

## Insulin Pumps and Diabetic Ketoacidosis (DKA)

*How to keep it from happening to you*

*This handout explains what diabetic ketoacidosis is and how to manage it if you use an insulin pump.*

### What is DKA?

*Diabetic ketoacidosis (DKA) can occur when your body does not have enough insulin to use glucose for energy.*

Your body needs insulin to move glucose out of your bloodstream and into your cells, where it is used for energy. Without insulin, your body will use fat for energy. When fat is used for energy, your body produces *ketones* as a byproduct. Ketones can make you feel ill.



*Check your blood glucose more often if you have any problems with your pump.*

### Your Risk of DKA

People who use an insulin pump are at greater risk of DKA than people who give themselves injections. This is because pumps do not use long-acting insulin. Pumps use only rapid-acting (short-acting) insulin that starts working in 10 to 15 minutes and lasts 4 to 5 hours in most people.

Blood glucose levels can start rising very quickly and cause DKA if:

- A pump is disconnected for more than 1 to 2 hours
- A pump malfunctions (does not work correctly)
- There are problems with an infusion set

### Signs of DKA

**Early warning signs** of DKA are:

- Unusual tiredness
- Dry mouth, thirst
- Stomach pain
- Nausea
- Fruity odor to breath

These symptoms occur as DKA becomes more severe:

- Rapid breathing or having a hard time breathing
- Vomiting

## What to Know About DKA

- Having high blood glucose with ketones is a serious medical problem. It must be treated **right away**.
- **DKA can start to develop in just 5 to 6 hours.**
- You will likely need more insulin than usual to correct high blood glucose when ketones are present.
- A serious illness or infection can also cause ketones to develop.

If high blood glucose does not decrease after a correction bolus it might be because:

- The infusion set has come out from under your skin.
- The insulin pump tubing or infusion set cannula is blocked or kinked.
- The insulin is no longer good because it got too hot or too cold.
- The insulin pump reservoir or cartridge is empty.

## Managing High Blood Glucose When You Are Wearing an Insulin Pump

If your blood glucose is higher than 250 mg/dL and your pump appears to be connected and working correctly:

- Give a correction bolus with your pump.
- Check your blood glucose again in 1 hour.
- If your blood glucose is **decreasing**, relax but check it a bit more often than usual for the rest of the day.

If it has been 1 to 2 hours since your correction bolus and your blood glucose is still higher than 250 mg/dL and you cannot figure out why:

- Check your urine for ketones (or check your blood if you have a meter that measures ketones).
- Make sure your infusion set and infusion site are working OK.

## If You Have Ketones

If you have a medium or large amount of ketones, OR your blood glucose is **rising**:

- Take a correction dose of rapid-acting insulin by **syringe**, not by pump.
- Change your cartridge, tubing, and infusion set, using insulin from a **new vial**.

- Check your blood glucose every hour until it returns to normal.
- Avoid dehydration by drinking lots of carbohydrate-free liquids such as water, caffeine-free teas, broth, or diet sodas. Avoid liquids with caffeine because they can make you more dehydrated.

### **Checking Your Infusion Set and Infusion Site**

- Is your insertion site red or painful?
- Is your infusion set properly connected?
- Do you feel or smell insulin leaking anywhere?
- Is your pump delivering insulin? Check this by disconnecting the tubing from the infusion set. Then give a bolus and watch to see if a few drops of insulin appear at the end of the tubing.

### **When to Call for Help**

**Call your health care provider right away or go to the nearest emergency room if:**

- Your blood sugar is still high after 2 correction doses of insulin,  
**AND**
- You have ketones, nausea, or vomiting, or it is hard to breathe.

### **Be Ready for Emergencies**

Be sure you are prepared to prevent DKA if your insulin pump is not working properly:

- Contact your health care provider for instructions if your pump is not working and you must stop using it. You may need to give yourself an injection of long-acting insulin to replace the basal rate your pump usually delivers over 24 hours. Because of this, you always need to keep a vial or pen of long-acting insulin in your refrigerator. Be sure it is not expired.
- If you do not have a current prescription for long-acting insulin, ask for one at your next appointment. Also find out what your dose of long-acting insulin would be if your pump is not working. You will take this dose once a day until your replacement pump arrives.
- Make sure you have a few syringes or pen needles in your emergency supplies to inject the insulin from the insulin vial or pen.
- Remember, a vial of insulin or an insulin pen is good for only 28 days when it is stored at room temperature or after you start using it.
- Learn to use urine ketone test strips. Keep fresh ones on hand. The individually foil-wrapped strips stay fresh much longer.

#### **Questions?**

Your questions are important. Call your doctor or health care provider if you have questions or concerns.

Diabetes Care Center:  
206-598-4882