CASE STUDY

Wireless interoperability helps optimize intravenous infusion safety, documentation and management

Children’s Hospitals and Clinics of Minnesota integrates CareFusion Alaris® System smart pumps with Cerner Millennium® electronic health record system

Children’s Hospitals and Clinics of Minnesota (Children’s Minnesota), partnering with CareFusion and Cerner, became the first pediatric hospital system to achieve interoperability between smart intravenous (IV) infusion pumps and an electronic health record (EHR) system. Children’s Minnesota is also the first hospital of any type to implement infusion interoperability for both large-volume and syringe IV infusions. The state’s largest provider of neonatal, cancer, diabetes and cardiac care, Children’s Minnesota is a nonprofit, independent pediatric health system with 381 inpatient beds, 1,700 professional staff, 12,218 inpatient admissions, 20,453 surgical cases, 403 active research programs and approximately $590 M in annual revenue.

Following its successful pilot study in a PICU in March 2012, Children’s Minnesota has implemented smart pump-EHR interoperability for all 381 inpatient beds throughout its Minneapolis and St. Paul hospitals, including ICUs, medical/surgical units, short-stay units, the ER and surgical services for acutely ill pediatric patients ranging from 400-g neonates to 150-kg adolescents. The goal is to continually increase medication safety while reducing costs, using technology to help decrease costly adverse drug events (ADEs) by 10% to 15% per year.

High-risk IV infusions present much greater medication safety challenges than non-infusion medications.1 IV infusion errors, which involve high-risk medications delivered directly into a patient’s bloodstream, are the medication errors with the greatest potential to cause harm—especially for pediatric and neonatal patients requiring precise weight-based dosing.2 Traditional barcode medication administration (BCMA) systems,
which help ensure the 5 rights (right patient, medication, dose, route and time) for a single dose, provide only limited safety value for high-risk IV infusions.

**Improved infusion administration**

Dose-error-reduction software (DERS) in Alaris System smart pumps alerts clinicians to manual infusion-pump programming that exceeds hospital-established limits. Smart pump Auto-ID systems have used barcode scanning to populate the pump with limited infusion-order information from the IV medication label. Now wireless interoperability between the Alaris System and the Cerner CareAware Infusion Suite™ EHR makes it possible to pre-populate the pump with the ordered infusion parameters transmitted directly from the EHR.

Scanning the barcode labels on the patient wristband, medication label and infusion pump helps verify the 5 rights and triggers wireless transmission of the ordered infusion parameters from the EHR to the smart pump module. This solution helps eliminate order transcription errors and almost all of the error-prone manual programming previously required to begin an IV infusion. The solution also automatically engages the Alaris System Guardrails® dose-error-reduction software to further protect the infusion. During IV administration, infusion data is wirelessly transmitted from the Alaris System in near real-time to populate Cerner CareAware Infusion Suite documentation, graphing, patient infusion view, and unit infusion views. This helps secure the 6th Right of medication administration—right documentation.

**Results**

Results from the six-week PICU pilot study of the integrated system* showed that nurse compliance with barcode scanning was close to 90%. Guardrails-protected infusions increased by 15%, and manually programmed infusions decreased by 33%. Personnel-reported medication errors decreased by 71%. Nurses increased their adoption of scanning for pre-population of infusion parameters at a higher rate than with the earlier Auto-ID. Since completing enterprise-wide implementation of the new system, preliminary data show even greater, sustained increases in Guardrails-protected infusions. The integrated system can also help Children’s Minnesota quantify the return on investment (ROI) to the leadership team.

“We’ve broken new ground and shown what’s possible,” says Bobbie Carroll, Senior Director for Patient Safety and Clinical Informatics at Children’s Minnesota. “While this is not the first time barcodes have been used to match medications with patients, it is the first time they have been used to pre-program both large-volume and syringe infusion smart pumps in a children’s hospital. This really opens a new era in IV medication safety in helping protect our most vulnerable patients.”

**Note**

* Children’s Hospitals and Clinics of Minnesota’s results reflect the facility’s infusion processes and protocols in combination with Alaris technologies.

**References**