

Blood Glucose Monitoring Devices

What does this test do? This is a test system for use at home to measure the amount of sugar (glucose) in your blood.

What is glucose? Glucose is a sugar that your body uses as a source of energy. Unless you have diabetes, your body regulates the amount of glucose in your blood. People with diabetes may need special diets and medications to control blood glucose.

What type of test is this? This is a quantitative test, which means that you will find out the amount of glucose present in your blood sample.

Why should you take this test? You should take this test if you have diabetes and you need to monitor your blood sugar (glucose) levels. You and your doctor can use the results to:

- determine your daily adjustments in treatment
- know if you have dangerously high or low levels of glucose
- understand how your diet and exercise change your glucose levels

The Diabetes Control and Complications Trial (1993) showed that good glucose control using home monitors led to fewer disease complications.

How often should you test your glucose? Follow your doctor's recommendations about how often you test your glucose. You may need to test yourself several times each day to determine adjustments in your diet or treatment.

What should your glucose levels be? According to the American Diabetes Association (Standards of Medical Care in Diabetes 2011, *Diabetes Care*, January 2011, vol.34, Supplement 1, S11-S61) the blood glucose levels for an adult without diabetes are below 100 mg/dL before meals and fasting and are less than 140 mg/dL two hours after meals.

People with diabetes should consult their doctor or health care provider to set appropriate blood glucose goals. You should treat your low or high blood glucose as recommended by your health care provider.

How accurate is this test? The accuracy of this test depends on many factors including:

- the quality of your meter
- the quality of your test strips
- how well you perform the test. For example, you should wash and dry your hands before testing and closely follow the instructions for operating your meter.
- your hematocrit (the amount of red blood cells in the blood). If you are severely dehydrated or anemic, your test results may be less accurate. Your health care provider can tell you if your hematocrit is low or high, and can discuss with you how it may affect your glucose testing.
- interfering substances (Some substances, such as Vitamin C, Tylenol, and uric acid, may interfere with your glucose testing). Check the instructions for your meter and test strips to find out what substances may affect the testing accuracy.
- altitude, temperature, and humidity (High altitude, low and high temperatures, and humidity can cause unpredictable effects on glucose results). Check the meter manual and test strip package insert for more information.
- store and handle the meter and strips according to manufacturer's instructions. It is important to store test strip vials closed.

How do you take this test? Before you test your blood glucose, you must read and understand the instructions for your meter. In general, you prick your finger with a lancet to get a drop of blood. Then you place the blood on a disposable "test strip" that is inserted in your meter. The test strip contains chemicals that react with glucose. Some meters measure the amount of electricity that passes through the test strip. Others measure how much light reflects from it. In the U.S., meters report results in milligrams of glucose per deciliter of blood, or mg/dl.

You can get information about your meter and test strips from several different sources, including the toll-free number in the manual that comes with your meter or on the manufacturer's web site. If you have an urgent problem, always contact your health care provider or a local emergency room for advice.

How do you choose a Glucose Meter? There are many different types of meters available for purchase that differ in several ways, including:

- accuracy
- amount of blood needed for each test
- how easy it is to use
- pain associated with using the product
- testing speed
- overall size
- ability to store test results in memory
- likelihood of interferences
- ability to transmit data to a computer
- cost of the meter
- cost of the test strips used
- doctor's recommendation
- technical support provided by the manufacturer
- special features such as automatic timing, error codes, large display screen, or spoken instructions or results

Talk to your health care provider about the right glucose meter for you, and how to use it.

How can you check your meter's performance? There are three ways to make sure your meter works properly:

1. Use liquid control solutions:

- every time you open a new container of test strips
- occasionally as you use the container of test strips
- if you drop the meter
- whenever you get unusual results

To test a liquid control solution, you test a drop of these solutions just like you test a drop of your blood. The value you get should match the value written on the test strip vial label.

2. Use electronic checks. Every time you turn on your meter, it does an electronic check. If it detects a problem it will give you an error code. Look in your meter's manual to see what the error codes mean and how to fix the problem. If you are unsure if your meter is working properly, call the toll-free number in your meter's manual, or contact your health care provider.
3. Compare your meter with a blood glucose test performed in a laboratory. Take your meter with you to your next appointment with your health care provider. Ask your provider to watch your testing technique to make sure you are using the meter correctly. Ask your health care provider to have your blood tested with a laboratory method. If the values you obtain on your glucose meter match the laboratory values, then your meter is working well and you are using good technique.

What should you do if your meter malfunctions? If your meter malfunctions, you should tell your health care provider and contact the company that made your meter and strips.

Can you test blood glucose from sites other than your fingers? Some meters allow you to test blood from sites other than the fingertip. Examples of such alternative sampling sites are your palm, upper arm, forearm, thigh, or calf. Alternative site testing (AST) should not be performed at times when your blood glucose may be changing rapidly, as these alternative sampling sites may provide inaccurate results at those times. You should use only blood from your fingertip to test if any of the following applies:

- you have just taken insulin

- you think your blood sugar is low
- you are not aware of symptoms when you become hypoglycemic
- the results do not agree with the way you feel
- you have just eaten
- you have just exercised
- you are ill
- you are under stress

Also, you should never use results from an alternative sampling site to calibrate a continuous glucose monitor (CGM), or in insulin dosing calculations.

Useful Links

- **[Useful Tips to Increase Accuracy and Reduce Errors in Test Results from Glucose Meters \(/MedicalDevices/Safety/AlertsandNotices/TipsandArticlesonDeviceSafety/ucm109519.htm\)](/MedicalDevices/Safety/AlertsandNotices/TipsandArticlesonDeviceSafety/ucm109519.htm)** [ARCHIVED]
- **[Common Problems with the Use of Glucose Meters at the Point of Care \(/MedicalDevices/Safety/AlertsandNotices/TipsandArticlesonDeviceSafety/ucm109449.htm\)](/MedicalDevices/Safety/AlertsandNotices/TipsandArticlesonDeviceSafety/ucm109449.htm)** [ARCHIVED]
- **[Getting Up to Date on Glucose Meters \(/ForConsumers/ConsumerUpdates/ucm049051.htm\)](/ForConsumers/ConsumerUpdates/ucm049051.htm)** [ARCHIVED]
- **[How to Report Problems with Glucose Meters and Continuous Glucose Monitoring Systems \(/MedicalDevices/ProductsandMedicalProcedures/InVitroDiagnostics/GlucoseTestingDevices/ucm162002.htm\)](/MedicalDevices/ProductsandMedicalProcedures/InVitroDiagnostics/GlucoseTestingDevices/ucm162002.htm)**
- **[Users of Blood Glucose Meters Must Use Only the Test Strip Recommended For Use With Their Meter \(/MedicalDevices/ProductsandMedicalProcedures/InVitroDiagnostics/GlucoseTestingDevices/ucm162016.htm\)](/MedicalDevices/ProductsandMedicalProcedures/InVitroDiagnostics/GlucoseTestingDevices/ucm162016.htm)**
- **[Lab Tests Online: Glucose \(http://www.labtestsonline.org/understanding/analytes/glucose/glance.html\)](http://www.labtestsonline.org/understanding/analytes/glucose/glance.html)**  **[\(/AboutFDA/AboutThisWebsite/WebsitePolicies/Disclaimers/default.htm\)](/AboutFDA/AboutThisWebsite/WebsitePolicies/Disclaimers/default.htm)**