

## Hematocrit Interference of Blood Glucose Meters for Patient Self-Measurement

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### Abstract

#### **Background:**

Abnormal hematocrit levels may interfere with glucose readings of patient self-assessment blood glucose (BG) meters. The aim of this laboratory investigation was to assess the potential influence of hematocrit variations on a variety of BG meters applying different measurement technologies.

#### **Methods:**

Venous heparinized blood was manipulated to contain three different BG concentrations (50–90, 120–180, and 280–350 mg/dl) and five different hematocrit levels (25%, 35%, 45%, 55%, and 65%). After careful oxygenation to normal blood oxygen pressure (65–100 mmHg), each sample was measured (eight times) with the following devices: Accu-Chek® Aviva Nano and Active, Breeze®2 and Contour®, FreeStyle Freedom Lite®, GlucoDr. auto™, Glucofix® mio Plus, GlucoLab™, GlucoMen® LX Plus, Nova Max® Link, Nova Max® Plus, OneTouch® Ultra®2 and Verio®, On Call® Plus and Platinum, Optium Xceed®, Precision Xceed®, and TaiDoc Fora TD-4227. A YSI 2300 STAT Plus™ glucose analyzer served as reference method. Stability to hematocrit influence was assumed, with <10% mean glucose result bias between the highest and lowest hematocrit levels.

#### **Results:**

Six of the investigated meters showed a stable performance in this investigation: Accu-Chek Active (7%), Glucofix mio Plus (5%), GlucoMen LX Plus (4%), Nova Max Plus (4%), Nova Max Link (7%), and OneTouch Verio (3%). All other meters failed this hematocrit interference test, with FreeStyle Freedom Lite (11%), and On Call Platinum (12%) being the better devices and On Call Plus (68%), GlucoLab (51%), TaiDoc Fora TD-4227 (39%), and Breeze 2 (38%) showing the worst performance.

#### **Conclusions:**

Hematocrit may affect BG meter performance in daily routine. In case of interference, low hematocrit values (<35%) result in too high readings. Our results encourage use of meters that are not affected by hematocrit interference.

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**Abbreviations:** (BG) blood glucose, (CV) coefficient of variation, (GDH) glucose dehydrogenase, (GOx) glucose oxidase, (HIF) hematocrit interference factor

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