

Understanding NICE guidance

Information for people who use NHS services

Type 2 diabetes

NICE 'clinical guidelines' advise the NHS on caring for people with specific conditions or diseases and the treatments they should receive.

This booklet is about the care and treatment of people with type 2 diabetes in the NHS in England and Wales. It explains guidance (advice) from NICE (the National Institute for Health and Clinical Excellence). It is written for people with type 2 diabetes but it may also be useful for their families or carers or for anyone with an interest in the condition.

The booklet aims to help you understand the care and treatment options that should be available in the NHS. It does not describe diabetes or the tests or treatments for it in detail. A member of your diabetes team should discuss these with you. There are examples of questions you could ask throughout this booklet to help you with this. Some sources of further information and support are on page 22.

This is an update of advice on type 2 diabetes that NICE produced in 2008. The advice on drugs to lower blood glucose has changed, but all the other advice is the same.

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The advice in the NICE guideline covers:

- the monitoring of glucose, lipid (blood cholesterol and fat) and blood pressure levels
- diabetes education programmes
- dietary advice
- the use of medications to:
 - control blood glucose
 - prevent vascular (blood vessel) disease
 - reduce blood pressure
 - improve lipid levels
- the detection and ongoing management (with referral to a specialist if necessary) of:
 - eye disease
 - kidney disease
 - nerve damage and nerve pain
 - depression.

It does not specifically look at:

- the prevention and management of foot problems related to diabetes (there is already guidance in this area – see www.nice.org.uk/CG10 for more information)
- preventing type 2 diabetes or screening for it
- how specialists should manage problems caused by diabetes
- the management of diabetes during pregnancy (there is already guidance in this area – see www.nice.org.uk/CG63 for more information).

Your care

Your treatment and care should take into account your personal needs and preferences, and you have the right to be fully informed and to make decisions in partnership with your diabetes team. To help with this, your diabetes team should give you information you can understand and that is relevant to your circumstances. All healthcare professionals should treat you with respect, sensitivity and understanding and explain type 2 diabetes and the treatments for it simply and clearly.

The information you get from your diabetes team should include details of the possible benefits and risks of particular treatments. You can ask any questions you want to and can always change your mind as your treatment progresses or your condition or circumstances change. Your own preference for a particular treatment is important and your diabetes team should support your choice of treatment wherever possible.

Your treatment and care, and the information you are given about it, should take account of any religious, ethnic or cultural needs you may have. It should also take into account any additional factors, such as physical or learning disabilities, sight or hearing problems, or difficulties with reading or speaking English. Your diabetes team should be able to arrange an interpreter or an advocate (someone who supports you in asking for what you want) if needed.

If you agree, your family and carers should have the chance to be involved in decisions about your care. Family members and carers also have the right to the information and support they need in their roles as carers.

If people are unable to understand a particular issue or are not able to make decisions for themselves, healthcare professionals should follow the advice that the Department of Health has produced about this. You can find this by going to the Department of Health website (www.dh.gov.uk/consent). Your healthcare professional should also follow the code of practice for the Mental Capacity Act. For more information about this, visit www.publicguardian.gov.uk

Type 2 diabetes

Type 2 diabetes is a disorder in which blood glucose (sugar), blood pressure, blood fats and blood clotting are often abnormal. Insulin is the hormone that helps the body use glucose (sugar) efficiently. The way the body controls blood glucose is abnormal because not enough insulin is produced to regulate the production of glucose by the liver, or to tell the body to remove glucose from the blood. In overweight people, this is made worse because the body is not able to respond properly to the insulin that is produced (this is called 'insulin resistance').

Type 2 diabetes has lots of effects throughout the body, and the medical care of someone with this condition involves many different tests and check-ups, which need to be repeated regularly. This is known as your care pathway. It's important that all of the advice, information, tests and treatment you get for type 2 diabetes are treated as part of this pathway so you get consistent ongoing care.

Diabetes education

When you're first diagnosed with type 2 diabetes, or soon after, you should be offered the opportunity to learn about diabetes in a structured education programme. This usually involves going to group sessions run by people who have been specially trained to do this. If you can't or don't want to attend as part of a group, you should be offered an alternative individual programme.

Your doctor or nurse should check, at least every year, whether you'd find further diabetes education helpful.

Questions you might like to ask your diabetes team

- How will a diabetes education programme help me?
- What will it involve?
- What programmes are available?
- What happens if I can't attend the programme offered?

Dietary advice

Taking care with your diet is an important part of managing diabetes, and you should be offered ongoing and personalised nutritional advice from someone with specific expertise. This should cover the best timing of meals and snacks for you, your carbohydrate intake and advice on alcohol. General healthy eating is also important, and your nutrition expert should encourage you to:

- eat carbohydrate from fruit, vegetables, whole grains and pulses
- eat low-fat dairy products and oily fish
- control your intake of foods containing saturated fats and trans fatty acids.

He or she should also discourage you from buying food marketed specifically for people with diabetes, because this tends to be expensive and is not necessarily any better for you. You can still enjoy some foods containing sugar as long as they form part of an overall healthy and balanced diet.

If you're overweight, you'll be encouraged to lose weight and you'll agree on a target weight loss. Any weight loss will help (although the nearer you get to a healthy body weight, the better it will be for your long-term health).

Hospitals and other institutions should offer meals and snacks with a consistent carbohydrate content for people with type 2 diabetes.

Questions about dietary changes

- How can changing my diet help the diabetes?
- What long-term effects are likely?
- What support is available?
- Can you provide any information for my family or carers?

Blood glucose levels

Assessing blood glucose control

HbA_{1c}

HbA_{1c} is a measure of the levels of glucose in your blood over the past 2–3 months – keeping it under control is a central part of diabetes treatment. Your doctor or nurse should discuss this with you and together you should agree on an HbA_{1c} target. The target is usually around 6.5% but – depending on your individual circumstances – you might jointly decide on a higher one. You should be offered advice, support, and medication if you need it, to help you reach and stay at your HbA_{1c} target. Any reduction in HbA_{1c} is worthwhile for your health in the future, even if you don't reach your target.

Your HbA_{1c} should be measured every 2 to 6 months until it stabilises and you're settled on a particular medication (if needed). When this has happened, you'll have an HbA_{1c} blood test every 6 months. If your HbA_{1c} is not falling to the target but you're checking your own glucose levels before meals and they are controlled, your doctor or nurse may discuss whether you should measure your glucose levels after meals. If the measurements are high, they'll look at ways to help you bring them down. If your HbA_{1c} level doesn't seem to match your other glucose measurements, your doctor or nurse should talk to you about getting some expert advice.

If you have a blood disorder that means an HbA_{1c} test would be unreliable, you will be offered an alternative.

Checking your own blood glucose

If you've just been diagnosed with type 2 diabetes, monitoring your own blood glucose levels (self-monitoring) should be discussed as part of your structured education programme. The programme will cover how to check your blood glucose and how to interpret and use the results.

Self-monitoring of your blood glucose, with appropriate equipment and information to help you use it effectively, should be recommended if you:

- use insulin therapy
- take certain tablets that may put you at risk of hypoglycaemia (low blood glucose)
- need to check changes in glucose control caused by changes in medication or lifestyle
- need to monitor changes during an illness
- need to make sure you are safe to carry out your normal activities, including driving.

At least once a year, your doctor or nurse should check the way you are self-monitoring and using the results, and your equipment, so you can carry on getting accurate and helpful results.

Monitoring your urine is a possible alternative if you find checking your blood unacceptable, but it is not as accurate. Your doctor or nurse should discuss it with you if necessary.

Drugs to lower blood glucose

Most people with type 2 diabetes need drugs to help control their blood glucose. If you need drugs, your doctor or nurse should discuss the different options so you can decide together which is most likely to suit you. Most people need more than one drug for their diabetes and in time also need insulin. The boxes on pages 8 and 9 list the drugs you might be offered. Brief information about how the different types of drug work is given on pages 20 and 21. Ask your community pharmacist, nurse or doctor for more information, particularly if you have concerns about side effects.

Drugs used to lower blood glucose (other than insulin)

Name of drug	Information
Metformin	<ul style="list-style-type: none"> • A usual starting point, particularly if you are overweight. • The dose should be lowered or stopped if you develop signs of kidney problems. • If you have or develop mild or moderate liver or heart problems, metformin will normally be continued, but your doctor or nurse should discuss this with you.
Sulfonylureas	<ul style="list-style-type: none"> • May be the first drug used if you are not overweight, if your blood glucose levels are very high or if you cannot take metformin (see above). • Should be taken as well as metformin if a greater effect is needed. • Can increase the risk of hypoglycaemia, especially if you have kidney problems – you should be offered information about this if you're considering one of these drugs.
Rapid-acting insulin secretagogues	<ul style="list-style-type: none"> • A type of fast-acting drug that may suit you if your mealtimes vary from day to day.
Thiazolidinediones (pioglitazone, rosiglitazone)	<ul style="list-style-type: none"> • May be an option if you are already taking metformin (see above), you need additional drugs and taking a sulfonylurea (see above) isn't a good idea for you. For example, you might have side effects with a sulfonylurea, or need to be particularly careful about hypoglycaemia, which can be a problem with sulfonylureas. • May be added to a sulfonylurea if you need additional drugs and you can't take metformin. • May be added to metformin and a sulfonylurea instead of insulin if insulin is unsuitable. • May be more suitable than a drug called a DPP-4 inhibitor (see below) if a DPP-4 inhibitor did not work well or did not agree with you. • Not suitable if you have heart failure or your risk of bone fractures is higher than usual. • Although they don't increase the risk of hypoglycaemia, these drugs may cause weight gain. • Your doctor should recommend stopping the thiazolidinedione if it doesn't lower your HbA_{1c}. • Pioglitazone may be given with insulin if a thiazolidinedione worked well for you in the past or if your blood glucose levels are still high with high-dose insulin.
DPP-4 inhibitors (sitagliptin, vildagliptin)	<ul style="list-style-type: none"> • May be an option if you are already taking metformin (see above), you need additional drugs and taking a sulfonylurea isn't a good idea for you. For example, you might have side effects with a sulfonylurea (see above) or need to be particularly careful about hypoglycaemia, which can be a problem with sulfonylureas. • May be added to a sulfonylurea if you need additional drugs and you can't take metformin. • Sitagliptin may be added to metformin and a sulfonylurea instead of insulin if insulin is unsuitable.

Name of drug	Information
	<ul style="list-style-type: none"> • A DPP-4 inhibitor may be more suitable than a thiazolidinedione (see page 8) if gaining weight is a problem for you, or if a thiazolidinedione did not work well or did not agree with you. • Your doctor should recommend stopping the DPP-4 inhibitor if it doesn't lower your HbA_{1c}.
Acarbose	<ul style="list-style-type: none"> • May be an option if you can't take any of the other drugs listed here.
Exenatide	<ul style="list-style-type: none"> • May be added to metformin (see page 8) and a sulfonylurea (see page 8) if you have a high body mass index (35 kg/m² or higher¹) and problems associated with high body weight. • May be added to metformin and a sulfonylurea if you have a body mass index below 35 kg/m² but insulin is not an option or losing weight would help with other conditions. • May cause nausea. • Must be injected twice a day. • Your doctor should recommend stopping the exenatide if it doesn't lower your HbA_{1c} and help you to lose weight at the same time.

¹ This figure is for people of European descent and should be adjusted for people from other ethnic groups.

Questions about diabetes drugs

- Why are you offering me this particular type of treatment?
- What are the pros and cons of having this treatment?
- What will the treatment involve?
- How will the treatment help me? What effect will it have on my symptoms and everyday life? What sort of improvements might I expect?
- How long will it take to have an effect?
- Are there any risks associated with this treatment?
- Is the drug likely to cause hypoglycaemia?
- What are my options for taking treatments other than the recommended treatment?
- Is there some written material (like a leaflet) about the treatment that I can have?

Insulin therapy

Insulin therapy is usually the next step for most people with type 2 diabetes when the drugs in the previous section haven't helped enough or the diabetes has got worse. Insulin does not come in tablet form and must be injected using very small needles. Your doctor or nurse should discuss the benefits and risks of insulin therapy with you and describe how taking insulin will affect your day-to-day life.

Information and support

If you agree to start using insulin, you should be given:

- education about how to use the insulin and the injection device prescribed for you, how insulin works, how it affects the body, and how you need to think about and control what you eat and drink
- information about hypoglycaemia, how to best avoid it and what to do if it happens
- equipment to check your blood glucose levels, and information about how to get helpful results and how to use them – for example, you should have information on what to do if there are unexpected changes in your glucose levels
- support (on the phone and face-to-face) from a doctor or nurse with training and experience in managing insulin therapy.

Which insulin?

Different insulins are available – some are designed to last for a long time ('background insulin' or 'basal insulin') and some are designed to deal with the sharp increase in blood glucose that happens after a meal ('short-acting insulin' or 'prandial insulin'). Usually, your doctor or nurse will suggest a type called 'human NPH insulin' to start with. You should use it at bed-time or twice a day (your doctor or nurse will discuss this with you), and it will provide your body with background insulin all day and night. Human NPH insulin is a synthetic version of the body's own insulin mixed with a substance that slows down the speed at which it is absorbed into the body.

Your doctor or nurse may discuss using a long-acting insulin analogue such as insulin glargine or insulin detemir rather than NPH insulin. An insulin analogue is a synthetic insulin which is similar to the body's own insulin. Insulin glargine and insulin detemir are insulin analogues that have been changed so that, like NPH insulin, they are absorbed very slowly by the body and work over a long period. These may be an option for you if:

- you have problems with hypoglycaemia, or
- you cannot use the device needed to inject NPH insulin, or
- you would otherwise need NPH insulin twice a day and other drugs to lower your blood glucose, or
- you need help to inject insulin and using an analogue would mean one rather than two injections a day.

Mixtures of different insulins are available that are designed to give a fast-acting effect to help cope with meal times plus a longer-lasting effect to help throughout the day and night. In most cases these need to be used twice a day. If you and your doctor or nurse think that this type of insulin would suit you, they should tell you how often and when to inject.

When you start using insulin, your doctor or nurse should explain how to gradually increase the dose until your blood glucose results are stable, and have reached a level agreed at the start of treatment.

Injecting insulin

Different devices can be used for insulin injections, and your doctor or nurse should take time to discuss the options with you so you can agree which one to try first. If you have a manual or visual disability, you should be offered a device (or an adaptation to it) that you or your carer can use easily and successfully.

There should be arrangements in place for disposing of needles used for injections and finger lancets used for blood monitoring, and you should be advised about what to do.

Taking tablets and insulin

You doctor will usually advise you to continue some of your tablets when you start insulin. Sometimes this can make side effects more likely. In particular, hypoglycaemia is more likely if you're taking a sulfonylurea with insulin – tell your doctor or nurse if this becomes a problem. For some people, doctors may advise taking pioglitazone with insulin. If this applies to you, you need to watch out for swollen ankles and tell your doctor or nurse, particularly if you become breathless.

Some treatments may not be suitable for you, depending on your exact circumstances. If you have questions about specific treatments and options covered in this booklet, please talk to a member of your diabetes team.

Questions about insulin

- Why do I need to consider taking insulin now?
- What are the pros and cons of insulin treatment?
- What are my options?
- What effect will insulin have on my symptoms and everyday life?
- What sort of improvements might I expect?
- What should I watch out for?
- What is likely to happen in the future?
- Is there some written material (like a leaflet) about insulin that I can have?

Monitoring and making changes

Your self-monitoring glucose results and HbA_{1c} will be reviewed by your doctor or nurse. He or she will check whether the insulin is working well for you and whether changes such as additional insulin to cover meal-time increases in blood glucose are needed. The dose of insulin may have to be adjusted until the dose is right for you.

Cardiovascular disease

People with diabetes tend to be more at risk of heart and blood vessel disease that can lead to a heart attack or stroke (known as cardiovascular disease). Because of this, your doctor or nurse should assess your risk of cardiovascular disease at least once a year. As part of this assessment, they'll:

- arrange blood tests to check your lipid (blood fat) levels
- check your blood pressure
- measure how much fat there is in your abdominal area
- check a urine sample for protein.

They'll also ask whether you, or a close blood relative, has had a heart attack or stroke. If you've previously been found to have high levels of a type of lipid called 'triglycerides' in your blood, you should be offered a full fasting lipid profile. This involves taking blood samples for analysis after you have gone without food for a time (usually overnight).

Once your risk has been assessed, you'll be given tailored advice and support to make any changes necessary. The steps that should be taken to help reduce the risk from high blood pressure and improve blood lipids are described in the next two sections.

Questions about cardiovascular risk

- What is my risk of having cardiovascular disease?
- What can I do to reduce it?
- How will I be helped to do this?

Blood pressure

Your doctor or nurse should check your blood pressure at least once a year, and you should be offered advice about lifestyle changes that can help prevent high blood pressure (also called 'hypertension'). If you've previously been diagnosed with high blood pressure or kidney disease, your blood pressure should be checked more often.

If your blood pressure is higher than 150 over 90 (written as 150/90), it should be checked again within a month. If it is above 140/80, it should be checked again within 2 months. And if it is above 130/80 and you have early signs of kidney disease, eye damage from diabetes, or you've had a stroke or transient ischaemic attack (sometimes called a 'mini stroke'), then you should also have another check within 2 months of the first. Your doctor or nurse should take the opportunity to give you some advice about lifestyle changes that can help control blood pressure at the same time as you're having these repeat checks.

If your blood pressure stays high

If you've followed the advice about lifestyle changes but your blood pressure stays high, your doctor or nurse should discuss blood pressure drugs that may help. See pages 20–21 for brief information about how the drugs mentioned here work. Usually, the first drug to try is an ACE inhibitor.

If you're of African or Caribbean descent, your doctor or nurse should discuss taking a diuretic or a calcium channel blocker as well as an ACE inhibitor.

If there's a possibility that you may become pregnant, your doctor or nurse should discuss this with you and how it affects the choice of blood pressure drug. Usually, he or she will offer you a calcium channel blocker to try first.

If you get side effects with the ACE inhibitor, talk to your doctor or nurse. If these continue, your doctor or nurse may suggest switching you to another type of blood pressure drug called an 'angiotensin 2 receptor blocker'.

If your blood pressure doesn't come down to your target with the first drug, you should be offered other drugs to take as well. These will usually be a calcium channel blocker or a diuretic (and if it still doesn't come down with one of these, you will usually be offered the other one to take as well). If your blood pressure still isn't coming down with these three drugs, you may also be given an alpha-blocker, a beta-blocker or a potassium-sparing diuretic.

Checking your blood pressure

If you agree to start a drug, you should have your blood pressure checked every 1 to 2 months. The dose or medications should be changed until your blood pressure comes down to below 140/80 (or 130/80 if you have early signs of kidney disease or eye damage from diabetes, or you've had a stroke or transient ischaemic attack). Once your blood pressure has fallen and is stable, you should have checks every 4 to 6 months.

Questions about blood pressure drugs

- Why have you decided to offer me this drug?
- What are the pros and cons of taking it?
- How long will it take to have an effect and how long will I have to take it?
- Are there any risks associated with this treatment?
- Is there some written material (like a leaflet) about the treatment that I can have?

Blood lipids

If you're 40 or over, your doctor or nurse should offer you medication known as a statin to help reduce the blood lipids that can contribute to cardiovascular disease (see page 12). The exception is if you are assessed as being at an unusually low risk of cardiovascular disease for a person with type 2 diabetes. You may also be offered a statin if you're under 40 and are assessed as being at particularly high risk of cardiovascular disease. If there's a possibility you could become pregnant, your doctor or nurse should discuss how this affects your options before you agree to try a statin.

Once you start on a statin, you should have a check after 1 to 3 months to see how it is affecting your blood lipids – this check should be repeated every year from then onwards.

If your risk of cardiovascular disease is judged to be high, a 'stronger' statin or another medication called ezetimibe may be more suitable for you, and your doctor or nurse should discuss this.

If your blood triglycerides are high

If tests show your blood triglycerides are high, your doctor or nurse should try to find out whether this is an effect of the diabetes or whether it's happening for another reason. If the triglyceride level stays high and seems to be a result of having diabetes, your doctor or nurse should offer you a drug called a fibrate to try to bring the level down.

Fish oils

You shouldn't normally be advised to take a fish oil supplement to help cut your risk of cardiovascular disease. The exceptions to this are if you are seeing a lipid specialist and he or she has discussed using this type of supplement with you, or you have tried lifestyle changes and taking a fibrate, and your triglyceride level has not come down.

Questions about ways of lowering blood lipids

- How can I change my diet to reduce my blood lipids?
- What are the pros and cons of taking a statin?

Thrombosis

A thrombosis is a blood clot, and if one forms in a blood vessel it can put a person at serious risk of a heart attack or stroke. One way of cutting the risk of a thrombosis is to take a low dose of aspirin every day. But this also has some risks so it's important to discuss these with your doctor or nurse before you start. In general, a low dose of aspirin taken daily is likely to benefit:

- a person aged 50 or older if their blood pressure is below 145/90
- someone under 50 if they are judged to be at high risk of cardiovascular disease.

If there's a strong reason why you can't take aspirin, your doctor or nurse should offer you a drug called clopidogrel instead.

Kidney damage

Diabetes increases the chances of getting kidney damage. For this reason, your doctor or nurse should regularly check for early signs of damage. When you go for your annual check, you should be asked to bring in a urine sample from your first urination of the day. As long as there are no signs of a urine infection, this sample will be sent off for a test known as the albumin:creatinine ratio, which can provide information about kidney damage. Your doctor or nurse will also arrange a blood sample to check how well your kidneys are working.

If the albumin:creatinine ratio shows there is a possible problem, the test should be repeated (on a fresh urine sample) at your next two visits to the clinic, and within a maximum of 3 to 4 months. If at least one more measurement also shows a problem, your doctor or nurse should discuss what this means and the options for you.

If you are diagnosed as having kidney damage resulting from diabetes, your doctor or nurse should usually offer you a drug called an 'ACE inhibitor'. This will help to reduce your blood pressure, which will also help protect your kidneys. The dose of the ACE inhibitor should be increased until it reaches the highest effective dose that doesn't cause you problem side effects. If there's a possibility you could become pregnant, your doctor or nurse should discuss this with you and the possible risks and benefits of taking an ACE inhibitor.

If you don't get on with the ACE inhibitor, tell your doctor or nurse. He or she should usually offer you an alternative called an 'angiotensin 2 receptor blocker'.

Eye damage

High glucose levels can cause damage in the retina, which is the inner layer at the back of the eyeball. Your doctor or nurse should highlight the importance of regular checks on your eyes, and should explain the problems that can happen if eye damage starts to appear. These eye checks are different from routine sight tests and are specifically to look for early signs of damage caused by diabetes.

To monitor your eye health, your eyes should be checked at or around the time you are diagnosed with diabetes and, if everything seems okay, at least once a year from then on. If there are signs that damage may be developing, you'll be offered an earlier repeat check or a referral to an eye specialist (see the box below).

Reasons for referral to an eye specialist

You should be offered an **emergency appointment** with an eye specialist (ophthalmologist) if:

- your sight suddenly gets worse, or
- you have new blood vessels forming on the front surface of the coloured part of your eye (the iris – the medical term for this is 'rubeosis iridis'), or
- there is bleeding in front of the retina or in the main part of the eyeball, or
- the retina has peeled away from its support at the back of the eye (known as 'retinal detachment').

You should be offered an appointment for a **rapid review** by an eye specialist (ophthalmologist) if new blood vessels are forming in your eye.

A routine appointment will usually be offered if there are other signs of abnormalities caused by diabetes, including 'maculopathy' or 'pre-proliferative retinopathy' – these are detailed in the NICE guideline (see page 24 for more information).

As part of your regular eye checks, trained staff will digitally photograph the back of your eye so a record can be kept that will allow any changes to be spotted easily. Eyedrops should be used before this procedure to make the pupil dilate (widen). The pros and cons of doing this and the precautions you should take if you have the eyedrops should be discussed with you **before** you go to the photography appointment.

Nerve damage and pain

When you have your annual check up, your doctor or nurse should discuss any pain you've been having, or other problems that could be caused by nerve damage. In particular, they should ask about how often and when it's happening. Your doctor or nurse should discuss why it's happening, how nerve damage may affect your body in the future, and the options for coping with the symptoms. This may include some psychological support if you agree it could help.

If you experience nerve pain and normal painkillers (analgesics) don't help, your doctor should discuss other drugs with you. After painkillers, the next step is usually to try a tricyclic drug. If you take a tricyclic drug and a blood pressure drug, you may be more at risk of side effects – your doctor should discuss this with you if this is the case, and tell you what to watch for.

If a tricyclic drug doesn't help, your doctor should discuss other drugs, explaining the possible benefits and side effects. If you try all the options but are still in pain, your doctor should discuss whether you want to be referred to see healthcare professionals with specialist experience and training in helping people cope with long-term pain.

If taking a drug has helped with nerve pain, your doctor should eventually talk to you about reducing the dose and finally stopping the drug altogether – this process will be done gradually and your doctor will see you regularly to check how you're getting on. He or she will talk to you about the steps involved.

Gastroparesis

Gastroparesis is a condition that happens when the nerves controlling the stomach aren't working properly. The result is that food doesn't get moved on from the stomach as quickly as it should, and this can cause problems such as a feeling of fullness after eating a small amount of food, and abdominal bloating. It can also affect blood glucose control, so your doctor should consider it if you are on insulin and get erratic episodes of hypoglycaemia. If your doctor or nurse suspects you have gastroparesis but there's a possibility that your symptoms are happening because of another reason, or you are having continued or severe vomiting, your doctor or nurse should offer to refer you to a specialist.

If you have gastroparesis, your doctor or nurse should discuss the medications available and their relative advantages and disadvantages.

Erectile dysfunction

Erectile dysfunction is quite common in men with diabetes. High blood glucose levels over a prolonged period can cause changes in the way the nerves, muscles and blood vessels work. This can mean a man can't get an erection despite his desire to have sex. If you're a man, your doctor or nurse should check whether this is a problem for you at your annual check up.

If you are having problems achieving or maintaining an erection, your doctor or nurse should discuss why this is happening and the options for you. If there are no health reasons why you shouldn't use it, your doctor or nurse should offer you a type of drug known as a phosphodiesterase type-5 inhibitor. If you try this type of medication and it isn't helpful, tell your doctor or nurse. He or she should then discuss referring you to a specialist clinic.

Other nerve-related problems

Talk to your doctor or nurse if you notice any of the following problems, because they may need further investigation:

- if you start to get hypoglycaemic without the usual warnings
- if you suffer from diarrhoea for no obvious reason, particularly at night
- if you have problems emptying your bladder fully for no obvious reason.

If you are troubled by other symptoms, such as sweating an abnormal amount, talk to your doctor or nurse. They should try to treat the problem or find ways of helping you cope with it.

Questions about problems related to diabetes

- How can I reduce the risk of developing problems related to diabetes?
- Do I have any signs already? If so, what is the outlook?
- What are my options?
- Is there any support available?
- Is there some written material (like a leaflet) that I can have?

Drugs mentioned in this booklet

The names of drugs can be confusing. Each drug has a chemical or generic name, and also sometimes a brand name (brand names have not been mentioned in this booklet). It also belongs to a group of drugs, which has a name.

- **Acarbose** is a drug for diabetes. It belongs to a group of drugs called 'alpha glucosidase inhibitors'. Acarbose slows down the speed at which the body digests starch and glucose. By doing this, it slows down the increase in blood glucose that happens after a meal.
- **ACE inhibitors** are a group of drugs that can help reduce blood pressure by widening the blood vessels. ACE stands for 'angiotensin-converting enzyme'.
- **Alpha-blockers** are another group of blood pressure drugs. They work by blocking the nerve signals that normally make the blood vessels become narrow (constrict).
- **Analgesics** are painkillers – there are many different types, including paracetamol, non-steroidal anti-inflammatory drugs such as aspirin, and opiate analgesics such as codeine and dihydrocodeine.
- **Angiotensin 2 receptor blockers** are blood pressure drugs that are designed to have a similar end result to ACE inhibitors, although they work in a different way.
- **Aspirin** is a painkiller, but in low doses it can also help stop blood clots forming.
- **Beta-blockers** interrupt the nerve signals that increase the rate and force at which the heart pumps blood around the body. As a result, the blood pressure falls.
- **Calcium channel blockers** reduce blood pressure by stopping the arteries from narrowing.
- **Clopidogrel** can help stop blood clots forming.
- **Diuretics** encourage the body to remove a larger amount of water from the bloodstream than usual, which makes the blood pressure fall. There are several different types of diuretics that work in different ways (see 'potassium-sparing diuretics').
- **DPP-4 inhibitors** are a type of drug for diabetes (they are also sometimes described as GLP-1 enhancers or incretin enhancers). GLP-1 is a hormone that the body normally produces after a meal or snack, which helps the body control glucose levels. DPP-4 inhibitors stop GLP-1 from being broken down by the body, so that it can work for longer.

- **Exenatide** is a type of diabetes drug, known as a GLP-1 agonist or incretin mimetic. It is designed to have similar effects to the hormone GLP-1 described on page 20.
- **Ezetimibe** helps to reduce the amount of cholesterol the body absorbs, and so reduce the amount of cholesterol in the blood.
- **Fibrates** are lipid-lowering drugs that work mainly by reducing the levels of triglyceride in the blood. Fibrates also increase the 'good' cholesterol in the blood, known as HDL-cholesterol.
- **Metformin** is a diabetes drug known as a biguanide. It helps to reduce blood glucose by reducing the amount of glucose absorbed into the blood from the digestive system. It also reduces the amount of glucose produced by the liver and kidneys, and it makes cells in the body take up glucose more effectively from the blood.
- **Phosphodiesterase type-5 inhibitors** are drugs that can help men achieve and sustain an erection.
- **Potassium-sparing diuretics** are mild diuretics (see page 20) that can help prevent the loss of potassium from the body that can happen with some other types of diuretic.
- **Rapid-acting insulin secretagogues** (sometimes called 'prandial glucose regulators') are diabetes drugs that stimulate meal-time insulin secretion.
- **Statins** help to reduce the amount of cholesterol in the blood by slowing down the production of cholesterol in the liver.
- **Sulfonylureas** are diabetes drugs that encourage the body to make insulin.
- **Thiazolidinediones** (or glitazones) are diabetes drugs that work by helping the body to overcome 'insulin resistance' (cells in the body not responding properly to insulin) and use its own insulin more efficiently.
- **Tricyclic drugs** can help with long-term nerve pain because they damp down the signals coming from the damaged nerves. This is different from their use in some other medical conditions, such as depression.

More information

The organisation below can provide more information and support for people with type 2 diabetes. NICE is not responsible for the quality or accuracy of any information or advice provided by this organisation.

- Diabetes UK, careline 0845 120 2960
www.diabetes.org.uk

NHS Choices (www.nhs.uk) may be a good place to find out more. Your local patient advice and liaison service (usually known as 'PALS') may be able to give you more information and support. You should also contact PALS if you are unhappy with the treatment you are offered, but you should talk about your care with a member of your healthcare team first. If your local PALS is not able to help you, they should refer you to your local independent complaints advocacy service. If you live in Wales you should speak to NHS Direct Wales for more information on who to contact.

About NICE

NICE produces guidance (advice) for the NHS about preventing, diagnosing and treating different medical conditions. The guidance is written by independent experts including healthcare professionals and people representing patients and carers. They consider the evidence on the condition and treatments, the views of patients and carers and the experiences of doctors, nurses and other healthcare professionals. Staff working in the NHS are expected to follow this guidance.

To find out more about NICE, its work and how it reaches decisions, see www.nice.org.uk/aboutguidance

This booklet and other versions of the guideline aimed at healthcare professionals are available at www.nice.org.uk/CG87

You can order printed copies of this booklet from NICE publications (phone 0845 003 7783 or email publications@nice.org.uk and quote reference N1864).

We encourage NHS and voluntary organisations to use text from this booklet in their own information about type 2 diabetes.