

# Operator experience and quality error rates in point-of-care testing



**Authors and affiliations:** Caoimhe Haughey<sup>1</sup>; David Porter<sup>2,3</sup>; Amanda Wilson<sup>3</sup>; Aoife O'Donnell<sup>1</sup>; Francesca Patton<sup>1</sup>; Mark Lynch<sup>3</sup>

<sup>1</sup> Biochemistry Laboratory, Letterkenny University Hospital, Letterkenny, Republic of Ireland

<sup>2</sup> Centre for Clinical Personalised Medicine: Clinical Decision Making and Patient Safety, C-TRIC, Altnagelvin Area Hospital, Derry/Londonderry, Northern Ireland

<sup>3</sup> Clinical Chemistry Laboratory, Altnagelvin Area Hospital, Derry/Londonderry, Northern Ireland

## BACKGROUND:

- Point-of-care [POC] diagnostics plays an increasingly important role in clinical care
- Trained clinical staff generate the test results rather than central laboratory testing services & scientists
- Evidence suggests POC testing may be associated with significantly higher quality error rate than central laboratory testing with the potential to compromise patient safety
- In POC the majority of quality errors occur in the analytical process and relate to operator error

## STUDY AIM: Investigate the relationship between POC operator experience and quality error rates

## METHODS:

- Data were retrospectively reviewed from POC databases within Western Health and Social Care Trust [WHSCT] and Letterkenny University Hospital [LUH] on instrument logged quality errors over a 6 month period for POC Blood gas/electrolyte, Glucose and INR testing [WHSCT only]
- Different blood gas testing systems were used in the two hospitals, whereas the same blood glucose meters were used at both sites
- Both hospitals had comprehensive POC training programmes in place for clinical users with only approved, trained staff accessing testing equipment

## RESULTS:

**Table 1 – Total POC Instrument logged quality errors at Altnagelvin Hospital**

POC test	POC Operators	Patient samples tested	Instrument errors logged	Testing error rate; %
Blood gas <sup>a</sup>	676	20376	1927	9.5
Glucose <sup>b</sup>	644	24681	588	2.4
INR <sup>c</sup>	69	616	41	6.7

**Table 2 – Total POC Instrument logged quality errors at Letterkenny Hospital**

POC test	POC Operators	Patient samples tested	Instrument errors logged	Testing error rate; %
Blood gas <sup>d</sup>	279	15388	813	5.3
Glucose <sup>b</sup>	1016	32090	1178	3.7

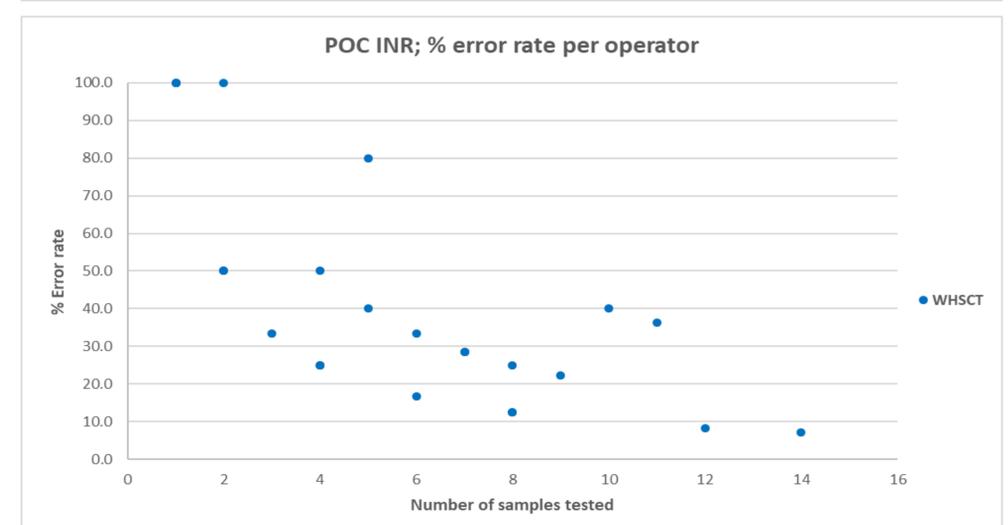
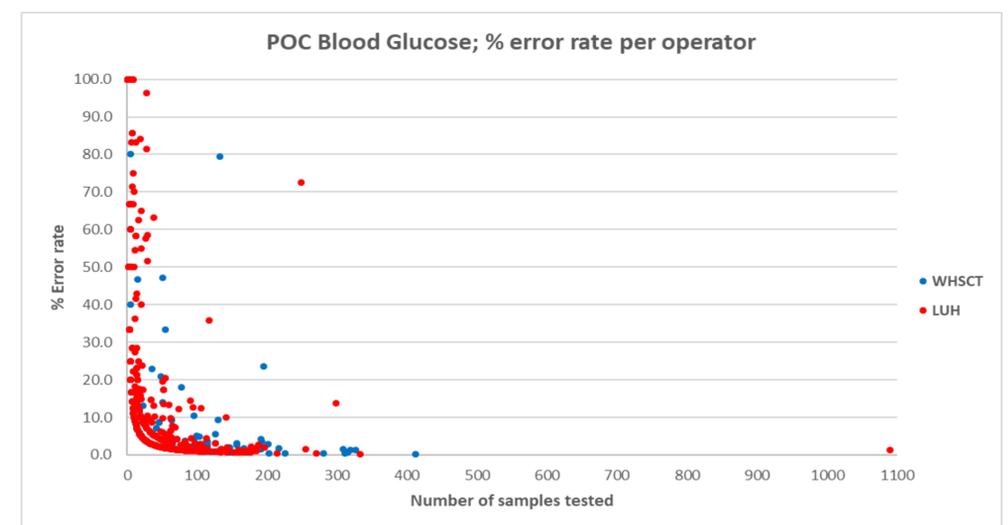
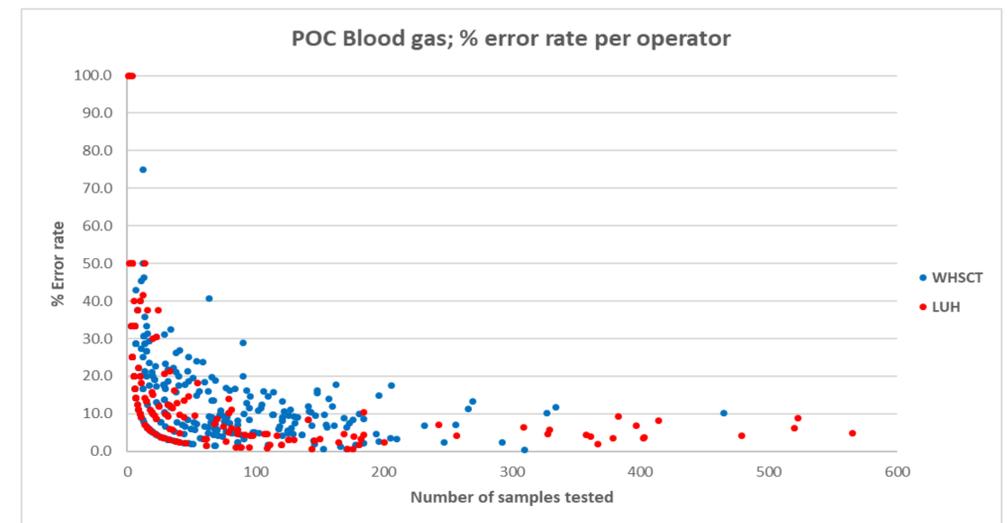
<sup>a</sup> Cobas b123 POC system, Roche Diagnostics

<sup>b</sup> Accu-Chek Inform II Glucose Meter, Roche Diagnostics

<sup>c</sup> CoaguChek XS Pro INR POCT Analyser Roche Diagnostics

<sup>d</sup> Rapidpoint 500 system, Siemens Healthineers

**Figure 1-3 – Scatter graphs showing relationship between individual POC operators % sample error rate and number of samples tested**



- Spearman correlation coefficient (95% CI) analysis confirmed a negative inverse relationship between number of samples tested by individual operators and % Error Rate for POC Blood gas [P < 0.0001 for both WHSCT & LUH], POC Glucose [P < 0.0001 for both WHSCT & LUH] and POC INR testing [P < 0.0001 for WHSCT] over the 6 month reporting period

## CONCLUSION:

- These results show that for staff trained and authorised to use POC testing equipment, frequency of use was an important determinant of quality error rates
- These results can help inform risk assessments when introducing POC equipment into clinical settings, and define the optimum operator testing frequency required for training and competency assurances