Comparison of the HemoCue Glucose 201 RT system with the Architect ci8200

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Background and Aim:
Worldwide prevalence of diabetes and cardiovascular disease is increasing extensively [1]. Currently used diagnostic criteria of diabetes is depending on glucose measurements after an overnight fast and after oral glucose loading [2]. These measurements should ideally be performed immediately after collection by near patient testing with high accuracy and results rapidly available [2].

In contrast to previous glucose systems from HemoCue, the RT solution comes with room temperature stable cuvettes that simplify the handling for the user and extended measuring range. The objective of this study was to evaluate the performance of the HemoCue Glucose 201 RT system, using a plasma based method for comparison and fresh whole blood from a diverse population of healthy volunteers, diabetic and non diabetic patients.

Materials and Methods:
Samples were taken from 50 volunteers after overnight fasting and in non-fasting state. Each sample was analyzed in duplicate on both methods, determining glucose concentration within one hour with the HemoCue Glucose 201 RT system and with the Architect ci8200 in plasma from the same sample. For statistical analyses, individual replicate values and mean values were used for HemoCue and the Architect, respectively. Venous blood samples were collected in 5 mL glass vacutainer tubes (Vacuette), containing the anticoagulant potassium oxalate and antiglycolytic sodium fluoride.

Results:
The population studied was diverse, some subjects had normoglycemia while others had pronounced hypo- and hyperglycemia as noted from the glucose values.

Glucose values obtained with the HemoCue Glucose 201 RT system showed good correlation to glucose measured by the Architect ci8200 (Figure 1). Linear regression analysis between the results produced the regression line $y = 0.921x + 0.4253$, $R^2 = 0.9914$, $R = 0.9957$ (Figure 1).

All sampling and measuring during the study was performed by specially trained nurses or laboratory technicians and followed a standard technique for blood collection and preservation used in the laboratory at Falu lasarett.

According to error grid analyses developed by the research group of Cox and Clarke, all results fell within zone A and should be classified as severity rank 1 given negligible or no risk for the patient (Figure 2) [3].

Discussion:
In this study we have compared the HemoCue Glucose 201 RT system to the Architect ci8200 that is a frequently used and well accepted laboratory instrument for accurate plasma glucose determination in healthcare settings. There is a very good agreement between HemoCue Glucose 201 DM RT and Architect ci8200. All results are within zone A and should be classified as severity rank 1 given negligible or no risk for the patient.

The new cuvette design of the RT system makes it easy and comfortable to fill. In this evaluation, we also got use of the extended measuring range, pointing out the clinical advantage of a broader measuring range.

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References: