How to manage high blood glucose and avoid ketoacidosis: A guide for people with type 1 diabetes

As a person with type 1 diabetes (the following is also true for many people with type 2 diabetes who take insulin), you need a steady supply of insulin in your body to stay healthy. Without enough insulin, your blood glucose (sugar) rises, causing increased thirst and urination – and possibly serious dehydration.

Without insulin, your body also begins to produce ketones. As ketone levels rise, the blood becomes acidic, and this can lead to a condition known as diabetic ketoacidosis (DKA). DKA can be life-threatening, particularly in the young and the elderly, and in persons with underlying illness or infections. To prevent DKA, people with type 1 diabetes and their caregivers must know how to manage high blood glucose levels and days when you are sick.

Here are some guidelines to help you:

1. Be prepared! Every person with type 1 diabetes should carry the following with them at all times: blood glucose monitor and strips, a supply of insulin (at least fast- or rapid-acting), syringes or an insulin pen (or both), and fast-acting glucose. You should also have easy access to long-acting insulin, glucagon, for hypoglycemic emergencies, and urine or blood ketone testing strips. If you use an insulin pump, you should also have extra reservoirs/cartridges, infusion sets, and batteries handy. Make sure your supplies are not past their expiry date.
2. Be especially cautious when you're traveling. Always carry twice as much insulin and supplies as you would normally use. Be careful not to expose your insulin to extreme temperatures.
3. Never stop your insulin. Remember that you still need insulin even if you're sick and not eating. You may need to cut back on your insulin if you're unwell and unable to keep food down, but your body still needs some insulin to prevent DKA.

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KETONE MANAGEMENT GUIDELINES

If urine or blood ketones are:		Give this much extra insulin:	
Urine ketones	Blood ketones	Blood glucose 15 to 20	Blood glucose over 20
negative (–)	less than 0.6 mmol/L	no extra insulin	give 5% of TDD*
small (+)	0.6 to 1.5 mmol/L	give 5% of TDD*	give 10% of TDD*
medium (++)	1.5 to 3.0 mmol/L	give 10% of TDD*	give 15% of TDD*
large (+++/++++)	more than 3.0 mmol/L	give 15% of TDD*	give 20% of TDD*

*TDD = total daily dose = the total amount of all the insulin (short-acting plus long-acting) that you normally take in a day.

From: http://endodiab.bcchildrens.ca/pdf/sickdays.htm
http://endodiab.bcchildrens.ca/pdf/pumpdka.htm

4. Check your blood glucose regularly. This is especially important if you are sick or feeling unwell, if you are eating or exercising outside your usual daily routine, or if you suspect a problem with your insulin pump infusion site. You can't manage a high blood glucose if you don't know it's happening!
5. Keep yourself hydrated. If your blood glucose is high, be sure to drink plenty of water or other sugar-free beverages to prevent becoming dehydrated.
6. Check for blood or urine ketones if your blood glucose is 15 mmol/L or higher (especially if you're not feeling well), if you may have forgotten to take your insulin, or if you are using an insulin pump. If you have ketones and your blood glucose is high, you need to take extra insulin. Use fast- or rapid-acting insulin. Exact advice for how much extra insulin to take depends on each person, but the chart on page one can be used as a guideline.

You may need to give extra insulin every 2–3 hours until you are better. If you are on an insulin pump and have ketones, your infusion site is probably not working. You need to give yourself an injection with a syringe or pen, and then change your infusion site.

Go to the hospital if:

- You have ketones and are vomiting or have severe abdominal pain.
- You have a fever, difficulty breathing, or other signs of infection.
- You cannot get your blood glucose levels to come down with extra insulin.

Fortunately, with careful management, you will likely never experience DKA. But you must always remain especially careful during times of high blood glucose levels and illness, as DKA can develop surprisingly rapidly, especially if you are a pumper with infusion-site problems. Make sure you have a plan in place for managing sick days. Your own diabetes health care team can provide you more detailed, individualized advice.

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GLOSSARY OF TERMS

Glucose – sugar

Insulin – a hormone that helps the glucose get into your cells to give them energy

Ketoacidosis – a serious complication of diabetes

Ketones – toxic acids that can develop when you don't have enough insulin