

BLOOD GLUCOSE TESTING

Learning how to test your own blood glucose levels can help you take control of your diabetes. Keeping your blood glucose levels in a healthy range may require checking your blood glucose several times a day.

Testing can be very encouraging and motivating for you. It can help you see what impact your activities and exercise, your types and quantities of food, and your medications are having on your blood glucose levels. Learn how often to check, how to do it properly, and how to interpret the numbers.

What's Normal?

Before any blood glucose reading has meaning, you need to know what you're aiming for. Ask your health-care provider to discuss what your goals should be.

The words you use to describe blood glucose monitoring may affect how you feel about it. For example, it might help to call it a blood glucose check, not a test, because the word "test" implies pass or fail. It might also help to refer to blood glucose readings as either in or out of target range rather than "good" or "bad."

It's also good to remember that your blood glucose goal is to aim for a target range, not an exact number each time.

When you begin to analyze your blood glucose readings, it is helpful to recognize the difference between an isolated reading and a pattern of readings. Say you check your blood glucose before lunch one day, and you get a reading of 13.6 mmol/l. You know that the reading is out of range, but so what? To make sense of that reading, you would need to know your pattern of blood glucose readings before lunch. If you checked three days in a row before lunch and recorded readings of 6.5 mmol/l, 6.1 mmol/l, and 6.2 mmol/l, you'd see that the reading of 13.6 mmol/l doesn't fit your usual pattern before lunch and therefore isn't noteworthy.

Knowing your pattern gives you a background for comparison. Isolated readings can still be helpful, especially when your blood glucose is low. But an isolated reading is meaningless without knowing the story behind it. And the story includes the factors that affect blood glucose level, including food, medicines, exercise, stress, and infection.

How often should I check?

Most people check their blood glucose level once a day, first thing in the morning. It's a common time to check because it's easy: You get up, check your blood glucose, take your medicines, and eat breakfast. Then you're done with your diabetes for the day and don't have to think about it anymore.

The problem with this routine is that it only tells you about your blood glucose pattern before breakfast. You don't learn what is happening after meals or later in the day. To find meaningful patterns at other times of the day, you have to check at other times of day.

One option for finding more patterns is to check your blood glucose four times per day three days per week. Checking before breakfast, two hours after breakfast, before dinner, and two hours after dinner three times per week for a few weeks will help you identify your patterns throughout the day. Try to make blood glucose monitoring a useful tool by checking your blood glucose at times that serve you. Blood glucose monitoring should help you make a decision, give you feedback about a decision, and help you learn about your usual patterns.

Another option might be to check before and after breakfast on Monday, before and after lunch on Wednesday, and before and after dinner on Saturday. If you take insulin, you will need to discuss with your doctor or diabetes educator how often you should be testing.

There are many ways to keep track of your blood glucose readings so that you can evaluate the patterns. You can use a logbook in which you write down the readings along with any comments (such as what you had for lunch or how stressed you were feeling). Depending on what meter you use, you may be able to use computer software that displays the contents of your meter memory in graphic forms.

Here are some common patterns and probable explanations that will help you make sense of your numbers:

My blood glucose is always higher in the morning when I get up and is lower during the day.

- Your liver might be sending a lot of glucose into the bloodstream because the signals telling it to shut off aren't working. The drug metformin may be prescribed, because its main action is to signal the liver to shut off.
- Your dinner or bedtime snack choices might be raising your blood glucose the next morning. Try changing your food choices and portions to learn more about their effect on your blood glucose levels.
- Your body may be unable to handle the effect of the hormones secreted at dawn that work against insulin. This early-morning release of hormones is called the dawn phenomenon. High blood glucose that results from it can be managed with oral medicines or insulin.
- Your insulin or oral medicine dose may need to be adjusted.

My blood glucose is high all day.

- If you have Type 2 diabetes, your cells may be resisting your insulin. Exercise, weight loss, and certain medicines will help to make your body more sensitive to insulin and lower your blood glucose.
- If you have Type 2 diabetes, your pancreas may not be making enough insulin to meet your needs, and you may require oral medicines or insulin.
- If you have Type 1 diabetes, you may need an increase in your basal insulin doses. Basal insulin is the amount of insulin your body needs in the background all day long.

My blood glucose is within range before I eat but high two hours later.

- It is helpful to understand how the secretion of insulin changes in Type 2 diabetes. The pancreas secretes insulin in response to a meal in two phases. In the first 10 minutes after glucose enters the bloodstream, there is an early burst of insulin release called first-phase insulin secretion. This is followed by the second-phase insulin secretion, a sustained release of insulin that lasts for several hours. One of the early changes in Type 2 diabetes is the loss of first-phase insulin secretion following a meal. This means that not enough insulin enters the bloodstream as quickly as it is needed, resulting in high blood glucose after meals.
- Certain medicines taken at mealtimes can help. The rapid-acting insulins also work effectively to lower blood glucose after meals.
- What you eat makes a difference, too. Your blood glucose reading taken two hours after you start to eat should be about 2mmol/l higher than before you eat. After-meal readings can tell you about the impact of food on your blood glucose levels.

My blood glucose is usually no higher than 7.2 mmol/l, but for the past two days every reading is over 11 mmol/l.

- A sudden change in your blood glucose pattern is usually due to infection. The stress hormones released when you are sick tend to raise blood glucose levels. Infection is a physical stress, and when stress occurs, the body reacts by secreting more epinephrine, cortisol, and glucagon. These hormones cause extra glucose to be released from the liver to give the body added energy to cope. Most times, your blood glucose levels will rise even before you get symptoms of an infection.

Some people stop checking simply because the numbers upset them. It's especially hard when you've been following all the rules, eating right, exercising, and taking your medicines and the numbers are still high.

Learning what the numbers mean and evaluating the patterns are tools that can help you cope. It's also helpful to remember that there are blood glucose readings that defy explanation. Sometimes we just don't know why a reading is out of range. That's why it is wise to team up with a diabetes educator or your health-care provider who can offer guidance and a fresh perspective. What do the numbers tell you? The answer lies in knowing your targets, patterns, and who to call when you have a question.

