

# Insulin and Diabetes

In type 1 diabetes the body stops producing insulin. Insulin therapy is essential in the treatment of type 1 diabetes, together with a healthy eating plan and regular physical activity. Insulin can be given either by injection or through an insulin pump. Managing type 1 diabetes is a constant balancing act between insulin and physical activity which lower the blood glucose level (BGL) and food and stress hormones which raises the BGL.

## What is Insulin?

Insulin is a hormone made by the beta cells in the pancreas. When we eat, insulin is released into the blood stream where it helps to move glucose from the food we eat into cells to be used as energy. Insulin also helps store excess glucose in the liver.

## Why must it be injected or given by Insulin Pump?

At present insulin cannot be given by mouth as the stomach would digest it, just as it digests food.

It is important that your child eats as soon as insulin has been injected to prevent a hypo or low blood glucose level.

Insulin must be adjusted according to activity, food intake and growth. Your diabetes team can help you with this.

## Types of Insulin available in Australia

### ***Rapid onset fast acting insulin***

Rapid acting insulins are clear in appearance. They act very quickly starting to work within 20 minutes, peaking approximately one hour later and lasting from 3 to 5 hours. When using these insulins it is important to eat immediately after injecting. These insulins are used in insulin pumps.

### **Rapid acting insulins currently available are:**

Novorapid® and Humalog®

### ***Short acting insulin***

Short acting insulins are clear in appearance. They begin to lower blood glucose levels within 30 minutes so you need to have your injection 30 minutes before eating. These have a peak effect at 2 to 4 hours and last for 6 to 8 hours.

### **Short acting insulins currently available are:**

Actrapid® Humulin® R Apidra®

### **Intermediate acting insulin**

Intermediate insulins are cloudy in appearance. They have either protamine or zinc added to delay their action. These insulins begin to work about 1 1/2 hours after injection, peaking at 4 to 12 hours and lasting for 16 to 24 hours.

### **Intermediate acting insulins available are:**

Protaphane® Humulin® NPH

### **Long Acting Insulin**

#### **Long acting insulins currently available are:**

Lantus® (Insulin Glargine) is a long acting clear insulin which is usually injected once a day (but can be twice a day). Lantus must not be mixed with any other insulin in a syringe. Lantus pens are available for use with Lantus pen cartridges.

Lantus is also available in a disposable pen called a SoloSTAR®.

Levemir® (insulin Detemir) is also a long acting clear insulin which can be injected once or twice a day. Levemir is available in a disposable pen called a Flexpen® as well as in a 3ml cartridge for use with a durable pen.

Both Lantus and Levemir last up to 24 hours. Both are used to provide background or basal insulin and both need to be supplemented with injections of rapid or very fast onset insulin at meal time.

### **Mixed Insulin**

There are mixed insulins available which are not commonly used in children, however, they may be used in certain circumstances.

### **How is insulin given?**

There are many different devices available to inject insulin. The main choices include:

#### **Insulin Syringes**

- Insulin syringes are to be used with insulin vials (10ml) or cartridges (3ml)
- Syringes are manufactured in 30 unit (0.3ml), 50 unit (0.5ml) and 100 unit (1.0ml) measures. The size of the syringe will depend on the insulin dose e.g. it is easier to measure a 10 unit dose in a 30 unit syringe and 55 units in a 100 unit syringe
- Each syringe should only be used once
- Needles on the syringes are available in two different lengths 8mm and 12.7mm. Your doctor or diabetes educator will help you decide which syringe is right for you
- Syringes are free for people registered with the National Diabetes Services Scheme (NDSS). Contact your State and Territory Diabetes Australia Organisation for details on **1300 136 588** or visit [www.ndss.com.au](http://www.ndss.com.au)

### **Insulin delivery devices**

#### **Insulin pens and other devices**

- Devices are available in different shapes and sizes. An insulin cartridge (3ml containing 300 units of insulin) fits into the pen device. When finished, a new cartridge is inserted. Some pen devices, however, are pre-filled with insulin and the whole device is disposable. Your doctor or diabetes educator will advise the one that's right for your child's needs.
- Many people find pen devices easier and more convenient to use than syringes.
- It is recommended that the needle be changed with each injection.
- Needles vary in length – 5mm, 6mm, 8mm or 12.7mm. They also vary in thickness or gauge –



28G, 29G, 30G or 31G. The higher the number the finer the needle.

- Devices: NovoPen® 3, NovoPen® 3 Demi, Humapen® and Autopen
- Pre-filled or disposable devices: Innolet®, Flexpen®, NovoLet® and Solostar
- Pen needles are free for people registered with the NDSS. Contact your State and Territory Diabetes Australia Organisation for details on **1300 136 588** or visit [www.ndss.com.au](http://www.ndss.com.au)

## Insulin Pump

- An insulin pump is a small programmable device about the size of a pager that holds a reservoir of insulin. The pump is programmed to deliver insulin into the body through thin plastic tubing known as the infusion or giving set. The pump is worn outside the body in a pouch or on your belt. The infusion set has a fine needle or flexible cannula that is inserted just below the skin, usually on the abdomen, where it stays in place for approximately 3 days.
- Only rapid acting insulin is used in the pump. Whenever food is eaten the pump is programmed to deliver a surge of insulin into the body similar to the way the pancreas does in people without diabetes. Between meals a small and steady rate of insulin is delivered.
- The insulin pump is not suitable for everyone. Talk to your diabetes health team if you are considering one for your child.



## Where is insulin injected?

Insulin is injected through the skin into the fatty tissue known as the subcutaneous layer. You do not give it into muscle or directly into the blood.

Absorption of insulin varies depending on the part of the body into which you inject. The stomach (abdomen) is the site used by most people.

It's important not to inject into the same spot on the stomach every day.

## What affects the way insulin is absorbed?

### **Absorption is accelerated by:**

- Injecting into an exercised area such as the thigh.
- High temperatures e.g. shower, bath, hot water bottle, spa, sauna.
- Massaging the area around the injection site.
- Injecting into muscle (the deeper the injection into muscle, the faster the insulin will be absorbed).

Variation in insulin absorption (either accelerated or delayed) can cause fluctuations in blood glucose levels.

### **Absorption is delayed by:**

- Smoking.
- Scarring or lumps due to over-use of the same injection site, which causes the flesh to become hard and leads to erratic absorption of insulin.
- Cold insulin e.g. injecting immediately after taking from the fridge.

## What is the best way to get rid of used syringes and needles?

Used syringes, pen needles and lancets must be disposed of in an Australian Safety Standard- approved sharps container which is puncture proof and has a secure lid. These are usually yellow in colour and are available through pharmacies and your State and Territory Diabetes Organisation, phone 1300 136 588.



*Procedures to dispose of sharps vary from Council to Council and from State to State. Contact your State or Territory Diabetes Organisation on **1300 136 588**, your State Department of Health or Local Council for information.*

## How is insulin stored?

- Keep your unopened insulin vials or pen cartridges in the fridge. Do not allow insulin to freeze.
- Once opened, insulin may be kept at room temperature (less than 30 degrees) for one month and then thrown away.
- Insulin can be safely carried in a bag or pocket.
- Insulin may be damaged by extreme temperatures. It must not be left where temperatures are over 30 degrees or in direct sunlight.

### **Do not use insulin if:**

- The clear insulin has turned cloudy.
- The expiry date has been reached.
- The insulin has been frozen or exposed to high temperatures.
- Lumps or flakes are seen in the insulin.
- Deposits of insulin are seen on the inside of the vial and cannot be dissolved by gently rotating the vial.
- The vial has been open for longer than one month.

Many countries need insulin. If you have spare in-date insulin, please donate to your State or Territory Diabetes Organisation on **1300 136 588** or send directly to Insulin for Life Inc., PO Box 2010, Ballarat Mail Centre, Victoria 3354.

## Need an interpreter?

A free telephone interpreter service is available for people who may have difficulty in understanding or speaking English. This service is available through the Translating and Interpreting Service (TIS) of the Department of Immigration and Multicultural and Indigenous Affairs (DIMIA).

TIS have access to professional interpreters in almost 2000 languages and dialects and can respond immediately to most requests.

### **Accessing an interpreter:**



1. Simply dial 131 450 for the Telephone Interpreting Service.

2. Explain the purpose for the call e.g. wanting to talk to an educator/dietitian at Diabetes Australia.

3. The operator will connect you to an interpreter in the required language and to a Diabetes Australia health

professional for a three-way conversation.

This free service has been set up by Diabetes Australia and will be promoted with assistance from the Australian Government Department of Health and Ageing.