Enhancing Blood Gas Analysis for NICU Patients

The Problem

Neonatal ICU infants often spend weeks to months in the NICU. Many of these infants are extremely premature, weigh less than 1500 grams and require ventilator support. Comprehensive clinical care requires frequent blood sampling for blood gas analysis and interpretation. Microspecimens of no more than 0.2 mL are obtained from lines, blood vessels, or heel stick punctures, and drawn into 1 mL syringes or wicked into capillary tubes. The pneumatic tube system transported the specimens to the Chemistry Lab for analysis. Frequently, the specimens could not be analyzed because of clots or other sample issues. Multiple repeat specimens were often needed to return a reportable result. This resulted in delays in patient care.

Goals

Adding point of care technology in the NICU for running blood gas samples will

- reduce the number of clotted and inadequate blood gas samples
- reduce the need for repeat specimens
- reduce turn-around time from specimen draw to interpretation of results

The Team

- Point of Care Testing Technical Specialists
- NICU Registered Respiratory Therapists
- NICU Nurse Practitioners
- NICU Leadership

The Interventions

- Several point of care analyzers were reviewed by the NICU and lab team. The IL GEM Premier 4000 was chosen due to its continuous internal calibration and self-contained electrodes, reagents, and waste container.
- Funding was secured with the assistance of the CFO after the project was approved by the Core Clinical Services Committee.
- The Point of Care Testing specialists designed a rigorous validation process to establish reliability of the analyzer.
- The NICU Respiratory Therapy staff underwent specific training to operate the analyzer, run specimens, and enter results into the Clinical Computing system.
- The Point of Care Testing specialists developed a monitoring program to ensure NICU compliance with Laboratory regulations

The Results

- √ The GEM Premier 4000 went live on September 22, 2008.
- √ More than 1200 blood gas specimens have been run.
- √ No specimens have clotted.
- √ Results and interpretation times have been reduced to less than 5 minutes.
- √ Clinician satisfaction has been extremely high.

Lessons Learned

Initiatives that change existing care practices can significantly improve patient care, but require carefully planned multidisciplinary and multidepartmental collaboration.

Next Steps

The NICU continues to expand the use of the GEM Premier. Blood glucose, ionized calcium and lactate are now available for analysis on the machine; electrolytes may be an added panel in the near future.

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