More on ketones

For people with Type 1 diabetes only

Diabetes New Zealand

In the Summer 2005 *diabetes* magazine, Louise Farmer explained what ketones are and what if means to have them. She now tells us more.

Ketones are acids that are released into your blood when the body can't use its normal source of energy (glucose). When you have Type 1 diabetes, ketone levels can sometimes build up to dangerous levels if you don't have enough insulin.

This can happen when:

- You haven't taken enough insulin
- Your normal insulin dose can't work as well as usual (when you are sick, injured, or on certain medications).

How can you test?

- Testing your urine (dipstick)
- Testing your blood (fingerprick)

Testing your urine checks for a type of ketones called acetoacetic acid. Testing your blood checks for a type of ketones called beta hydroxybutyrate.

Some pros and cons

- Testing your blood for ketones
- Gives you an accurate result
- Can show quickly if your levels are rising or falling
- Tests for the form of ketones that laboratories test for
- You need an Optium meter with Optium Ketone sticks to test
- Cost: $23-$29 for 8 strips.

Testing your urine for ketones

- Less accurate result (level of ketones in your urine may not reflect the level of ketones in your blood)
- Tests for acetoacetic acid rather than the more damaging form of ketones
- Does not need an Optium meter
- Cost: $12-$15 for 20 strips.

Your diabetes nurse or doctor will teach you how to use the system you choose.

A note if using urine testing strips - individually foil wrapped sticks are good as they stay fresh until the expiry date listed on the package. Strips that come packaged in a canister often degrade within a few months of opening the canister.

What do the levels mean and what should you do if you have ketones?

Set up a plan with your diabetes team about what to do if you develop ketones. Your plan needs to be right for you. At present there are no developed New Zealand guidelines, but here is a sample of the sort of plan your team might recommend:

Blood ketones

0.2—0.6 mmol/L Drink plenty of water, take your usual insulin at your usual time. Check your blood ketone levels again in 1-2 hours. Hopefully, they will be dropping.

0.6—1.5 mmol/L Talk with your health care team. They will generally recommend that you take an additional dose of rapid or short acting insulin. They will also recommend that you drink lots of water and check your ketones every 1-2 hours to make sure they are dropping.

1.5 mmol/L—2.5mmol/L Talk with your health care team urgently. They may want to see you immediately, or they may recommend that you take additional rapid or short acting insulin, drink plenty of water, and check your ketones every hour to make sure they are dropping.

2.5—3.5 mmol/L or more If you can't talk immediately with your specialist diabetes team, you need to go to hospital urgently. If you are feeling at all unwell, you are short of breath, or your ketones are very high, this trip should be in an ambulance. Your team will recommend that you take an additional dose of short or rapid acting insulin and drink plenty of water on the way.

Urine ketones

A trace to a small amount of ketones (5—15mg/dL)

Drink plenty of water and check your urine ketones again in 2 hours. Hopefully, they will be dropping.

Moderate ketones (40 mg/dL)

Talk with your health care team. They will generally recommend that you take an additional dose of rapid or short acting insulin. They will also recommend that you drink lots of water and continue to test your ketones every 1-2 hours to make sure they are dropping.

Large ketones (80—160mg/dL)

If you can't talk immediately with your specialist diabetes team, you need to go to hospital urgently. If you are feeling at all unwell, or the journey is a long one, this trip should be in an ambulance. Your team will recommend that you take an additional dose of short or rapid acting insulin and drink plenty of water on the way.

By Louise Farmer, Diabetes Nurse Specialist

You can also download the article *Testing for ketones* from the Summer 2005 issue of *diabetes* magazine on www.diabetes.org.nz