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Introduction
There is much discussion about the accuracy of hospital blood glucose monitoring systems (BGMS) and self-monitoring blood glucose meters (SMBG). Studies undertaken with the same POC glucose meters have shown different results and this is often related to the different comparative methods used. With new ISO and CLSI performance guidelines emerging it is important that evaluations are standardized to a true and traceable definitive reference method. We assessed the calibration of our laboratory hexokinase method with NIST standards before commencing an assessment of the performance of BGMS and found unexpected results.

Methods
The calibration of our laboratory hexokinase method (Hitachi 7180) and glucose oxidase methods for glucose measurement were assessed using primary and secondary NIST standards (NIST 917c and NIST 965b). Both laboratory glucose measurement methods were performed on an open channel on the Hitachi 7180 analyser. Twelve aqueous glucose levels ranging from 1.39 - 55.56 mg/dL where prepared from NIST standard SRM917c. Four glucose levels of NIST SRM965b (prepared in human serum) with glucose concentration of 1.836 ± 0.027, 4.194 ± 0.059, 6.575 ± 0.094 and 16.35 ± 0.20 mg/dL were also tested. The NIST standards were aliquoted and stored at -80°C before use. Testing was performed at several time points and also the sample aliquots were also tested at an alternative site in Shanghai. During the assessment period an engineering fault occurred with the Hitachi 7180 analyser which required maintenance and repair.

Results
The mean % bias for twelve NIST SRM917c glucose samples tested using the laboratory hexokinase method pre the engineering fault was -0.6% in the first run and -0.3% in the second run. Following maintenance of the Hitachi 7180 analyser the mean % bias across all twelve samples was 6.9% and 11.9% in the next two runs. A similar pattern of results were obtained with the four NIST SRM965b glucose samples with a mean % bias of 0.4%, 3.9% and 2.6% for three test runs pre the engineering fault and 15.1%, 9.3%, 10.1%, 8.8%, 9.0%, 9.7% for six test runs after correction of the engineering fault. The NIST glucose samples tested using the glucose oxidase reagents and at the alternative site continued to give expected target values showing low mean % bias indicating that the pattern of results seen with the hexokinase reagents was not due to instability of the NIST standards.

Conclusion
Although the maintenance change to the analyser did not affect the measurements of the routine biochemical tests, the pattern of hexokinase glucose measurements did show a shift. It is important that NIST standards are used in this situation to check for calibration drift and before commencing an evaluation of the performance of blood glucose monitoring systems.