TIDM Pump users- Sick day Guidelines: Type 1 Diabetes Mellitus- On Insulin Pumps

Patients who use insulin pumps are at greater risk of DKA (diabetic ketoacidosis) than people who give themselves injections because pumps do not use long-acting insulin, and the rapid-acting insulin is delivered in very small amounts.

Ketones develop when the body is breaking down fat for energy, which happens when there is not enough insulin in the body, or the child has not been able to eat or keep down carbohydrates. Patients are instructed to check ketones in urine

Patient must check for ketones in the following situations:

- Unexplained and persistently elevated blood sugars
- Blood sugar greater than 250mg/dl
- Symptoms of nausea or vomiting or abdominal pain (regardless of blood sugar)
- If the basal insulin delivery is interrupted for more than an hour

Insulin pump-related hyperglycemia and/or ketone buildup may be caused by:

- Infusion set problem (examples: infusion set came out from under the skin, insulin pump tubing or infusion set cannula got blocked or kinked)
- insulin pump reservoir or cartridge is empty
- Air in tubing (resulting in missed insulin)
- Extended pump suspension or disconnection (for more than one to two hours)
- Pump malfunction, Insulin leakage (at insertion site or infusion set connection site)
- Illness or infection, Vomiting or dehydration
- "Spoiled" insulin (examples: insulin got too hot or too cold, insulin vial has been opened for more than 28 days)
- Not in auto mode-make sure you are back on auto mode

If the patient has trace and/or small amount of ketones, and the pump appears to be connected and working correctly:

- **Change infusion site/pod,** particularly if it has been in place for more than 2-3 days.
- Give a correction bolus with pump.
- Check blood glucose again in 1 hour.

  - If the blood glucose is decreasing, then check the blood glucose in another 1 hour
  - If the blood glucose is not decreasing, or if it has been 1-2 hours since the last correction bolus and the blood glucose is still higher than 250mg/dl, then suspect pump failure
- Administer a correction bolus with pump every 2 hours and check the blood glucose every hour until it returns to target
- If the blood sugar is 200mg/dl or greater, then the patient is to drink at least 8 ounces of water, Pedialyte, caffeine-free teas, broth, or diet sodas, Pedialyte ice pops every 30-60 minutes. (If the blood sugar is less than 200mg/dl and ketones are present, then patient to sip on sports drinks or other sugar containing drinks such as regular Ginger Ale, Sprite, regular Gatorade.)
- Check every urine for ketones, until the urine is negative for ketones

If the patient has medium and/or large amount of ketones, OR if the patient's blood glucose is not decreasing with a correction dose OR pump failure suspected:

- Take a correction dose of rapid-acting insulin by insulin pen or insulin syringe, not by pump.
- Change the cartridge, tubing, and infusion set/pod, using insulin from a new vial.
- Check the blood glucose every hour until it returns to target (80-160).
- Administer a correction bolus by insulin pen or insulin syringe, not by pump, every 1-2 hours and check the blood glucose every hour until it returns to target. Patient will need more insulin than usual to correct high blood glucose when ketones are present- If moderate to large ketones and blood sugar>250, consider 150% of the correction dose.
- If the site is changed, after the correction dose consider running a higher temporary basal rate for 2 hrs)
- If the blood sugar is 200mg/dl or greater, then the patient continues to drink water or carbohydrate-free liquids such as water, caffeine-free teas, broth, or diet sodas, every 30-60 minutes.
- Check every urine for ketones, until the urine is negative for ketones
- If the pump stopped working, then patient is to follow pump failure protocol as instructed by their provider, after a correction dose of rapid-acting insulin by insulin pen or insulin syringe has been administered.
- If large Ketones, **avoid strenuous exercise and Gym until Ketones are small**

If the patient has moderate to large ketones and is unable to drink, and/or develops severe abdominal pain/vomiting and/or difficulty breathing, then they must go to the nearest emergency room, since DKA is a medical emergency that requires immediate medical attention.