
New white paper addresses common pre-analytical errors in blood gas analysis

[Sphere Medical](#), innovator in critical care monitoring and diagnostics equipment, has published a white paper focusing on the mitigation of common pre-analytical errors associated with arterial blood gas analysis [1]. The informative paper is available for download from Sphere's [online clinical resource centre](#) and explores how and why pre-analytical errors occur, as well as the impact of an error on analyte levels in the blood sample. It also considers the [Proxima](#) system, an on-demand arterial blood gas analyser, which is designed to address many of the errors that can occur in the pre-analytical phase.

Entitled "[Addressing common pre-analytical errors associated with arterial blood gas analysis using the Proxima system](#)," the paper observes that up to 60% of all errors in blood gas testing occur in the pre-analytical phase which can ultimately result in patient misdiagnosis and incorrect treatment. The main reason that pre-analytical processes are often more error prone than those later in the testing process is because blood sampling is a manual procedure, whilst analytical and post-analytical phases are often automated and therefore subject to computer checks. Many pre-analytical steps in arterial blood gas analysis are analogous to other laboratory tests; for example accurate sample labelling. However, some pre-analytical steps and potential sources of error are unique to blood gas analysis due to the physicochemical properties of the analytes being measured. Consequently, if the need to draw blood into a tube, label, transport and treat the sample prior to analysis is removed, then many potential pre-analytical errors could be prevented.

As the Proxima system is a patient dedicated blood gas analyser, this allows critical care staff to obtain blood gas measurements without leaving the patient's bedside. Furthermore, the Proxima sensor is integrated into the arterial line meaning that it is a closed system which minimises the need for blood handling with the associated risk of pre-analytical errors.

The paper discusses design features of the Proxima which address specific sources of analytical errors, including: haemolysed samples; errors associated with anti-coagulation; deficient samples; sample storage and transport; sample sedimentation; errors in patient identification and sample contamination.

Notably, risk of the introduction of pre-analytical errors when undertaking manual blood sampling and handling has also been recognised in a recent observational study undertaken by the European Federation of Clinical Chemistry and Laboratory Medicine (EFCLM) working group for the pre-analytical phase (WG-PRE) [2]. The study concludes that the level of compliance with blood sampling guidelines in the 12 European countries assessed is unacceptably low – the most critical steps requiring immediate attention are patient identification and sample tube labelling.

References:

- 1) Fox, J. and Troughton, G. [Addressing common pre-analytical errors associated with arterial blood gas analysis using the Proxima system](#). Published online (March 2015): www.spheremedical.com/content/clinical-resources.
- 2) Simundic, A-M *et al.* [Compliance of blood sampling procedures with the CLSI H3-A6 guidelines: An observational study by the European Federation of Clinical Chemistry and Laboratory Medicine \(EFCLM\) working group for the preanalytical phase](#). Clin Chem Lab Med 2015; 53(9): 1321–1331.

For more information on Sphere Medical and the Proxima in-line blood gas analyser, please view www.spheremedical.com.

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