

## Troubleshooting Ketones on an Insulin Pump

Ketones can develop anytime your body is not receiving enough insulin. The most common reasons ketones develop on an insulin pump are due to the following:

- \*infusion set coming off
- \*infusion set tubing becomes clogged by blood in the tubing
- \*the cannula becomes bent, kinked or becomes clogged by blood
- \*leaks at the connection sites (tubing to cartridge or tubing to infusion site)

Ketones can also develop if you are sick and unable to eat foods containing carbohydrate. Instead of burning glucose from carbohydrate for energy, your body starts to burn fat which makes acids called ketones.

Symptoms of ketones include stomachache, vomiting, and nausea.

***If you have a blood glucose above 250 mg/dl or you have symptoms of ketones, check your urine or blood for ketones NO MATTER WHAT YOUR BG IS.***

1. Check BG every 2-4 hours
2. Check urine or blood ketones if BG is 250 or above or if you are vomiting, nauseous, have stomach pain, or are sick

**If BG is above 250 do the following:**

Trace/Small Ketones and BG is above 250 mg/dl:

1. Refer to "Preventing DKA When Using a Pump"
2. Give correction bolus using the insulin pump
3. Drink water or other non-caffeinated sugar free fluids to stay hydrated
4. Check BG and ketones 2 hours after correction bolus

Moderate Ketones and BG is above 250 mg/dl:

1. Refer to "Preventing DKA When Using a Pump"
2. Give correction bolus **using an insulin pen or syringe equal to 10% of the Total Daily Dose (TDD)** of insulin (find 7 day TDD average in History, choose Delivery Summary, 7 Day Average)
3. **Change infusion site**
4. Drink water or other non-caffeinated sugar free fluids to stay hydrated
5. Check BG and ketones 2 hours after correction bolus.
6. If BG is unchanged or higher and/or ketones remain moderate or large call your diabetes team or health care provider.

Large Ketones and BG is above 250 mg/dl:

1. Refer to “Preventing DKA When Using a Pump”
2. Give correction bolus **using an insulin pen or syringe equal to 20% of the Total Daily Dose (TDD)** of insulin (find 7 day TDD average in History, choose Delivery Summary, 7 Day Average)
3. **Change infusion site**
4. Drink water or other non-caffeinated sugar free fluids to stay hydrated
5. Check BG and ketones 2 hours after correction bolus.
6. If BG is unchanged or higher and/or ketones remain moderate or large call your diabetes team or health care provider.

If BG is **under 250 mg/dl with moderate or large ketones**

1. Eat or drink carbohydrate containing food or fluid (see below) to get BG to 250 or above so extra Humalog or Novolog can be given per above recommendations for moderate or large ketones.

Examples of 15 grams of carbohydrate to eat when BG under 250 with moderate or large ketones

½ cup juice	4-6 ounces decaffeinated regular soda	1 cup regular sport drink
½ twin popsicle	½ cup regular gelatin	8 saltine crackers
1 cup cream/noodle soup	¼ cup sherbet	½ cup applesauce
1/3 cup rice or pasta	½ cup regular pudding	1 slice bread or toast

#### References

Walsh J. & Roberts, R. (4<sup>th</sup> ed). (2006). Pumping Insulin. San Diego: Torrey Pines Press.

Wolpert, H (2002). Smart Pumping for People with Diabetes. American Diabetes Association.