

Whole Blood Glucose Standard Is Key to Accurate Insulin Dosages

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Abstract

Introduction:

There is no available glucose standard for whole blood. None of the various glucose controls can be used as standards (calibrators) for glucose meters or test strips. This article describes the need for a whole blood glucose standard for areas such as manufacturing or proficiency evaluations. Furthermore, it describes the performance of the standard developed by Streck. Implementation of a whole blood glucose reference standard may allow the manufacturers of products for the diabetes health care industry to reduce the level of systematic difference between true blood glucose values and those obtained by point-of-care (POC) glucose meters.

Methods:

Glucose agreement data were collected across four prominent POC glucose meters representing >97% of all meters reporting data in the 2006 College of American Pathologists survey. Glucose concentrations of whole blood were adjusted to replicate the concentrations contained in the blood glucose standard developed by Streck. Commercial glucose controls, provided by the respective strip manufacturer, remained unaltered and were tested in accordance with the manufacturer's recommendations.

Results:

Only slight variations in hematocrit, surface tension, and viscosity were measured over a period of 90 days with the Streck Blood Glucose Standard compared to fresh whole blood at time zero. Glucose measurements on whole blood and the blood glucose standard were in agreement for all four commonly used glucose meters. In contrast, there is a lack of agreement between a manufacturer's set of recommended aqueous-based glucose controls in measurements taken on their POC meter relative to the YSI. Finally, the blood glucose standard demonstrated stability in 35-day open- and 110-day closed-vial assessments.

Conclusions:

Results of our experiments illustrate the ability of the blood glucose standard to closely mimic whole blood results. In addition, the blood glucose standard shows good open-vial and closed-vial stability at 6°C.

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Abbreviations: (ADA) American Diabetes Association, (POC) point of care, (SMBG) self-monitoring of blood glucose

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