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**Ward-based blood gas analysis**

Blood gas analysis is a time-consuming procedure, taking up to 30 minutes from obtaining a blood sample from the patient to receiving the results. The process can involve as many as three health care professionals: the doctor, nurse and a member of the pathology department. The result is that it is difficult to provide continual monitoring of blood gas levels on patients with acute respiratory problems.

A decision to introduce blood gas testing on a medical/respiratory ward at the North Cheshire Hospitals NHS Trust was made with the aim of improving patient care. Access to a blood gas analyser on the ward had the potential to improve care by providing speedier results and reducing the margin of error involved when the process was divided among health care staff. A literature search provided a number of papers on ward-based blood gas testing but none of them were written from a nurse’s perspective. This article outlines our experience of introducing the service.

**Prior considerations** There were a number of considerations before we bought the blood gas analyser:

- **Consultation** – it was felt that consultation prior to the initial purchase of the equipment should include the pathology department, ward staff, medical staff and the trust’s clinical governance team. We also liaised with manufacturers of the analysers;
- **Funding** – this needed to be identified accurately for the initial purchase as well as for ongoing consumables;
- **Cost effectiveness** – the number of blood samples taken in the clinical area and whether there was a need for an analyser were considered along with the availability and access to analysers in other wards and departments;
- **Sampling** – the method used to obtain blood samples was considered in relation to the implications for training.

**Cost implications** An audit was carried out that identified the need for the ward-based service. A business case was put forward to support funding for an analyser and its ongoing running costs. We used the clinical governance agenda (Department of Health, 1998) and the British Thoracic Society’s guidelines on the management of acute respiratory failure (1997) to support the case.

**Choice of analyser** The i-STAT analyser was purchased because it is compact, low maintenance and technical and training support was offered by the manufacturer. It is used for blood gases only, from either arterial or capillary samples.

**Issues identified during the introduction of the ward-based analyser** Several further considerations became apparent during the 18-month process of introduction:

- **Users** – ward-based patient testing must be undertaken with the same attention to the needs of the patient and the provision of a safe working environment for the user as would be required in a laboratory setting (Goldie and Kemp, 1993). It was felt necessary to limit the use of the analyser to ward nurses and physiotherapists because of the training required and quality control concerns. It was necessary to provide specific guidelines for staff using the analyser, and comprehensive support at ward level;
- **Training** – initially the manufacturers provided training and ongoing support. However, it was important that the respiratory nurse specialists felt confident in using the machine and developed the confidence to train others to use it safely;
- **Ordering** – initial problems were encountered with our central ordering system. Ordering is now restricted to one person who coordinates delivery between the company and central stores;
- **Storage** – a new larger refrigerator was purchased to cope with storage as cartridges and controls needed to be stored at 2–8°C;
- **Equipment** – software needs to be updated by suitably qualified staff from the pathology department every three months;
- **Interpretation of results** – nursing and physiotherapy staff using the analyser need to be aware of the implications of the results for the patient’s plan of care. This involved further training;
- **Quality controls** – all pathology equipment is accredited and needs to pass the necessary external quality controls.

**Current and future developments** The implementation of ward-based blood gas testing has been a success. We can now offer a combined service of non-invasive ventilation, capillary sampling and ward-based patient blood gas testing. We are now considering purchasing a bench top analyser for the ward and this will allow us to use the current analyser more freely throughout the hospital and community for ongoing monitoring of blood gases, particularly of patients on long-term oxygen therapy.