

Patient information from BMJ

Last published: Jan 16, 2020

Obesity - diet and exercise

Obesity - diet and exercise

If you're obese, you weigh much more than is healthy for you. This is the result of regularly eating more calories than your body uses. Your body stores the extra calories as fat.

Losing weight isn't easy. You'll need to change the way you eat and the amount of exercise you get. But if you make these changes you'll feel better and reduce your chance of many serious health problems.

You can use our information to talk with your doctor about which approach to weight loss is best for you.

What is obesity?

Being obese means being very overweight. This can greatly increase your chances of serious health problems such as:

- diabetes
- high blood pressure
- arthritis
- cancer, and
- heart disease.

When doctors talk about reaching a 'healthy' weight, they mean getting to a weight that lowers your risk of these health problems. It's not based on how thin you would like to look.

Most doctors use the body mass index (BMI for short) to work out whether you're at a healthy weight. Your BMI is a single number that's calculated based on your height and your weight. Doctors say someone is obese if their BMI is 30 or higher.

You might think that you don't eat a lot and that your weight problems must be caused by something else, such as a slow metabolism. But you can only become obese by eating more calories than your body uses. Unfortunately, to put on weight, you only have to eat slightly more calories than you use.

Obesity - diet and exercise

What are the symptoms?

If you are obese, you carry a lot of extra weight on your body. Carrying this extra weight may make you feel tired, or short of breath, or make your joints ache. You may also get skin irritation where your skin folds. Women may find that their periods become irregular.

Having extra weight around your waist has also been linked to having a higher chance of problems with your blood sugar, blood pressure, or cholesterol. This in turn may increase your chance of having heart problems.

What treatments work?

To lose weight, you need to take in fewer calories each day than you use. You can do this by following a **weight loss programme**.

Doctors usually recommend that people lose about 10 percent of their body weight over the first six months. If your BMI is 30 to 35, this will mean losing between 0.25 and 0.5 kilograms each week. If your BMI is above 35, you may need to lose between 0.5 kilograms and 1 kilogram a week.

Work with your doctor or practice nurse to set short-term, realistic goals.

Weight loss programmes

You have the best chance of losing weight if you combine a low-calorie diet with an exercise programme and behavioural therapy to help change the way you eat and exercise.

- A **low-calorie diet** means you eat fewer calories. This could mean eating smaller portions, and choosing foods with fewer calories. Men are usually advised to eat around 1200 to 1500 calories a day to lose weight. For women, the goal is usually 1000 to 1200 calories.

There are many types of diet you can follow to lose weight, including low-fat diets, low-carbohydrate diets (such as the Atkins diet), the Mediterranean diet, and supervised diet plans (such as Weight Watchers).

Some research suggests that low-carbohydrate diets work better than low-fat diets for the first six months, and that people find them easier to stick to. But there isn't much good evidence about what works best over the long term.

- **Exercise** is another essential part of a weight loss programme. The more exercise you do, the more calories you use. You'll probably need to do at least 30 minutes of physical activity on most days.

If you don't currently exercise, it's a good idea to start slowly and work up to this amount. Your doctor can provide advice on how much exercise you should do. Bear in mind that exercise alone won't help you to lose much weight. You need to cut calories, too.

- **Behavioural therapy** includes ways to help you change the way you eat and your exercise habits. You have sessions with a health professional to learn to think and act differently so that you can stick to your weight loss programme.

Obesity - diet and exercise

Research suggests that you're more likely to lose weight and keep the weight off if your weight loss programme includes:

- regular contact with a health professional
- support from other people who are losing weight
- a low-calorie diet that lists the kinds of foods to eat and those to avoid
- weighing yourself regularly
- a personalised exercise plan
- a plan for how best to keep weight off when you've reached your target weight.

Home videos or self-help books probably won't help as much as meeting regularly with a health professional to talk through your progress.

It's better to lose weight slowly and keep up the changes to your lifestyle. Crash diets or one-time bursts of exercise don't help to control your weight in the long term. The longer your weight loss programme lasts, the more likely you are to keep the weight off.

What will happen to me?

If you're obese, losing weight and keeping the weight off can be difficult. It will probably be easier if you get help from your doctor and follow a weight loss programme.

Here's what we know happens to most people who follow a weight loss programme:

- Most people lose about 5 percent to 10 percent of their weight within six months if they follow a programme that includes diet and exercise.
- Keeping the weight off can be a struggle. Most people put back on at least some of the weight they lose.
- Your best chance of keeping the weight off is to stay in a weight loss programme, with regular support from a health professional.

Although losing weight can be a challenge, the benefits are many. You will feel better and also have a much lower chance of serious health problems, including heart disease, cancer, diabetes, and arthritis.

The patient information from *BMJ Best Practice* from which this leaflet is derived is regularly updated. The most recent version of Best Practice can be found at bestpractice.bmj.com. This information is intended for use by health professionals. It is not a substitute for medical advice. It is strongly recommended that you independently verify any interpretation of this material and, if you have a medical problem, see your doctor.

Please see BMJ's full terms of use at: bmj.com/company/legal-information. BMJ does not make any representations, conditions, warranties or guarantees, whether express or implied, that this material is accurate, complete, up-to-date or fit for any particular purposes.

© BMJ Publishing Group Ltd 2020. All rights reserved.

Patient information from BMJ

Last published: Jan 16, 2020

High cholesterol: questions to ask your doctor

If you've been diagnosed with high cholesterol, you may want to talk to your doctor to find out more. Here are some questions that you might want to ask.

- Do I need to change my diet? If so, what should I eat? What should I avoid eating?
- Do I need to do anything else, such as exercising more?
- Do I need to lose weight?
- What's the best treatment for me?
- Do I need to take medicine?
- What are the side effects of treatment?
- By how much will treatment lower my cholesterol?
- Do I need to take vitamins or any other supplements?
- What will happen if I don't have treatment?
- Do I need to have my cholesterol tested regularly?
- How likely am I to get heart disease? Besides high cholesterol, what are my other risk factors?
- What can I do about these risk factors?

The patient information from *BMJ Best Practice* from which this leaflet is derived is regularly updated. The most recent version of Best Practice can be found at bestpractice.bmj.com. This information is intended for use by health professionals. It is not a substitute for medical advice. It is strongly recommended that you independently verify any interpretation of this material and, if you have a medical problem, see your doctor.

Please see BMJ's full terms of use at: bmj.com/company/legal-information. BMJ does not make any representations, conditions, warranties or guarantees, whether express or implied, that this material is accurate, complete, up-to-date or fit for any particular purposes.

© BMJ Publishing Group Ltd 2020. All rights reserved.

High cholesterol: questions to ask your doctor



Patient information from BMJ

Last published: Mar 17, 2020

High cholesterol

You need cholesterol to stay healthy. But having too much can increase your chance of heart problems or a stroke. Here, we look at treatments for people who have high cholesterol but have not been diagnosed with heart or circulation problems.

What is high cholesterol?

Cholesterol is a waxy, fatty substance found in all the cells in your body. It is carried around your body in your blood.

There are two kinds of cholesterol, and your body needs both types. However, having too much cholesterol - or having too much of the wrong type - can increase your chance of serious heart and circulation problems, such as heart attacks and strokes. The two types of cholesterol are:

- **LDL cholesterol.** This is often called 'bad cholesterol', as it can build up in your blood vessels and cause blockages if you have too much. This increases your risk of heart and circulation problems.
- **HDL cholesterol,** or 'good cholesterol'. This type helps to reduce the amount of bad cholesterol in your blood.

When discussing your cholesterol, your doctor may also talk about another potentially harmful type of fat in your blood called **triglycerides**.

How is high cholesterol diagnosed?

If you've been told you have high cholesterol, this usually means that one, or both, of the following is true:

- You have too much cholesterol in your blood overall
- You have too much bad (LDL) cholesterol in your blood in particular.

To check your cholesterol, your doctor will take a sample of your blood and do a test called a **lipids profile**. 'Lipids' is what doctors call the fats in your blood, including your cholesterol and triglycerides.

High cholesterol

Most people have a lipids profile as part of a general health check-up. You may be asked not to eat anything for 12 hours or so before this test.

The amount of cholesterol in your blood is measured using millimoles per litre (mmol/L). As a rough guide, doctors often say a person's cholesterol is at a healthy level if:

- their total cholesterol is under 5.2 mmol/L ('total cholesterol' includes their good and bad cholesterol and a portion of their triglycerides)
- their bad (LDL) cholesterol is under 2.6 mmol/L.

But having cholesterol levels above these numbers doesn't necessarily mean that you need treatment for your cholesterol.

Your doctor will look at several things to work out your overall chance of heart and circulation problems and whether you need treatment for high cholesterol. You might hear your doctor call these things 'risk factors'. These may include:

- your age
- whether you smoke
- your family history of heart and circulation problems
- whether you are overweight, and
- whether you have certain health problems, such as high blood pressure, kidney disease, or diabetes.

What treatments work?

Doctors usually recommend that all people with high cholesterol make changes to their lifestyle. This is sometimes the only treatment people need to lower their cholesterol. But your doctor will probably recommend taking medicines as well if:

- your level of bad (LDL) cholesterol is very high, or
- you have a high risk of heart and circulation problems, or
- lifestyle changes alone don't improve your cholesterol enough.

Lifestyle changes

Changing what you eat

The amount of fat you eat can affect your cholesterol levels. This doesn't mean that all fat is bad. You just need to be careful about the types of fat you eat. The less healthy kinds of fat are called saturated fats and trans fats.

- Saturated fats are found in meat and dairy products.
- Trans fats are found in some fast foods, biscuits, and baked goods.
- In general, less healthy fats are solid at room temperature.
- Healthier types tend to be liquids, such as olive oil and some other vegetable oils. These healthier types of fat are called polyunsaturated or monounsaturated fats.

High cholesterol

To reduce your bad fats, try to eat only lean cuts of meat, and only fat-free or low-fat dairy products. You should also avoid common sources of bad fats, such as fast food.

Your doctor may also recommend eating more fish, and also more foods that are high in fibre, including fruit and vegetables, nuts, beans, and wholegrain foods.

Making changes to your diet can be hard. Your doctor may refer you to a dietitian to come up with an eating plan that suits your needs and tastes.

Exercising regularly

This means getting a moderate amount of exercise several times a week. Types of exercise can include walking briskly, swimming, playing sports, or cycling.

Your doctor can provide advice on what types of exercise might be best for you, how much you should do, and for how long.

For most people, doctors recommend exercising at a moderate intensity (enough to feel their heart beating and increase their breathing) for 30 minutes, at least three days a week.

You don't need to do the 30 minutes all at one time. It can be broken into bouts of physical activity of at least 10 minutes each.

Losing weight (if you're overweight)

Exercising regularly and changing your diet to improve your cholesterol can have another benefit - it can help you lose weight. And losing weight can improve your cholesterol further in turn. You can discuss your weight-loss goals with your doctor and work out a plan to reach them.

Taking plant sterols and stanols

These are natural substances found in plants that are similar to human cholesterol. They help lower cholesterol levels by competing with cholesterol to be absorbed by the body.

Natural sources of sterols and stanols include wheat germ oil, soybean oil, corn oil, sesame seeds, nuts, and some fruits such as oranges and figs.

But the amounts of sterols and stanols in these foods is too small to have much effect on your cholesterol levels. So treatment with stanols and sterols usually involves taking supplements.

You might also eat foods enriched with higher amounts of these substances, such as enriched spreads, yoghurts, fruit juices, and cereal bars.

Stopping smoking

Studies suggest that smoking raises your bad (LDL) cholesterol and lowers your good (HDL) cholesterol. Besides raising bad cholesterol, smoking is one of the main risk factors for serious heart and circulation problems, such as heart attacks and strokes.

High cholesterol

By stopping smoking, you can greatly reduce your risk of these problems. Your doctor can provide advice and support, as well as treatments, to help you stop.

Medicines

Statins are the main drug treatment for reducing high cholesterol, and they work well for most people. There are several different ones.

If your cholesterol is still too high while taking a statin, your doctor may increase your dose or try a different statin.

Statins can cause side effects in some people. You may need to have blood tests every so often to make sure treatment doesn't damage your liver. Some people who take statins get muscle pain or muscle damage. Tell your doctor if you notice any muscle pain or weakness.

Other drugs are sometimes used to treat high cholesterol. For most people, these drugs aren't as good as statins. But they can be helpful for people who aren't able to take statins because of side effects.

What will happen to me?

If you've been diagnosed with high cholesterol, making lifestyle changes and taking medicines can work well to improve your cholesterol and reduce your chance of serious heart and circulation problems. Your doctor may also recommend treating other conditions, such as high blood pressure, to further reduce your risk.

To get the full benefit of these treatments and lifestyle changes, you need to commit to them over the long term. Your doctor will regularly check your cholesterol levels and adjust your treatment if necessary.

The patient information from *BMJ Best Practice* from which this leaflet is derived is regularly updated. The most recent version of Best Practice can be found at bestpractice.bmj.com. This information is intended for use by health professionals. It is not a substitute for medical advice. It is strongly recommended that you independently verify any interpretation of this material and, if you have a medical problem, see your doctor.

Please see BMJ's full terms of use at: bmj.com/company/legal-information. BMJ does not make any representations, conditions, warranties or guarantees, whether express or implied, that this material is accurate, complete, up-to-date or fit for any particular purposes.

© BMJ Publishing Group Ltd 2020. All rights reserved.



Patient information from BMJ

Last published: Jan 16, 2020

Diabetes type 2: questions to ask your doctor

If you've been told you have diabetes, you may want to talk to your doctor, hospital specialist, or diabetes nurse to find out more.

Here are some questions that you might want to ask:

- Why do I have diabetes?
- Can I control my diabetes by eating better, exercising, or taking tablets?
- Will I have to start giving myself insulin injections?
- Could the food I eat be making my diabetes worse?
- Do I have to stop eating sweet foods?
- Should I be checking my blood sugar level myself? If so, how often should I check my blood sugar?
- Will I get bouts of low blood sugar? If so, how can I recognise them and how should I treat them?
- Can I keep driving?
- Is there anything I can't do?
- Should I exercise more?
- Is there anything special I should do before I exercise? (Take less insulin? Eat something? Check my blood sugar?)
- Am I at risk of getting any other diseases because of my diabetes?
- What can I do to avoid getting extra problems (complications)?
- Do I need treatment for my blood pressure?
- Do I need treatment for my cholesterol?
- How can you help me stop smoking?
- What should I do if I'm planning to become pregnant?
- Are members of my family likely to get this type of diabetes too? If so, is there anything I can do to protect them?

Diabetes type 2: questions to ask your doctor

The patient information from *BMJ Best Practice* from which this leaflet is derived is regularly updated. The most recent version of Best Practice can be found at bestpractice.bmj.com. This information is intended for use by health professionals. It is not a substitute for medical advice. It is strongly recommended that you independently verify any interpretation of this material and, if you have a medical problem, see your doctor.

Please see BMJ's full terms of use at: bmj.com/company/legal-information. BMJ does not make any representations, conditions, warranties or guarantees, whether express or implied, that this material is accurate, complete, up-to-date or fit for any particular purposes.

© BMJ Publishing Group Ltd 2020. All rights reserved.



Patient information from BMJ

Last published: Jan 16, 2020

Diabetes: what can I do to keep healthy?

If you have diabetes, making changes to your lifestyle, having regular check-ups, and following your doctor's treatment plan can help you stay healthy.

What health problems might I get?

If you have diabetes you have too much glucose in your blood. Glucose is a kind of sugar that your body uses for energy. But if it builds up in your blood it can cause problems. You might get damage in the blood vessels of your feet, kidneys, and eyes. You also have more of a chance of having a heart attack or stroke.

There are many things you can do to reduce your chance of having these health problems. We've listed them below. Doing these things has many benefits for your health. They help to keep the levels of glucose in your blood as close to normal as possible. They also help to keep your blood pressure and your cholesterol (a fatty substance in the blood) at healthy levels.

Your doctor or nurse can help you work out the levels of blood glucose, blood pressure, and cholesterol that you should aim for.

Eating a healthy diet

There are healthy eating guidelines for people with type 2 diabetes. But doctors are keen to stress that many people benefit from food plans that are tailored to what's best for them. So your doctor might refer you to a dietitian who will help you find a food plan that suits you.

In general, though, doctors recommend that people with type 2 diabetes eat a balanced, low-fat diet with plenty of fibre. You don't need to buy special diabetic foods.

Things to avoid include too many sugary foods and drinks, starchy foods such as white bread and pasta, and saturated fats.

Healthier foods for people with type 2 diabetes include wholegrains, beans and pulses, oily fish, fruit and vegetables, and low-fat dairy products.

The aim is to lose weight, if you are overweight, and to stop your blood pressure from getting too high. A healthy diet can also help keep your blood glucose and cholesterol under control.

Diabetes: what can I do to keep healthy?

Stopping smoking

Smoking increases your chances of having a heart attack or a stroke. It also makes other circulation problems worse. If you have diabetes your chances of a heart attack, a stroke, or other circulation problems are already higher than for most people. So it makes sense to give up smoking, to reduce your risk as much as possible.

Stopping smoking isn't easy, but help is available. Getting professional help from your doctor, a nurse, or a trained counsellor can help you stop smoking. There are also treatments that can help, including nicotine replacement therapy and medicines called bupropion (Zyban) and varenicline (Chantix).

Taking exercise

If you haven't exercised much in the past, making exercise part of your life might seem hard. But exercise has great benefits. It will help keep down the level of glucose in your blood. It will also:

- Help keep your weight down
- Help keep your blood pressure and cholesterol under control
- Help lower your chances of having a heart attack or a stroke.

Talk to your doctor about what sort of exercise is best for you. Most doctors advise their patients to do some kind of physical activity every day. Broadly speaking there are two kinds of exercise, and doctors recommend doing a mixture of both.

Aerobic exercise, such as brisk walking or cycling, gets you out of breath and makes your heart and lungs work harder.

Resistance strength training, such as lifting weights, makes your muscles work harder.

So, for example, you might want to do some aerobic exercise on some days, and some gentle resistance training on others. Try to find an exercise you enjoy, so it's easier to keep at it.

Ask your doctor if you need to change your medicine when you exercise. Exercise uses up glucose, so you might need to take less medicine or take it later. If you are going to exercise for a long time you may need to eat a snack first.

Regular check-ups

When you're first diagnosed with diabetes you'll probably need to see many different health professionals, to check whether you have any health problems. Once your treatment is going well you might only need check-ups twice a year. These check-ups are important to make sure your treatment is working and you're not getting any health problems.

You should have these tests at least once a year:

- A blood or urine test to check if your kidneys are working properly

Diabetes: what can I do to keep healthy?

- A test of your blood sugar control. This is called an HbA1c test. It shows doctors how well your treatment is working. In the UK it is recommended that you have this test at least twice a year. You might need to have this test more often if your diabetes is not well controlled.
- An eye test.

You might also have your cholesterol checked.

During a check-up, your doctor will look at:

- Your weight, to see if you need to lose some weight to control your diabetes better
- Your legs and feet: Your doctor will examine your skin and check to see if your circulation and nerves are working properly. You may need to see a foot doctor if you have any problems with your feet
- Your blood pressure
- Your eyes: You may need to see an eye doctor for this check. The doctor will examine the backs of your eyes (your retina). Diabetes can damage your retina and affect your eyesight.

Your doctor may also help you to learn how to check your blood glucose at home, especially if you need to take insulin.

Taking medicines

Some people control their diabetes with just diet and exercise. But most people with diabetes need to take medicines. There are different types:

- Medicines to control your blood glucose. Keeping your blood sugar as close to normal as possible may help you avoid damage to your eyes, kidneys, and feet.
- Medicines to keep your blood pressure and cholesterol levels healthy. These medicines reduce the chance of a heart attack or a stroke. You might also need to take a low dose of aspirin or a medicine called clopidogrel (brand name Plavix), to thin your blood.

You'll probably need to take more than one type of medicine. It can be hard to keep track of all the medicines you are taking. Ask your doctor or pharmacist for help. You might want to try a pill organiser.

It's important to take all your medicines as prescribed by your doctor. This gives you the best chance of staying healthy.

Some medicines have side effects. If you are getting problems from your medicines, don't stop taking them. Talk to your doctor first. You don't have to put up with side effects. You may need to switch to a different type of medicine, or to a different dose.

Some people with type 2 diabetes need regular insulin injections to control their blood glucose. But you are unlikely to need insulin straight away, and you may never need it. If your doctor thinks you would benefit from insulin, you'll usually have plenty of time to discuss it before you start injections, and you'll learn all about insulin and how to use it.

Diabetes: what can I do to keep healthy?

The patient information from *BMJ Best Practice* from which this leaflet is derived is regularly updated. The most recent version of Best Practice can be found at bestpractice.bmj.com. This information is intended for use by health professionals. It is not a substitute for medical advice. It is strongly recommended that you independently verify any interpretation of this material and, if you have a medical problem, see your doctor.

Please see BMJ's full terms of use at: bmj.com/company/legal-information. BMJ does not make any representations, conditions, warranties or guarantees, whether express or implied, that this material is accurate, complete, up-to-date or fit for any particular purposes.

© BMJ Publishing Group Ltd 2020. All rights reserved.



Patient information from BMJ

Last published: Jan 16, 2020

Diabetes type 2: should I take insulin?

If you take tablets for diabetes and they don't control your blood sugar well enough, your doctor might suggest that you start taking insulin. This leaflet tells you what taking insulin involves and how it can help.

What is insulin?

Insulin is a hormone that your body makes to keep the amount of glucose (sugar) in your blood steady. If you have type 2 diabetes your body doesn't make enough insulin, or the insulin it does make doesn't work properly. This means that too much glucose builds up in your bloodstream. This can make you ill.

The insulin you take for diabetes is made in a laboratory to be as much like natural human insulin as possible. It works in the same way to keep your blood sugar under control.

You can't take insulin as a tablet, because the digestive juices in your stomach would destroy the insulin. It's usually taken as an injection. You might worry about the idea of giving yourself an injection.

But there are special devices made for people with diabetes who need to take insulin. These devices make injecting insulin much easier and the needles are very thin. So it shouldn't hurt and you will probably find you soon get used to it.

Some people with diabetes need to use a device called an insulin pump. This is a small machine about the size of a pack of cards that regularly delivers small amounts of insulin into the body through a tube that goes into the skin.

Why might I need to take insulin?

Most people with type 2 diabetes start by taking tablets to control their blood sugar. These tablets encourage the body to make more insulin or to make better use of insulin. But some people make so little insulin that these tablets are not enough. They need to take extra insulin to keep their blood sugar under control.

If your blood sugar is too high you might get symptoms of high blood sugar (hyperglycaemia) such as feeling tired and thirsty a lot. Although not everyone gets symptoms.

Diabetes type 2: should I take insulin?

If your blood sugar stays too high for a long time it can damage your blood vessels. You could get serious problems, such as damage to the nerves in your feet, which can make it hard to walk, or to your eyes, which could damage your eyesight.

Your doctor will measure how well your blood sugar is controlled using a blood test called the haemoglobin A1c test (also known as HbA1c). This test can show how high your blood sugar has been over the previous three months.

If this test shows your blood sugar is too high over a long time, even when you are taking diabetes tablets, your doctor might suggest that you start taking insulin.

How can it help?

Having insulin injections can help bring your blood sugar levels back under control. You should no longer get symptoms of hyperglycaemia. And if your blood sugar levels are lower you are less likely to get damaged blood vessels in your eyes, nerves, and kidneys.

Insulin should lower your haemoglobin A1c level. If you start taking insulin because your diabetes is not well controlled, your HbA1c level is likely to be one to two points lower after four months than if you'd been taking tablets instead. This shows that your blood sugar is better controlled with insulin.

If you have just started treatment for type 2 diabetes you are unlikely to start with insulin. Diabetes tablets are likely to work as well as insulin for you to begin with.

Can it be harmful?

If you take insulin injections instead of tablets you are more likely to get low blood sugar (hypoglycaemia) and to put on some weight.

The biggest problem with taking insulin is getting a good balance between your insulin dose and your eating and activity. If you take too much insulin you could get low blood sugar (hypoglycaemia).

But if you don't take enough insulin your blood sugar can go too high. This is called hyperglycaemia. People who take insulin need to check their blood sugar level regularly to keep it in their target range.

Before you start taking insulin your doctor or nurse will explain how to recognise the signs of very low blood sugar and what to do about it. Some people call having very low blood sugar having a hypo (from the word 'hypoglycaemia').

If you have a hypo you might feel drowsy, dizzy, or confused. You might even lose consciousness. This can be dangerous. But if you learn to recognise the warning signs, taking some glucose pills or having a sugary drink can keep you from having a bad hypo.

It's useful if family members or close friends know what to do if you have a hypo or lose consciousness.

Diabetes type 2: should I take insulin?

This might include knowing how to use a glucagon kit in an emergency. Glucagon is a hormone that helps to raise blood sugar levels. If you have a severe hypo or if you lose consciousness a glucagon injection can help restore your blood sugar to a safer level.

It's a good idea if family members and close friends know how to use the kit, in case you can't give yourself the injection.

Many people who take insulin wear an insulin bracelet or badge. These items can be marked with personal information that can help medical personnel in an emergency.

How and when do I take insulin?

The type of insulin you take will depend on how your body responds to insulin and how you want to use it. Your doctor or diabetes nurse will help you to work out which type of insulin is best for you, and to work out a dosing schedule that suits you.

It might take some time to get your dosing schedule to fit well with how you live. Different people need different dosing schedules. The amount of insulin you need changes according to how much you eat and how much exercise you take.

The first drug many people with type 2 diabetes will be prescribed is metformin. Many people who take insulin will keep taking metformin. Some people find that they can manage their blood sugar best by having an injection of long-acting insulin at night. If that doesn't work they might also have injections before meals.

You will have to adjust your dose of insulin if you plan to eat, or to exercise, more or less than usual. But if you have trouble mixing insulin pre-mixed versions are available.

Changes in your body can affect how much insulin you need: for example, if you have an infection, or if you're stressed, or your body is having hormone changes from puberty.

If you become pregnant your doctor will want to monitor your insulin needs closely. You will need to be extra careful during these times. You might need to see your doctor or diabetes nurse if you find it hard to control your blood sugar levels.

You can inject insulin into several different places on your body, but here are a few rules to remember:

- Insulin injected in your abdomen works fastest
- Insulin injected into your thigh works more slowly
- Insulin injected into your arm works at medium speed.

It's a good idea to vary where you inject. This doesn't necessarily mean that you inject in different areas of the body, just that you avoid injecting in the same spot all the time.

Testing your blood glucose

If you take insulin you need to test your blood sugar regularly to make sure it isn't getting too high or too low. There are kits to help you do this.

Diabetes type 2: should I take insulin?

You take some of your blood, usually one drop from your finger or your forearm. Most people use a testing device for this. When you press the button the needle goes into your finger to give you the right amount of blood.

When you have a drop of blood on your finger you touch the drop to a test strip on a meter. The meter analyses your blood and tells you how much sugar is in it. The number usually shows on a little screen on the meter. Sometimes you might also use a continuous glucose monitoring device.

Your doctor will help you decide how often to test your blood. Some people need just one test a day. Others need to do it before they take their insulin (three or four times a day).

Based on your test results you might need to adjust your insulin dose or your activities. You will get used to this over time. But if you're not sure what to do, ask your diabetes nurse or your doctor for advice.

Driving and insulin

The law about insulin and driving varies from country to country. For example, in the UK and Australia you need to let the local driving licence authority know if you are using insulin. In the UK it's the DVLA. You need to be careful about your blood sugar level when you're driving. If your blood sugar drops too low when you're at the wheel you could have a hypo and black out.

Check your blood sugar level just before you get into the car. Always have some sugary drinks or sweets in the car. If you feel you're going into a hypo you can stop and have a drink or some sweets to boost your blood sugar. It's a good idea to check your blood again before driving.

You might also want to make sure you're wearing an insulin bracelet or badge when driving, and to have a glucagon kit handy.

What are the alternatives?

Some people find that taking tablets and watching their diet is enough to keep their blood sugar under control. But if your blood sugar is not well controlled with tablets you risk getting serious health problems from diabetes.

If your doctor thinks you might benefit from taking insulin you will usually have plenty of time to discuss this, think about it, and make a decision with your doctor.

Your doctor will also make sure that you know how to inject yourself and how to test your blood sugar. He or she should give you a lot of help and support to adjust to taking insulin.

It's also important to remember that, whether you take insulin or not, you still need to take measures to control other problems linked with diabetes, such as high cholesterol and high blood pressure.

Diabetes type 2: should I take insulin?

The patient information from *BMJ Best Practice* from which this leaflet is derived is regularly updated. The most recent version of Best Practice can be found at bestpractice.bmj.com. This information is intended for use by health professionals. It is not a substitute for medical advice. It is strongly recommended that you independently verify any interpretation of this material and, if you have a medical problem, see your doctor.

Please see BMJ's full terms of use at: bmj.com/company/legal-information. BMJ does not make any representations, conditions, warranties or guarantees, whether express or implied, that this material is accurate, complete, up-to-date or fit for any particular purposes.

© BMJ Publishing Group Ltd 2020. All rights reserved.



Patient information from BMJ

Last published: Jan 16, 2020

Diabetes type 2: what treatments work?

If you have diabetes, closely following your doctor's treatment recommendations can help you live a long and healthy life. Although not everyone with diabetes needs medicine, most people do, and you might need to take several types.

Treatments for diabetes

If you have diabetes you have too much glucose in your blood. Glucose is a kind of sugar that your body uses for energy. Normally, a chemical called insulin helps keep the levels of glucose in your blood steady. Insulin is made in your body.

But if you have type 2 diabetes your body is not making enough insulin, or the insulin your body makes is not working properly. So glucose can build up in your blood and cause problems. Doctors call this hyperglycaemia.

Having type 2 diabetes increases your chances of having two main types of health problem:

- problems with the larger blood vessels, leading to heart attacks and strokes (called macrovascular complications)
- problems with the smaller blood vessels in the eyes, kidneys, and feet (called microvascular complications).

Many people with diabetes need treatment with medicines to prevent these problems. This includes medicines to lower blood sugar, blood pressure, and cholesterol.

Medicines to control your blood sugar

There are several types of medicine that can help keep your blood sugar levels under control. Some of them help your body release more insulin. Others help your body use insulin better. Some are tablets and others are injections.

Although doctors set general blood sugar targets for people with diabetes, in practice your treatment, including your blood sugar target, will be tailored to your individual needs.

Not everyone needs the same level of treatment. And different medicines suit some people better than others.

Diabetes type 2: what treatments work?

For example, some people take two or three types of tablet, while others might take a combination of tablets and insulin injections. It all depends what is likely to help you the most and to give you the fewest problems with side effects.

Tablets to control blood sugar:

- **Metformin:** this is the first medicine that most people with type 2 diabetes are offered for controlling blood glucose. It can also help reduce your chances of having a heart attack or stroke.

It doesn't make you put on weight, unlike many other diabetes medicines. But it can make you feel sick or get diarrhoea, especially if you take it on an empty stomach.

So your doctor will probably recommend that you build up the dose slowly and take this medicine with food. You might take metformin on its own or with another type of diabetes medicine.

- **DPP-4 inhibitors:** these medicines help reduce the amount of a substance called glucagon in your blood. You might also hear them called gliptins. These drugs are often used together with metformin.
- **Sulfonylureas:** these medicines help your body release more insulin. They are sometimes used as a first diabetes medicine. There are different types of sulfonylurea. You might take a sulfonylurea on its own, or with metformin or injections of medicines called GLP-1 agonists.

But sulfonylureas can sometimes make your blood sugar too low. The medical name for this is hypoglycaemia. Some people get an allergic reaction (usually a skin rash) when they start taking sulfonylureas. You might also gain some weight.

Meglitinide medicines are similar to sulfonylureas and are sometimes used instead. You take them just before you eat. You might take them as well as metformin. They can make your blood sugar too low, although this is less likely than with sulfonylureas. They can cause some weight gain.

- **Alpha glucosidase inhibitors:** these are sometimes used if you can't take another type of diabetes medicine. They slow down the speed at which your body breaks down food to make glucose. But they can cause bloating, wind, and diarrhoea.

They might also cause a small amount of weight loss in some people. You might take an alpha glucosidase inhibitor on its own or with another type of diabetes medicine.

- **Sodium-glucose cotransporter 2 (SGLT2) inhibitors:** these work by helping the kidneys to reduce blood sugar.
- **Glitazones:** these medicines are not used as often as some other diabetes medicines. And they are only used if you are also taking either metformin or a sulfonylurea.

Your doctor will want to monitor you regularly if you take a glitazone as they can cause serious side effects in some people, including liver damage, heart failure, and an

Diabetes type 2: what treatments work?

Injections to control blood sugar

- Insulin: some people with diabetes need to take insulin to keep their blood sugar under control. Insulin can't be taken as a tablet. It's usually taken as an injection. Not everyone with type 2 diabetes needs to take insulin. But if your diabetes medicine is not working to keep your blood sugar under control your doctor may suggest you consider insulin.
- Glucagon-like peptide 1 (GLP-1) agonists: these are medicines given by injection that are sometimes used with diabetes tablets like metformin and sulfonylureas. As well as controlling blood sugar they might also help reduce your chance of having a heart attack or stroke.

They can have some side effects, such as lowering the level of sugar in your blood after you eat, and some people lose a little weight.

Medicines to prevent heart attacks and strokes

Having diabetes increases your chances of having a heart attack, stroke, or circulation problems. So most people with diabetes take medicines to help prevent these problems. These might include medicines to:

- control blood pressure
- control cholesterol
- prevent blood clots.

Medicines to control your blood pressure

Most people with diabetes need to take medicines for their blood pressure. If your doctor recommends blood pressure tablets your blood pressure is probably higher than the usual target range.

These are some of the types you might be prescribed. You might take just one, or a combination of tablets.

- Angiotensin-converting enzyme (ACE) inhibitors: these medicines help stop your blood vessels from narrowing too much and your heart from working too hard.

ACE inhibitors can have some side effects. The most common one is a dry cough. Some people get low blood pressure (which can make you feel dizzy), kidney problems, or problems with their heart rhythm.
- Angiotensin receptor blockers (ARBs): these drugs work in a similar way to ACE inhibitors. If you can't take an ACE inhibitor your doctor might prescribe an ARB. They seem to work about as well. Most people only get mild side effects from ARBs. The most common side effect is dizziness.
- Diuretics: these help your body get rid of excess salt and water. Your doctor might suggest you take a diuretic as well as other blood pressure drugs. Diuretics can make you feel thirsty and can raise your blood sugar. They also make you urinate more.

Diabetes type 2: what treatments work?

- Calcium channel blockers: these medicines keep the blood vessels relaxed and open, making it easier for blood to flow through them. People usually only take them if they are already taking another blood pressure medicine.

Possible side effects include headaches, dizziness, swollen ankles, flushing (going red in the face), an uneven heart beat, and constipation.

Medicines to control your cholesterol

Taking a type of medicine called a statin can help reduce your chance of a heart attack or stroke. If you have diabetes this can help even if your cholesterol level is not high to start with.

Statin are the usual treatment for lowering cholesterol.

If your cholesterol is still high after taking statins, or if you can't take statins, there are other options. But we don't know if they work as well as statins to reduce the chance of a stroke or heart attack.

Medicines to stop your blood from clotting

Aspirin makes your blood less sticky so that it's less likely to form blood clots. This can help prevent a stroke or heart attack in people who are at high risk of these problems. Many people with diabetes take a low daily dose of aspirin.

Side effects

Most medicines can cause some side effects for some people. We don't know as much about the side effects of some of the newer medicines as we do about the ones that have been around for longer.

The leaflet that comes with your medicine lists the possible side effects. But very few are likely to affect you. Tell your doctor or pharmacist if you get any problems. You might be able to try different treatments.

The patient information from *BMJ Best Practice* from which this leaflet is derived is regularly updated. The most recent version of Best Practice can be found at bestpractice.bmj.com. This information is intended for use by health professionals. It is not a substitute for medical advice. It is strongly recommended that you independently verify any interpretation of this material and, if you have a medical problem, see your doctor.

Please see BMJ's full terms of use at: bmj.com/company/legal-information. BMJ does not make any representations, conditions, warranties or guarantees, whether express or implied, that this material is accurate, complete, up-to-date or fit for any particular purposes.

© BMJ Publishing Group Ltd 2020. All rights reserved.



Patient information from BMJ

Last published: Jan 16, 2020

Diabetes: what is it?

Diabetes is a long-term condition. It can lead to serious health problems. But making changes to your lifestyle and taking medicines can help you live a long and healthy life.

What happens in diabetes?

If you have diabetes you have too much glucose in your blood. Glucose is a kind of sugar that your body uses for energy. But if it builds up in your blood it can make you ill. Doctors call this hyperglycaemia.

There are two main types of diabetes: type 1 and type 2. Type 1 diabetes usually starts suddenly, when you're a child or teenager. But it can start later. Type 2 diabetes comes on gradually, usually when you're 40 or over.

This information is for adults with type 2 diabetes. More than 90 in 100 people with diabetes have type 2.

Ask your doctor: What type of diabetes do I have?

Glucose and your body

You always need to have some glucose in your blood. It comes from food and it gives your body energy.

Normally, a chemical called insulin helps keep the levels of glucose in your blood steady. Insulin is made in your body. But if you have type 2 diabetes, either your body is not making enough insulin, or the insulin your body makes is not working properly.

The level of glucose in your blood goes up and down throughout the day. It's higher when you've just eaten and lower first thing in the morning, or after you've been exercising.

Doctors measure your glucose levels in millimoles per litre of blood (mmol/L for short). Your 'fasting' blood glucose (the amount of glucose in your blood when you haven't eaten or drunk anything but water overnight) should be less than 7 mmol/L.

Ask your doctor: What is my blood glucose level? What should it be ideally?

Diabetes: what is it?

Who gets diabetes?

More than 3 million people in the UK have diabetes. That's about 5 in every 100 people. Some people are more likely to get it than others. These things make it more likely that you will get diabetes:

- Having a relative with type 2 diabetes
- Being overweight or obese (very overweight)
- Not exercising enough
- Coming from South Asian, African, African-Caribbean, or Middle Eastern families (we don't know why this is)
- For women, having had a type of diabetes while pregnant (called gestational diabetes) increases your chance of getting diabetes later in life
- Having problems with your heart or blood vessels (cardiovascular disease) or having too much harmful fat in your blood.

Being overweight and not exercising enough increase people's chances of getting diabetes. But not everyone who gets diabetes is overweight or doesn't exercise. Even some athletes get diabetes.

Ask your doctor: Why do I have diabetes?

What are the symptoms of diabetes?

Not everyone with type 2 diabetes gets symptoms, and most people find out they have it through screening (testing). But these are some possible symptoms:

- Needing to pass urine more often: Your body tries to get rid of the extra glucose in your blood by flushing it out in your urine.
- Feeling very thirsty: You may feel thirsty more often. This is partly because you pass urine more.
- Feeling very hungry or tired: If you have diabetes, your body can't use the glucose in your blood properly. So your cells don't get the energy they need. This makes you hungry and tired.

These symptoms should go away if your treatment is working properly. But if it's not diagnosed and treated properly, type 2 diabetes gets worse. You might get:

- Blurred vision
- An infection called candidiasis. You might know this as thrush. You might get it in your mouth or in the folds of your skin. If you're a woman you might get it in your vagina.
- Wounds or sores that don't heal well.

There are some symptoms you need to watch out for, because they mean your blood glucose may have got very high. These include feeling light-headed, dizzy, sick, or confused. Or you might lose consciousness. If you get these symptoms you need medical help straight away.

Diabetes: what is it?

Ask your doctor: What symptoms should I look out for that might mean my diabetes is getting worse or is not being well controlled?

How do doctors diagnose diabetes?

Your doctor will give you a blood test to find out how much glucose is in your blood. The usual test for diabetes measures glucose levels first thing in the morning, before you eat. The result is called your fasting plasma glucose level. If it is more than 7 you could have diabetes. You will need to have a second test to make sure.

You might also have a type of blood test called an HbA1c test (sometimes called an A1c test). This test can give your doctor an idea of what your average blood glucose has been for the past few months.

If you've been told you have diabetes your doctor will probably want to do other tests on your blood and urine. These tests are to find out how well your thyroid gland, liver, and kidneys are working. You will also have a test to see if your cholesterol is high. After you've been diagnosed with diabetes you should have a thorough check-up at least once a year with a doctor experienced in treating diabetes. You might have follow-up tests as often as every 3 to 6 months.

Ask your doctor: How often do I need follow-up tests?

What will happen to me?

If you have diabetes you should be able to lead a normal life. You may need to:

- Take medicines regularly. You may have heard that people with diabetes can be treated with insulin. This is usually only used for people with type 1 diabetes. But some people with type 2 diabetes take it, too.
- Watch what you eat
- Exercise regularly
- Check your blood glucose level throughout the day. But this is usually only needed for people who take insulin.

Apart from these changes, you should be able to take part in all your normal activities. You may need to tell the Driver and Vehicle Licensing Agency (DVLA) about your diabetes, if you have a health problem that could affect your driving. Check with your doctor.

If you've had diabetes for a long time, you may have a higher chance of a heart attack, a stroke, or problems with your circulation. You may also get problems with your eyes, kidneys, and feet. These problems are called complications.

Not everyone with diabetes gets complications. If you carefully control your blood glucose level you are more likely to avoid some of the complications of diabetes. But you might also need to take medicines to control your blood pressure and cholesterol. Having regular health checks with your doctor can help you to avoid complications.

Diabetes: what is it?

Ask your doctor: Do I have any complications from my diabetes? If not, how can I best avoid getting problems in future?

For more information about what you can do to help yourself, read "Diabetes: what can I do to keep healthy?"

The patient information from *BMJ Best Practice* from which this leaflet is derived is regularly updated. The most recent version of Best Practice can be found at bestpractice.bmj.com. This information is intended for use by health professionals. It is not a substitute for medical advice. It is strongly recommended that you independently verify any interpretation of this material and, if you have a medical problem, see your doctor.

Please see BMJ's full terms of use at: bmj.com/company/legal-information. BMJ does not make any representations, conditions, warranties or guarantees, whether express or implied, that this material is accurate, complete, up-to-date or fit for any particular purposes.

© BMJ Publishing Group Ltd 2020. All rights reserved.



Patient information from BMJ

Last published: Jan 16, 2020

Pre-diabetes

If you have pre-diabetes it means that your blood sugar level is too high, but not high enough to be classed as diabetes.

Pre-diabetes can easily develop into type 2 diabetes. But if you make changes to your lifestyle it can usually be avoided.

What is pre-diabetes?

Pre-diabetes is a useful term for doctors when talking with people who are at risk of getting type 2 diabetes.

Type 2 diabetes is a serious long-term condition. People with type 2 diabetes have very high levels of glucose (sugar) in their blood. This can cause:

- damage to the small blood vessels in the eyes, kidneys, and feet. This can lead to sight problems, kidney disease, and foot amputations
- damage to large blood vessels. This can lead to problems such as heart attacks and strokes. Having type 2 diabetes greatly increases your chances of dying from heart disease.

If you have pre-diabetes your blood sugar level is higher than it should be, but it's not high enough to be classed as diabetes.

While this is good news in one way, it's also a warning: you could be on the way to having diabetes, and it's a good idea to act now to prevent it.

And it can be done. Research suggests that type 2 diabetes can be prevented in more than 80 in 100 people.

Blood sugar is not the only way of predicting someone's chance of getting type 2 diabetes. Other things that make diabetes more likely include:

- being very overweight (obese)
- eating a diet that's high in starchy or sugary foods and low in fresh fruits and vegetables
- being older

Pre-diabetes

- having close family members with diabetes, and
- being inactive.

What are the symptoms?

Pre-diabetes doesn't usually have any symptoms. But, rarely, raised blood sugar can cause patches of darkened skin in the armpits and neck, and around joints, such as the knees, knuckles, and elbows.

What treatments work?

If you have raised blood sugar, the main things that can help you avoid diabetes are:

- changing your lifestyle, and
- taking prescription medicines that lower your blood sugar.

Changing your lifestyle

If we're honest, most of us know that we aren't always active enough and don't eat as healthily as we should. For many people, this doesn't cause obvious problems.

But if you have blood sugar at pre-diabetes levels, an unhealthy lifestyle could lead to serious health problems.

The main lifestyle changes that can prevent diabetes are:

- changing your diet
- being more active, and
- losing weight if you are overweight. The first two changes should help you achieve this one.

Being overweight is a major cause of type 2 diabetes. The good news is that most people don't have to lose a lot of weight to reduce their chances of getting diabetes. Losing between one twentieth and one tenth of your body weight can make a big difference.

To lose this amount of weight you will probably need to:

- eat a bit less
- make some changes to what you eat and drink, and
- be more active.

It might help to make a plan. For example, you might want to talk to your doctor or practice nurse about what you need to do, and how to stick to it.

But it can be hard. Most people struggle to make healthy choices all the time. The important thing is to do your best.

If your blood sugar is too high, the changes you will probably need to make to your diet include:

Pre-diabetes

- avoiding starchy foods, such as potatoes, white rice, white bread, and white pasta. If you find it hard to cut back on these foods, try eating brown rice and wholemeal bread and pasta instead
- avoiding foods that contain refined sugar, such as sweets, biscuits, and cakes
- avoiding sugary drinks. You might also need to cut down on alcoholic drinks
- eating more fresh fruits and vegetables, and
- avoiding processed foods.

Being active is important in preventing diabetes for two reasons:

- it lowers your blood sugar, and
- it helps you to lose weight.

Most people find that it's easier to stay active when they do a type of exercise that they enjoy. So if, for example, going to the gym isn't for you, there are plenty of other ways to exercise, including walking, cycling, swimming, jogging, and playing sports.

If you haven't been very active for a long time, or if you are older, it's a good idea to start slowly. It might help to talk to your doctor about what type of exercise would suit you best.

But if you're younger and don't have any health problems that stop you from exercising, you will need to gradually build up the amount you exercise to the point where it will make a real difference. This might mean going for long walks or doing an activity that works up a sweat, several times a week.

Medications

The medications that can help with pre-diabetes are some of the same ones that are used to treat diabetes itself. They work by reducing the amount of sugar in your blood.

If you have raised blood sugar that could lead to diabetes, your doctor might suggest that you take medication to help. But he or she is more likely to suggest that making changes to your lifestyle is more important.

This is because research suggests that, while medications can help reduce blood sugar, losing weight and other changes to your lifestyle are better protection against diabetes.

Monitoring your blood sugar

Your doctor will probably also suggest that you have your blood sugar checked regularly. You might hear this called an HbA1c test.

You might be able to use a kit at home to check your blood sugar with a finger-prick test. Your doctor can explain the options and how they work.

What will happen?

It's not possible to say what will happen to you as an individual. But we know that, in most people with raised blood sugar classed as pre-diabetes, type 2 diabetes itself can be prevented.

Pre-diabetes

Preventing diabetes means preventing the complications that can cause serious health problems and death.

The patient information from *BMJ Best Practice* from which this leaflet is derived is regularly updated. The most recent version of Best Practice can be found at bestpractice.bmj.com. This information is intended for use by health professionals. It is not a substitute for medical advice. It is strongly recommended that you independently verify any interpretation of this material and, if you have a medical problem, see your doctor.

Please see BMJ's full terms of use at: bmj.com/company/legal-information. BMJ does not make any representations, conditions, warranties or guarantees, whether express or implied, that this material is accurate, complete, up-to-date or fit for any particular purposes.

© BMJ Publishing Group Ltd 2020. All rights reserved.

