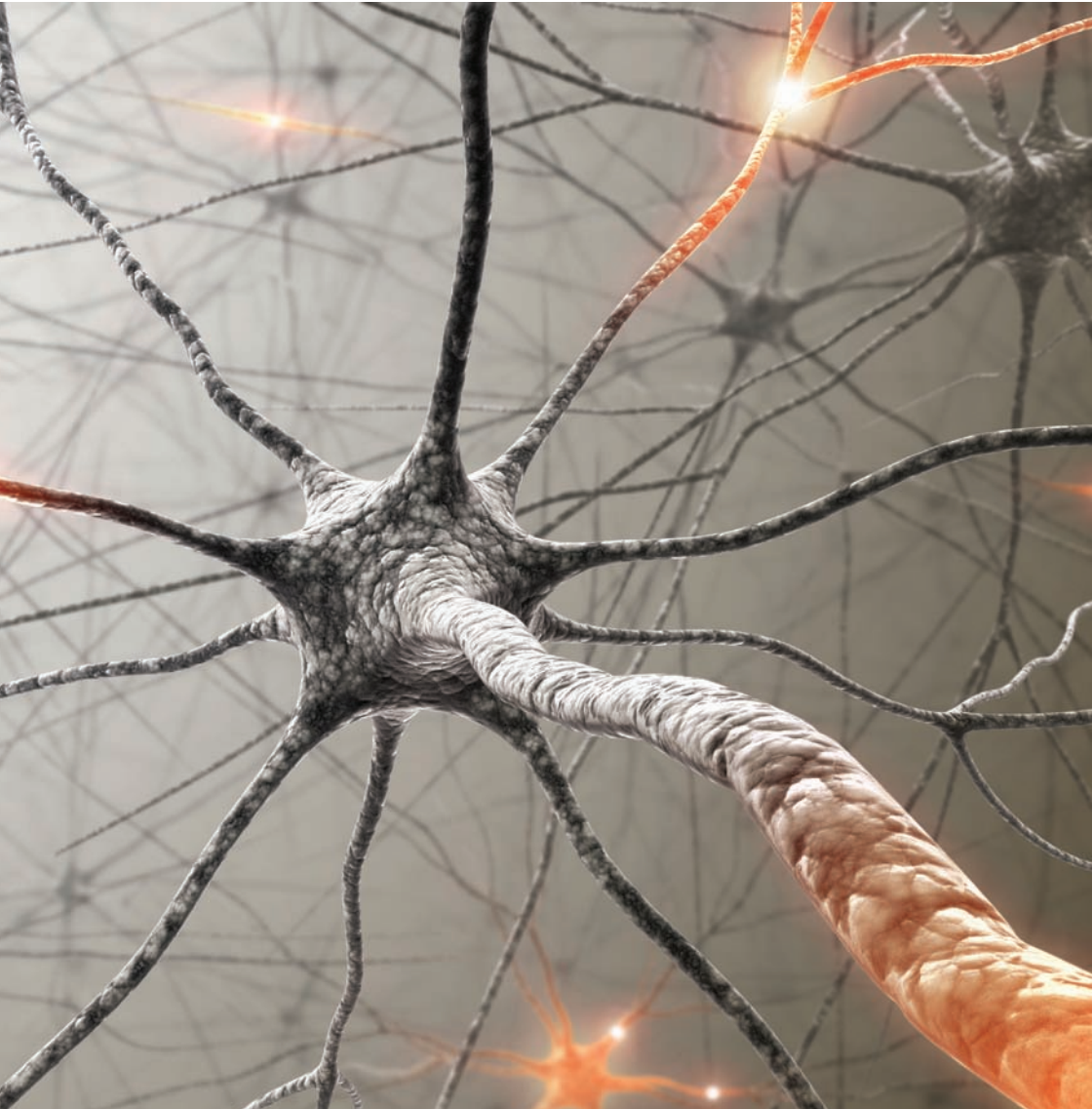


Diabetic neuropathy



Contents

How this booklet can help you	3
What is diabetes?	4
Introduction	5
Sensory neuropathy	7
Autonomic neuropathy	12
Motor neuropathy	16
And finally	17
About Diabetes UK	18
Become a Supporting Member	19
Diabetes UK national and regional offices	20

How this booklet can help you

Nerves send impulses or messages to every part of our body and this allows us to function.

This is an introduction to nerve damage, one of the common complications of diabetes. It is known as diabetic neuropathy.

This booklet provides you with information about:

- what diabetes is
- the three different types of neuropathy
- how you can reduce the risk of developing neuropathy
- what can be done to help the symptoms
- Diabetes UK and how we can help you.

It is aimed at anyone who:

- has Type 1 or Type 2 diabetes
- is caring for someone with diabetes
- is interested in understanding more about what having diabetes means.

What is diabetes?

Diabetes is a common life-long condition where the amount of glucose in the blood is too high as the body cannot use it properly. This is because the pancreas does not produce any or not enough insulin or the insulin that is produced doesn't work properly (known as insulin resistance). Insulin helps glucose enter the body's cells, where it is used for energy.

Glucose comes from digesting carbohydrate from various kinds of food and drink, including starchy foods such as breads, rice and potatoes, fruit, some dairy products, sugar and other sweet foods. Glucose is also produced by the liver.

There are two main types of diabetes: Type 1 and Type 2.

Type 1 diabetes develops when the insulin-producing cells have been destroyed and the body is unable to produce any insulin. Usually it appears before the age of 40, and especially in childhood. It is treated with insulin either by injection or pump, a healthy diet and regular physical activity.

Type 2 diabetes develops when the body doesn't produce enough insulin or the insulin that is produced doesn't work properly. Usually it appears in people aged over 40, though in South Asian and Black people it can appear from the age of 25. It is becoming more common in children and young people of all ethnicities. Type 2 diabetes is treated with a healthy diet and regular physical activity, but medication and/or insulin is often required.

The main symptoms of undiagnosed diabetes include passing urine frequently (especially at night), increased thirst, extreme tiredness, unexplained weight loss, genital itching or regular episodes of thrush, slow healing of wounds and blurred vision.

The main aim of diabetes treatment is to achieve blood glucose, blood pressure and blood fat levels (including cholesterol) within the target ranges agreed by you and your healthcare team. This, together with a healthy lifestyle, will reduce the risk of developing the long-term complications of diabetes such as heart attack, stroke, amputation, blindness, kidney failure and nerve damage.

Introduction

Neuropathy means damage to the nerves of the body that carry messages to and from the brain and spinal cord. There are different types of neuropathy depending on which type of nerve has been affected.

Nerves are thread-like structures that carry hundreds of thousands of tiny fibres, linking all parts of the body, inside and outside, to the brain. They carry tiny signals of information backwards and forwards, making it possible for us to feel and move.

The brain is the central control room of all our bodily actions and sensations. Information to or from the brain passes up and down the spinal cord and out through the **peripheral nerves** in the arms and legs – out for movements and action, and in for sensations and pain.

Sensory nerves carry messages from the skin and bones to the brain. Different sensations register different signals, for example, heat, cold, touch, pain, vibration and joint position. The brain then responds in the appropriate way.

In return, the brain sends messages to different parts of the body through the **motor nerves**, allowing us to move our limbs.

There is also a large network of nerves that control almost every organ in the body without us being aware of it. These nerves partly control the heartbeat, breathing, the stomach, bladder and bowel function – all without us knowing it. This is called the **autonomic nervous system**.

Diabetes can injure some of these nerves, so that some of the communicating fibres are either damaged or disappear altogether.

Neuropathy in people with diabetes is very common and the longer you have had diabetes, the more likely you are to develop some form of neuropathy. But for most people, neuropathy is mild and only a small number of people develop more severe symptoms.

What causes diabetic neuropathy and can it be prevented?

Two major studies, The Diabetes Control and Complications Trial (DCCT), carried out in the USA and the United Kingdom Prospective Diabetes Study (UKPDS), showed that good blood glucose control slows down the rate at which nerve damage develops. So good diabetes control is the key to reducing the risk of neuropathy.

It is still not known exactly how diabetes damages the nerves. There may be a number of factors involved, including high blood glucose levels over a long period of time. One possibility is that the nerve damage is a result of damage to the small blood vessels, which prevents essential nutrients from reaching the nerves.

Much research is taking place into neuropathy, and various drugs are being tested to see if they can reduce the nerve damage associated with diabetes.

At the moment there are no drugs to cure neuropathy, but there are drugs that can help relieve the symptoms. These are discussed later in this leaflet.

Sensory neuropathy is the most common type and mainly affects the nerves in the feet and legs and, occasionally, the hands.

Autonomic neuropathy is less common. It affects the organs that work without us being aware of them – the stomach, bowels, heart, bladder, sweat glands and sexual organs.

Motor neuropathy is very rare. It leads to weakness and wasting of the muscles that receive messages from the affected nerve. This may involve the eyes or the muscles of the legs and feet.

Sensory neuropathy

Which parts of the body are affected?

Sensory neuropathy is the most common type and the feet are the most likely to be affected. This is probably because the most vulnerable nerves are the longest ones – in the feet and legs. Most people with sensory neuropathy do not realise that they have lost some feeling in their feet. If there are no symptoms, the condition may be picked up during the annual medical check-up. Sensory neuropathy affects the hands less often but when it does, it can cause problems with fine touch.

The feet

The main danger of sensory neuropathy is loss of feeling in the feet, especially if you do not realise that this has occurred. It can mean that you may not notice minor injuries, such as those caused by:

- nails or stones
- friction from badly fitting shoes
- burns from radiators or hot-water bottles
- walking about barefoot.

If ignored, minor injuries may get worse and cause infections or ulcers, which can take a long time to heal. Good foot care can prevent this happening. This is why it is so important for people with diabetes to look after their feet, to have regular checks, and to get expert help when there is a problem and not treat foot problems themselves. You can find out more about this in Diabetes UK's leaflet *Taking care of your feet*, available from our Publications orderline – details on the back page.



The loss of feeling in your feet may mean that you are unable to tell whether your bath water is too hot, so you should always check the temperature before getting in.

Even when it is very severe, neuropathy is not life-threatening. Although the condition cannot actually be cured, the symptoms may improve with treatment.

How do I know if I have it?

When you attend for your annual medical check-up, your feet will be examined. They will be checked to see if there are any deformities or changes in the shape of your feet that may cause a problem, especially if your shoes do not fit properly. The blood supply to your feet will also be checked by feeling the pulses.

The person examining your feet will check to see if there is any loss of feeling in them. This should be done with a vibrating tuning fork or with a small filament that you feel as it is gently pushed against your skin.

If you are found to be losing some feeling in your feet, your diabetes team will give you advice on how to take special care and may refer you to a podiatrist/chiroprapist. All people with diabetes should take special care of their feet. Again, our leaflet *Taking care of your feet* will be helpful to you.

There are some other medical conditions that can cause similar symptoms to diabetic neuropathy but which need different treatment. So it is very important that you are examined by a GP, and by a diabetes specialist or neurologist if needed.

Symptoms

Neuropathy can produce symptoms, although not everybody will have them.

Tingling

One of the most common symptoms is tingling in the toes, often described as pins and needles. This can affect the toes and feet,

and sometimes the lower leg as well. The feeling is there all the time. For some people, this is only a minor nuisance. Others find it very uncomfortable and it can disturb sleep. It is not normally painful but unpleasant forms of pain can occur, and these are described below.

Tingling in the feet often disappears when diabetes control is improved, though in some people it remains. Sometimes, when the diabetes control improves, the tingling may get worse before getting better. And it may persist, sometimes for years. But though it may feel unpleasant, the tingling is harmless.

Numbness

People with neuropathy may find that they have lost the feeling in their feet. People with numb feet are at great risk of injuring them without knowing they've done so. Good foot care is especially important for these people. Once numbness has occurred, it is permanent and will not get better.

Sometimes people say that their numb feet also feel cold, though they are not actually cold. This is quite common. It is harmless and does not usually mean that there is anything wrong with your circulation. But if you have this problem, it is especially important that you do not use a hot-water bottle or any other form of external heat on your feet, as this might cause a burn.

Pain

Some people have very severe pain from neuropathy. This is usually felt in both feet (sometimes extending up both legs), or in one or both thighs. Very rarely, it may be felt in one part of one or both sides of the abdomen. Pain from diabetic neuropathy does not affect the chest or arms.

Painful neuropathy can be very distressing. People often feel a burning sensation, pins and needles, and shooting pains. Contact with the skin is very uncomfortable, so even the lightest touch from clothes or bedclothes is unpleasant. Because of these symptoms, many people use a bed cradle to lift the bedclothes

or keep their feet exposed beyond the end of the bed. Cooling the feet also gives some relief.

The pain is, unfortunately, continuous day and night, causing great misery, lack of sleep and depression. Because of all these problems, many people also lose weight.

Pain relief is discussed on page 11.

The hands

The fingers contain a high number of fine sensory nerves, which makes them very sensitive. They are so well served in this way that neuropathy does not normally affect the hands, and very few people are aware of any problems, even when their feet are seriously affected.

But when neuropathy is very severe, some numbness can occur and this may cause difficulty in handling small objects such as needles, or in doing up buttons. Blind people may be unable to read Braille because of a very subtle loss of sensation that may not affect them in any other way. Painful neuropathy does not normally affect the hands.

A separate condition, called carpal tunnel syndrome, may cause pins and needles in the fingers and is often worse at night. It is not related to neuropathy but is slightly more common in people with diabetes. It is caused by pressure on the median nerve,

which crosses the wrist into the hand. The diagnosis is made by measuring the electrical conduction in the nerve.

The problem is easy to treat. Splinting the wrist with a plastic splint may help. The best treatment is a simple operation, under local anaesthetic, in which a small cut is made over the wrist to



relieve the pressure on the nerve. This usually cures the problem.

Pain relief

Treating the pain from diabetic neuropathy takes patience and persistence. The most important thing to remember is to take the treatment regularly, even if the pain has lessened.

Preventing pain is much easier than waiting for pain to return and then treating it. Even the simplest treatment, such as paracetamol, can be very effective if taken regularly.

Pain can be treated in the following ways:

- Improved control of diabetes. One way might be to review your medications if the treatment you are on is not achieving good control.
- Simple painkillers, such as paracetamol, taken regularly.
- Application of a film of Opsite (applied by a special spray or dressing) can ease the discomfort of contact with clothes and bedclothes.
- A special cream known as capsaicin cream may help some people when applied to the feet.
- Some tablets normally used for treating depression are very valuable for treating pain from diabetic neuropathy because they have a calming effect on the nerves. They also have the added advantage of improving sleep.
- Some tablets that are normally used to treat epilepsy can also have a beneficial effect. Some of these are now licensed to treat painful neuropathy.
- More powerful painkillers, especially at night.
- Your diabetes doctor can refer you to a specialised pain clinic. Treatments from such clinics can include an electrical nerve stimulator, nerve blocks or taking vitamins, but they may not take away all the pain.

Complementary treatments

If you do choose to use a complementary therapy, remember that it should be used in addition to, not instead of, the treatments advised by your diabetes doctor. Always go to a qualified therapist who understands diabetes, and always tell your doctor beforehand.

If sensory neuropathy is confirmed, then remember that:

- The worst of the pain will end but it will take a long time, perhaps between six and 18 months. In the meantime, there are many treatments that can be given for the pain.
- Better diabetes control should eventually help to ease the pain.
- Recovery is usually complete, with the symptoms disappearing. Minor tingling may continue, sometimes for many years, but it should not be too troublesome.
- The pain, no matter how bad, does not lead to amputation or paralysis, and people with this condition do not become crippled.

Autonomic neuropathy

Symptoms

The autonomic nerves – those that control automatic bodily functions – can also be affected by diabetes, but this causes serious problems for only a very small number of people, about one or two in 100. Because the autonomic nerves control so many different organs in the body, the symptoms will vary depending on the organs affected.

Impotence

As men get older, whether or not they have diabetes, it can become more difficult for them to achieve an erection sufficient for sexual intercourse. There are many physical and psychological causes of this, including tiredness, stress, too much alcohol and certain medicines.

Even though impotence can affect all men, it is more common in men with diabetes. It may be due to poor blood supply to the penis itself or, in men with autonomic neuropathy, to damage to the nerves that help the penis to become erect. This may be combined with a loss of sensation in the penis, making it more difficult to achieve an erection.

Nowadays impotence is much better understood than in the past. There are many causes of impotence and the various treatments that can help are detailed in our leaflet *Sex and diabetes* (call the publications orderline on the back page for a copy) or on our website at www.diabetes.org.uk/sexanddiabetes

Sweating

Sometimes, people with autonomic neuropathy find that they sweat heavily all over the face, neck and scalp when they eat certain spicy or highly flavoured foods. This is not usually troublesome but, just occasionally, the sweating is so severe that people feel extremely uncomfortable. If this happens, there are some drugs that can help.

Diarrhoea

Occasionally, very severe diarrhoea can develop. This comes and goes, usually lasting for just a day or two, with a return to normal for days or weeks until it starts again. If this happens, it needs to be fully investigated to find out whether or not there is any other cause for it.

Vomiting

Gastroparesis is the name given to a disorder in which the stomach takes too long to empty its contents and so leads to vomiting.

Up to 50 per cent of people with diabetes develop gastroparesis though for the majority it will be mild. Controlling blood glucose is made more difficult because of the vomiting. Some drugs are available to treat gastroparesis.

Bladder problems

The muscles responsible for contracting and emptying the bladder can become weakened, so the bladder does not empty itself completely. This leaves some urine remaining in the bladder even when the act of passing urine is thought to be complete. This is known as urine retention. In most cases the person is not aware of this problem.

But, occasionally, the urine remaining in the bladder acts as a reservoir for infection, and can cause repeated urinary infections.

The commonest cause of urine retention is an enlarged prostate gland in men. It is, therefore, important for people suffering from urine retention to be fully investigated. If the cause is thought to be diabetic neuropathy, then specialist advice is necessary.

Charcot Foot

Charcot foot is the name given to a rare complication of neuropathy. Damage to the motor and sensory nerves can lead to the loss of pain sensation and muscles become unable to

support the joints of the foot. This can lead to minor traumas such as sprains or fractures going unnoticed. Damage continues leading to deformity of the foot. The bones most often affected are those of the forefoot and midfoot.

Deformity of the foot can lead to pressure ulcers with the risk of them becoming infected.

Signs that there may be a problem can include the foot feeling hot, the skin looking red, swelling of the foot and ankle, loss of sensation in the foot. If you notice these signs speak to your diabetes specialist



team immediately. If recognised and managed early permanent damage to the bone can be minimized.

Charcot foot is managed with antibiotics, insoles, leg and foot casts and special footwear.

Low blood pressure on standing (postural hypotension)

The body's method for controlling blood pressure normally ensures that, when we stand up, our blood pressure remains the same as when we are lying down. This is achieved by the action of autonomic nerves that cause blood vessels, mostly in the lower half of the body, to narrow and so prevent our blood from, literally, 'falling to our boots'. In people who develop autonomic neuropathy, the mechanism may fail, so the blood pressure drops. This is harmless but the bigger the drop, the more likely you are to experience unpleasant symptoms.

Symptoms of postural hypotension range from a slight dizziness on standing up, usually felt on getting out of bed in the morning, to feeling so faint you are hardly able to walk. The problem goes as soon as the person sits down.

The symptoms can vary from day to day – they can be very severe one day and less severe the next. It is always worse after a period of vomiting or diarrhoea, when the body has lost fluid.



Once again it is important for a specialist to make the right diagnosis, since there are other causes of dizziness on standing up. But if postural hypotension is shown to be the cause of the problem, there are a number of useful treatments that your doctor may suggest. These include:

- placing pillows under your feet when lying down
- occasionally, wearing a full-length elastic stocking can help
- possibly altering your blood pressure medication
- taking a tablet called fludrocortisone, which causes some salt and water to be retained in the circulation. Some people who use this tablet can develop swelling of the feet and legs. It can *only* be given by a specialist. If the treatment does not succeed, the specialist can advise you on other treatments that can help.

Motor neuropathy

Leg and foot weakness

Sometimes, the nerves that supply the muscles in the leg and foot are affected. This means that the damaged nerves are unable to send messages to the muscles that control the movement of the limbs.

This condition has various names – your doctor may call it femoral neuropathy, proximal motor neuropathy or diabetic amyotrophy.



The condition can be very troublesome but, provided the correct diagnosis has been made, full recovery can be expected within about a year. In the meantime, strengthening exercises, physiotherapy and knee or foot supports may help, together with pain relief where necessary.

Motor neuropathy can cause the shape of your feet to alter. Your toes can become clawed and your arch can drop. This can result in certain

parts of your feet being subjected to more pressure, which can make you more prone to callouses and corns.

The eyes

A rare form of neuropathy affects the eyes. This is caused by damage to one or other of the nerves that control eye movement. Sudden onset of double vision without warning is the chief symptom. Complete recovery takes about three months. Anyone experiencing this problem should consult a specialist immediately because double vision has other causes that may need different treatment.



And finally

Although neuropathy is a very common problem for people who have diabetes, most people are neither aware of it nor inconvenienced by it.

The most important thing to remember because neuropathy most commonly affects your feet, you must protect them from injury, which can occur when some feeling has been lost. This is why the annual medical check-up is so important. It allows your diabetes care team to spot any problems that you may be unaware of.

Good control of diabetes does reduce the progression of the nerve damage. Nevertheless, a few people do develop the more unpleasant problems described in this leaflet. These need specialist diagnosis and advice and, when the diagnosis has been made, help is always available.

Although neuropathy cannot be cured, there are many treatments available and, with the help of your diabetes care team, symptoms can be relieved and your quality of life greatly improved.

About Diabetes UK

Diabetes UK is the charity for people with diabetes, their family, friends and carers. Our mission is to improve the lives of people with the condition and work towards a future without diabetes.

Diabetes UK stands up for the interests of people with diabetes by campaigning for better standards of care. We are one of the main funders of diabetes research in the UK which includes research into cause and prevention, care and treatment and finding a cure. We provide support and information to help people manage their diabetes.

Did you know?

There are 2.6 million people in the UK diagnosed with diabetes and up to 500,000 people who have the condition but don't know it.

- Our website www.diabetes.org.uk has over 5,000 visitors a day.
- We have a **network of offices throughout the UK** – see back cover.
- Diabetes UK Careline staff answer **over 100 enquiries a day**.
- We fund diabetes research, investing **more than £6 million every year**.
- We produce a wide range of **magazines, books and leaflets** covering all aspects of diabetes.



All of this and more is made possible through donations, fundraising and membership of Diabetes UK.

How can you help?

You can be actively involved in the work Diabetes UK does. For details call **020 7424 1000** or visit our website about:

Diabetes Campaigners Network – www.diabetes.org.uk/campaigns

Fundraising ideas and events – www.diabetes.org.uk/fundraise

Make a donation – www.diabetes.org.uk/donate

Become a Supporting Member today – your support will make a real difference



Join our team and help us get closer to a future free from diabetes while improving the lives of everyone living with diabetes.

Enjoy the benefits of being a Supporting Member

Being a Diabetes UK Supporting Member entitles you to a range of benefits including:

- exclusive personalised Supporting Members area on our website
- our bi-monthly magazine *Balance*
- access to experienced counsellors on our confidential Diabetes UK Careline
- a wealth of reliable and expert publications on diabetes
- opportunities to make new friends living with the same condition as you
- the latest updates and developments about diabetes from our researchers.

To join visit www.diabetes.org.uk/join
or call free on **0800 138 5605**

For more information call our Supporter Services team on **0845 123 2399** during office hours.

Diabetes UK

National and regional offices

Central Office

Telephone

020 7424 1000

Diabetes UK Cymru

029 2066 8276

Diabetes UK Northern Ireland

028 9066 6646

Diabetes UK Scotland

0141 245 6380

Diabetes UK Eastern

01376 501390

Diabetes UK East Midlands

0115 950 7147

Diabetes UK London

020 7424 1116

Diabetes UK Northern and Yorkshire

01325 488606

Diabetes UK North West

01925 653281

Diabetes UK South East

01372 720148

Diabetes UK South West

01823 324007

Diabetes UK West Midlands

01922 614500

Visit www.diabetes.org.uk/in_your_area for email addresses

Useful contacts

Become a Supporting Member

0800 138 5605

Supporter Services

0845 123 2399

Advocacy Service

020 7424 1840/1847

Publications orderline

0800 585 088

Diabetes UK Careline is here to give support and information about diabetes: careline@diabetes.org.uk or call **0845 120 2960** (please check the costs of calls to 0845 numbers with your phone provider). Or call 020 7424 1000 and ask to be transferred to the Careline.

Diabetes UK welcomes feedback on this or any of its information.

Please email infofeedback@diabetes.org.uk



The charity for people with diabetes

Macleod House, 10 Parkway, London NW1 7AA

Telephone 020 7424 1000 **Fax** 020 7424 1001

Email info@diabetes.org.uk

Website www.diabetes.org.uk

A charity registered in England and Wales (no. 215199) and in Scotland (no. SC039136). © Diabetes UK 2010

Published: January 2010

To be reviewed: July 2011

8005/1011/f