healthy diet. The diet is the same as recommended for everyone. The idea that you need special foods if you have diabetes is a myth. Diabetic foods still raise blood glucose levels, contain just as much fat and calories and are usually more expensive than non-diabetic foods. Basically, you should aim to eat a diet low in fat, salt and sugar and high in fibre and with plenty of fruit and vegetables.
- **Lose weight if you are overweight.** Getting to a perfect weight is unrealistic for many people. However, losing some weight if you are obese or overweight will help to reduce your blood glucose level (and have other health benefits too).
- **Do some physical activity regularly.** If you are able, a minimum of 30 minutes' brisk walking at least five times a week is advised. Anything more vigorous and more often is even better. For example, swimming, cycling, jogging, dancing. Ideally, you should do an activity that gets you at least mildly out of breath and mildly sweaty. You can spread the activity over the day - for example, two fifteen-minute spells per day of brisk walking, cycling, dancing, etc. Regular physical activity also reduces your risk of having a heart attack or stroke.

Many people with type 2 diabetes can reduce their blood glucose (and HbA1c) to a target level by the above measures. However, if the blood glucose (or HbA1c) level remains too high after a trial of these measures for a few months, then medication is usually advised.

Medication

There are various medicines that can reduce the blood glucose level. Different ones suit different people. It is fairly common to need a combination of medicines to control your blood glucose level. Some medicines work by helping insulin to work better on the body's cells. Others work by boosting the amount of insulin made by the pancreas. Another type works by slowing down the absorption of glucose from the gut. There is also a type which suppresses a hormone called glucagon, which is released into the bloodstream by the pancreas and stops insulin from working.

Medication is not used *instead* of a healthy diet, weight control and physical activity - you should still do these things *as well* as take medication. See separate leaflet called [Treatments for Type 2 Diabetes](#) for more details.

Treatment aim 2 - to reduce other risk factors

You are less likely to develop complications of diabetes if you reduce any other risk factors. These are briefly mentioned below - see separate leaflet called [Preventing Cardiovascular Diseases](#) for more details. Although everyone should aim to cut out preventable risk factors, people with diabetes have even more of a reason to do so.

Keep your blood pressure down

It is very important to have your blood pressure checked regularly. The combination of high blood pressure and diabetes is a particularly high risk factor for complications. Even mildly raised blood pressure should be treated if you have diabetes. Medication, often with two or even three different medicines, may be needed to keep your blood pressure down. See separate leaflet called [Diabetes and High Blood Pressure](#) for more details.

If you smoke - now is the time to stop

Smoking is a high risk factor for complications. You should see your practice nurse or attend a smoking cessation clinic if you have difficulty [stopping smoking](#). If necessary, medication or nicotine replacement therapy (nicotine gum, etc) may help you to stop.

Other medication

You will usually be advised to take a [medicine to lower your cholesterol level](#). This will help to lower the risk of developing some complications such as heart disease, peripheral vascular disease and stroke.

Treatment aim 3 - to detect and treat any complications promptly

Most GP surgeries and hospitals have special diabetes clinics. Doctors, nurses, dietitians, specialists in foot care (chiropractors), specialists in eye health (optometrists) and other healthcare workers all play a role in giving advice and checking on progress. Regular checks may include:

- Checking levels of blood sugar (glucose), HbA1c, cholesterol and blood pressure.
- Ongoing advice on diet and lifestyle.
- Checking for early signs of complications, for example:
 - Eye checks - to detect problems with the retina (a possible complication of diabetes) which can often be prevented from getting worse. Increased pressure in the eye (glaucoma) is also more common in people with diabetes and can usually be treated.
 - Urine tests - which include testing for protein in the urine, which may indicate early kidney problems.
 - Foot checks - to help to prevent foot ulcers.
 - Other blood tests - these include checks on kidney function and other general tests.

It is important to have regular checks, as some complications, particularly if detected early, can be treated or prevented from getting worse.

Immunisation

You should be **immunised against flu** (each autumn) and also against **pneumococcal germs (bacteria)** (just given once). These infections can be particularly unpleasant if you have diabetes.

Further help & information

Diabetes UK

Macleod House, 10 Parkway, London, NW1 7AA

Tel: (Careline): 0845 120 2960 (Admin): 020 7424 1000

Web: www.diabetes.org.uk

Further reading & references

- [Type 2 diabetes: the management of type 2 diabetes \(update\)](#); NICE Clinical Guideline (May 2008)
- [Type 2 diabetes - newer agents \(partial update\)](#); NICE Clinical Guideline (May 2009)
- [Management of diabetes](#); Scottish Intercollegiate Guidelines Network - SIGN (March 2010)
- [Diabetes - type 2](#); NICE CKS, July 2010

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