

# INSULIN – Things you should know



**Many medications are used to manage diabetes, but the one that most people have heard about is insulin. This booklet describes insulin, what it does, the different types available and how to use it.**

## What is insulin?

Insulin is a hormone produced by the pancreas to control the amount of glucose (sugar) in the blood. In people who have diabetes, the pancreas does not produce any or enough insulin, or is unable to effectively use the insulin it does produce. As a result, glucose builds up in the bloodstream, potentially leading to serious health problems such as blindness, heart disease, kidney problems, amputation, nerve damage and erectile dysfunction.

## Insulin and type 1 diabetes

People with type 1 diabetes do not naturally produce any insulin. As a result, they need to take insulin every day.

## Insulin and type 2 diabetes

If you have type 2 diabetes, you may be able to keep your blood glucose levels in your target range through healthy eating, physical activity and by taking diabetes medication. Ask your doctor to refer you to a registered dietitian to learn about healthy eating. You should follow Canada's Guidelines for Healthy Eating, which includes limiting the amount of fat you eat.

Type 2 diabetes is a progressive condition, however, and over time some people with type 2 diabetes will need to use insulin to properly manage blood glucose.

You may feel guilty or as if you have failed because you must now take insulin. You may be nervous at the thought of having to take insulin injections every day. Please don't!

A number of factors may have contributed to you needing to take insulin. For example, your body may have lost its ability to make or use insulin effectively, or your diabetes medications may no longer be effective for you.

The most important thing is to manage your diabetes and prevent complications. If you're nervous about learning to inject insulin, take heart – even young children can master this skill with practice. As well, modern injection devices, such as insulin pens, are virtually painless.



## Types of insulin

When insulin was first made available for people with diabetes, there was only one kind: short-acting insulin, which required several injections a day. Today, many different types of insulins are available, offering more flexibility in the number and timing of injections you may need and making it easier for you to maintain your target blood glucose levels. You may need one to four injections a day for optimal management of your blood glucose.

Insulins differ by their duration of action (how long they work), their onset of action (how quickly they start working) and when their action peaks (when they are most effective). By understanding how your insulin works, you can time your meals, snacks and activity levels accordingly.



If you take insulin, you need to monitor your blood glucose levels regularly. Regular monitoring is the best way to keep your blood glucose levels in their target range. Regular checks also give you important information about how your blood glucose levels vary during the day, how much insulin you need and if you're on track in managing your diabetes.

When prescribing an insulin regimen, your doctor will consider several factors, including your treatment goals, age, lifestyle, meal plan, general health, risk of low blood glucose (hypoglycemia), and your financial circumstances. There is no "one size fits all" plan.

Your healthcare team will talk with you about the best insulin plan to meet your needs. Remember, it will take time to fine-tune your insulin regimen, which may change over time depending on life events (such as a major illness) and changes in your lifestyle (such as a new exercise plan).

Talk to your doctor or diabetes educator if you have any questions or concerns about your insulin regimen, or if you aren't sure how to handle certain situations, such as adjusting your insulin when travelling.

## How do I use insulin?

Insulin can be administered by syringe, pen or pump – according to your personal preference.

- ▼ Insulin pens combine a very fine needle and insulin cartridge in a single unit, making it easier to give multiple injections. Some people carry two or more pens if they use more than one kind of insulin at different times of the day. If you need to use two types of insulin at the same time, you will need two separate pens and give yourself two injections. One of the main benefits of insulin pens is their portability.
- ▼ Jet injectors have no needles at all. These devices release a tiny stream of insulin, which is forced through the skin by pressure. Some people find that bruising occurs at the injection site.
- ▼ Syringes today are smaller than ever and have finer needles with special coatings so injecting is as painless as possible. If you need to use two types of insulin at the same time, you can mix the insulin and give yourself only one injection, or you may be prescribed a mixed insulin.



- ▼ Insulin pumps are a safe, effective way to deliver intensive insulin therapy. The device involves a small catheter, which is inserted under the skin, and a pump, which is about the size of a pager, that is worn outside the body. The pump has an reservoir and can be programmed to deliver small amounts of insulin on a schedule that you determine. To deliver extra doses of insulin (at mealtime, for example), you simply press a button on the device.

Talk to your doctor or diabetes educator about which device is right for you.

## TYPES OF INSULIN AVAILABLE IN CANADA

<b>INSULIN TYPE/ACTION</b> (appearance)	<b>BRAND NAMES</b> (generic name in brackets)	<b>DOSING SCHEDULE</b>
<b>Rapid-acting analogue (clear)</b> Onset: 10-15 minutes Peak: 60-90 minutes Duration: 4-5 hours	<b>Humalog® (insulin lispro)</b> <b>NovoRapid® (insulin aspart)</b>	<b>Usually taken right before eating, or to lower high blood glucose</b>
<b>Short-acting (clear)</b> Onset: 0.5-1 hour Peak: 2-4 hours Duration: 5-8 hours	<b>Humulin®-R</b> <b>Novolin®ge Toronto</b>	<b>Taken about 30 minutes before eating, or to lower high blood glucose</b>
<b>Intermediate-acting (cloudy)</b> Onset: 1-3 hours Peak: 5-8 hours Duration: up to 18 hours	<b>Humulin®-N</b> <b>Novolin®ge NPH</b>	<b>Often taken at bedtime, or twice a day (morning and bedtime)</b>
<b>Extended long-acting analogue (clear and colourless)</b> Onset: 90 minutes Peak: none Duration: 24 hours	<b>Lantus® (insulin glargine)</b> <b>Levemir® (insulin detemir)</b>	<b>Usually taken once or twice a day</b>
<b>Premixed (cloudy)</b> A single vial contains a fixed ratio of insulins (the numbers refer to the ratio of rapid- or fast-acting to intermediate-acting insulin in the vial)	<b>Humalog® Mix 25TM</b> <b>Humulin® (20/80, 30/70)</b> <b>Novolin®ge (30/70, 40/60, 50/50)</b>	<b>Depends on the combination</b>

*Adapted from the Canadian Diabetes Association 2003 Clinical Practice Guidelines*



## How do I give insulin?

Your doctor or diabetes educator will teach you how to inject insulin according to your personal needs. Here are a few general pointers to remember:

- ▼ Keep a written record of the name(s) and amounts of the insulin(s) you use, what times during the day you should inject your insulin, how long the insulin works and when this action peaks (when they are most effective).
- ▼ Keep unopened insulin at refrigerated temperatures of 2°C to 10°C (35°F to 50°F). Once opened, insulin has a shelf life of 28 days. Unopened vials are good until the expiry date – be sure to check the expiry date on a vial before you use it.
- ▼ Make sure your insulin does not freeze or get too hot (not over 37°C or 98.6°F).
- ▼ Insulin must be injected under the skin (called “subcutaneously”) for it to work, but not directly into the blood. Insulin is absorbed from different parts of your body at different rates and can also be affected by the amount of physical activity you are doing. Different injection devices may require specific injection sites. Talk to your doctor or diabetes educator about a pattern for your injections. (For more information about the effect of physical activity on insulin requirements, visit [www.diabetes.ca](http://www.diabetes.ca)).
- ▼ Your doctor or diabetes educator will also instruct you how to mix/inject two different kinds of insulin, if required.

## Looking forward to good health

If this seems like a lot to learn, don't worry – your diabetes team will work with you to ensure that you understand how to use insulin. You can also contact the Canadian Diabetes Association for more information about many aspects of managing your diabetes.



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