

# Understanding Type 2 diabetes

## Putting you in the picture

Being told that you or someone you care for has diabetes can be daunting. But, like most things in life, fear of the unknown diminishes as we learn about the subject.

This guide aims to answer some of your questions. However, it is intended purely as a support to the advice of your doctor or diabetes specialist nurse. If you are worried about anything at all, please let them know and they will be able to help.

Type 2 diabetes usually appears in middle-aged or older people, although South Asian and African-Caribbean people often develop it earlier. Sometimes it can be managed with diet and exercise alone but tablets are often used and insulin can be added too.

You have Type 2 diabetes and this fact sheet helps you to understand what this means.

## What is diabetes?

The medical name for this is diabetes mellitus but we'll just refer to it as diabetes from now on. Diabetes is a condition where the level of sugar in the blood is too high because the body cannot use sugar properly. Blood sugar is also referred to as blood glucose. After eating starchy foods, such as bread, rice and potatoes, the digestive process releases glucose into the bloodstream, which is then carried to all the parts of the body where it's used to make energy. Glucose is used by the cells in our bodies – a bit like a car burns fuel for energy.

Glucose comes from sugars and other sweet foods that we eat and can also be made by your liver. Normally, the amount of glucose in our blood is carefully controlled by a hormone called insulin, which is made in the pancreas. Insulin helps the cells in the body to take in glucose where it is used as fuel.

## Who gets Type 2 diabetes?

Diabetes can affect anyone, at any age, although Type 2 diabetes often starts as you get older – usually over the age of 40.

No-one really knows why some people are affected and others are not, but you are more likely to have Type 2 diabetes if:

- it runs in your family
- you are overweight
- your family has Asian or African-Caribbean origins
- you had diabetes during pregnancy

There are nearly three million people with confirmed diabetes in the UK of which Type 2 diabetes accounts for between 85 and 95 per cent.

**Type 2 diabetes is more common in older people.**

## Two types of diabetes

### Type 1 diabetes and Type 2 diabetes

**Type 1 diabetes** is when the body cannot produce any insulin and usually starts in people under 40 years of age. It is always treated with insulin injections, and a healthy diet and regular exercise are important to help manage the condition.

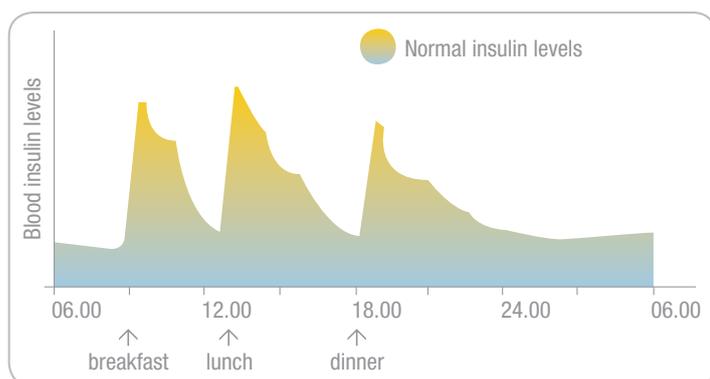
**Type 2 diabetes** develops either when the body doesn't make enough insulin or when the body does not respond fully to the insulin which is produced – this is called 'insulin resistance'.

## What is Type 2 diabetes?

Your body uses food as fuel to keep it working properly. Before food can be used, it's broken down into smaller parts by the process of digestion and some of it is used to make glucose.

If you do not have diabetes, insulin is released from an organ in the gut region called the pancreas to help remove the excess glucose from the blood and store it for future use in muscle and fat.

## Important Information



So, after a meal when blood glucose levels rise, insulin is produced to deal with it. But when glucose levels fall, such as when you're exercising, the level of insulin also falls. In this way, insulin helps control blood glucose levels by keeping them within a narrow range.

When you have Type 2 diabetes, your pancreas may not produce enough insulin or your body does not respond fully to the insulin which is produced. Not responding to the insulin that's produced is sometimes called insulin resistance because the cells in your body become resistant to the effect of the insulin.

No one really knows why this happens, but it may be related to being overweight or the ageing process.

Because your insulin is not working normally, you will have too much glucose in your blood. This is called hyperglycaemia and can eventually lead to health issues, such as damage to your eyes and problems with your heart, kidneys or feet.

**Too much glucose (sugar) in your blood may eventually lead to health problems.**

### What can I do?

- Your diabetes nurse or doctor will discuss how you can help to lower the amount of sugar in your blood – also referred to as your blood glucose level
- By learning how to lower your blood glucose level, you can keep your diabetes under control to help prevent future health problems

- Diet and exercise are part of your diabetes treatment. You may need to change what you eat and the amount of exercise or activity you do every day
- The more active you are, the more glucose your body will use up – so lowering your blood glucose. On the other hand, eating more will increase your blood glucose
- Good blood glucose control comes from finding a balance between the amount of glucose you take in as food and how much glucose you use through exercise
- If you are overweight, you will need to try and control your weight, by eating less or becoming more active

**You can control your blood glucose by balancing what you eat and your exercise/activities.**

### Blood glucose control

#### How is blood glucose normally controlled?

The cells in your body need energy to work properly and the 'fuel' that's used as a source of this energy is glucose. To distribute sufficient glucose to all the cells in your body, it is constantly circulated by your blood system.

The level of glucose needs to be controlled carefully. Too little glucose, which is called hypoglycaemia, can make you feel very unwell.

But too much glucose can eventually cause health problems such as damage to your eyes or kidneys.

#### How can I keep my blood glucose level down?

When you are first diagnosed, your diabetes nurse or doctor will discuss with you what type of treatment you need. It is normal for your treatment to change as time passes, to keep your blood glucose under control.

Many people will be able to control their blood glucose level by eating a balanced diet and keeping active. Some people will use tablets as well.

## Important Information

After a while, you may well find that your treatment does not work as well as it did. Your blood glucose level may start to go up again. This may be a sign that you need to change your treatment by adding different tablets or starting insulin.

You can monitor the situation by learning how to check your blood glucose level.

**It's normal for your diabetes treatment to be changed from time to time.**

### What is good control?

Your diabetes nurse or doctor may need to show you how to check your blood glucose level.

The concentration of glucose in your blood is measured in millimoles per litre (mmol/L).

A level of between 4 and 7mmol/L before meals means your blood glucose is well controlled.

A level below 4mmol/L is called hypoglycaemia or a 'hypo' which may make you feel unwell.

Hypos can only occur if your diabetes is controlled by tablets or insulin.

A level above 8.5mmol/L two hours after a meal is known as hyperglycaemia and can cause health problems in the long term, such as problems with your eyes, feet, heart or kidneys.

You may find it helpful to record your test results in a notebook or diary – your diabetes nurse or doctor can give you one of these.

**Hyperglycaemia - high blood glucose**  
**Hypoglycaemia - low blood glucose**  
**Good control - between 4 and 7mmol/L**



### Checking your blood glucose levels

It's a good idea to check your blood glucose level regularly – before and after meals – to check on your control. If your control is poor, you will need to improve it by changing what you eat, the amount of exercise you take and possibly your medication. It is important to learn how different activities and foods affect your blood glucose level and testing your own blood glucose levels should help you to do this.

At least once a year, your diabetes nurse or doctor will want to take a sample of blood to measure something called your HbA<sub>1c</sub>. This indicates your average blood glucose readings over the last three months.

Good control of your blood glucose level can help to reduce the chance of problems with your eyes, feet, heart or kidneys in the future.

Make a note of the target blood glucose levels you have agreed with your diabetes nurse or doctor here:

**My target blood glucose level before meals is \_\_\_\_ mmol/L**

**My target blood glucose level two hours after meals is \_\_\_\_ mmol/L**

**My target HbA<sub>1c</sub> level is \_\_\_\_\_ %**

### Why does monitoring matter?

Your diabetes nurse or doctor will be able to discuss with you how to change what you eat or your exercise so that they balance each other.

What works for one person may not be right for everyone, so you will need to find the right balance for your own exercise and eating patterns. It may sound a bit complicated at first, but you will soon learn how your own body adapts.

This doesn't mean you have to stop doing the things you enjoy – you may just need to adapt, for example, by preparing for them in advance.

**You control your diabetes – don't let it control you.**

### Treatments for Type 2 diabetes

Type 2 diabetes usually develops slowly. In fact, many people don't realise anything is wrong to start with. There is a long process during which the pancreas produces less and less insulin. As a result, doctors tend to change the treatments for Type 2 diabetes as the disease develops.

When first diagnosed, people with Type 2 diabetes can often manage their condition by eating a carefully considered diet and taking regular exercise to make sure they don't become overweight.

Gradually, as diabetes develops, these measures may not be adequate and doctors will prescribe tablets to help control the levels of glucose in the bloodstream.

There are a number of different types of tablets that help to control diabetes, and they work in different ways.

### Tablets

#### Sulphonylureas

One type of tablet used in Type 2 diabetes contains drugs called 'sulphonylureas'. Taken once or twice a day, they work by getting the pancreas to make more insulin and helping insulin to work better in the body. They can make you feel a bit sick with an upset stomach and may increase your weight. Sometimes they cause hypoglycaemia.

Glibenclamide, gliclazide, glimepiride and tolbutamide are examples of sulphonylurea-type drugs.

#### Mealtime glucose regulators

These tablets are taken just before meals and also work by helping the pancreas to make more insulin.

They work more quickly than the sulphonylureas and for a shorter time – so they're only taken at mealtimes and there's less risk of causing hypoglycaemia. Repaglinide and nateglinide are both glucose regulator tablets and can be taken up to three times every day. Unwanted effects include upset stomach, nausea and rashes.

#### Biguanides

These tablets work in 2 ways; they stop the liver making new glucose and help your insulin to carry glucose into the muscle and fat cells more effectively.

These tablets are taken 2 or 3 times every day but can give some people an upset stomach with nausea and diarrhoea. These unwanted effects usually wear off after a while and can be reduced by taking the tablets at mealtimes. Metformin is a biguanide type of drug.

#### Alpha-glucosidase inhibitors

These drugs work by slowing down the uptake of starchy food and, hence, slowing down the rise of sugar in the blood after meals. They may cause wind, feeling 'full up', or diarrhoea.

Acarbose is an alpha glucosidase inhibitor and is taken three times each day with food.

#### Glitazones

These help the body to use its own, naturally-produced insulin more effectively and should be taken once- or twice-daily. But they can cause headaches, fluid retention, weight increase and, sometimes, colds or flu-like infections. Pioglitazone is an example of this class.

#### Dipeptidyl peptidase 4 inhibitors

This is a type of drug that works to increase the production of hormones called 'incretins'. These reduce the amount of glucose your liver makes and help the body produce more insulin when it's needed, such as at mealtimes. It's used once-daily as an addition to a biguanide or a glitazone.

Unwanted effects include nausea, flatulence, fluid retention and hypoglycaemia.

#### SGLT2 inhibitors (sodium-glucose co-transporter 2 inhibitor)

This type of drug works in the kidney where it allows excess glucose to be filtered out of the blood and excreted in the urine. This will reduce blood sugar levels. These drugs are taken as tablets, and unwanted effects include hypoglycaemia (when used with sulphonylureas or insulin) and urinary and genital tract infections.

### Injectables

#### Incretin mimetics

Incretin mimetics, or GLP-1 analogues as they are also called, increase levels of hormones called 'incretins' which encourage the production of insulin in response to food and reduce the amount of glucose being produced by the liver. They also reduce the rate of digestion, and can reduce appetite. Incretin mimetics have to be given via injection. This group includes lixisenatide, exenatide and liraglutide.

Unwanted effects include gastrointestinal upset, hypoglycaemia, headaches, dizziness and reduced appetite.

#### Insulin

Due to the progressive nature of Type 2 diabetes, tablets usually become inadequate in controlling the disease and insulin is then needed to keep to reasonable blood glucose levels. Many people with Type 2 diabetes will need to be treated with insulin in order for them to control their blood glucose levels properly.

There are lots of different types of insulin available to treat Type 2 diabetes. Which type to use – and when – is not always straightforward.

Insulin can be used with or without tablets to control diabetes.

Insulins can be classified by the time they take to work:

#### Rapid-acting insulin

This type can be injected around mealtimes – either 5–15 minutes before or immediately afterwards, or even when eating. Rapid-acting insulin can last for 2–5 hours, so does not act for long enough to control blood glucose between meals.

#### Long-acting insulin

This kind of insulin acts over a long time because, once injected, it enters the bloodstream very slowly and so can last in the body for 24 hours.

Consequently, it is only taken once each day.

#### Short-acting insulin

This type of insulin works quickly and is taken 15–30 minutes before eating, to control the extra glucose entering the bloodstream after a meal. It has a peak action of 2 to 6 hours.

#### Medium- and long-acting insulins

Work over several hours, keeping blood glucose under control between meals.

#### Mixtures of short- and longer-acting insulins

Should cover mealtimes and the periods in-between.

### Healthy eating

Being diagnosed with diabetes will mean that you need to make some changes in your life – often to what you eat. You should start to eat a more healthy, balanced diet – for example, by cutting down on fat and eating more fresh fruit and vegetables. It doesn't mean you can never again have chocolate or a cream cake – but you will need to watch what you eat.

Eating properly and maintaining a good diet is an essential part of staying healthy when you have diabetes in order to keep glucose levels well controlled. It's also important to keep to a healthy weight. Even when you are taking insulin to control your diabetes, being overweight and not keeping to a good eating plan makes it almost impossible to keep to the correct glucose levels.

Healthy eating is good for everyone – whether you have diabetes or not. You may find that it helps if other people in your household follow the same advice about food – and you all change your eating habits together. If you would like more advice about healthy eating, your diabetes nurse or doctor can arrange for you to see a dietician, a specialist in foods and eating.

## Important Information



### Tips for healthy eating

- More high-fibre foods, such as bread, pasta, potatoes, wholemeal chapati
- Less fatty food – try to avoid butter, cakes and fried food
- More fruit and vegetables – at least five helpings a day
- Avoid sugary foods and drinks
- Use less salt – try herbs and spices to add flavour instead
- Avoid 'diabetic' foods – they are expensive, high in fat and you don't need them

**A dietician will be able to give you advice about meals and suggest recipes.**

### Eating out

If you are going out for a meal, try to book for about half an hour or so before you need to eat. This should allow enough time for you to have a drink and a chat before your first course is served.

Bear in mind that you will probably eat more than you would at home – so you may need to increase your insulin dose. Have some bread if you are drinking alcohol or if the restaurant is busy, in case your food takes longer to arrive than you had planned.

Choose dishes you enjoy, but don't be afraid to try something different. If you are unsure, check to see if you can order a side serving of a starchy food such as potatoes or poppadoms.

Finally, check your blood glucose level when you get home. Your diabetes nurse or doctor will be able to give you advice on changing your insulin dose according to different sizes of meals.

**Bear in mind that you might eat more than usual if you go out for a meal – and increase your insulin dose to allow for this.**

### Cooking tips

You don't need a new set of cookery books now that you have diabetes. Your favorite recipes can easily be adapted by following a few simple suggestions.

#### Adapting your own recipes

- Use olive oil instead of butter
- Use low-fat dairy products, such as fromage frais or crème fraîche, instead of cream; replace full-fat milk with semi-skimmed milk
- Flavour with lemon juice, mustard or herbs as a healthy alternative to salt
- Reduce the amount of sugar. You may find that low-sugar dishes don't keep for as long, because sugar acts as a natural preservative
- Grill or bake instead of frying, whenever you can

Dried fruit can be used to sweeten desserts, instead of sugar, while pulses (such as lentils) and beans can be used to thicken casseroles and stews. Eating a healthy, balanced diet and keeping your weight under control helps you to look after your diabetes.

### Looking after yourself

#### Keeping active and playing sport

Try to keep fit. If you have diabetes, it's especially important to take regular exercise, either by playing sports or just keeping active.

#### Regular exercise has two essential benefits:

- It helps to control weight
- It is good for the heart and reduces the risk of heart disease, especially in later life

For younger people, playing football or swimming are good forms of exercise, but older people should try to keep active as well. Even simple things such as walking to the shops rather than using public transport, gardening, or regularly taking your dog for a walk, are all beneficial. Regular, everyday activity of this sort, in fact, brings more long-term benefits than joining a gym or health club.

## Important Information



### Looking after your eyes

If your blood glucose level is too high, you may find that your vision becomes blurred. If this is not corrected, it could eventually damage your eyes and affect your eyesight. Permanent damage can be avoided if changes are picked up and treated at an early stage. It is, therefore, very important that you have an eye check-up every year.

Your diabetes nurse or doctor will be able to tell you more about eye testing in your area. Eye checks are free if you use insulin to control your diabetes.

**Taking care of your eyes can help prevent damage to your sight in the future.**

### Looking after your feet

Diabetes can affect your nerves and circulation. If the nerves from your feet are not working properly, you may not realise that you have a sore place on your foot. And, if the blood circulation to your feet is also poor, a simple cut or blister could get badly infected.

To avoid such problems, it is important to look after your feet very carefully.

#### Looking after your feet

- Check your feet every day for redness, irritation or broken skin
- Before you put on your shoes or slippers, check that there are no loose stones inside
- Make sure your shoes are comfortable and fit well – that they don't pinch or rub
- If your feet get cold, don't put them on anything hot to warm up, like radiators, hot water bottles or hot foot baths
- Don't walk about in bare feet – even at home – and especially on the beach
- Have regular check-ups with a foot specialist

If you find it difficult to check your feet yourself, you could use a small mirror to examine your soles or ask a family member to look at them for you.

Problems with the circulation in your feet can cause ulcers and, in some cases, permanent damage which can affect your ability to walk.

You need to have regular check-ups with a foot specialist who will be able to pick up any problems early and treat them. Your diabetes nurse or doctor will be able to tell you more about the foot care services available in your area.

### Can I still drink alcohol?

Provided you only drink in moderation, there's no reason why you should have to give up alcohol just because you have diabetes.

Try to drink less than 2 units a day if you're a woman or 3 units a day if you're a man and avoid drinking every day.

#### One unit is approximately

**1/2 pint of ordinary strength beer, lager or cider**

**1 pub measure (125ml) of wine**

**1 pub measure (25ml) of spirit**

Be careful though – the strength of many drinks have crept up over the years; some premium lagers are the equivalent of three units a pint and a small glass of table wine can be two units.

You should also be aware that measures at home or at someone else's house may be much larger than in a pub or restaurant.



## Important Information



### Drinking responsibly

- Never drink alcohol on an empty stomach
- Combine spirits (such as gin, vodka or whisky) with sugar-free mixers
- Bear in mind that alcohol is high in calories
- Remember that alcohol can lower your blood glucose level

Alcoholic drinks also contain quite a lot of calories so, if you need to watch your weight, keep your drinking to a minimum and make sure that mixer drinks are of the 'diet' or sugar-free variety.

## Can I still smoke?

Giving up smoking is good advice for anybody.

But if you have diabetes, remember that smoking substantially increases the long-term risks associated with the condition – so it's even more important to quit.

Smoking encourages the build-up of deposits in arteries making them narrower in places, which can reduce the blood supply to the organs of your body or encourage the formation of clots which could break off and travel to the heart or brain causing a heart attack or stroke. It also increases your blood pressure.

Smoking is bad for your health – but especially so for people with diabetes.

Smokers quit in different ways. What helps one person to stop smoking successfully may not work in another because the psychological and physical reasons for addiction vary.

These methods include everything from prescription medicines and nicotine replacement therapy to hypnotherapy and simple will-power or determination.

Your diabetes nurse or doctor will be able to tell you more about other ways to help you give up smoking.

### For more information:

Contact the free NHS Smoking Helpline on:  
**0800 022 4332**

or visit the website at:

[www.smokefree.nhs.uk/](http://www.smokefree.nhs.uk/)

### Driving and diabetes

Just because you have diabetes doesn't mean that you won't be allowed to drive a car.

If you haven't applied for a driving licence yet, you will be asked, on the application form, whether you have certain medical conditions – including diabetes. If you already have a driving licence but have just been diagnosed with diabetes and need medication to help control your diabetes, you should check with your doctor or nurse, or check on the website below:

[www.gov.uk/diabetes-driving](http://www.gov.uk/diabetes-driving)

You should not drive if you have difficulty recognising a hypo, as this could be dangerous for you and for others. Ask your doctor or nurse for further information or contact the DVLA directly:

#### Drivers Medical Enquiries

**DVLA**

**Swansea**

**SA99 1TU**

**Phone 0300 790 6806 for car or motorcycle enquiries**

**0300 790 6807 for bus, coach or lorry enquiries**

### Helpful words

<b>Blood glucose level</b>	The amount of sugar in your blood
<b>Chiropodist</b>	Member of the medical profession who looks after feet (sometimes known as a podiatrist)
<b>Dietician</b>	Someone who gives advice about foods and eating
<b>Digestion</b>	Process of breaking down food into sugar
<b>Glucose</b>	Sugar – form in which food can be used as fuel by the body
<b>HbA<sub>1c</sub></b>	Blood test to check your average blood glucose reading over the last three months
<b>Hyperglycaemia</b>	High blood glucose
<b>Hypoglycaemia</b>	Low blood glucose, commonly

#### **Insulin**

known as a hypo  
Hormone produced during digestion, to lower blood glucose

#### **Insulin resistance**

When the body does not respond fully to the insulin which is produced (because it is 'resistant' to insulin)

#### **Pancreas**

Part of the digestive system that produces insulin

## My contacts

Diabetes nurse

Name: \_\_\_\_\_

Tel: \_\_\_\_\_

Diabetes specialist doctor

Name: \_\_\_\_\_

Tel: \_\_\_\_\_

GP

Name: \_\_\_\_\_

Tel: \_\_\_\_\_

Dietician

Name: \_\_\_\_\_

Tel: \_\_\_\_\_

Chiropodist/Podiatrist

Name: \_\_\_\_\_

Tel: \_\_\_\_\_

Community nurse

Name: \_\_\_\_\_

Tel: \_\_\_\_\_

Pharmacist

Name: \_\_\_\_\_

Tel: \_\_\_\_\_

Other

Name: \_\_\_\_\_

Tel: \_\_\_\_\_

## Some more contacts you might find useful

### Diabetes UK

[www.diabetes.org.uk](http://www.diabetes.org.uk)

Tel: 0845 120 2960

### Driving with diabetes

DVLA

[www.gov.uk/diabetes-driving](http://www.gov.uk/diabetes-driving)

Tel: 0300 790 6806

### Healthy living

NHS support in giving up smoking

[www.smokefree.nhs.uk](http://www.smokefree.nhs.uk)

Tel: 0800 022 4332

This fact sheet is part of a series that helps to provide information about diabetes. Each of these sheets can be downloaded from [www.diabetesmatters.co.uk](http://www.diabetesmatters.co.uk) and pre-printed booklets may be ordered from the website, or your doctor or nurse might have copies to give to you.

[www.diabetesmatters.co.uk](http://www.diabetesmatters.co.uk)

Freephone 24-hour Sanofi Diabetes care-line

**08000 35 25 25**

Sanofi, One Onslow Street, Guildford, Surrey GU1 4YS