

Type 2 Diabetes

Type 2 diabetes occurs mainly in people aged over 40. The 'first-line' treatment is diet and exercise. If the blood glucose level remains high despite a trial of diet and exercise, 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, and other measures to reduce the risk of complications.

What is diabetes?

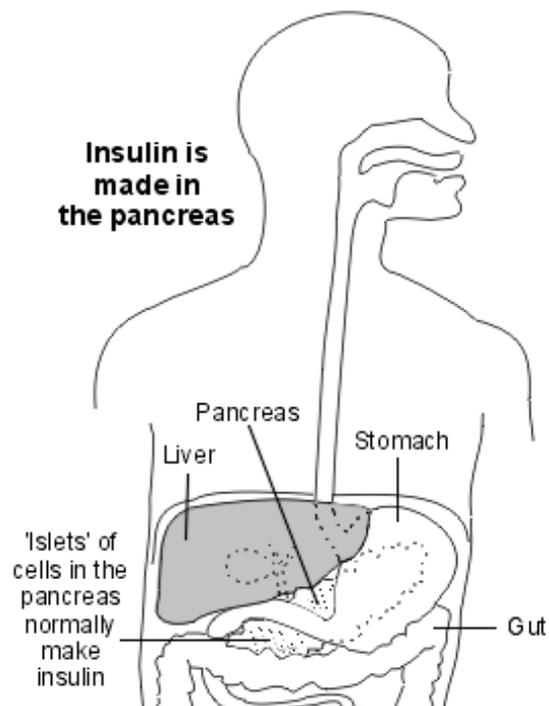
Diabetes mellitus (just called diabetes from now on) occurs when the level of glucose (sugar) in the blood becomes higher than normal. There are two main types of diabetes - Type 1 diabetes and Type 2 diabetes.

Understanding blood glucose and insulin

After you eat, various foods are broken down in your gut 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 glycogen or fat (which are stores of energy). 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 made by special 'islands' of cells in the pancreas. (Hormones are chemicals which are released into the bloodstream and work on various parts of the body.)



Type 1 diabetes

In this type of diabetes the pancreas stops 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.

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 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. So, you need more insulin than you normally make to keep the blood glucose level down), OR
- a combination of the above two reasons.

Type 2 diabetes used to be known as maturity onset, or Non-Insulin Dependent Diabetes. It develops mainly in people older than 40 (but can occur in younger people). In the UK about 3 in 100 people aged over 40, and about 10 in 100 people aged over 65, have Type 2 diabetes. It is more common in people who are overweight or obese. It also tends to run in families. It is also more common in South Asian and African-Caribbean people (often appearing before the age of 40 in this group).

The rest of this leaflet deals only with Type 2 diabetes.

What are the symptoms of Type 2 diabetes?

The four common symptoms are:

- being thirsty a lot of the time.
- passing large amounts of urine. (The reason you make a lot of urine and become thirsty is because glucose leaks into your urine which 'pulls out' extra water through the kidneys.)
- tiredness.
- weight loss.

The symptoms may develop so gradually that you can become used to your increased thirst and tiredness. 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 glucose level is not too high. (But, even if you do not have symptoms, you should still have treatment to reduce the risk of long term complications.)

How is diabetes diagnosed?

A simple 'dipstick' test can detect glucose in a sample of urine. If you have glucose in your urine, it is likely that you have diabetes. (Urine does not normally contain glucose. If the blood glucose level goes above a certain level, then some glucose 'spills' through the kidneys into the urine.)

But, some people have kidneys which are more 'leaky', and glucose may leak into urine with a normal blood level. So, if your urine contains any glucose you should have a blood test to measure the blood level of glucose to confirm, or rule out, diabetes.

What are the possible complications of diabetes?

Very high blood 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 and cause dehydration, drowsiness, and serious illness which can be life-threatening. However, a very high glucose level develops in some people with Type 2 diabetes.

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 may lead to some of the following complications (often years after you first develop diabetes).

- Atheroma ('furring or hardening of the arteries'). 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.
- Other rare problems.

The type and severity of long-term complications varies 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 complications is also reduced if you deal with any other 'risk factors' which you may have such as high blood pressure.

Treatment complications

Too much insulin or certain medication can make the blood glucose level become too low (hypoglycaemia or 'hypo'). Symptoms of hypoglycaemia include: trembling, sweating, anxiety, blurred vision, tingling lips, paleness, mood change, vagueness or confusion. To treat hypoglycaemia: take a sugary drink or some sweets. Then eat a starchy snack, such as a sandwich. Some people carry a glucagon injection (a hormone which has the opposite effect to insulin) for use in emergencies to reverse hypoglycaemia. Note: hypoglycaemia cannot occur if you are treated with diet alone.

What are the aims of treatment?

If a high blood glucose level is brought down to a near normal level, your symptoms will ease and you are likely to feel well again. But, 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. So, the main aims of treatment are:

1. To keep your blood glucose level as near normal as possible.
2. To reduce any other 'risk factors' which 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.
3. 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 down

What is the level of blood glucose to aim for?

Some people with diabetes check their blood glucose level each day. If you do, ideally you should aim to keep your blood glucose level between 4 and 7 mmol/l before meals, and less than 10 mmol/l two hours after meals. This 'tight' control is not realistic for everybody, and a target level to aim for may be agreed between you and your doctor or nurse.

Not everybody checks their blood so often. Another type of blood test is called HbA1c. This test may be 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 blood glucose control over the last 2-3 months. Treatment aims to lower you HbA1c to below a target level which is usually agreed between you and your doctor. The target level is usually somewhere between 6.5% and 7.5%. If your HbA1c is above your target level then you may be advised to 'step up' treatment to keep your blood glucose level down (for example, by increasing the dose of medication, etc).

Diet and exercise

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

- *Eat a healthy balanced diet.* A practice nurse and/or dietician will give details on how to eat a healthy diet. The diet is the same as recommended for everyone. (The idea that you need special foods for diabetes is a myth.) Basically, you should aim to eat a diet low in fat, high

in fibre, and with plenty of starchy foods, fruit and vegetables.

- *Lose weight if you are overweight.* Getting to a 'perfect weight' is unrealistic for many people. But, losing some weight will help to reduce your blood glucose level (and have other health benefits too).
- *Exercise regularly.* If you are able, a minimum of 30 minutes brisk walking at least five times a week is advised. Anything more is even better. You can spread the exercise over the day. (For example, three 10 minute spells per day of brisk walking, cycling, dancing, etc.) Regular exercise 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 tablets which can reduce the blood glucose level. Different ones suit different people. Some tablets 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. Some people need a combination of tablets to control their blood glucose level. Tablets do not work *instead* of a healthy diet - you need to eat a healthy diet *as well*. See a separate leaflet called 'Treatments for Type 2 Diabetes'.

Insulin injections

Insulin is needed in some cases if diet, exercise and tablets do not work well enough. You cannot take insulin by mouth as it is destroyed by the digestive juices in the gut.

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, but are discussed more fully in another leaflet called *Preventing Heart Disease and Stroke*. Everyone should aim to cut out preventable 'risk factors', but people with diabetes have even more of a reason to do so.

Keep your blood pressure down

Have your blood pressure checked regularly. The combination of high blood pressure and diabetes is a particularly high risk factor. Even mildly raised blood pressure should be treated if you have diabetes. The aim is to keep your blood pressure below 140/80 (lower in some cases). Medication, sometimes with two or even three different tablets, may be needed to keep your blood pressure down. See separate leaflet called '*Diabetes and High Blood Pressure*'.

If you smoke - now is the time to stop

Smoking is a high risk factor. See a practice nurse if you have difficulty stopping. If necessary, medication or nicotine replacement therapy (nicotine gum, etc) may help you to stop.

Other medication

You may be advised to take tablets to lower your cholesterol level, and to take a daily aspirin. These help to lower the risk of developing some complications such as heart disease and stroke.

Treatment aim 3 - to detect early, and treat any complications

Most GP's surgeries and hospitals have special diabetes clinics. Doctors, nurses, dieticians, chiropodists, optometrists, and other health care workers all play a role in giving advice, and checking on progress. Activities in diabetes clinics include:

- Checking levels of blood 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. 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.
- other blood 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 against the pneumococcus bacteria (just given once). These infections can be particularly unpleasant if you have diabetes.

Diabetes UK

This leaflet gives only a brief account of diabetes. For further information contact Diabetes UK (formerly the British Diabetic Association). There are numerous branches throughout the country. They produce information leaflets on all topics related to diabetes, and their careline answers enquiries on all aspects of diabetes.

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