# INSULIN PUMPS

## What you need to know

**If you are injecting insulin, an insulin pump might be an option for you whether you have Type 1 or Type 2 Diabetes**

**What is an Insulin Pump?**

Pumps are about the size of a cellphone and are programmed to deliver a continuous flow (basal rate) of rapid –acting insulin to you via a small flexible tube under the skin, the size of an insulin needle. Pumps come with either 4 to 5 year warranties but can last beyond the warranty dates.

**Can a Pump fit your lifestyle?**

Insulin pumps can be programmed to deliver a variety of basal rates to fit your lifestyle. A "basal rate" is the small amount of rapid-acting insulin delivered every few minutes to replace your current long acting or intermediate acting insulin injections. You can increase the basal rate to receive more insulin if you know you will be less active or lower the rate if you will be more active. Insulin is also programmed by you to cover meals and when needed to correct for high blood sugars (called bolus doses). Insulin pumps run on batteries and can be discreetly clipped to a belt or worn under clothing. Pumps can be worn in most activities, including sports and swimming (Animas and Omnipod are waterproof pumps). Omnipod is tubeless and cannot be disconnected, Other pumps can be disconnected for short periods of time.

**Are Insulin Pumps more effective than injections at controlling blood sugars?**

Many studies have shown improved glucose management outcomes for those using insulin pumps. A pump does allow for more flexibility in lifestyle and the potential to even out blood sugar fluctuations that are often experienced when injecting insulin. But, using an insulin pump does not eliminate the need to be actively involved in managing your diabetes.

**What knowledge must you have to use a pump?**

Some people believe advanced technology is too complicated to use, many children and teens learn to program and maintain their own insulin pumps with assistance from their parents. Your pump trainer and healthcare team will provide in-depth training on proper use of the pump and how to troubleshoot any problems that might arise.

**Advantages**

**An insulin pump eliminates the need for daily insulin injections**. Instead of multiple injections every day, you only need to perform an injection when changing infusion sets every 2 -3 days , when inserting a new cannula.

**You may be able to level out many blood sugar swings.** Because you receive a continuous low dosage of insulin (basal rate) 24 hours a day, you are not prone to the rapid drop in glucose levels that can occur after insulin injections.

**Insulin pumps increase the flexibility of your diabetes management**. If your schedule causes you to eat at odd times or miss a meal occasionally, you can easily adjust to these circumstances with a pump. Because pumps use rapid-acting insulin, extra insulin (bolus dose) can be given to cover a meal with a few pushes of a button on a pump.

**An Insulin pump can reduce low blood sugar reactions (hypoglycemia). There are greater risks of hypoglycemia with injections because you must take larger doses of insulin at one time**. The continuous flow of insulin in a pump reduces the risk of a low. This is especially helpful at night when injecting too much insulin could increase the risk of a low during sleep.

**Are Insulin Pumps safe?**

Pumps have alarms that sound to alert you to possible problems such as a blocked tube, or when you accidentally press the wrong button. Pumps are durable and built to withstand the normal bumps and mishaps of life.

**Can you wear a pump while you sleep?**

This is one of the most frequent questions about pump use. You sleep connected to the pump. It may take a few nights to find the best sleeping set-up for you; most pump users forget they are hooked up as they sleep. Another advantage of using the pump at night is the decreased risk of having a low blood sugar reaction while you sleep.

**Do you still need to test your blood sugar when using a pump?**

It is still necessary to test your blood sugars when using an insulin pump. Most people test several times a day, especially at meal times and when they are more active, in order to effectively manage their glucose levels. When first starting on a pump you may be asked to test blood sugars 8 or more times per day for a short period of time . More frequent testing is often needed when re-assessing pump rates,. [i] New technology is currently in development that will eventually allow insulin pumps to also automatically adjust insulin rates for glucose levels. This would become the equivalent of an artificial pancreas. [ii]

**NEXT STEPS FOR AN INSULIN PUMP** :

1. Discuss with your diabetes doctor if an insulin pump would be a good option for you. Consider these topics when you talk to your doctor : are you good at carbohydrate counting and adjusting your insulin to match your carbohydrates , adjusting insulin for activity and sick days , testing blood sugars at least 4 times daily and recording the information and insulin doses when you can't get your blood sugars under better control to look at trends and patterns , are you realistic in that an insulin pump can be a great tool to help with diabetes management when you are already doing the above.
2. Contact **one** pump company and fill out the "insurance investigation form" to find out how much coverage you might have from any private insurance ( all pump companies have employees that deal with insurance companies) , the pump company will get "on paper" what coverage you have from your insurance company.
3. Once you know your coverage, and can proceed ahead knowing the costs, you should select a pump. Determine what are your needs in a pump and you can eliminate a few of the choices.

**Disadvantages**

**Cost** Insulin pumps cost approximately $7000, monthly pump supplies from $260- 300 changing sites every 3 days, if you need to change your site every 2 days , supplies cost can be $450 / month.

**There is a risk of infection.** If you do not change the insertion site every two to three days you increase the risk of infection. Proper cleansing prior to cannula insertion is important also.

**You may need to check your blood sugars more frequently.** This is especially true during training and the first few months of wearing the pump. Frequent testing is the only way you can know whether your basal rate and bolus doses are working as planned.

**Wearing a pump can be bothersome at times**. When you want to be active, sun at the beach or sleep, you may find a pump can cramp your style. Some pumps can be disconnected for a short period , such as showering or bathing, and all pumps can be discreetly worn.

**You have a greater risk of high glucose levels that could lead to diabetic ketoacidosis.** Disconnecting from the pump for too long or not checking blood glucoses frequently could result in high blood sugars levels. You need to know what to do when you have a high-unexpected blood sugar on a pump - your trainer will cover this with you. You will always need to have back up insulin pens or syringes incase your pump fails.

Example : visually : LED screen vs black and white screen , use of CGM , waterproof vs. non-waterproof pump , tubing or no tubing, meter as a remote control for pump , button pushing for those with arthritis in their hands, volume for 3 days – do you possibly need up to 300 units of insulin in 3 days .

4. Pump websites below , take a look at your options.

**Continuous Glucose Monitoring : CGM**

Continuous glucose monitors use a tiny sensor inserted under the skin into the fatty tissue to monitor glucose in the tissue fluid. The sensors are inserted by you and are similar in size to insulin needles. The sensors can stay in for 6-7 days depending on the model, and are connected to a small transmitter which sends information about glucose levels via radio waves every 1 – 5 minutes to a wireless receiver or insulin pump. The user must still perform finger stick blood glucose tests to calibrate the sensor and anytime the user feels hypoglycemic, during or after exercise and before administering insulin.

The receivers display tissue glucose levels and can help the user to prevent high and low blood glucose levels before they happen, when wearing a working sensor . CGM can help with identifying patterns or trends when finger stick glucose is not being performed such as overnight.

Glucose sensors are generally not covered by private health insurance and do not go towards your pharmacare deductible as yet, but may be applied as medical expenses for income tax purposes.

**Insulin Pump Websites Canada:**

Accu-chek www.accu-chek.ca

Animas Canada www.animas.ca

Medtronic Canada www.minimed.ca

Omnipod Canada www.myomnipod.ca

[i] By Gary Gilles , About.com Guide Updated : 14-Jan-2009

[ii] New York January 13, 2010 – The Juvenile Diabetes Research Foundation today announced an innovative, non-exclusive partnership with Animas Corporation to develop an automated system to help people with Type 1 Diabetes better control their disease- the first step on the path to what would be among the most revolutionary advancements in treating Type 1 Diabetes: the development of an artificial pancreas, a fully automated system to dispense insulin to patients based on real-time changes in blood sugar levels.