# Point-of-care testing, blood glucose, ambulatory care

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## Introduction

Point-of-care blood glucose testing is intended for use as a screening tool to measure the glucose level of capillary blood, which can be obtained by fingerstick sampling and evaluated using a glucose meter. Various portable blood glucose meters are available for analyzing blood glucose levels with accuracy comparable to that of laboratory tests.[1]

Depending on the type of blood glucose meter used, blood glucose testing requires placing a drop of blood on a blood glucose test strip before or after inserting the strip into the meter. The test strip contains enzymes that sense signals related to glucose activity. If a blood glucose test result is questionable or doesn't correlate with the patient's symptoms, the test should be repeated. If the repeated test result is still questionable, conventional laboratory testing should be conducted as ordered or per protocol.[1] Staff must have verification of competency to perform any and all testing before administering a point-of-care test for the first time.[2][3]

## Equipment

- Portable blood glucose meter
- Blood glucose test strips
- Gloves
- Mild soap, water, and towel
- Facility-approved disinfectant pads
- Gauze pads or cotton balls
- Single-use, autodisabling lancet
- Optional: small adhesive bandage, alcohol pads

## Preparation of Equipment

Inspect all equipment and supplies. If a product has expired, is defective, or has compromised integrity, remove it from patient use, label it as expired or defective, and report the expiration or defect as directed by your facility. Check the expiration date on the blood glucose test strips. Ensure that the cap on the vial of test strips is secured properly, and observe the strips for any discoloration. *Blood glucose test strips are sensitive to light and humidity and may become inactivated if stored improperly*.

Before using a blood glucose meter, ensure that it has been cleaned and disinfected according to the manufacturer's instructions if the meter is used for multiple patients *to prevent infection*.[4] Calibrate the blood glucose meter and run it with a quality control

test following the manufacturer's instructions *to ensure accurate test results.*[5] Most facility-based blood glucose meters must undergo quality control testing every 24 hours. Follow the manufacturer's instructions for calibration.

Turn on the blood glucose meter. Enter your operator identification and password, if required. Enter and then confirm the patient's identification information manually. Alternatively, if your facility uses bar-code technology, use it as directed by your facility. Note that some blood glucose meters require the blood glucose test strip to be inserted into the meter before applying the blood sample, whereas others require the test strip to be inserted afterward. Make sure to follow the manufacturer's recommendations for the specific blood glucose meter you're using.

## Implementation

- Review the practitioner's order.
- Gather and prepare the necessary equipment and supplies.
- Perform hand hygiene.[6][7][8][9][10]
- Confirm the patient's identity using at least two patient identifiers.[11]
- Provide privacy.[12][13][14]
- Explain the procedure to the patient and family members (if appropriate) according to their individual communication and learning needs *to increase their understanding, allay their fears, and enhance cooperation.*[15]
- Perform hand hygiene.[6][7][8][9][10]
- Put on gloves *to comply with standard precautions.*[16][17]
- Select the puncture site—usually the side of the ball of the fingertip in adults, but some devices allow for blood collection from alternative sites; consult the manufacturer's instructions.[18]
- Instruct the patient to perform hand hygiene by washing using mild soap and water and then drying the hands thoroughly using a towel *to remove sugar that may be present on the skin from exposure to sugar-containing products.*[19] If the patient can't wash with soap and water, clean the intended puncture site using an alcohol pad or other facility-approved disinfectant and let it air-dry completely *because alcohol may interfere with test results.*[18]
- Insert the blood glucose test strip into the blood glucose meter according to the manufacturer's instructions. Note that some meters require you to insert the test strip *after* applying the blood sample.
- Puncture the patient's skin using an approved single-use, autodisabling lancet. If the puncture is insufficient to produce the necessary blood drop, use a new lancet to repeat the puncture.[18]

- Wipe away the first drop of blood using a gauze pad, if required by your facility, *because it may be contaminated with tissue, fluid, or debris.*[18]
- Touch a drop of blood to the test area of the blood glucose test strip, ensuring that the blood covers the entire test area. Note that some blood glucose meters require a hanging drop of blood; refer to the manufacturer's instructions for use. Don't squeeze the patient's finger too tightly, *because doing so may dilute the specimen with plasma, thereby altering the test results.*[18]
- Apply a gauze pad or cotton ball to the puncture site, and apply light pressure *to stop the bleeding.*[18] If the patient is conscious and capable, instruct the patient to apply pressure.[20]
- Read the digital display on the blood glucose meter when the indicator sounds.
- Discard the lancet in a puncture-resistant sharps container.[16]
- Remove and dispose of the used blood glucose test strip appropriately.[16]
- Turn off the blood glucose meter.
- Apply a small adhesive bandage to the puncture site after the bleeding stops, if needed.
- Remove and discard your gloves.[1617]
- Perform hand hygiene.[678910]

♦ ***Clinical alert:*** If you obtain an extremely low or high test result on the blood glucose meter, repeat the test immediately using a different puncture site and confirm the test result. If the test results are still critical, report them immediately *to prevent treatment delays.*[21]♦

- Clean and disinfect the blood glucose meter following the manufacturer's instructions after each patient use.[422]
- Perform hand hygiene.[678910]
- Document the procedure.[232425]

## Special Considerations

- If the patient's hands or fingers are cold, consider warming them using a warmed washcloth or heat pack for several minutes to promote blood flow. Keeping the patient's hands in a dependent position can also help improve blood flow to the puncture site.
- Always notify the practitioner if the results of the blood glucose test are critical. Treat any symptoms as ordered, and follow up with conventional laboratory testing for the blood glucose level.[1]

- Store the blood glucose test strips away from heat, light, and humidity, *because these conditions may affect the accuracy of the test results*.

## Patient Teaching

Teach the patient about the proper use of the single-use, autodisabling lancet and the portable blood glucose meter if the patient will perform blood glucose monitoring at home as needed. Also, teach the patient about the importance of handwashing and drying and then using the first drop of blood for self-monitoring of blood glucose level. If handwashing isn't possible and the patient's hands aren't visibly soiled or exposed to sugar-containing products, advise the patient to use the second drop of blood after wiping away the first drop.[19] Provide the patient with written instructions.

## Complications

Failure to follow proper blood glucose testing technique may lead to inaccurate test results or infection. [418]

## Documentation

Document the date and time of blood glucose testing and the test results in the patient's medical record. Record the name of the person notified of the test results, if needed, as well as the date and time of notification. Record any prescribed interventions and the patient's response to those interventions. Also, document any teaching provided to the patient and family members (if applicable), their understanding of that teaching, and any need for follow-up teaching.

*This procedure has been co-developed and reviewed by the American Academy of Ambulatory Care Nursing.*

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## Related Procedures

- Capillary blood gas sampling
- Capillary blood gas sampling, pediatric
- Capillary blood sampling, neonatal
- Fingersticks and heelsticks, pediatric
- Point-of-care testing, fecal occult blood tests, ambulatory care

- Point-of-care testing, hemoglobin A1c, ambulatory care
- Point-of-care testing, pregnancy test, ambulatory care
- Point-of-care testing, rapid influenza diagnostic test, ambulatory care
- Point-of-care testing, rapid strep test, ambulatory care
- Point-of-care testing, urine test, ambulatory care
- Waived testing, neonatal

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(Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions)

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**Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions**

The following leveling system is from *Evidence-Based Practice in Nursing and Healthcare: A Guide to Best Practice* (2nd ed.) by Bernadette Mazurek Melnyk and Ellen Fineout-Overholt.

Level I: Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials (RCTs)

Level II: Evidence obtained from well-designed RCTs

Level III: Evidence obtained from well-designed controlled trials without randomization

Level IV: Evidence from well-designed case-control and cohort studies

Level V: Evidence from systematic reviews of descriptive and qualitative studies

Level VI: Evidence from single descriptive or qualitative studies

Level VII: Evidence from the opinion of authorities and/or reports of expert committees

*Modified from Guyatt, G. & Rennie, D. (2002). Users' Guides to the Medical Literature. Chicago, IL: American Medical Association; Harris, R.P., Hefland, M., Woolf, S.H., Lohr, K.N., Mulrow, C.D., Teutsch, S.M., et al. (2001). Current Methods of the U.S. Preventive Services Task Force: A Review of the Process. American Journal of Preventive Medicine, 20, 21-35.*