**Journal of Diabetes Science and Technology**
Volume 3, Issue 6, November 2009


SYMPOSIUM

# Challenges to Glycemic Measurement in the Perioperative and Critically Ill Patient: A Review

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## Abstract

Accurate monitoring of glucose in the perioperative environment has become increasingly important over the last few years. Because of increased cost, turnaround time, and sample volume, the use of central laboratory devices for glucose measurement has been somewhat supplanted by point-of-care (POC) glucose devices. The trade-off in moving to these POC systems has been a reduction in accuracy, especially in the hypoglycemic range. Furthermore, many of these POC devices were originally developed, marketed, and received Food and Drug Administration regulatory clearance as home use devices for patients with diabetes. Without further review, many of these POC glucose measurement devices have found their way into the hospital environment and are used frequently for measurement during intense insulin therapy, where accurate measurements are critical. This review covers the technology behind glucose measurement and the evidence questioning the use of many POC devices for perioperative glucose management.

*J Diabetes Sci Technol 2009;3(6):1270-1281*

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**Abbreviations:** (ADA) American Diabetes Association, (CLD) central laboratory devices, (CLIA) Clinical Laboratory Improvement Amendment, (CQI) continuous quality assurance, (CV) coefficient of variation, (FDA) Food and Drug Administration, (GDH) glucose-1-dehydrogenase, (ICU) intensive care unit, (ISO) International Organization for Standardization, (NICE-SUGAR) Normoglycemia in Intensive Care Evaluation and Survival Using Glucose Algorithm Regulation, (POC) point of care, (SD) standard deviation, (SMBG) self-monitoring of blood glucose, (YSI) Yellow Springs Instrument

**Keywords:** glucometer, glucose measurement, intense insulin therapy, intraoperative, laboratory, perioperative, point-of-care device

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