

What is insulin?

Insulin is a hormone made in the pancreas, which is an organ in your body that helps with digestion. Insulin helps your body use glucose (sugar) for energy. But when you have diabetes, sometimes your pancreas doesn't make any insulin, doesn't make enough or the insulin it makes doesn't work properly. And that's why some people with diabetes are insulin-dependent, which means they need to take it as medication. Taking insulin helps you control your blood sugar levels. You take insulin by injecting it using an insulin pen, or by using an insulin pump. Pumps aren't available to everyone – only for people who have Type 1 diabetes. If you need to inject insulin, we've made a video showing exactly how to inject in seven simple steps. Your healthcare team will talk to you about insulin if they think it's the right medication for you. Together you'll agree the type of insulin you need and how much you need to take (your dose).

Your injection kit

To inject insulin safely you'll need:

- An insulin pen – this can be one that already has insulin in which you throw away after it's empty, or a pen you can reuse by changing the insulin cartridge yourself.
- Your needle – this is small and thin, as it only has to go just under the skin, not into a muscle or vein. These can only be used once.
- A sharps bin or needle clipper – this is where you will safely throw away your needle.

How to inject insulin

- Wash and dry your hands.
- Choose where you're going to inject – you're looking for fatty tissue so the main injection sites are your stomach (in a semi-circle under your belly button), sides of your thighs and your bum. It's vital you choose a different spot each time – at least 1cm or half an inch from where you last injected. If not, hard lumps can appear that will stop your body absorbing and using the insulin properly.
- Attach the needle to your pen – removing the outer and inner caps – and dial up two units of insulin. Point your pen upwards and press the plunger until insulin appears from the top of the needle. This is known as priming, and helps regulate your dose by removing any air from the needle and cartridge.
- Dial your dose and make sure the spot you're injecting is clean and dry.
- Insert the needle at a right angle (90° angle). You might want to gently pinch the skin before injecting. Press the plunger until the dial goes back to 0.
- Count to 10 slowly to give the insulin time to enter your body before removing the needle.
- Throw away the needle using your needle clipper or sharps bin. Your healthcare team will tell you how to get rid of the bin safely when full.

Insulin pump

An insulin pump is a battery-operated device that gives you insulin regularly throughout the day. It's an alternative to injecting but it's only available to people with Type 1 diabetes. We've got more information about insulin pumps if you need it.

Insulin resistance

Insulin resistance is when the insulin that you produce, or the insulin you inject, doesn't work properly. This can mean your blood sugar levels increase. Insulin resistance can happen if you have too much fat around your stomach, but it doesn't only affect you if you're overweight.

Types of insulin

There are five different types of insulin and they all work slightly differently to manage your diabetes. Which ones you take will be decided between you and your healthcare team.

Rapid-acting insulin

You take rapid-acting insulin (sometimes known as fast-acting insulin) shortly before or after meals. It works very quickly, and it's usually taken alongside an intermediate-acting insulin or long-acting insulin. Your dose will depend on how many carbohydrates you're eating. You will see brands such as Novorapid, Flasp and Apidra if you take rapid-acting insulin.

Short-acting insulin

Short-acting insulin is similar to rapid-acting insulin, but is slightly slower. Because it's slower, you need to take it around 25 minutes before you eat. It's also called a bolus insulin, which means you take it around meal times. Actrapid and Humulin S are some brands you could be prescribed.

Mixed insulin

This is a mixture of short-acting insulins and long-acting insulins. You still take it before meals, but you won't have to take a background insulin as well. You may see brands such as Insuman Comb if you take mixed insulin.

Intermediate-acting insulin

Intermediate-acting insulin is also known as background insulin or basal insulin. This means it works throughout the day. It's taken once or twice a day. Brands you may see include Humulin Isophane, Insulatard and Insuman Basal.

Long-acting insulin

Long-acting insulin is slower than intermediate insulin, but very similar in how your body processes it. You usually take it once a day, at the same time each day. Tresiba and Lantus are some brands you may be prescribed. It's been shown to reduce the risk of hypos compared to intermediate-acting insulin – we've got more information on the possible side effects of taking insulin.

Insulin side effects

Hypos

Hypos are the most common side effect of taking insulin. Hypos are when your blood sugar is low, and they are very common when you take insulin. They can be caused by taking too much insulin. If you're having a lot of hypos, you may be on the wrong dose of insulin and you should speak to your healthcare professional. We've got more information on the symptoms of hypos, as well as how to manage them.

General side effects

As with all prescribed medication, you may react differently to others when you take insulin. You should let your healthcare professional know if you have headaches, nausea or flu-like symptoms within the first 72 hours of starting any new insulin.

Injection site reactions

Lipoatrophy, also known as lipos, are hard lumps that can form if you inject in the same place too often. This can stop the insulin from working properly, so make sure you choose a different spot each time you inject.

Other side effects from injecting a lot can be itching, rashes and other skin irritations. Changing where you inject helps with this too. You can also get treatments from your local pharmacy that can will help with the irritation.

Insulin and weight gain

When you start taking insulin, you may notice that you start to put on weight. There are lots of reasons for this, like how much insulin you take, your diet and the type of insulin you're taking. If you're worried about putting on weight, or you'd like some help losing weight, then we're here to help. Insulin is a growth hormone, and any growth hormone you take will mean putting on more weight. When you're diagnosed with diabetes it's also likely that you've lost a lot of weight in a short space of time, as this is one of the symptoms, and the weight gain is part of the recovery. How much insulin can affect your weight depends on the type of insulin you're taking. Analogue insulin doesn't cause much weight gain, but you're more likely to put on weight if you take human insulin or animal insulin. Dose is also very important. If you take too much insulin, this could lead to you putting on weight as well. And if you're not eating well, and you're taking more insulin to deal with a poor diet, this may mean you put on weight as well. Similarly, if you're taking less insulin and eating healthily to try and lose weight, switching back to your regular dose and eating patterns may mean you quickly put weight back on. But this will balance out after a few weeks.

Insulin overdose

Insulin overdose can happen if you take more insulin than you need. This can be very serious, and may lead to severe hypos. The worst cases can make you feel disorientated, cause you to have seizures and could even lead to death. If you think you've taken too much insulin accidentally, then eat a lot of fast-acting carbohydrate such as sweets or glucose tablets. If you're worried about taking too much insulin, or think you may have taken too high a dose, contact your healthcare team or go to your local Accident and Emergency (A&E) department.

Storing insulin

Keep any insulin you're not using in the fridge whatever the time of year. Don't put it in the freezer compartment as it may damage the insulin. If you leave it out of the fridge for 28 days or more you'll need to throw it away as the insulin will have broken down. Some insulins may need to be stored slightly differently so make sure you read the information leaflet that comes with yours. Insulin needs to be kept at temperatures lower than 25°C (77°F). The ideal storage temperature is 2 to 6°C (36 to 43°F). Room temperatures can be below 25°C, but they can be higher if the heating is on or it's summer, so keep your insulin in the fridge.

How insulin medicine is made

Insulin is made in different ways. You and your healthcare team will discuss which insulin you can take.

- Human insulin – this is synthetic and made in a laboratory to be like insulin made in the body.
- Analogue insulin – the insulin molecule is like a string of beads. Scientists have managed to alter the position of some of these beads to create genetically engineered insulin known as analogues.
- Animal insulin – This isn't used much anymore, but some people find that insulin from animals works best for them. It is usually from a cow or pig.

Insulin sensitivity and your dose

You may hear your healthcare professional talk about insulin sensitivity. This is how well your body is using insulin to get your blood sugar levels down. People with high sensitivity need less insulin than those with low sensitivity. Your healthcare professional can test you for insulin sensitivity, and this will help them decide what dose of insulin you will need, and if insulin of you need it at all.