

## Point-of-care Glucose Meters Vs. Centralized Laboratory Serum Testing

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Diabetes mellitus is a serious chronic medical condition that affects approximately seventeen million individuals in the United States (Briggs & Cornell, 2004). Diabetes mellitus along with its sequelae comprise the six leading cause of death in the United States. Mortality due to diabetes mellitus is secondary to other complications, including: retinopathy, peripheral vascular disease, stroke, end-stage renal disease, and coronary artery disease. Point-of-care whole blood glucose meters have been strongly recommended by the American Diabetes Association to monitor blood glucose levels and assist in therapy (Khan, Vasquez, Gray, Wains Jr, & Kroll, 2006). There are over thirty different point-of-care whole blood glucose meters approved by the Food and Drug Administration. With each new device, meters become smaller, faster, and easier to use (Melker, 2003). Values obtained from point-of-care whole blood glucose meters are widely used, both in hospitals and at home, to make therapeutically important decisions, and should therefore accurately correlate with centralized laboratory serum glucose values. Much of the medical community assumes good correlation between point-of-care whole blood glucose meter measurements and those obtained in the centralized laboratory. Baig et al. (2007) found that bedside glucose testing with a glucometer is a simple, cost effective method for monitoring glucose and that centralized laboratory testing, despite having more turnaround time and high financial impact, is a more reliable, accepted method for diagnosis and management of the patient in an acute care setting (Baig, et al., 2007). A study performed by Khan et al. (2006) demonstrated the practice of taking only one measurement with the point-of-care whole blood glucose meters might lead to misdiagnosis (Khan, Vasquez, Gray, Wains Jr, & Kroll, 2006).

Therefore, medical professionals should recognize the potential of point-of-care whole blood glucose meters to produce inaccurate results.

The overall reliability of values obtained from point-of-care whole blood glucose meters is dependent on a variety of factors, including: underlying diseases, patient drug regimens, instrument analytical performances and user proficiency. It is of utmost importance that medical personnel within the hospital utilizing the point-of-care meters be adequately trained in usage, maintenance, and reliability of these devices. Similarly, it is important for patients utilizing these instruments, at home to be properly trained in a similar manner as the medical personnel. Diabetic mellitus patients should also be advised to seek medical help, whenever glucose readings are near the hypoglycemic and hyperglycemic levels, as these values are where the devices show the least amount of accuracy and correlation with centralized laboratory serum glucose testing results.

Although point-of-care whole blood glucose meters provide advantages such as rapid turnaround time and the use of smaller blood volumes, they should be verified routinely with a centralized laboratory serum glucose analyzer. Point-of-care whole blood glucose meters are least accurate at the high and low ends of the linear range; therefore, it is essential to verify results with centralized laboratory serum glucose methods during hypoglycemic and hyperglycemic episodes to prevent further complications and death. It is up to medical professionals to advise the diabetic patients of the importance of routine centralized laboratory testing, and provide orders for both emergency and routine central laboratory serum glucose testing.

## Works Cited

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