

Supported by

**Pancreatic
Cancer
UK**



Type 3c diabetes and reduced appetite

This booklet has been produced for people who have a particular type of diabetes that is caused by having all or part of the pancreas removed (surgically) or the pancreas being damaged, (for example by pancreatitis or pancreatic cancer). **This is called Type 3c Diabetes.**

This booklet is for people with a reduced appetite or who have lost weight, who are aiming to put weight back on, and/or recover from surgery.

Our other publication 'Type 3c diabetes and healthy living' provides advice for people with type 3c diabetes who are aiming to maintain or reduce their weight and are not recovering from surgery.

Publication Date: May 2019

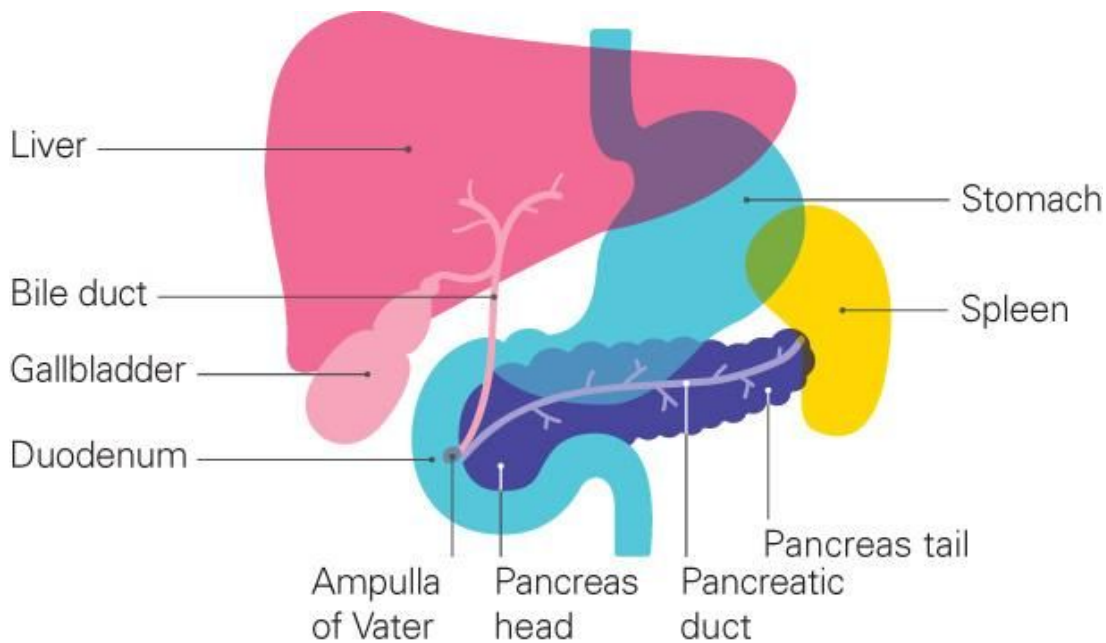
Review Date: May 2021

Contents

What is the pancreas?	3
What is type 3c/ Pancreatogenic Diabetes?	4
Blood glucose targets	
Why is it important to have blood glucose levels within target?	6
How do I know what my blood glucose level is?	8
How do I get my blood glucose level within target?	8
Physical activity	9
What if I've lost weight?	9
General points to increase the energy and protein content of your diet	10
Fortified Milk	11
Nutritional supplement drinks	12
Homemade Nutritional Supplement Drinks	13
Which foods affect my blood glucose level?	14
Which foods should not cause my blood glucose levels to rise?	15
Alternative sweeteners	16
Tablet treatment for type 3c diabetes	17
Insulin	18
When do I take insulin?	19
How much insulin do I inject?	21
How to inject insulin	22
Hypoglycaemia (hypo)	23
Driving when prescribed insulin	26
Alcohol when prescribed insulin	27
Physical activity when prescribed insulin	29
Eating out when prescribed insulin	30
'Sick day rules' when prescribed insulin	30
Monitoring and problem solving	31
Contacts/Further Information	33

What is the pancreas?

The pancreas is a gland that lies behind the stomach. It has three main parts: the head, the body, and the tail. The position of these organs can be seen in the diagram below, which has kindly been provided by Pancreatic Cancer UK©.



The pancreas has three main functions, all of which are essential for good nutrition:

1. To produce digestive juices (which contain enzymes)

These enzymes help to break down (digest) food so that it can be absorbed through the wall of your gut into your bloodstream to be used by your body. The pancreas produces many enzymes, the three main ones are:

- Proteases - to break down proteins
- Amylase - to break down starchy carbohydrate
- Lipase - to break down fat

If your pancreas is not producing enough of these enzymes or they are blocked from getting into your gut, you cannot fully digest your food and drink. This can lead to weight loss, a change in bowel habit, wind, bloating and unexpected blood glucose (sugar) levels, amongst other symptoms. If this is the case, you can take these enzymes in a capsule with your food and

drinks. This is called Pancreatic Enzyme Replacement Therapy (**PERT**). There are 4 brands of PERT available in the UK and Ireland: Creon[®], Nutrizym[®], Pancrease[®] and Pancrex[®]. Not all brands are available in all areas. If you need to take these, your doctor or dietitian will give you more information.

2. To produce hormones

The pancreas produces two important hormones (chemical messengers in the blood):

- **Insulin** which reduces the level of glucose (sugar) in your blood. It does this by moving the glucose from the bloodstream into parts of the body, where it is either stored or used for energy.
- **Glucagon** which helps to increase the glucose level in your blood if it becomes too low, by releasing glucose which is stored in your liver.

3. To produce bicarbonate

The stomach produces acid, this passes out of the stomach with the food into your gut. The bicarbonate in the pancreatic juices reduces the acidity in your gut. This is important for your pancreatic enzymes (both those produced by your pancreas and any PERT you take in a capsule) to work effectively.

What is type 3c diabetes?

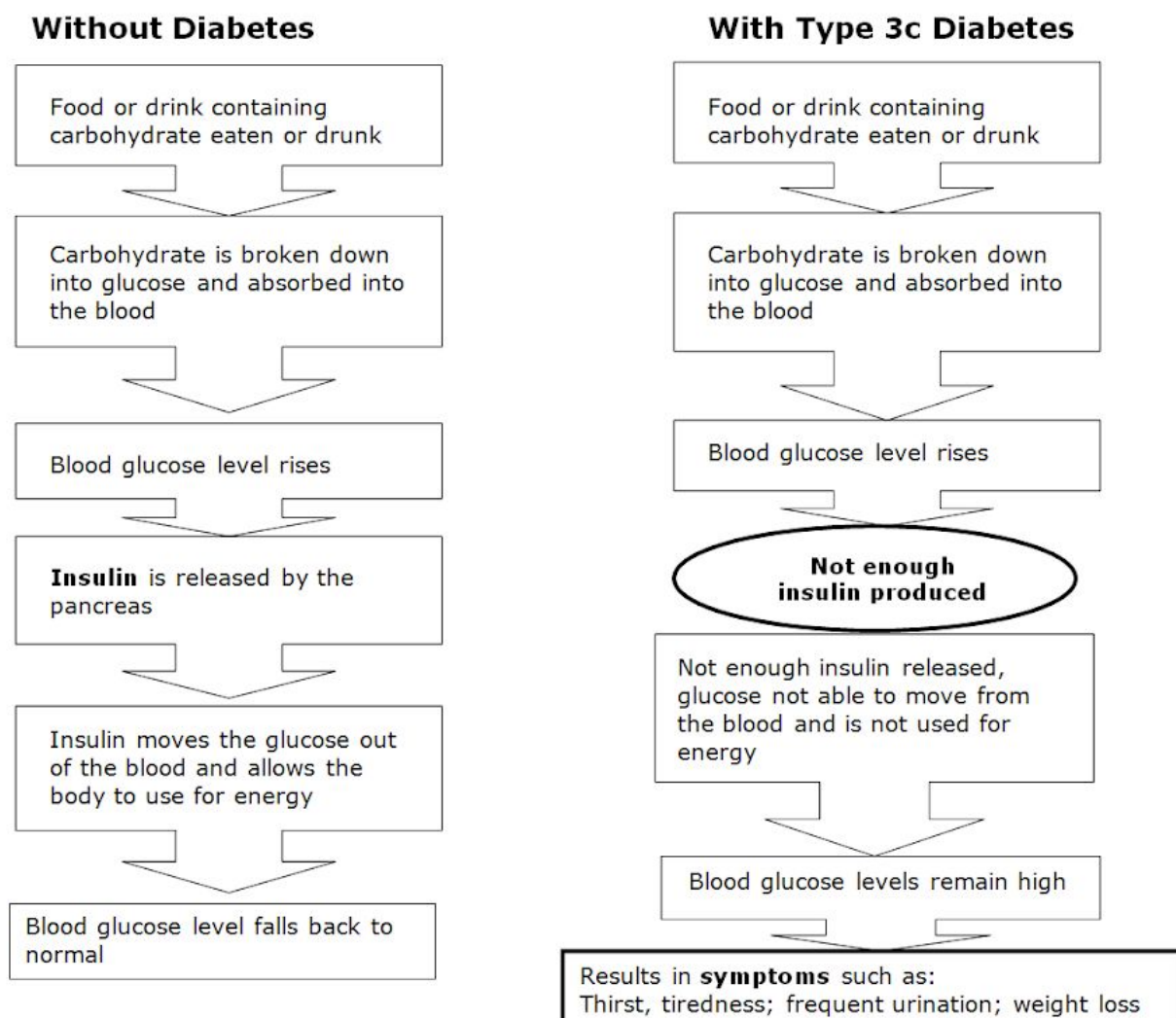
Diabetes Mellitus is the term used to describe a condition where the level of glucose in the bloodstream is high and your body is unable to return it to its usual level. This is usually shortened to **Diabetes**. It is explained on page 6.

There are many different types of diabetes. As a result of inflammation (pancreatitis), cancer, injury or surgery to your pancreas, your pancreas is now producing less insulin and glucagon than your body needs. This is called Type 3c Diabetes. It is sometimes also called Pancreatogenic Diabetes or Secondary Diabetes. If your entire pancreas has been removed, your body will not produce any insulin or glucagon.

You may have heard of type 1 diabetes or type 2 diabetes. Although there are similarities between these and type 3c diabetes, each type of diabetes is different:

- People with type 1 diabetes produce very little or no insulin. Whereas people with type 3c diabetes produce less of all the hormones from the pancreas, including insulin and glucagon.
- People with type 2 diabetes can't properly use the insulin their pancreas produces, whereas people with type 3c diabetes can use the insulin but do not produce enough of it.

The different types of diabetes need to be treated differently. A lot of the information you may find about diabetes is for people with type 1 or 2 diabetes, and may not always be relevant to you.



Why is it important to have blood glucose levels within target?

Blood glucose levels are measured in units of millimols per litre (abbreviated to mmol/L). It is important to have enough glucose in the blood to provide energy to support all the bodies functions e.g. brain function, heart beating, moving around etc. The optimal level of glucose to support this is 3.5 – 9 mmols/L.

Different people have different targets for their blood glucose levels, your diabetes team will tell you what yours is.

The body is not designed to have high levels of glucose in the blood. If your blood glucose level does become high, this can cause symptoms. In the short term these symptoms can include:

- increased thirst
- tiredness
- confusion
- passing urine more often
- blurred vision
- headaches and irritability
- losing weight
- wounds taking longer to heal
- picking up infections more easily

In the longer term (months to years), continued high blood glucose can damage blood vessels. This can damage the heart, brain, kidneys, eyes and other organs. High blood glucose levels can also increase the risk and severity of infections (eg. the common cold, wound infections, urine infections, 'tummy bugs').

How do I know what my blood glucose level is?

You may be given a blood glucose monitor so that you can check your own blood glucose level. This is done by pricking your finger to produce a small drop of blood, which is put onto a measuring strip in the monitor. The monitor then tells you what your blood glucose level is within a few seconds.

If you need one of these monitors, you will be given more information on how to use it.

Some people do not need to check their blood glucose levels regularly so will not need a glucose monitor. In this case your doctor or nurse will be able to carry out blood tests to let you know whether your blood glucose levels are within target.

Your doctor may request a blood test to check your HbA1c level. HbA1c indicates an average of your blood glucose levels for the previous two to three months. A high HbA1c means you have had high levels of glucose in your blood. This measure will help assess your risk of developing long term diabetes complications.

How do I get my blood glucose level within target?

If you have type 3c diabetes, it can be challenging to get your blood glucose level within target. It may be particularly high when you have just been diagnosed with diabetes. Blood glucose levels are affected by many things, for example: illness, stress, surgery, different food and drinks, activity levels and medication.

Most people will need medication to bring their blood glucose level into the target range. This may be tablets and/or insulin injections. Read about tablets on page 17 and insulin injections on page 18. When you are aiming to increase

your weight or have lost weight, we do not generally recommend avoiding any specific foods to help keep your blood glucose level within target range.

However if you drink a lot of sugary drinks, we would recommend reducing the amount of these you have.

If you measure your own blood glucose levels and they are frequently above your target range then you are likely need more medication to help to bring them down. Discuss this with your diabetes specialist nurse or doctor. Do not restrict what you are eating to bring your blood glucose level down, as this would also restrict the nutrition your body gets.

Physical activity

Physical activity can help you to feel better and cope with treatment you may be receiving. However, if you have recently had an operation or are having other treatment, you should listen to your body and only increase your activity levels as you feel able. Avoid heavy lifting for 6-8 weeks after surgery (this can be discussed with your surgeon).

All forms of exercise can be beneficial. Aim to find something that you enjoy so that you are more likely to carry it on in the long term. This does not have to be structured exercise, things like cleaning, gardening and shopping all count. It is important to include regular activity in your day. You should aim for 150 minutes of moderate activity a week. This is described as activity when you are getting warm and slightly out of breath and will be different for each person. This can be broken down into 30 minutes 5 days a week, each 30 minutes does not need to be done in one go and can be taken as three 10 minute blocks.

What if I've lost weight?

If you have lost weight or are underweight it is recommended to have a high protein and high energy diet. If your blood glucose levels are high, you should discuss this with your diabetes team. They may suggest some medication changes to help with this. You should not reduce how much you eat to try to get your blood glucose level within target. When blood glucose levels are high,

calories in the form of sugar are lost in the urine. This makes it harder to put weight back on.

When someone loses weight quickly, they often lose muscle and strength. Protein is needed to help rebuild muscle. If you are struggling with your appetite then it can help to eat small amounts regularly, with lots of high protein snacks.

High protein foods:

- Meat for example – chicken, beef, pork, lamb
- Fish
- Eggs
- Dairy foods for example – milk, yoghurts, cheese
- Nuts
- Beans for example – baked beans, kidney beans, soybeans
- Lentils, pulses, chickpeas
- Tofu, soya, Quorn®

General points to increase the amount of energy and protein in your diet

- Eat 3 small meals plus 2-3 snacks or milky drinks per day
- Use at least 1 pint (600ml) of milk per day. Full fat, semi-skimmed and skimmed milk all contain the same amount of protein, however the fat and calorie content vary
- Try including a milky drink at bedtime
- Take drinks after meals if you feel full quickly
- Sometimes when you have been unwell your tastes can change. Try different food or adding flavours such as sauces, herbs and spices
- Aim to have a good source of protein at each meal (see high protein foods above)

- Prioritise the protein part of your meals. If you are feeling full, try to finish the protein part, and don't worry too much if you don't eat all the vegetables
- Try to include a milk based pudding (e.g. custard, rice pudding, greek style yoghurt, tapioca). Waiting half hour to an hour after your main meal before having pudding can help with appetite and digestion

Fortified Milk

Try making enriched/ fortified milk to use throughout the day. Add 2-4 tablespoons of milk powder (e.g. Marvel® or Sanatogen® high protein powder) to a pint (600ml) of milk to increase its protein content. This can then be used in porridge, milky puddings, sauces, hot drinks, on cereal or just sipped throughout the day.

Milk powder can also be directly added to foods such as soups, sauces and yoghurts. It can be stirred in and won't add to the amount you need to eat, but will increase the amount of protein you eat.

Other ways to enrich the foods that you eat include:

- Adding grated cheese to meals such as mashed potato, soups, beans on toast
- Adding extra butter into meals
- Adding thick & creamy yoghurt, cream cheese, evaporated milk or condensed milk to recipes

Don't forget:

You will need to take enzymes (Creon® / Nutrizym® / Pancrease® / Pancrex®) with your main meal and with your pudding, especially if you have had a gap after your main meal

Nutritional supplement drinks

If you are struggling to get all the nutrients you need from eating or continue to lose weight, you may be recommended nutritional supplement drinks. These can be very helpful in putting weight back on or helping to maintain your weight.

If you are having milk based supplement drinks (e.g. Ensure Plus[®], Fortisip[®], Fresubin[®], Meretine[®] or Complian[®]) you must remember to take enzymes with them so that your body can use the nutrition in them properly.

If you have diabetes, you should avoid juice based supplement drinks (e.g. Ensure Juce[®], Fresubin Jucy[®] and Fortijuce[®]), unless this has been discussed with your dietitian. These are lower in protein than milk based supplement drinks and high in sugar, so may increase your blood glucose levels quickly.

If you find that your blood glucose levels remain too high after taking any nutritional supplement drinks, speak to your diabetes team about adjusting your medication to bring your blood glucose levels within target. You can also try sipping your supplement drinks after meals to slow down the absorption of the carbohydrate.

Some people find nutritional supplement drinks taste better chilled. If you find their taste too strong you can try diluting them down with iced water or milk. They come in a wide variety of flavours, so discuss trying new flavours with your pharmacist, to find one you like. Supplement drinks can also be frozen to make ice lollies or in ice cube trays to make a refreshing snack. They can also be gently heated (not boiled) to make a warm drink, this works particularly well with the chocolate, vanilla or coffee flavours.

Some nutritional supplements come in neutral or vanilla flavours which can be

used to add to foods such as porridge and cereal.

You can also add other flavours to the supplement drinks and make up milkshakes. Here are some ideas for recipes.

Strawberry Crush (Serves 1)

1 strawberry flavoured supplement

1/2 cup tinned or fresh strawberries

1 scoop vanilla ice cream

Blend ingredients in a food processor or liquidiser until smooth.

Nutty special (Serves 1)

1 vanilla flavoured supplement / 200ml (1/2 pint) Milk

1 banana

1-2 tablespoons smooth peanut butter

Blend in a food processor or liquidiser until smooth

Yoghurt drink (Serves 1)

1 vanilla flavoured supplement

125g carton plain or natural yoghurt

Add your choice of fresh, frozen or tinned fruit

Blend until smooth

Homemade Nutritional Supplement Drinks

Ready made supplement drinks such as Ensure, Fresubin, and Fortisip are helpful because they have added vitamins and minerals. However you can make up tasty high protein drinks at home and add in flavours that you enjoy. Frozen fruits, ice cream, yoghurts, milk, milk powder and cream are key ingredients to keep to hand for these drinks.

You can experiment with flavours to find what suits you. Here are some recipe ideas:

Fruit smoothie (Serves 4)

- 1 tin of fruit such as peaches (in natural juice)
- 1 small pot double cream (150ml/5floz)
- 1 small pot thick and creamy yoghurt (175g/ 6floz)
- 1 scoop ice cream
- 1 glass of apple juice (400ml/13floz)

Place all ingredients into a blender or food processor and mix until smooth

Milky moment (serves 1)

- 200ml (1/3 pint) Milk
- 1-2 tablespoons vanilla ice cream or double cream
- 1 tablespoon skimmed milk powder
- Your choice of: milkshake powder (e.g Nesquick), malted drinking powder (e.g. Ovaltine or Horlicks), drinking chocolate, a small banana, soft fresh or tinned fruit

Blend together until smooth

Oatmeal smoothie (serves 2)

- 100g porridge oats
- 2 teaspoons honey
- 200g Greek yoghurt
- 1 medium banana
- 100g strawberries
- 2 tablespoons flaxseed (optional)

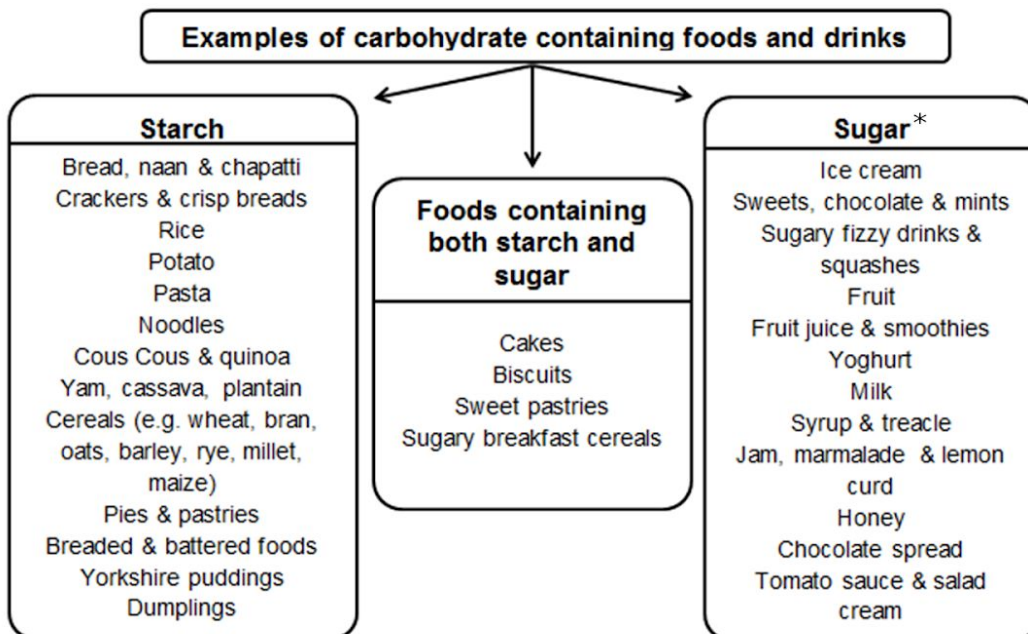
Blend together and serve.

Which foods affect my blood glucose levels?

Carbohydrate in your diet causes your blood glucose level to rise.

Carbohydrate (starchy foods, sugars) provides an essential source of energy. It is a key part of a healthy balanced diet and should therefore not be completely removed from your diet.

Examples of food that contain carbohydrate are given below.



*Note that fruit, milk and yogurt contain natural sugar and have less impact on blood glucose levels than refined sugar. They also contain other important nutrients and should be included regularly in a healthy diet.

Different types of carbohydrate affect blood glucose levels in different ways. The more carbohydrate you eat, the more your blood glucose level will rise and the more processed the foods are, the more quickly your blood glucose level will rise. For example blood glucose levels will rise more slowly after eating a slice of wholegrain seeded bread, than after eating a slice of white bread. So eating the right type of carbohydrate and the right amount helps to keep blood glucose levels in a healthy range.

If you would like more information about the amount and type of carbohydrate in your food or drink, speak to your diabetes specialist nurse or dietitian.

Which foods should not cause my blood glucose levels to rise?

Foods low in carbohydrate will not affect blood glucose levels. These include:

- Meat, fish, eggs, cheese, quorn® and tofu
- Lentils, beans, pulses, nuts and seeds (some people may find these do increase blood glucose levels)

- Vegetables (except potatoes), salads, grapefruit, cherries
- Herbs, spices, soy sauce and vinegars
- Fats, oils, butter and margarines
- Small amounts of sauces and pickles

Although these foods do not cause a rise in your blood glucose levels, most do contain proteins and fats so require pancreatic enzymes e.g. Creon[®], Nutrizym[®], Pancrease[®] or Pancrex[®] to be absorbed

Alternative sweeteners

Having diabetes doesn't mean that you need to completely avoid sugar, it can be part of a balanced diet. However including large portions of sugar in your diet does make it harder to keep your blood glucose levels within the recommended range. You can use sweeteners instead of sugar if you wish to reduce the amount of sugar you have.

Sugary drinks, such as cola, lemonade and fruit juices, cause a rapid increase in blood glucose levels, so avoid drinking large amounts of these. 'Diet' versions of these drinks do not impact on blood glucose levels, making them a suitable alternative. There is a wide range of artificial sweeteners available so it may be useful to try different varieties to find the one you like the best.

Examples of alternative sweeteners include Canderel[®], Splenda[®], Stevia[®], Sweetex[®].

**'Diabetic' foods are not recommended.
They are expensive and can cause diarrhoea**

Tablet treatment for type 3c diabetes

Different types of tablets are used to get blood glucose levels within target.

These are described below:

- Tablets to make your body more sensitive to insulin, for example, metformin
- Tablets that encourage your pancreas to produce more insulin, for example, gliclazide, glibenclamide, glipizide
- Tablets that slow down the digestion of carbohydrates in food, for example, acarbose
- Tablets that work in other ways to reduce high blood glucose levels, for example, gliptins

Your doctor will decide which is most suitable for you. If you are taking a medication that encourages your pancreas to produce more insulin, you may be more likely to experience hypoglycaemia (low blood glucose levels). See page 10 for more information about this.

Timing of medications is important. It is generally advised that metformin is taken after a meal. Medications that encourage your pancreas to produce more insulin, for example, gliclazide, glipizide, glibenclamide are taken before a meal. If you are unsure when to take your medication, check with your doctor, pharmacist or diabetes specialist nurse.

As with all medication, these tablets can have side effects. Read the leaflets carefully and discuss any concerns with your doctor or diabetes nurse.

Insulin

The hormone insulin is produced by your pancreas. It is needed for glucose to move from the blood into parts of the body where it is stored or used for energy. When your pancreas is not producing enough insulin, too little glucose is moved from your blood, so the level of glucose in your blood increases beyond usual levels. You might need to inject insulin to bring the level of glucose in the blood back into your target range.

Background insulin

A fully functioning pancreas releases a constant trickle of insulin to keep your blood glucose levels within the normal range between meals and overnight. This constant trickle of insulin is often called 'background' insulin. You may need an injection of a 'long acting' or 'intermediate' insulin once or twice a day to supplement this background insulin.

This injected 'long acting' insulin is shown by the solid line on the diagram on page 19. Examples include:

- Humulin I
- Insulatard
- Levemir (Detemir)
- Degludec (Tresiba 100 or 200)
- Glargine (Lantus)
- U300 (Toujeo)

Bolus insulin

Normally the pancreas also releases a 'bolus' or surge of insulin to help return the blood glucose levels back to the target range after eating or drinking carbohydrate.

When you have diabetes this surge of insulin may not be enough to return the blood glucose levels back to the target range after a meal. This means you may need to inject quick acting insulin at mealtimes. This is shown by the dotted line on the chart below. Examples of quick acting insulins include Novorapid, Humalog and Apidra.

When do I take insulin?

If you are advised to take insulin, you will be referred to a Diabetes Specialist Nurse who will teach you about injecting insulin and how to use it safely. You will be given contact details for a Diabetes Specialist Nurse in your area. It is important that you call them if you are not sure what to do or have any questions.

There are several different insulin regimens, yours is called:

There are different types of insulin regimens, these are described below.

Long acting insulin only:

This is injected either once or twice a day. It should be injected at the same time every day and does not need to be injected with food.

Quick acting insulin only:

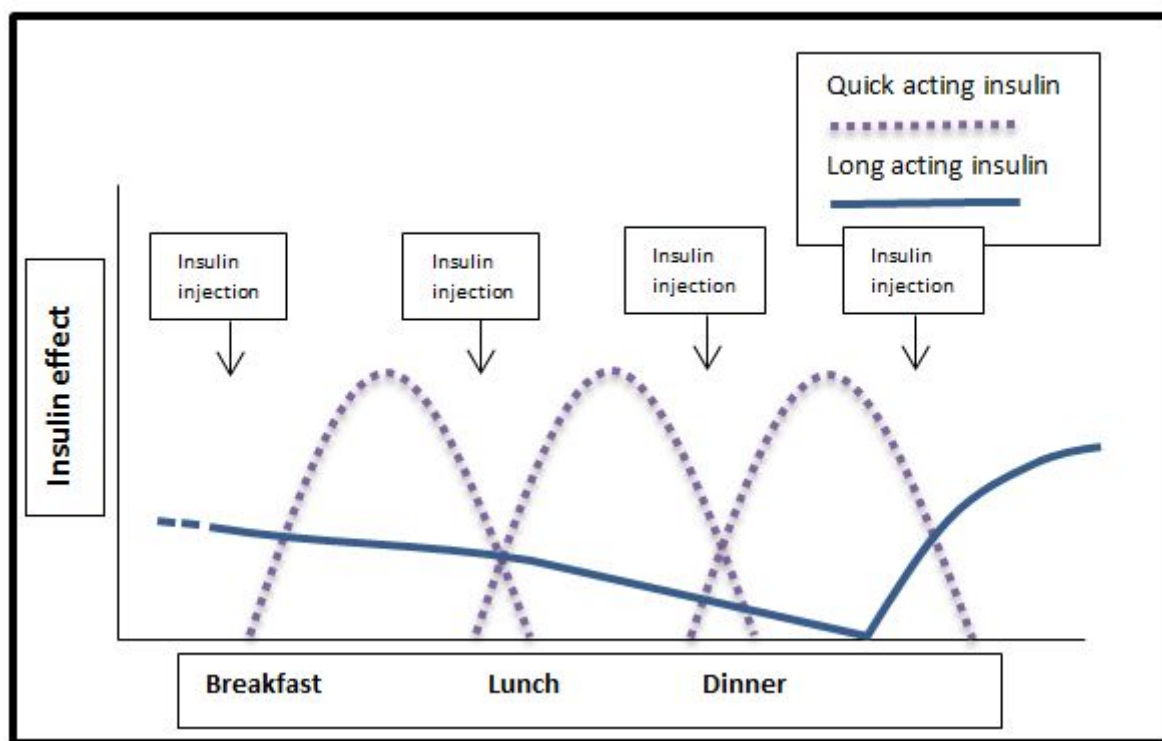
This is injected with meals. You may be taught to adjust the dose, depending on the size of your meal.

Basal bolus insulin regimen:

This means that you inject a 'long acting' or 'intermediate acting' insulin once or twice a day and also inject a 'quick acting' insulin at meal times.

If there is no carbohydrate in the meal you are having then this dose of quick acting insulin is not needed. If you have a snack containing a lot of carbohydrate, you will need to inject quick acting insulin with this. This regimen involves more injections but gives you flexibility when compared to a mixed insulin (see page 20).

If you are requiring a little and often meal pattern including larger snacks, then your insulin doses may need to be altered. You can speak to your diabetes nurse about this.



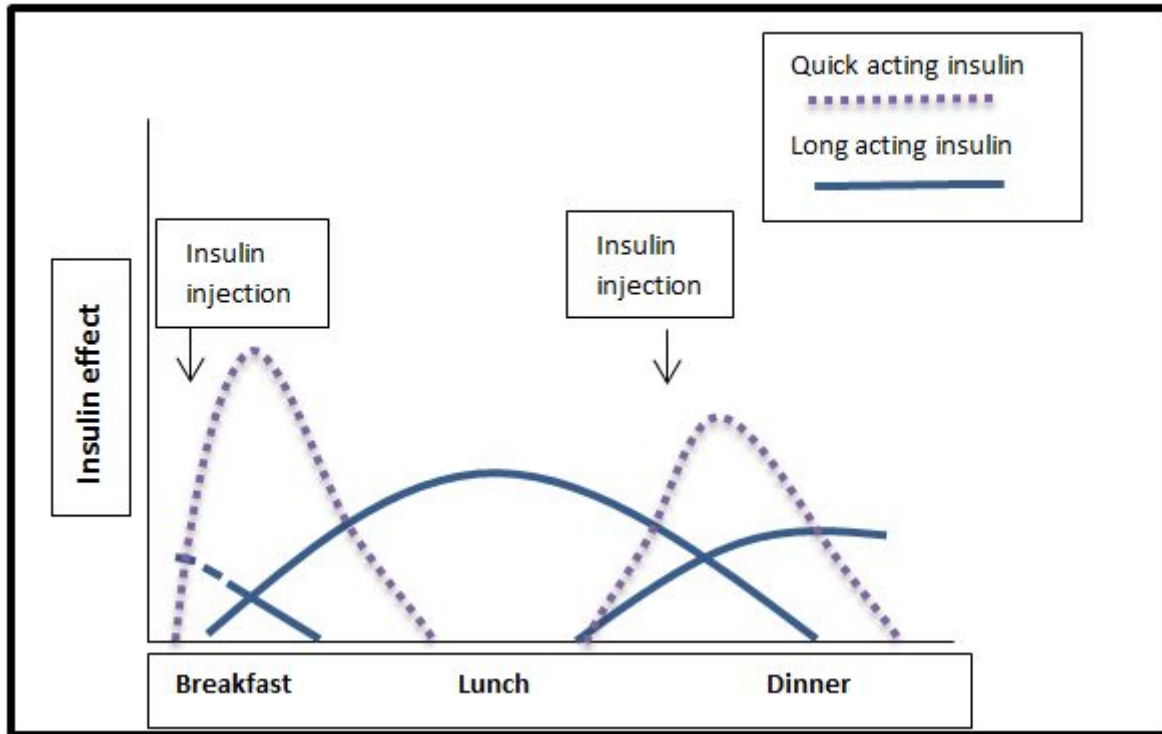
Mixed insulin:

This contains both intermediate acting and quick acting insulin in the same dose. This is normally injected twice a day, with your breakfast and evening meal. It is important to eat meals and snacks at the right time every day when you are taking this type of insulin.

Once you have taken your first injection in the morning, you should have your breakfast straight away and then have your lunch five to six hours later. Some people find they may also need a small mid-morning snack.

Once you have taken your second injection in the evening, you should have your meal immediately and then a carbohydrate snack before bedtime. Each meal must contain carbohydrate.

This type of insulin is also suitable for a little and often meal pattern.



How much insulin do I inject?

Your doctor or Diabetes Specialist Nurse will work out how much insulin you need. The dose will depend on how much your body needs, what and how much you are eating and how physically active you are. It will also depend on your lifestyle and the type of insulin injected. Getting the dose right for you means that your blood glucose levels need to be monitored. Most people will monitor these themselves.

If your blood glucose levels are not within the target range, adjustments to your insulin dose will usually be suggested by your doctor or Diabetes Specialist. You may later learn to adjust the dose yourself.

How to inject insulin

1. Make sure that your hands and the area you are injecting are clean.
2. Attach a new needle to the insulin pen (use a new needle each time).
3. Dial up two units on the insulin pen and eject this in to the air to make sure that the tip of the needle is filled with insulin (this is called an 'air shot').
4. Dial up your dose of insulin
5. Insulin can be injected into the abdomen, upper outer thighs or the bottom.
6. Insert needle into layer just under the skin by holding the insulin pen at a right angle to the skin and using the weight of your hand to gently push the needle in. Speak to your Diabetes Specialist Nurse for further guidance on injection technique.
7. Inject the insulin, ensuring that the plunger is fully pressed down and count to 10 before removing the needle.
8. Dispose of the used needle safely.
9. Remember to use a new needle every time you inject insulin.

Some insulins need to be mixed, speak to your Diabetes Specialist Nurse for guidance on this.

Where to inject insulin

If you always inject your insulin into the same area of your body, this area can become stiffer and lumpy over time. You will also not consistently absorb the insulin, therefore it becomes difficult to keep your blood glucose level in the target range. You can avoid this by varying the areas of skin you inject your insulin into. Ask your Diabetes Specialist Nurse which places are most suitable for you and how to vary injection sites.

The recommended places to inject are:

- Abdomen (tummy)
- Outer part of thighs
- Buttocks (bottom)
- Back of upper arm (avoiding muscle)

Hypoglycaemia (hypo)

Hypoglycaemia or a 'hypo' means a low blood glucose level of less than 4mmol/l. Some people find it helpful to remember 'four is the floor', so not to go below this.

Symptoms of hypoglycaemia include:

- Hunger
- Trembling
- Headache or light headedness
- Blurred vision
- Paleness
- Sweating, cold sweats
- Mood changes
- Palpitations
- Tingling of the lips
- Feeling sick, vomiting
- Diarrhoea
- Anxiety, irritability or aggression
- Loss of concentration

Common causes of hypoglycaemia include:

- Missing a meal, or having a meal or snack later than usual
- Eating less starchy (carbohydrate) food than usual
- More exercise than usual
- Drinking alcohol without food
- Injecting too much insulin
- Not taking enough, or forgetting to take your enzyme supplements (PERT) with food or drinks

There are two steps to treat hypoglycaemia. You must follow both of these steps to treat the hypo and prevent it happening again. It may be useful to share this information with those you spend time with, particularly when your diabetes diagnosis is new or you don't always recognise the symptoms of a hypo.

Step 1: Immediately take 15–20g of quick acting carbohydrate (glucose), for example one of the following:

- 4–6 dextrose or glucose tablets
- 5 jelly babies
- 5 fruit pastilles
- 10 jelly beans
- One 60ml bottle of Glucojuice®
- 200mls fruit juice

Chocolate, milk and sugar added to drinks are not suitable options at this stage, as they won't increase your blood glucose level fast enough.

Wait up to 10- 15 minutes and re-check your blood glucose level.

If it remains low (below 4mmol/l) repeat step 1. If it has come back to the normal range (above 4mmol/l) then go to step 2.

If you have repeated step 1 three times and your blood glucose level is still below 4mmol/l then phone for an ambulance.

Step 2: If you are due to have a meal within the next hour, then have this meal making sure there is a good portion of starchy carbohydrate in it. See the list of foods containing carbohydrate on page 15.

If you are not planning to eat within an hour, take 10-15g of extra carbohydrate. Examples include:

- 1 x medium slice of bread (white/brown/granary)
- 3 x plain biscuits (for example Rich Tea)
- 1 x cereal bar or bowl of cereal
- 1 x chocolate covered biscuit (for example Digestive)
- 1 x medium apple or banana

If you have been prescribed enzyme supplements do not forget to take these with step 2 of your hypo treatment.

Always keep something suitable to treat a hypo with you when you are out and about. If you drive, keep something in the car. It is also useful to keep something by the bedside in case you have a hypo overnight. Night time hypos are more likely to occur if you:

- have been more active that day than you usually are
- your glucose reading before bed is less than 6mmol/l
- have had a hypo earlier that day
- have taken less enzyme supplements than you need
- have had more than 1-2 alcoholic drinks that day

If any of the above apply you may need a bedtime carbohydrate snack to reduce the risk of a hypo. It is important that you do not inject insulin with this snack as this could cause your blood glucose levels to go too low. If you are having regular hypos then please discuss this with your diabetes team.

Driving when prescribed insulin

By law, if you are prescribed insulin, you must tell the:

- Driver and Vehicle Licensing Agency (DVLA), if you live in England, Scotland or Wales
- Driver and Vehicle Agency (DVA), if you live in Northern Ireland
- National Driver Licence Service (NDLS) if you live in the Republic of Ireland
- Your insurance company

Your license will then be renewed every one, two or three years.

You should report any changes in your diabetes or its treatment which occur between renewals to the relevant organisations above. This includes complications which might affect your ability to drive safely, you should report these when they happen.

If you are prescribed insulin, you must check your blood glucose level before driving and every two hours whilst driving. It is a criminal offence not to do so.

If blood glucose is 5mmol/L or less, you should take carbohydrate before driving. Some people find it helpful to remember this as 'five to drive'.

If blood glucose is less than 4mmol/l before or during driving (hypoglycaemia) do not drive.

- Stop the vehicle

- Switch off the engine, remove the keys from the ignition and move from the driver's seat
- Take some fast-acting carbohydrate such as glucose tablets or sweets and then some form of longer-acting carbohydrate
- Do not start driving until 45 minutes after your blood glucose level has returned to above 5mmol/L

For further information, see: www.gov.uk/driving-medical-conditions

Alcohol when prescribed insulin

Many people with pancreatic disease, such as those with pancreatitis, are advised to avoid alcohol. For others, a small amount may be allowed. Talk to your doctor about whether it is acceptable for you to have a small amount of alcohol, and how much they would recommend as the upper limit.

Important: Drinking alcohol makes hypoglycaemia more likely. If you have had too much alcohol you also might not be able to recognise or treat a hypo properly. Other people can mistake the signs of a hypo for drunkenness. It is important to tell people you are with when drinking alcohol that you have diabetes. You may also want to tell them how to treat a hypo.

If you drink more than a few units of alcohol then you will have an increased risk of hypos through the night and into the next day. This is because your liver will process the alcohol rather than releasing glucose into the blood. If you drink a sugary drink, you may have an initial rise in your blood glucose level, however if this drink includes alcohol, it will drop again later. If you correct this initial rise in your blood glucose level with insulin, then it is likely to drop too low later. Always have a starchy carbohydrate snack such as cereal or toast before going to bed if you have been drinking alcohol. Don't forget to take your enzyme supplements with this if you are prescribed them.

Some alcoholic drinks such as beer, lager, cider and alcopops contain carbohydrate and are likely to cause a short term rise in blood glucose levels. Wine, spirits and champagne contain minimal carbohydrate and therefore cause little or no rise in blood glucose levels. Be aware that soft drinks that are mixed with alcohol may contain carbohydrate. All alcoholic drinks when taken above the recommended levels will cause blood glucose levels to fall several hours after drinking and increase the risk of hypos.

Key Points:

- Never drink alcohol on an empty stomach
- Avoid drinking alcohol after exercise
- Always carry identification with you, as well as a hypo treatment and your enzymes (PERT) when you are out
- If you have been drinking alcohol in the evening, have a starchy carbohydrate snack before bed
- Low alcohol wine and beer are high in sugar, drinking them will initially cause blood glucose levels to rise and then later, fall
- 'Diet' mixers and sugar free drinks will not affect blood glucose levels
- Check your blood glucose levels more frequently the day after drinking alcohol, as you are still at risk of hypos then
- If you don't feel like eating or are sick the next morning, take as much fluid as you can including some sugary (non-diet) drinks

Physical activity when prescribed insulin

Physical activity can have variable effects on blood glucose levels, they may increase or decrease. Before undertaking physical activity when prescribed insulin, discuss this with your Specialist Diabetes Nurse, Doctor or Dietitian.

When increasing your physical activity level, you may need to make adjustments to the amount of carbohydrate and/or insulin you have.

If you are being more physically active than usual it is important to carry your glucose monitor and hypo treatment with you. We recommend monitoring your blood glucose levels before, during and after exercise, until you get to grips with the way the exercise affects your blood glucose levels.

Be aware that physical activity can decrease your blood glucose level through into the next day.

Eating out when prescribed insulin

You can enjoy meals out with friends and family and have blood glucose levels within target. However, you may need to adjust the timing or amount of insulin you take to achieve this. See the information below for each type of insulin regimen.

Mixed insulin: If you are eating lunch later than usual you may need to have an extra snack before your meal to prevent a hypo.

If you are having your evening meal later than usual, you may be able to delay your evening insulin to when you begin your meal. You must still have a bedtime carbohydrate snack.

Basal bolus insulin: This insulin regimen is more flexible, so you can vary the times of your meals. You would give yourself quick acting (mealtime) insulin at whatever time you eat.

Remember when you eat out that you may be having larger portions or higher fat foods which may need more enzymes (Creon[®], Nutrizym[®], Pancrease[®] or Pancrex[®]). You may also take longer to eat your meal, or have several courses. If you are having more than one course or eating slowly, you may need to take more enzymes than normal.

'Sick day rules' when prescribed insulin

Illness and infections may raise your blood glucose levels, even if you are not eating. The body releases glucose into the blood as it fights infections, and makes your body less responsive to insulin. The rise in blood glucose levels may mean you pass more urine and feel thirsty. Some medications including steroids and chemotherapy can also raise your blood glucose levels.

If you are unable to drink enough and become dehydrated you may have to be admitted to hospital. If your blood glucose level is high, your body may produce something called ketones. You may be given a ketone meter to measure the level in your blood. If this is the case, your Diabetes Specialist Nurse will explain this to you.

Important steps to follow when you are ill:

- Keep taking your insulin
- Test your blood glucose levels regularly
- Rest
- Drink plenty of sugar free fluids (3 litres per day)
- If you are struggling to keep solid food down, try drinking fluids containing carbohydrate such as fruit juice, full-sugar carbonated drinks, or milky drinks

If you are vomiting (being sick) for more than half a day, are not improving, or are unsure what to do, please seek urgent medical advice.

Monitoring and problem solving

It can be tricky to deal with symptoms and to work out the exact cause of them. It is a good idea to keep a record so that you and your diabetes team can look back and spot any patterns. Record:

- what you've had to eat and drink
- what enzyme supplements and insulin you have taken
- your blood glucose readings
- your activity levels
- any symptoms you have had such as diarrhoea, bloating, tiredness, dizziness, pain

The table below is an example of a diary you could use:

Time/day	Food and drinks you have had	Enzymes (PERT)	Blood glucose reading	Insulin dose	Exercise: Duration and intensity	Symptoms
When you wake up						
Before breakfast						
Breakfast						
Two hours after breakfast						
Before lunch						
Lunch						
2 hours after lunch						
Before dinner						
Dinner						
Before bed						

Contacts/Further Information

British Dietetic Association www.bda.uk.com

Diabetes UK www.diabetes.org.uk

DVLA www.dvla.gov.uk

Driver and Vehicle Agency (DVA), if you live in Northern Ireland

www.nidirect.gov.uk/contacts/driver-vehicle-agency-dva-northern-ireland

National Driver Licence Service (NDLS) if you live in the Republic of Ireland

www.ndls.ie

Macmillan Cancer Support www.macmillan.org.uk

NHS Direct www.nhsdirect.nhs.uk

Pancreatic Cancer Action www.pancreaticcanceraction.org

Pancreatic Cancer UK www.pancreaticcancer.org.uk

Authors

Victoria Mann, Hepatobiliary Specialist Dietitian, Oxford

Laura McGeeney, Pancreatic Specialist Dietitian, Addenbrooke's Hospital, Cambridge

Acknowledgement

Jennifer Hopley, Dietetic Assistant, The Churchill Hospital, Oxford

Laura McGeeney & Kulbir Kaur Pabla Cambridge University Hospitals 'Dietary advice for Secondary Diabetes with fixed dose multiple daily insulin injections'

Peer reviewed by:

Sarah Bell, Head of Services, Pancreatic Cancer UK

Helen Brown, Specialist Diabetes Dietitian, Addenbrooke's Hospital, Cambridge

Katy Davenport, Specialist Diabetes Nurse, Addenbrooke's Hospital, Cambridge

Dr Sinead Duggan, Post Doctoral Research Fellow, Trinity College, Dublin

Professor Nils Ewald, Endocrinologist, University Hospital Giessen & Marburg, Germany

Kathryn Freeman, Hepato-Pancreatico-Biliary Specialist Dietitian, Sheffield

Oonagh Griffin, Specialist Pancreatic Dietitian, PhD Candidate, Trinity College Dublin

Jeannie Grisoni, Advanced Dietitian, Diabetes Specialist, Addenbrooke's Hospital, Cambridge

Dr Roselle Herring, Consultant Diabetologist, Guildford

Jeni Jones, Specialist Nurse, Pancreatic Cancer UK

Emily Morgan, Senior Information Manager, Pancreatic Cancer UK

Mary Phillips, Hepato-Pancreatico-biliary Specialist Dietitian, Guildford

Notes

For more information contact your dietitian, nurse specialist or doctor:

Name:

Contact Number:.....