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# Type 3c diabetes and healthy living

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 suitable for people who are aiming to maintain or reduce their weight, are not recovering from surgery and have a good appetite.

Our other publication 'Type 3c diabetes and poor appetite' provides advice for people with type 3c diabetes who are aiming to gain weight, have a reduced appetite or are recovering from surgery.

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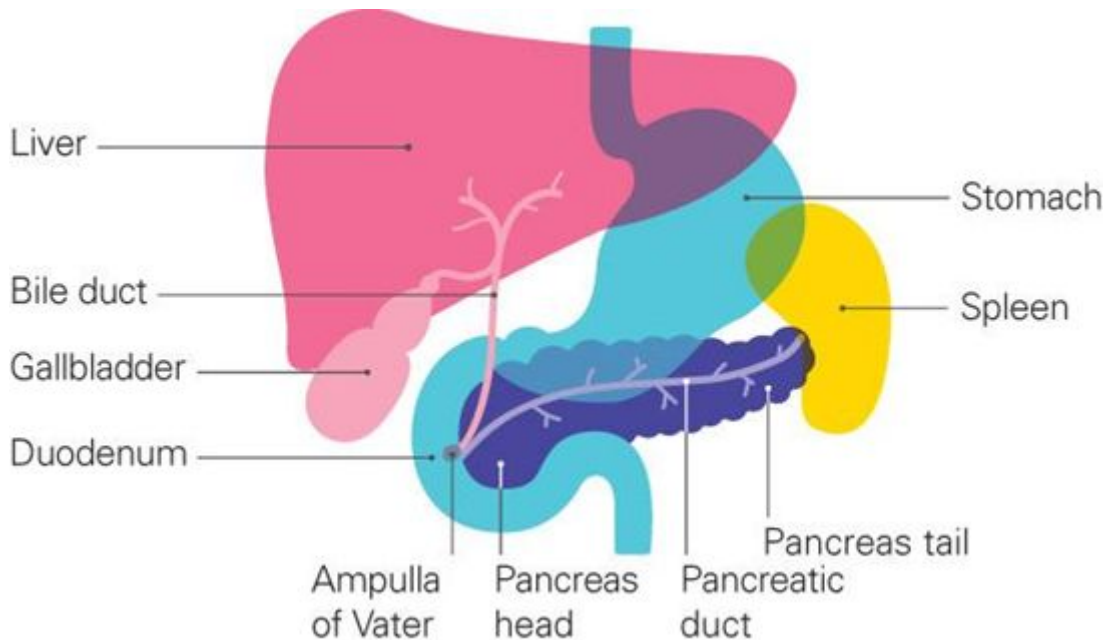
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## What is the pancreas?

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<sup>®</sup>, Nutrizym<sup>®</sup>, Pancrease<sup>®</sup> and Pancrex<sup>®</sup>. 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?

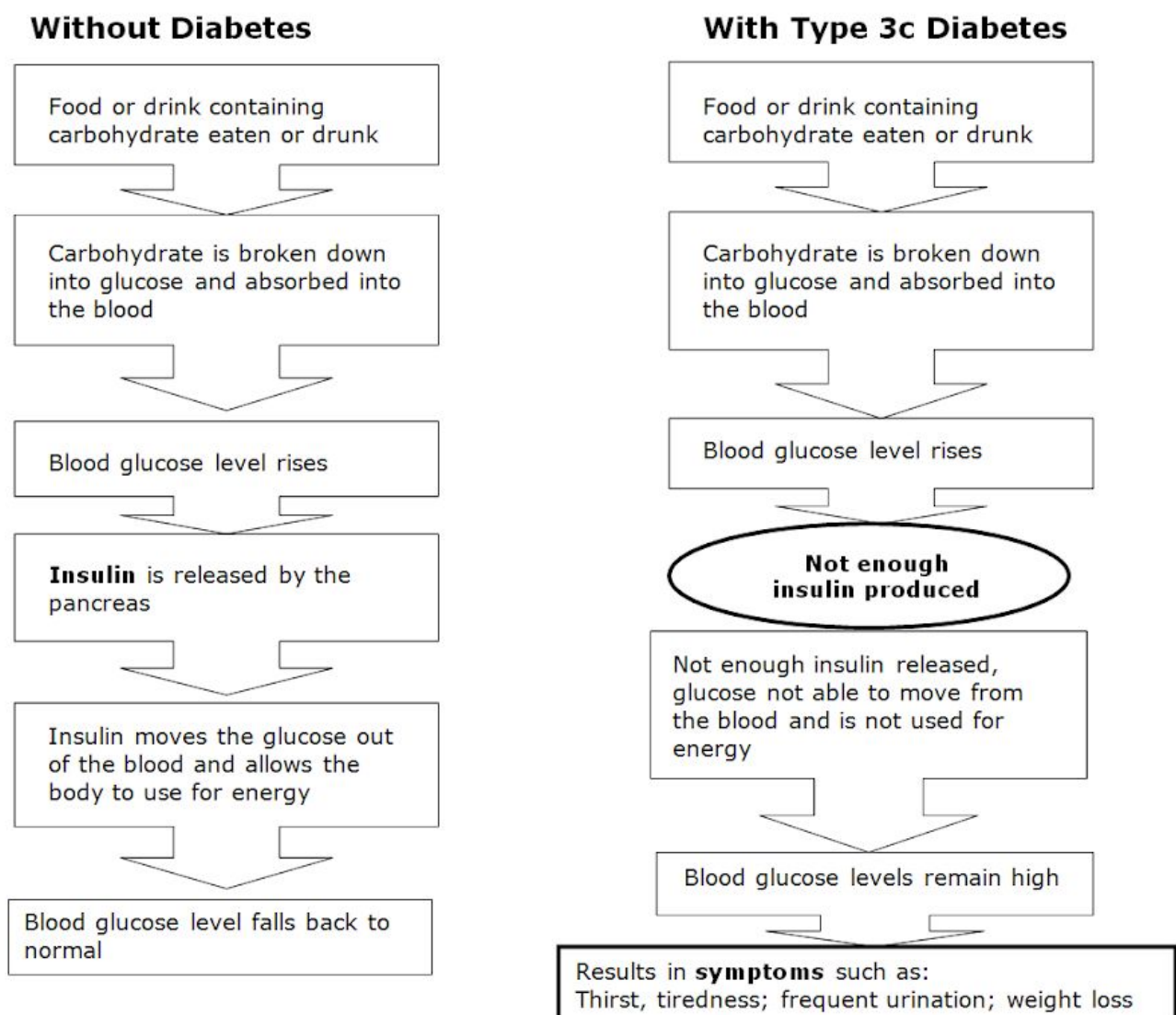
**Diabetes Mellitus** is the term used to describe a condition where the level of glucose in the bloodstream is high and your body is unable to return it to its usual level. This is usually shortened to **Diabetes**. It is explained on page 6.

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.

Making changes to your diet and lifestyle can help to bring their blood glucose level into the target range. Most people will also need medication to achieve

this. This may be tablets and/or insulin injections. Read about tablets on page 15 and insulin injections on page 16.

## **Eating well with type 3c diabetes**

The aim is to eat a diet that you enjoy, that is good for you and that keeps your blood glucose levels in an acceptable range. Having a healthy balanced diet is essential for good health and to reduce the risk of long term health problems. Key aspects to focus on are shown below.

**Eat regular meals.** Avoid missing meals as this can make you to feel more hungry and eat more later in the day. It is also likely to make it harder to keep your blood glucose levels within the target range. Aim to have 3 meals throughout the day and minimise the number of snacks you have.

**Avoid large portions.** Foods and drinks contain energy (measured in calories), reducing the size of your meals and snacks and therefore the calories you eat, will contribute to your weight reducing.

**Reduce sugar.** Sugar contains calories and also raises your blood glucose levels. Small amounts are likely to be okay, but larger amounts could cause you to gain weight. It is particularly important to try to reduce sugars added to foods and drinks. Those found naturally, such as in milk and whole fruits cause less of a problem. Replacing sugar with low calorie sweeteners is one way to reduce the amount of sugar you have (see page 14).

**Eat more fruit and vegetables.** Aim to have a combination of at least five portions of fruit and vegetables a day. Try to have more vegetables than fruit as fruit can be high in sugar. A portion of vegetables is around three heaped tablespoons. Examples of a portion of fruit include one banana, two plums, a handful of grapes. A small glass of fruit juice (150ml) is okay, but avoid more than this as it is high in sugar and low in fibre, therefore it can cause a rapid rise in your blood glucose level.



**Reduce fat.** Reduce the amount of fat you eat. In particular it is important to reduce saturated fats, these are the fats from animal products. To reduce the amount of saturated fat you eat, try:

- cutting off visible fat from meat
- using cooking methods such as grilling, steaming or baking rather than frying or roasting
- using reduced fat dairy products such as skimmed or semi-skimmed milk rather than full fat milk
- swap cream for yogurt, butter for low fat spread and have less cheese

**Include a good source of protein.** Include a good source of protein at each of your main meals. Examples of good sources of protein are; meat, fish, dairy, eggs, beans, pulses, tofu and soya products. These are important to build and repair muscle and other tissues in your body.

**Include fish in your diet.** Oily fish is particularly good for you as it contains healthy omega-3 fats which are not found in high concentrations in other foods. Aim to have 2 portions of oily fish a week. Examples include salmon, mackerel, sardines and pilchards.

**Reduce salt.** You should aim to have no more than 6g (1 teaspoon) of salt a day. This may seem like a lot, but most of the salt we eat is already in foods rather than the salt we add. Cut back on processed foods, these are high in salt and account for around 70% of the salt we eat. Add flavour to foods with herbs and spices instead of adding salt. Our taste buds adjust to salty tastes, so if you gradually reduce the amount of salt you have your taste buds should gradually adjust.

**Read food labels.** Foods that are in packages have information on them about their nutritional content. The table below gives guidance on what is considered low, medium or high fat, saturated fat, sugars and salt per 100g of the food. Try to choose mostly foods that fit into the low or medium categories.

	Fat	Saturates	Sugars	Salt
Low Healthier choices	3g or less	1.5g or less	5g or less	0.3g or less
Medium Ok most of the time	3.1 to 17.5g	1.6g to 5g	5.1g to 22.5g	0.31g to 1.5g
High Just occasionally	More than 17.5g	More than 5g	More than 22.5g	More than 1.5g

More information about eating a balanced diet can be found at

[www.nhs.uk/Livewell/healthy-eating](http://www.nhs.uk/Livewell/healthy-eating)

[www.diabetes.org.uk/Guide-to-diabetes/Managing-your-diabetes/Healthy-eating](http://www.diabetes.org.uk/Guide-to-diabetes/Managing-your-diabetes/Healthy-eating)

[www.bhf.org.uk/informationsupport/support/healthy-living/healthy-eating](http://www.bhf.org.uk/informationsupport/support/healthy-living/healthy-eating)

[www.diabetes.ie](http://www.diabetes.ie)

## 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 to 30 minutes 5 days a week.

## **Maintaining a healthy weight**

There are health benefits from your weight being within the recommended range. One way you can see if you are a healthy weight is by calculating your Body Mass Index (BMI). This is calculated by taking your weight in kilograms divided by your height in metres squared. There are lots of BMI calculators on the internet, for example [www.nhs.uk/live-well/healthy-weight](http://www.nhs.uk/live-well/healthy-weight). In rare instances the BMI can give an inaccurate representation of your health, it sometimes needs to be understood along with other information about you. If you get a result that seems unexpected please discuss this with your doctor, dietitian or nurse.

If you are overweight, studies have shown that losing just 5% of your body weight can have positive health benefits. Healthy weight loss is aimed at reducing the amount of fat stored in the body. Muscle is vital for health so it is important to minimise loss to muscle stores when losing weight. For this reason, slow and steady weight loss is recommended rather than 'crash diets'. For more advice on losing weight talk to your dietitian, doctor or specialist nurse.

## **Smoking**

If you smoke then giving up is one of the best things you can do for your health. Smoking also increases the risk of developing long-term health problems such as heart disease, strokes and cancer.

If you have pancreatitis, it is important to remember that smoking increases your risk of developing worsening pain. It also increases your risk of developing pancreatic cancer.

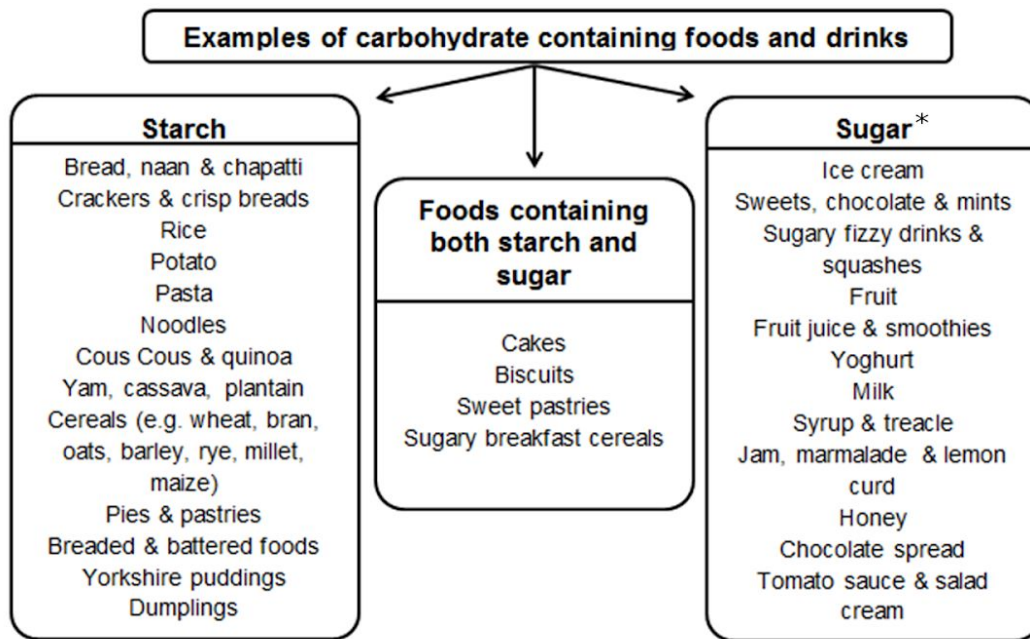
Giving up can be hard. Speak to your GP or specialist nurse to find help and support with this.

## Which foods affect my blood glucose level?

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:

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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.

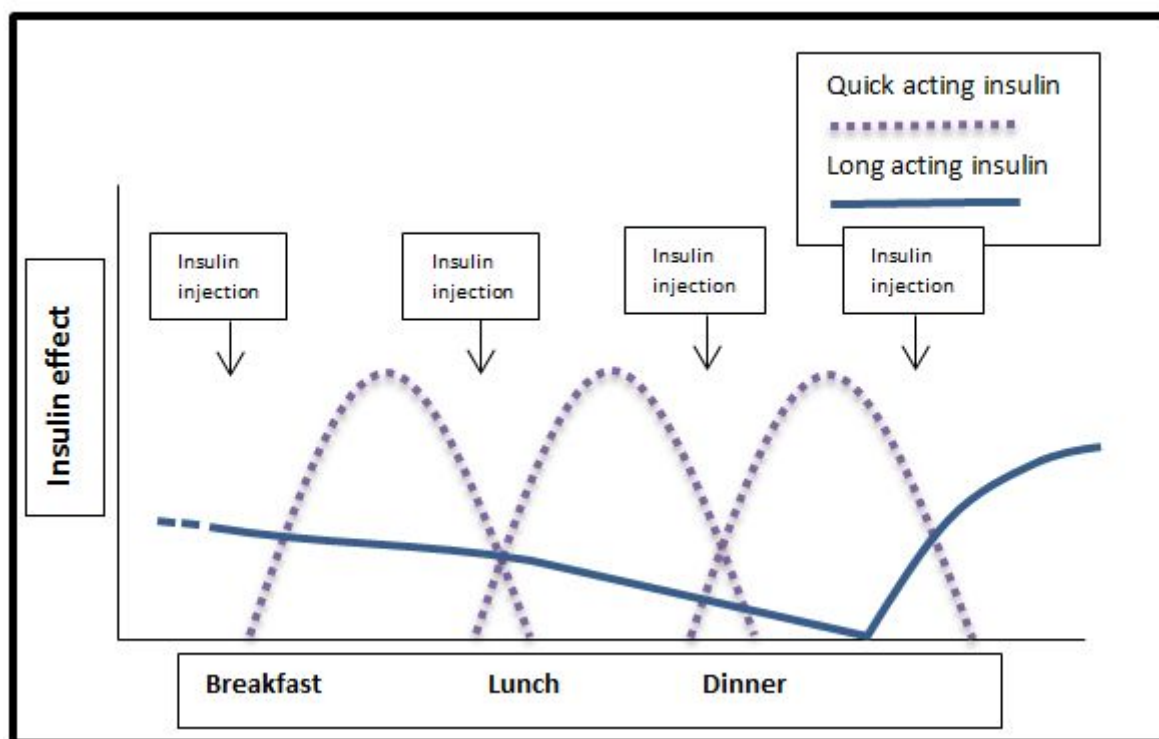
### **Basal bolus insulin regimen:**

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 18).

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.





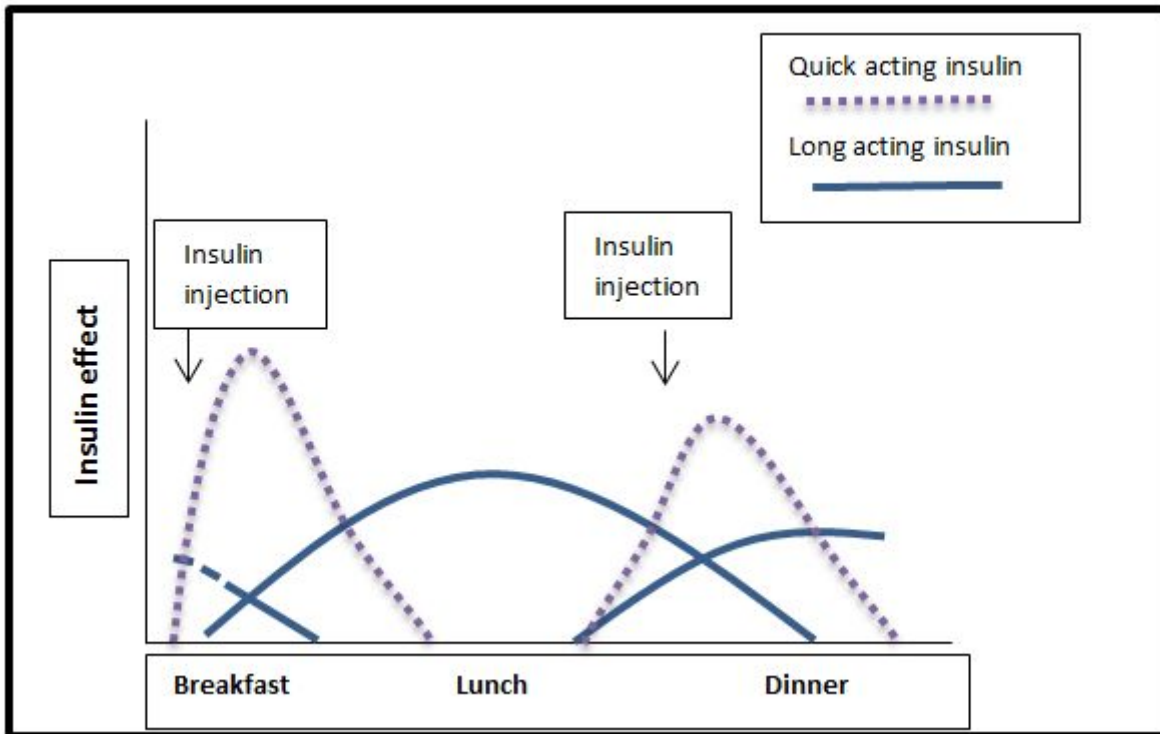
### Mixed insulin:

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 13.

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 licence 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](http://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
- Alcohol is high in calories and has no nutritional benefit. It will contribute to weight gain and should therefore be kept to a minimum.

## 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<sup>®</sup>, Nutrizym<sup>®</sup>, Pancrease<sup>®</sup> or Pancrex<sup>®</sup>). 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.

Restaurant and take-away food can be higher in calories, fat, sugar and salt than food you cook yourself. If you eat out or have take-aways regularly try to choose options lower in calories, fat, sugar and salt. Many restaurants have their menus' nutritional information on their website, you may find it useful to look at this before choosing what to order.

### **'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](http://www.bda.uk.com)

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

DVLA [www.dvla.gov.uk](http://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](http://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](http://www.ndls.ie)

Macmillan Cancer Support [www.macmillan.org.uk](http://www.macmillan.org.uk)

NHS Direct [www.nhsdirect.nhs.uk](http://www.nhsdirect.nhs.uk)

Pancreatic Cancer Action [www.pancreaticcanceraction.org](http://www.pancreaticcanceraction.org)

Pancreatic Cancer UK [www.pancreaticcancer.org.uk](http://www.pancreaticcancer.org.uk)

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**Notes**

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

**Name:** .....

**Contact Number:**.....