

# Diabetes Treatment: Insulin

When you have diabetes, you may need to learn how to inject yourself with insulin.



## What is Insulin?

Insulin is a hormone produced by the pancreas and released into our body cells to allow them to convert blood glucose (sugar) for energy. Food is converted into glucose before it is absorbed into our bloodstream. The function of insulin is to move the glucose from the bloodstream into the body cells for use or storage. People with diabetes are unable to fully use the glucose in their bloodstream either because they lack insulin in the body or insulin is ineffective for them.

## Insulin Therapy

Treatment for type 1 diabetes involves dietary control and insulin injections. Some patients with type 2 diabetes may also require insulin injections. Insulin is not effective if taken by mouth, and has to be injected.

You must know how to:

- Measure your insulin dose
- Inject yourself (and not rely on others)
- Adapt your diet and activity to your insulin injections

## Types of Insulin

There are several types of insulin. They differ in how quickly they start to lower your blood glucose, the time taken to reach their highest activity, and how long they continue to work.

## How to Inject Insulin

Knowing where to inject your insulin will make the injection easier, safer and more comfortable. Insulin is injected into the fatty area under the skin. After insulin is injected, it

moves into the blood and is used by your body.

There are three main areas of injection:

- Abdomen — insulin moves fastest into the blood from here
- Arm
- Thigh and buttocks — insulin moves slowest into the blood from here

The injection area is chosen based on the speed of insulin absorption required, and your convenience.

Your doctor or nurse will advise you on the best area to inject. It is not a good idea to change injection areas frequently. This may cause your blood sugar levels to go up and down. This happens because insulin moves into blood at different speeds from different areas.

You should inject your insulin into a different spot each time. Injecting into the same spot often may lead to formation of thick areas under the skin. Insulin injected into these areas may not be absorbed well. Rotating your insulin injection spot will prevent these thick areas from forming. You should try and use each spot only once a month.

Check your injection areas every few days. You can press gently and run your fingertips across each area. If there are any lumps, painful spots or any change of colour in the area, report these to your diabetes care team. Avoid using these areas until the problem stops.

## Timing of Insulin Injections

Inject your insulin 30 minutes before meals. The insulin will move into your blood to match the rise in the blood sugar level. You should eat regularly throughout the day. This is to avoid a low blood sugar levels caused by the injected insulin.

If you are using a new insulin called Lispro Insulin (Humalog®) you do not have to wait 30 minutes before eating your meal. Lispro insulin is absorbed and goes to work almost immediately after injection.

## Insulin Usage

Discard the insulin if:

- it has expired
- There is any contamination of clear (short-acting) insulin
- There are any lumps in cloudy (intermediate-acting) insulin that will not dissolve when the bottle is rotated

Insulin should be stored in the lower part of the fridge, away from the freezer. You should always keep at least one extra bottle of each type of insulin.

When travelling, carry your insulin and syringes with you. Do not put the insulin in your check-in luggage or in your car boot.

## Insulin Devices

### Syringes

Syringes are used to measure the amount of insulin to be injected. Choose a suitable syringe that best matches the number of units required.

A 0.3ml syringe should be used for doses up to 30 units. A 0.5ml syringe should be used for doses up to 50 units. A 1ml syringe can be used for doses up to 100 units. Disposable syringes can be used for the same person up to about two to four times. Between uses, replace the cap and put the syringe in the fridge.

### Insulin Pens

Insulin pens combine both the needle and insulin cartridge into one. Thus, insulin injections become more convenient and you do not have to carry syringes and insulin bottles with you.

### Insulin Pumps

The insulin pump is a small computerised device that pumps insulin continuously through a fine plastic tube into a site under the skin 24 hours a day. It is just a little larger than a pocket pager.

Pump users have to monitor their blood sugar frequently so as to make adjustments to the amount of insulin delivered. The insulin pump generally gives you better control and more meal flexibility, but is costlier and requires more frequent blood sugar monitoring.

### Switching to Insulin from Anti-diabetes Tablets

Patients who are switched to insulin from anti-diabetes tablets often worry that their condition must be deteriorating. However, the switch to insulin was made because the diabetes was getting out of control as the tablets were failing to control the patient's blood sugar — and the insulin will correct that.

## Insulin Side Effects

Taking insulin may result in some side effects. These include:

- Low blood sugar
- Initial weight gain
- Lumpy or scarred tissue from too many injections on the same part of the body
- Rashes on the injection site or, in rare cases, all over the body

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**Read these next:**

- Diabetes Medications
- Guide to Managing Diabetes

Type	Time of Start of Action (hours after administration)	Time of Maximum Action (hours after administration)	How Long Action lasts (hours after administration)
Rapid-acting · Lispro	5 minutes	1 hour	2-4 hours
Short-acting · Humulin® R · Actrapid® HM	Half hour Half hour	2-4 hours 1-3 hours	6-8 hours 6-8 hours
Intermediate-acting · Humulin® N/NPH human insulin · Humulin® L/lente human insulin · Insulatard® HM · Monotard® HM	1-2 hours  1-3 hours 1.5 hours 2.5 hours	6-12 hours  6-12 hours 4-12 hours 7-15 hours	18-24 hours  18-24 hours 18-24 hours Up to 24 hours
Long-acting · Humulin® U	3 hours	6-14 hours	Up to 24 hours

**\*\*** Low blood sugar (hypo) reaction is more likely to occur around the time of maximum action. High blood sugar (hyper) reaction is more likely to occur before the insulin starts acting, or when its action is ending.

Combination insulins (Humulin® 30/70, Mixtard®, etc) are mixtures of short and intermediate-acting insulins. These avoid the need for patients to manually mix their insulins. They are normally administered twice a day. Usually, two-thirds of the daily requirement is given in the morning and the remainder in the evening.

This article was last reviewed on Wednesday, November 22, 2023