

Insulin Pump Therapy

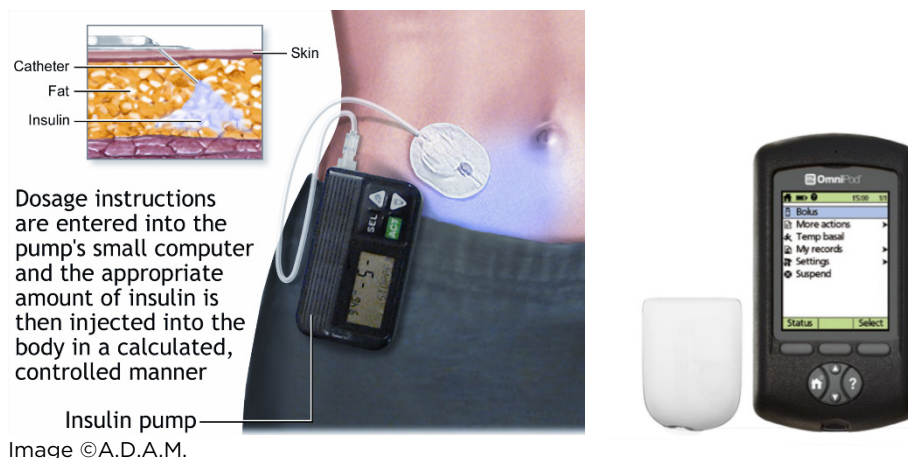
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Getting started with your insulin pump

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What does the pump look like?

An insulin pump is a small device that attaches to the body. The pump is either attached by adhesive or a strong, thin plastic tube that leads from the insulin cartridge to the body. The small device itself allows you to enter data that determines the amount of insulin to be delivered.



How is the device attached?

The infusion set is placed into the same area where insulin injections were given. The cannula is placed using an introducer needle. As the needle is put in the skin, it glides the short plastic tube along with it into the fatty tissue just beneath the skin. The needle is quickly removed and the plastic tube stays in place for 2 to 3 days. Pumps have insertion devices to make infusion set changes even easier.

To Learn More

- Endocrinology
206-987-2640
- Ask your child's healthcare provider
- seattlechildrens.org/patient-education

Free Interpreter Services

- In the hospital, ask your nurse.
- From outside the hospital, call the toll-free Family Interpreting Line, 1-866-583-1527. Tell the interpreter the name or extension you need.



How do we control the amount of insulin?

The pump has a screen to display the numbers and buttons to program the pump's internal computer. A motor in the pump pushes insulin from the cartridge through a tube and into your body. Pumps use only rapid-acting insulin – Humalog, Novolog or Apidra. The insulin is delivered continually at a steady rate or in a burst.

Basal or continuous rate: Once programmed to your needs and doctor's orders, the pump automatically delivers a small amount of insulin continually throughout the day and night. This covers the sugar produced naturally by the body. It keeps BG (blood glucose) steady between meals and during sleep. This is called your basal rate. It takes the place of long-acting insulin shots. Most people need different amounts or rates of insulin at different times and therefore can program in several basal rates for a single day. It's possible to create different basal rate "schedules" for different days.

Automated basal: Newer technology allows for pumps to communicate with continuous glucose monitors (CGM) and adjust basal rates based off the blood sugars. This is explained further during ongoing education of insulin pumps.

Bolus – a burst of insulin: You press the buttons on the device to deliver a burst of insulin to cover a snack or meal or to correct a high blood sugar. To do this, you enter the blood sugar and number of carbs to be eaten into the pump. The internal computer will use this information to calculate the right dose. You must then push a button to deliver the dose.

An insulin pump does NOT test blood sugar.

Benefits of pump therapy

The pump offers a number of benefits for young people with diabetes:

- **Improved blood sugar control** – If your basal rates are set correctly and you are giving all your boluses, you should see improvement in diabetes control and A1C levels. Some children are able to gain better control of their weight and feel better because their BGs are in such better balance.
- **Precise insulin delivery** – A pump can be programmed to deliver different amounts of basal insulin during different times of day, based on each person's unique needs. It is also able to give very tiny amounts of insulin that you cannot measure using a syringe.
- **More predictable absorption** – With injections, finding that spot on the body where insulin is best absorbed each time can be hard. With the pump you have fewer needle sticks and use the same site for 2 to 3 days. This avoids the problem of sites absorbing differently. Most people use a rotational pattern on the stomach or hip area.
- **Fewer low blood sugars** – This is due to more precise dosing. The pump will also "remember" previous doses of insulin and decrease doses if you have done a correction in the last few hours.
- **More flexible lifestyle** – You give a bolus when eating and to correct high blood sugars whenever that may be. It is easier to manage illnesses, frequent meals and exercise. You still carb count, but there aren't required carb levels.

Challenges of pump therapy

While there are many benefits to using a pump, there are some challenges. You need to be aware of these as you decide whether or not to switch to insulin pump therapy:

- **There is a lot to learn** – To be successful you will need to learn all you can about pump therapy. There will be homework and reading to do. We will help get you started and assist with adjusting your insulin doses at first. You must be very committed to the idea of using a pump. You will need to check blood sugars, basal rates, and boluses and adjust the pump's program often to keep good blood sugar control.
- **Risk of ketoacidosis** – An insulin pump is filled with rapid acting insulin only. No long-acting NPH or Lantus is used. That means that if insulin delivery is stopped, it may only take a few hours to develop ketones. Testing for ketones and higher blood sugars is critical.
- **Concerns of body image** – Some people don't like the idea of being attached to a device all the time. Others are concerned about how the pump looks to others.
- **Infection at the insertion site** – Infusion sets (cannula and port) need to be changed every 3 days to avoid infection. Site rotation or moving the cannula to a new place on the skin, is just as important as when taking injections.

Are you ready for a pump?

- You have had diabetes for at least 3 months before you and your provider begin the discussion.
- You know what a pump can and cannot do, which is taught to you in pump class.
- You are ready to give the time involved in starting and maintaining pump therapy.
- You want to improve blood sugar control and have a more freeing lifestyle.
- You commit to rotating injection sites and use the stomach site regularly.
- You are checking blood sugars at least 6 times per day and record the results in a logbook.
- You regularly review blood sugar results and can adjust doses by yourself.
- You know how to carbohydrate count accurately.
- You and your parents have a plan for managing the pump at daycare or school if you need help.
- You and your caregivers (parents) agree to attend several education sessions and do the required home reading and follow-up.
- You are prepared for the hard work the first 4 to 6 weeks of pump therapy. This will include:
 1. We may ask you to stop snacking between meals for the first few weeks to determine if pump doses are accurate.
 2. Counting carbohydrates carefully.
 3. Fasting for 6-hour periods several times during the first few weeks. This is to help test and set basal rates. You will fast at different times of the day while checking blood sugar every 2 hours; these recordings are critical to establishing correct basal rates.
 4. Uploading your pump 2 times per week initially.

What's the first step to getting started on a pump?

- Your healthcare provider will need to write an order (a referral) to send you to pump class. Discuss pump therapy at your next visit.
- You will need an appointment with a Children's diabetes social worker to discuss pump therapy.

Pump Class

Pump class is a 3-hour group class that is held 4 times a month. There is a charge for this basic class on pump therapy and for other advanced pump classes we offer. We will bill your insurance company, but if you'd like to confirm coverage with your provider, use the code G0109. If you do not have insurance, your insurance denies the claim or you do not qualify or apply for financial assistance, you may need to pay out of pocket for the class. Your family, and up to 3 other families, will meet to learn how the pump works, and what is involved in getting started on a pump. You will receive hands-on time and practice trying out 3 of the most popular insulin pumps and their infusion sets.

Then, you will need to

- Review the pump manufacturer information packets given to you by your provider.
- Review manufacturer websites (see resources below).
- Read, read, read about pump therapy (see suggested books listed below). While your doctor and nurses can advise you on which pump may make the most sense for you, the final decision is yours.

Other things to consider - parent notes:

Choosing and paying for a pump

You must decide which pump you want to purchase. It takes an average of 2 to 8 weeks for your insurance to approve your pump and mail it to you. The average cost of an insulin pump is \$6000, and coverage varies. Check with your insurance company to find out whether the pump is covered or not and your share of the cost. Most pump manufacturers offer payment plans.

Once you receive your pump, you will make an appointment with a diabetes educator for pump training and you will receive homework to complete at home prior to coming to this first class. This first class is 2 to 3 hours. You will learn the basic features of the pump and how to use it. Your healthcare provider will find your basal rate based on current insulin dosages, and will also calculate your initial bolus doses. You will work together to program these numbers into the pump as a starting point. Over the next 3 to 8 weeks, you will continue to adjust these settings. This time is critical to successful pump therapy. Don't plan to start on the pump at the start of a school year, while on vacation or during a busy sports season.

Resources

Insulin pump manufacturers:

- Medtronic Minimed Paradigm Real Time: [minimed.com](https://www.minimed.com)
- Omnipod: [omnipod.com](https://www.omnipod.com)
- Tandem T-Slim: [tandemdiabetes.com](https://www.tandemdiabetes.com)

Books on insulin pumps:

- Pumping Insulin: Everything You Need for Success with an Insulin Pump (4th edition) by John Walsh and Ruth Roberts (2006).
- Smart Pumping: A Practical Approach to Mastering the Insulin Pump, edited by Howard Wolpert (2002). American Diabetes Association ([diabetes.org](https://www.diabetes.org))

Other insulin pump related websites:

- [childrenwithdiabetes.com/insulin-pump-therapy](https://www.childrenwithdiabetes.com/insulin-pump-therapy)