Tests performed by using Chow-statistics for the overall differences in slope and intercept per method for lot numbers 1 and 2 showed significant differences in analytical performance between the 2 lot numbers \( P < 0.001 \).

The manufacturer provided 2 controls with wide ranges; low control 4.2% to 7.5% and high control 10.5% to 15.3%. The manufacturer should narrow these ranges as was described recently (1).

Results of analysis of the analytical performance of the Quo-Test showed a high total CV, large bias with 1 lot number, failed NGSP criteria, and significant differences between lot numbers. The Quo-Test is officially NGSP certified and passed the NGSP criteria with only 1 lot number as tested at the manufacturer’s site (2). The results we report here demonstrate the large lot-to-lot variability in quality of the Quo-Test Hb A1c point-of-care test.

Health care professionals should be aware of the clinical implications for an Hb A1c value that is determined by using a point-of-care instrument (3). Moreover, to properly interpret the result, health care professionals must know the analytical performance of the Hb A1c method used. This study and the previous study (1) prove that an NGSP certification does not guarantee the quality of results produced in the field and confirms the recommendation of the American Diabetes Association not to use Hb A1c point-of-care assays for diagnostic purposes at this time (3). Validation of a new method is always necessary and cannot be expected to be carried out by health care professionals. For this reason we think that point-of-care devices should be guided by and fall under the responsibility of a central laboratory.

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**Could Susceptibility to Low Hematocrit Interference Have Compromised the Results of the NICE-SUGAR Trial?**

**To the Editor:**

The recently published findings of the Normoglycemia in Intensive Care Evaluation and Survival Using Glucose Algorithm Regulation (NICE-SUGAR) trial have dramatically changed clinician attitudes toward the achievement of euglycemia in intensive care unit (ICU) patients (1). In defending the proof-of-concept studies that validated the efficacy of normalizing blood glucose in the ICU, Van den Berghe et al. pointed out numerous variances between their original studies and those of the NICE-SUGAR trial (2). They included differences in blood glucose targets, insulin administration, blood sampling, nutritional strategies, clinician expertise, and the relative accuracy of the glucose measurement devices. Recently, *Clinical Chemistry* presented a very interesting Q&A on the use of blood glucose meters to achieve tight glucose control in patients in the ICU (3). Because one of our ICUs participated in the NICE-SUGAR trial, we report here some interesting and relevant data that shed more light on the NICE-SUGAR trial, data that yield more questions than answers.

In our 30-bed general systems ICU at the University of Alberta Hospital, point-of-care glucose concentrations can be measured in 2 different ways: respiratory therapists measure arterial blood gases, hemoglobin, electrolytes, and glucose values with the Radiometer 800 blood gas system (BGA) and nurses measure arterial blood and capillary

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1 Nonstandard abbreviations: NICE-SUGAR, Normoglycemia in Intensive Care Evaluation and Survival Using Glucose Algorithm Regulation; ICU, intensive care unit; BGA, blood gas system; BGM, blood glucose meter.
blood glucose with the LifeScan SureStep Flexx blood glucose meter (BGM). Both the BGA and BGM glucose results are stored in a central laboratory data repository, and we retrieved Radiometer BGA and Lifescan BGM glucose results that were run within 15 min of each other for individual patients. The numeric differences between these paired values graphed against the date of collection (represented by the point data) are shown in Fig. 1. The BGM results were usually higher than the BGA results for the first 3 strip lots, with the difference averaging 0.83 mmol/L or 13.6%. For the next 3 strip lots, this BGM/BGA glucose bias was almost zero (0.03 mmol/L; 1.4%). Neither of the manufacturers, Radiometer or Lifescan, could offer any reason for these difference trends.

Because many BGM systems provide artifactually high glucose concentrations in patients with low hematocrits (4), we graphed the BGM/BGA differences against hemoglobin that was proportional to hematocrit and measured by using the Radiometer analyzer. [The mean (SD) hemoglobin concentrations were very similar over the 2 periods, 92.7 (16.9) vs 92.8 (18.1) g/L]. The first 3 glucose reagent-strip lots were more sensitive to the effects of hemoglobin compared to the next 3 lots [glucose difference = \(-0.0195 \times \text{hemoglobin (mg/L)} + 2.41\); \(r^2 = 0.108; P = 0.0001\) (first 3 strip lots); glucose difference = \(-0.0103 \times \text{hemoglobin (mg/L)} + 1.09\); \(r^2 = 0.0926; P = 0.0021\) (last 3 strip lots)]. It appears that many of the samples measured with the first 3 lots of strips would have artifactually increased glucose concentrations. Our hospital general systems ICU participated in the NICE-SUGAR study, and the time of the data collection for NICE-SUGAR coincided with the period during which we were using lots 1, 2, and 3. Of the glucose values reported by our ICU for the NICE-SUGAR patients, the LifeScan BGMs were the source of the most of the glucose values. In accordance with the NICE-SUGAR protocol, high glucose values would be treated. During the NICE-SUGAR study, our LifeScan BGMs were providing increased glucose concentration results on most of our
ICU patients because the majority had low hemoglobin concentrations. Treatment of artifactual hyperglycemia can cause hypoglycemia (5), which should be verified by the main laboratory or a point-of-care blood gas glucose measurement. BGM manufacturers produce multiple strip lots that should exhibit minimum variation. It is possible that other NICE-SUGAR study sites that used LifeScan meters would be treating such artifactual hyperglycemia and thus provoking hypoglycemia. It is important to know what proportion of participating institutions used LifeScan meters. It is also important to know the relative frequency of blood glucose measurements that were obtained by using the LifeScan BGM system in NICE-SUGAR study patients compared to more accurate methods such as BGA gluces. Finally, we should also know the frequency of occasions in which there was subsequent corroboration of hyperglycemia by the main laboratory or by BGA glucose analysis. If a large proportion of study participants used LifeScan systems and relatively few of the hyperglycemic episodes were verified by alternate methods, then perhaps the NICE-SUGAR study should be repeated with more attention paid to the accuracy of the glucose-measuring device (6).

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The Effect of Hemolysis on Current Troponin Assays—A Confounding Preanalytical Variable?

To the Editor:

The universal definition of myocardial infarction stipulates the detection of an increase and/or decrease in cardiac biomarkers [preferably troponin I (TnI)1 or T (TnT)], with at least 1 value >99th percentile of the upper reference limit, together with evidence of myocardial ischemia (1). With the emergence of more sensitive troponin assays, what constitutes a genuine increase and/or decrease becomes critically important (2). For analytical values to be considered different, it has been suggested that such values should vary by >3 SDs of the variance of the measurement method and that a 20% change for troponins is greater than what would be expected from analytical variation (1). At low troponin concentrations, either definition translates into small absolute changes. Good analytical precision is therefore critically important, as is careful consideration of preanalytical variables, such as sample type and particularly hemolysis. Hemolysis is known to be more prevalent in the emergency department environment, with rates of up to 20% of samples (3). Hemolysis is known to cause interference in both TnT and TnI assays (4), although such effects become even more important with the emergence of more sensitive troponin assays and the increased reliance on interpretation of small absolute changes. We therefore evaluated the degree of analytical inter-

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