# Meter Evaluations

PHARMAC
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## Background:

Formal evaluation of meter performance was undertaken to assess the accuracy and precision of blood glucose meter systems and their strips. The systems studied are those which are funded by the Government in New Zealand (via a subsidy on the Pharmaceutical Schedule). Three separate studies were completed to assess the funded blood glucose meters. The following studies were completed by the Christchurch Diabetes Centre:

Study 1: Accu-Chek Performa and Optium Xceed (5 second test strip): Completed Q2 2008[1]

Study 2: Care Sens II, Care Sens POP, FreeStyle Lite: Completed Q2 2009

Study 3: On Call Advanced: Completed Q3 2009

## Methods:

For each meter tested, simultaneously collected venous plasma and capillary blood samples were taken from at least 50 outpatients attending a diabetes centre. Capillary glucose was measured on at least two meters of each brand. Venous plasma glucose was measured by the laboratory hexokinase method. Method comparison was undertaken using the venous sample as reference standard, using Bland–Altman plots, Passing and Bablok regression analysis, and both Clarke and Consensus error grid analyses.

The paper referenced below [1] provides full details of the methodology.

## Results:

The key results from the meter evaluations are displayed visually on the following pages using both Clarke and Consensus error grid analyses. All meters performed satisfactorily with all results falling within the A and B zones *(see below for clinical interpretation of these zones)*.

The venous plasma sample (i.e. reference value) is displayed along the x axis. The corresponding mean capillary value is displayed along the y axis. The error grids assign a specific level of clinical risk to any possible capillary glucose error as follows:

A - <20% deviation

B - deviation that leads to no change in treatments

C - overcorrection of an acceptable glucose level

D - dangerous failure to detect and treat abnormal glucose levels

E - erroneous treatment

The zones are defined based on surveys of specialist medical practitioners. The only difference between the Clarke Diagram and the Consensus Diagram is in how the error zones are defined.

Other test results which are not shown here, such as measurement of imprecision, showed no significant concerns.

## Conclusions:

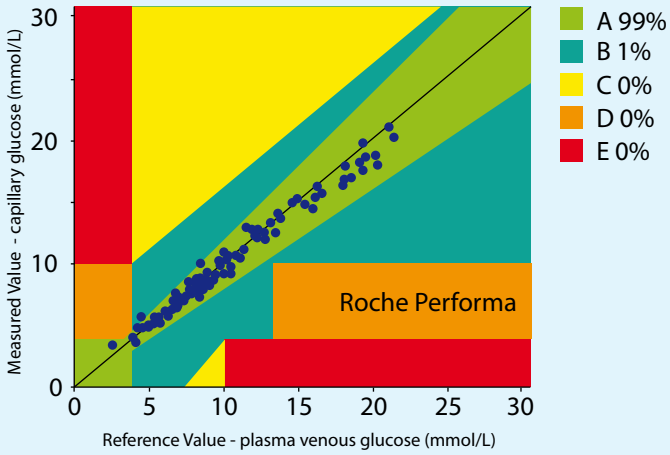
The authors of the study concluded that, in a controlled setting with testing undertaken by trained researchers, all meters performed to a standard that is acceptable for operational use.

[1] *Comparison of blood glucose meters in a New Zealand diabetes centre*
*Florkowski et al. Ann Clin Biochem.2009; 46: 302-305 (http://acb.rsmjournals.com/cgi/content/full/46/4/302)*

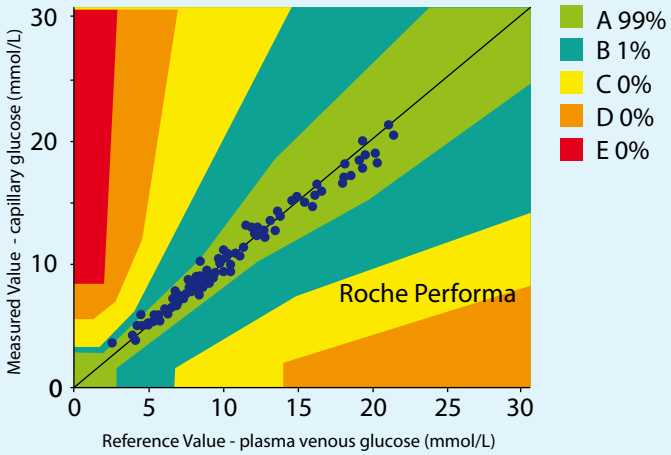
# Accu-Chek Performa

## Error Grid Analysis


### Clarke grid



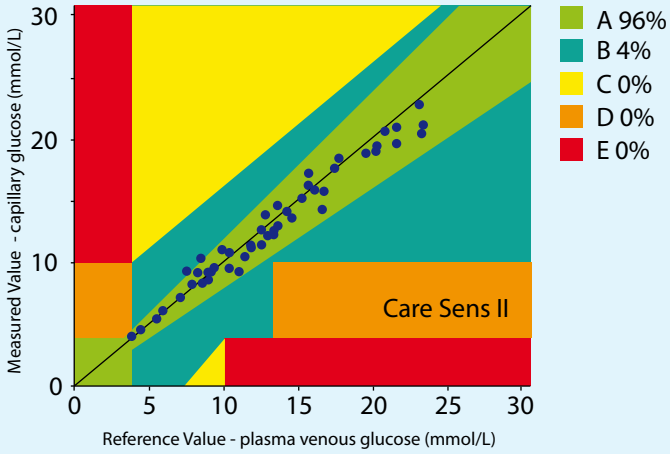

### Consensus grid



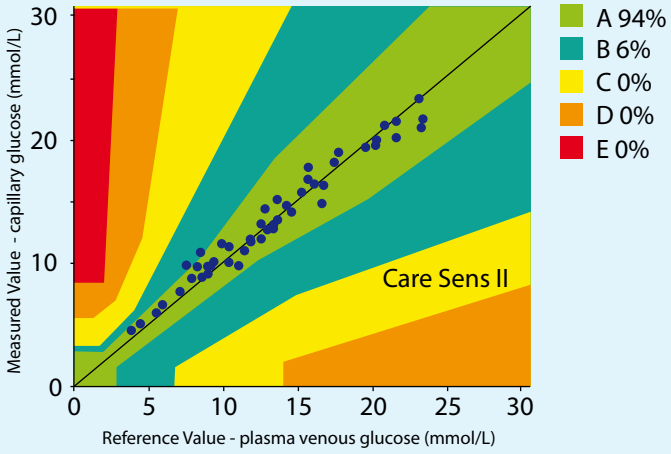

# CareSens II

## Error Grid Analysis


### Clarke grid



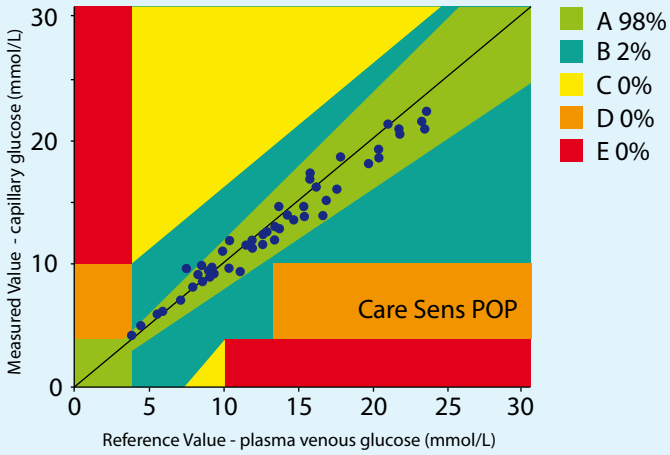

### Consensus grid



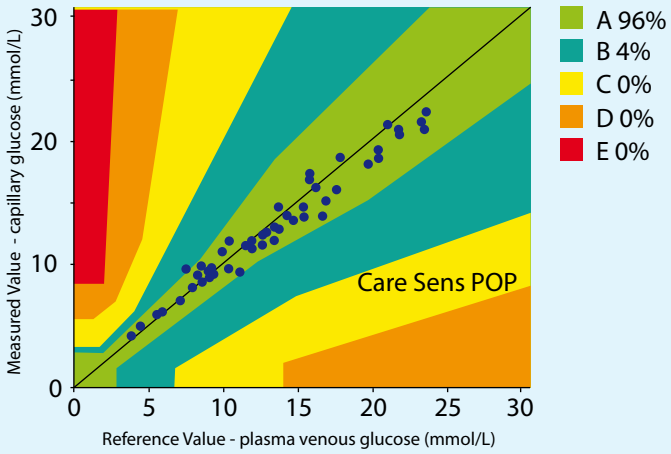
# CareSens POP

## Error Grid Analysis


### Clarke grid



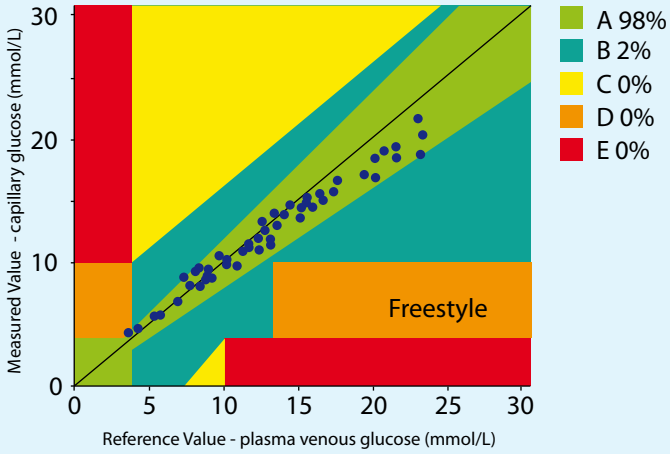

### Consensus grid



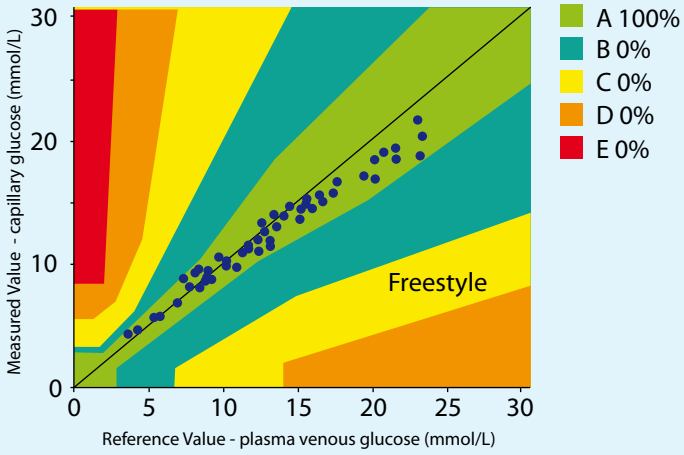

# FreeStyle Lite

## Error Grid Analysis


### Clarke grid



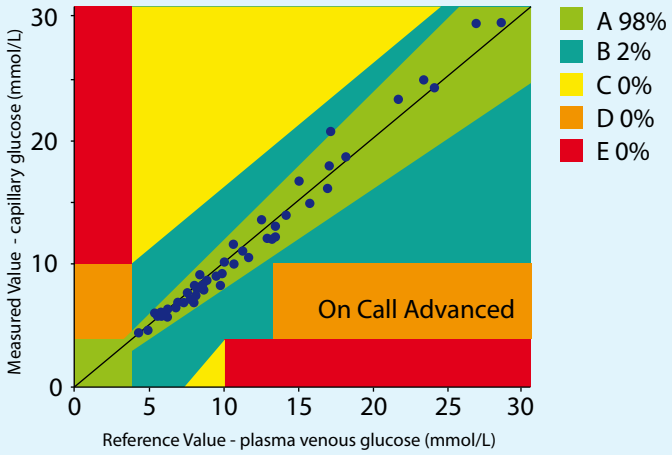

### Consensus grid



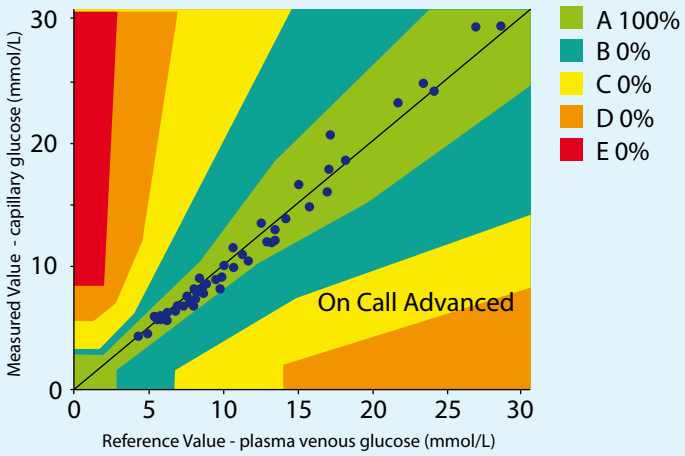
# On Call Advanced

## Error Grid Analysis


### Clarke grid



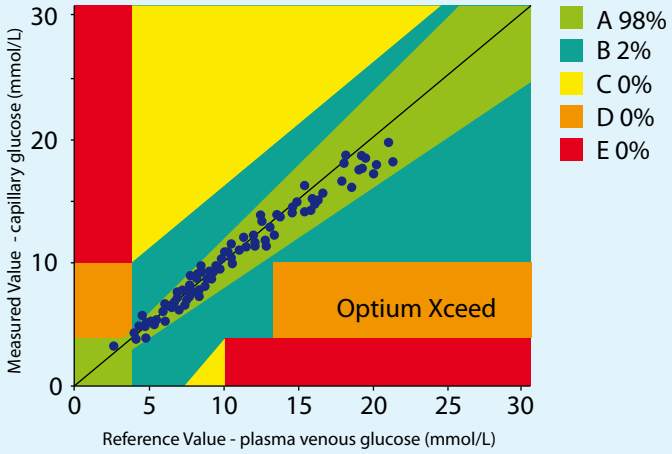

### Consensus grid




# Optium Xceed

## Error Grid Analysis


### Clarke grid




### Consensus grid