

Glucometer Calibration

Glucometers **require calibration each time a new vial of test strips is opened and are to be tested at least weekly thereafter** to ensure accurate and reliable readings. In the absence of routine testing, individuals may receive falsely lower or elevated readings, which can lead to inappropriate changes in diabetes medications. General guidance on using control solutions to calibrate and test glucometers has been summarized below.

What is a Glucometer Control Solution?

Glucometer control solutions are those with a known glucose concentration, used to check a glucometer for accuracy. Just as glucometers detect glucose within the blood, they too can detect glucose within control solutions. Solutions will have a specified glucose concentration denoted upon their label, and, if the glucometer is working correctly, should return a numerical reading matching the labeled concentration.

Control solutions may also contain other additives including water, buffers, and antibacterial agents. The addition of water and buffer agents helps the solution mimic the natural composition and pH of blood. Antibacterial agents are added to prevent growth of microorganisms, which have the ability to alter the solution's original glucose concentration.

How Often to Test Glucometers Using Control Solutions?

Best practice is to test glucometer accuracy using control solutions each time a new vial of test strips is opened and at least weekly thereafter. Manufacturers may clarify more stringent testing schedules and additional tests may be warranted in the following scenarios:

- Significant differences in blood glucose values during routine monitoring intervals.
- Blood glucose readings do not reflect how the resident is feeling (e.g., resident's symptoms are highly predictive of hypoglycemia, but an initial glucometer check does not show low blood sugar).
- Improper storage of device or test strips (e.g., test strip vial not securely capped).
- Device or test strip exposure to extreme environmental conditions (e.g., high humidity).
- Suspected water or fluid damage to the device or test strips.
- At the discretion of the testing clinician.

Does Control Solution Expire?

Expiration dating for control solutions may differ between manufacturers. As formulations may contain varying amounts of antibacterial agents and preservatives, always abide by the expiration date denoted upon the solution's label and beyond use dating information provided within the manufacturer's package insert.

How Do I Use Control Solutions?

The steps for testing your glucometer with a control solution are similar to that of routine blood glucose monitoring. A summary of testing steps has been provided below for reference:

1. Insert a new test strip into the glucometer and turn on the device. Ensure all device segments are displaying correctly.
2. Check the expiration date of the control solution. Do not use an expired solution.
3. If indicated on the control solution's label, shake well prior to use.
4. Squeeze the first drop of control solution into a clean tissue. Squeeze a second drop of control solution directly onto the tip of the test strip.
5. After a few seconds, the glucometer should display a glucose reading. Compare this reading to the control solution's glucose concentration as specified on its label.
 - If the reading is correct, testing is complete. For incorrect readings or error messages, refer to the manufacturer's package insert for further instructions.

Reference: [Melissa Herrmann Dierks. Glucose Control Solution: How to Use it to Check Your Meter & Strips. AgaMatrix.com](https://www.agamatrix.com/education/glucometer-control-solution-how-to-use-it-to-check-your-meter-strips)