INSTITUTE of ENDOCRINOLOGY
Diabetes, Health & Hormones

# Insulin Pump Education

## Welcome to insulin pumping!

Revised 10/2025

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# Insulin pump lingo

**Basal:** An hourly, continuous infusion of insulin delivered automatically by an insulin pump based on preprogrammed and personalized rates set in the pump.

**Basal rate**: The pump setting that provides a continuous infusion of insulin to keep the blood glucose stable between meals and during the night.

**Bolus:** A dose of insulin given to cover an expected rise in blood glucose (such as the rise after a meal or a snack) or to lower a high blood glucose down to target range.

**Cannula**: A short, thin, and flexible tubing at the end of the infusion set that is inserted into the subcutaneous tissue to deliver insulin.

**Correction bolus**: The amount of insulin needed to return a high blood glucose level back down to target range.

**Infusion set:** A complete tubing system that is attached to the end of the cartridge of the pump and connects to the body at the infusion site, through which insulin is delivered.

**Infusion Site (Insertion Site):** The area on the body into which the cannula or needle is inserted.

**Insulin on board (IOB):** How much insulin is still active inside the body from the previous bolus dose.

**Max basal**: The maximum amount of basal insulin that the pump will deliver at one time. (Set by the user)

**Max bolus**: The maximum amount of bolus insulin that the pump will deliver at one time. (Set by the user)

**Reservoir:** The syringe that holds insulin in the pump.

**Suspend:** Function on the pump that stops all insulin delivery. Any current bolus and/or prime deliveries are canceled. The basal delivery is paused until restarted.

**Occlusion:** A clog or blockage associated with the infusion set and/or infusion site that can stop or slow insulin delivery. An occlusion is typically caused by the cannula being pinched, kinked, dislodged or blocked by the formation of insulin crystals.

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# Insulin pump sites

Make sure to always rotate your sites to help with absorption and prevent infection. Place at least 3 inches apart if placing the Pod/site is placed in the same area as your continuous glucose monitor sensor.

******NEVER CHANGE YOUR PUMP SITE 2-3 HOURS BEFORE GOING TO BED******


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# Tips/Tricks to help the Pod or site stick

***__ALWAYS__ make sure skin is clean and dry before applying device***

## Helping the device stick

| Product | How it works | Where to purchase |
|---|---|---|
| Skin Prep | Contains alcohol and resin so it cleans the skin and makes it sticky | Amazon |
| Skin Tac | Comes in wipes or liquid and makes skin sticky (does not contain alcohol) | Amazon |
| Eyelash Glue (sensitive kind) | Used around the edges of the tape helps the device adhere to the skin | Amazon or local stores |
| Antiperspirant | Plain antiperspirant (nothing with deodorizers) when rubbed on skin where adhive will be placed can help with sweat | Local stores |

## Holding the device or site in place

There are several options for adhesive overlays that can be added on top of the device for extra support. Most companies will send you a sample if you contact them.

**-GrifGrips: www.grifgrips.com**
**-StayPut: www.stayputmedical.com**
**-ExpressionMed: www.expressionmed.com**
**-Kinesiology Tape: Amazon or sports stores**
**-Smith&Nephew Opsite FlexiFix** (hypo-allergenic)**: Amazon**
**-Dexcom** (will send overlay patches at no charge once every 30 days)**: Dexcom**

**Removal of the pod or site or the sticky outline it may leave:**
Baby oil
Adhesive remover wipes: **Amazon**

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# Reports and downloading

Once established on a pump it is good practice to download and review the most recent 1-2 weeks worth of blood sugar readings or sensor data.

Looking at the reports will allow you to see how well controlled blood sugars are.

Once a pattern is detected you can contact your diabetes team and adjustments to the insulin regimen can be made.

Work with your team at every visit going over the reports until you are comfortable with reviewing logs at home.

If you have any questions, always reach out to your diabetes team.

General goals related to diabetes control:

Hemoglobin A1C below 7%

Highs (above 180 mg/dl): less than 25%
Time in range (70-180 mg/dl): above 70% Lows (bellow 70 mg/dl): less than 4 %

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# HYPERGLYCEMIA GUIDELINES FOR INSULIN PUMPS

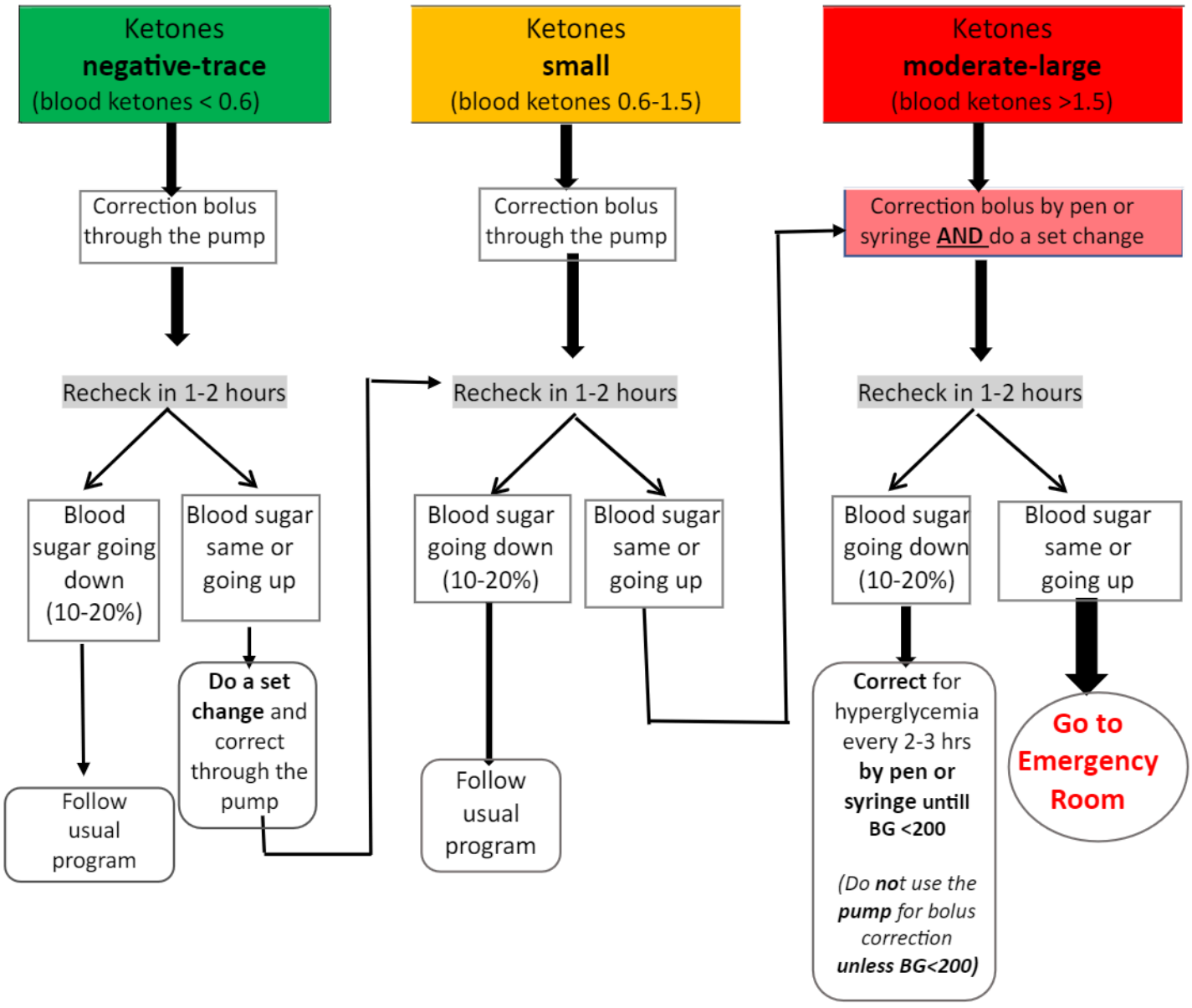
When blood glucose (BG) is unexpectedly **above 250 mg/dl**, always **check for ketones** and follow algorithm bellow.

Keep checking for ketones with each void until negative.

With any high blood sugars, always increase **carbohydrate free** liquids intake.

*The child should drink "age in years" ounces every hour until the ketones clear*

*(for example, if the child is 8 years old, then they should drink 8 oz every hour)*




- *If you need to change the pump site, use fresh site and fresh insulin!*
- *If you have to come to the emergency room, please bring new pump supplies with you*
- *If nausea or emesis, always check for ketones (even if blood sugar not above 250 mg/dl*

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# Pump Failure & Back Up Plan

Signs of a pump failure might be abnormal readings over 250 mg/dL twice in two hours and continues to rise even after a correction bolus. Do not keep giving correction boluses if blood sugar is not responding. If you are unsure if the pump is working correctly contact the pump technical support team then disconnect the pump and infusion site.

If pump failure is suspected follow the "Hyperglycemia Guidelines for Insulin Pumps" handout.

Common causes of pump failure

- Loose connection; kinked or clogged tubing/cannula
- Incorrectly primed tubing leading to air bubbles in tubing
- Dislodged infusion set or cannula ***There is NO ALARM for this*** (in most pumps)
- Bad sites: scarred skin or lipohypertrophy; irritation or infection at the site
- Empty reservoir
- Expired insulin or insulin that has gone bad due to improper storage
- Missed bolus (check the pump history to ensure a bolus was given)
- Pump left in suspended for 2+ hours
- Poor battery life
- Pump malfunctions (contact specific pump technical support to troubleshoot to determine if replacement is needed)

If insulin cannot be delivered via insulin pump there are two options:

**OPTION 1:** Give corrections with meals as routine and sooner if necessary if meals are longer than three hours apart. Keep track of your dosing. This option is good for shorter periods without the pump.

**OPTION 2:** Use a long acting insulin once a day. Then use short acting insulin for correction and carb ratio dosing at meal times. This option would be for longer periods without the pump. ****When you restart your pump don't restart basal rate as usual that day it could cause low BG. Ask your diabetes team how to safely transition back onto the pump.**

**How to calculate your long acting insulin dose:** Find the most recent total daily basal in your pump settings or total up your basal rates (multiply the rate times the number of hours it runs for and add them all together) for 24 hours~ if needed round to the nearest whole number.

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# Pump Malfunction Instructions

## INSULIN DOSES:

**Long-acting insulin** (Basaglar, Lantus, Tresiba): _____ units once a day.

- *Give long-acting insulin once the pump is detached.*
- *To find your long-acting insulin dose, look in your pump settings under "basal". Your rate per hour x 24 hours is your dose/day.*
- *Your pump may also list "total daily basal dose."*

**Rapid acting insulin** (Novolog, Humalog, Apidra, Fiasp):
**BREAKFAST, LUNCH and DINNER**:
1 unit per _____ grams of carbohydrates
**and** correction factor of 1 unit for every ____ points greater than 120.

- *Formula: (blood sugar -120) divided by a correction factor*
- *In some pumps correction factor is listed as "ISF"= **i**nsulin **s**ensitivy **f**actor*

**SNACKS**:
1 unit per _____ grams of carbohydrates
**Do not** calculate correction at snacks even when blood sugar is high.

## KETONES:

**When to check:**

- Blood sugar is above 300 mg/dl on two consecutive blood glucose checks 3 hours apart despite giving insulin injection appropriately
- Child is sick

If ketones are moderate to large:

- Add "***extra sick day***" amount of **rapid acting insulin to** each **correction dose.**
- If unsure what extra sick day amount is, follow the guidelines bellow:
  *If child is 8 years old or less: add 1 unit*
  *If child is 9-12 years old: add 2 units*
  *If child is 13-15 years old: add 3 unit*
  *If child is 16 years or older: add 4 unit*
- Do not use correction for hyperglycemia more frequently than every 3 hours

Contact the office if you have questions or doubts **via patient portal** or at **(850) 522-5490.**

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# Insulin Pump Emergency Kit

## Supplies to have on hand at all times:

- ☐ At least 2 new infusion sets or omnipods
- ☐ Power source
  - ☐ USB charger **OR** (portable power source if power is expected to be out- battery or solar powered are good options)
  - ☐ AA batteries
  - ☐ AAA batteries for PDM (controller)
- ☐ A vial or pen of rapid-acting U-100 insulin **and** long acting insulin
- ☐ Syringes or pens/needles for injecting insulin
- ☐ Alcohol wipes (and other adhesive products if needed)
- ☐ Instructions from the child's healthcare provider about how much insulin to inject if delivery from the pump is interrupted
- ☐ Ketone test strips
- ☐ Blood glucose meter, test strips, lancing device and lancets, or CGM sensor
- ☐ Glucose tablets or another fast-acting source of carbohydrate
- ☐ Glucagon emergency kit or Baqsimi with written instructions for use
- ☐ Phone numbers for parents, healthcare provider, and emergency contact
- ☐ Cooler or cooling pack to keep insulin cool (if warm weather is expected)

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# Travel

Planning ahead is important when traveling with diabetes. Your diabetes should not keep you from any type of travel as long as you are well prepared.

Make sure you pack at least twice the amount of medication and supplies you think you may need. Be sure to include these items in your carry on if you fly (do NOT check supplies).

- Insulins (vials and/or pens- both short and long acting even if you use a pump) + syringes and/or pen needles
- Testing supplies- including test strips, lancets, ketone strips, meter, alcohol swabs
- Pods, reservoirs, and/or infusion sets
- Sensors and transmitters
- Extra batteries or chargers for devices
- Hypoglycemia treatment and extra snacks **AND** Glucagon source
- Cool packs for keeping supplies cool during trip
- Medical ID
- Travel letter signed by your provider

## Airport security

All diabetes supplies are allowed to be stored in your carry on bag per TSA guidelines. Please notify the TSA officer that you have diabetes and are carrying your supplies with you. Insulin pumps and supplies must be accompanied by insulin, and insulin in any form or dispenser must be clearly identified.

- Per FDA guidelines insulin pumps and CGMs should not go through x-ray machines. Pumps and CGMs must be fully disconnected from the body prior to entering the body scanner. You may ask for an alternative method for security checks if you prefer to leave on your devices.

## Time Zones

If your travel will take you across time zones try staying in your home time zone to make it easier to keep track of “meal times” and insulin boluses. Once you arrive at your designation change all your devices to that time zone.


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# Congratulations!

## You are on your way to being a successful insulin pumper.

Just a few final reminders:

1.) Keep an eye on blood sugars and/or trends. Remember your long acting (ie: Lantus, Basaglar, or Tresiba) is being replaced by the basal rate. If the insulin site or Pod are not attached diabetes ketoacidosis (DKA) can occur faster. Pay attention to signs of nausea or vomiting with elevated blood sugars.
2.) SAVE the most current settings page somewhere accessible incase of a pump failure; ie: take a picture with a phone.
3.) Continue with routine follow up MD clinic appointments per American Diabetes Association's standards of every 3 months.
4.) When in doubt.....contact your endocrine team.

The best way to contact your provider- through the Healow app!

Download the Healow app from your app store
Use passcode: HAACCD

Phone number to the office: 850- 522-5490

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