

Statement on the utility of blood gas analysers at the point-of-care and the main laboratory platform.

Comparisons between bench-top blood gas analysers (ABL 800 and ABL 90) and laboratory analysers have recently been discussed between chemical pathologists and A&E physicians. It was concluded that blood gas analyser results for electrolytes, creatinine, haemoglobin, glucose and lactate are generally fit for purpose.

Summary Recommendations

- *Routinely confirming results from the blood gas analyser using the laboratory mainframe platform is not recommended and not necessary.*
- *We encourage laboratory confirmation if there is reason to believe that analysis by the blood gas machine is compromised e.g. patient on dopamine infusion, or if results do not fit the clinical scenario.*
- *Be aware that some errors in sample collection (pre-analytical errors) cannot be detected by the blood gas analyser e.g. haemolysis effect on potassium.*
- *In extremes of pH, it is recommended to keep to the blood gas analyser for serial monitoring of the anion gap, due to extreme HCO_3^- effects on laboratory chloride measurement.*

Please call the laboratory or on-call chemical pathologist at any time to discuss.

Background

Point of care testing (POCT), also known as near patient testing, supports timely clinical decision-making by providing results in a matter of minutes. ADHB has over 25 tests provided at the point-of-care, twelve types of devices/machines and hundreds of certified users.

There are discussions around the reliability of electrolytes, glucose, lactate, haemoglobin and creatinine results from blood gas analysers for clinical decision-making: Can they be used to base management decisions? *In short, yes, provided the requestor understands the subtleties involved.*

The POCT team perform multiple quality assurance checks to mitigate patient risk associated with an inaccurate result. This includes thrice weekly comparisons of anonymised residual patient samples, between blood gas analysers and the laboratory main platform. This data is collated to provide evidence of comparability.

Limitations of POCT and laboratory analysis:

Caution is needed when interpreting any laboratory or POCT result. Possible sources of error and confusion include, but are not limited to:

- *Pre-analytical factors* assume special significance in point of care testing e.g.
 - improper mixing gives falsely low haemoglobin results
 - haemolysis gives falsely high potassium results
 - very poor circulation can lower capillary glucose readings
 - a sample from a drip arm causes dilution and potentially low sodium and haemoglobin results.

These pre-analytical errors are not usually captured at the point of care.

- Mislabelling and patient mix-ups! Please take all due care
- Analytical interferences can affect one or both platforms, for example:

Blood gas analyser:

- glycolic acid (glycolate) interferes with lactate measurement (false high)
- dopaminergic drugs with creatinine measurement (false low)
- salicylate and nitrate interfere with chloride measurement (false high)

Laboratory analyser:

- hyperlipidaemia and hyperproteinaemia interfere with electrolyte measurement (false low)
- bicarbonate interferes with chloride measurement at extremes (high HCO_3 , false high Cl). In extremes of pH analytical differences in chloride measurement may lead to clinically significant differences in calculated anion gap.
- creatine supplements interfere with creatinine (false high)

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