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Hospital, UCHealth Pump it up for Patient Safety

By Tyler Smith

University of Colorado Health is poised to join a small group of institutions that have joined together two powerful technologies in the service of patient safety.

Medication safety team members who have played key roles in the upcoming launch of the Alaris/Epic integration. Left to right: Krystle Fulton, RN; Demi Jacobi, PharmD; and Sondra May, PharmD.

The project, which initially launches Nov. 10 at University of Colorado Hospital, integrates Alaris programmable medication pumps with the Epic electronic health record (EHR). Patient-specific medication orders – patient name, drug, dose, concentration, and duration, for example – entered in the EHR by physicians will be sent by nurses wirelessly to the pumps, which can deliver up to four intravenous medications to patients. In turn, the medication administration data will be automatically sent back to the EHR for nurses to review and validate.

The process frees nurses from manually programming the pumps, thus reducing the risk of error, and ensures timely documentation.

"Sometimes nurses don't have a chance to get into the chart right away to enter the bolus, drug doses, and administration," said Krystle Fulton, RN, of the medication safety team. "There is a time gap when providers might wonder what happened with the medications they ordered."

With the change, Fulton said, all infusion information will automatically flow back to the EHR, where the nurse will validate it "with the sweep of a mouse."

Automation with oversight. The new system relies extensively on barcoding, but clinicians remain at the center of the process. It begins with the physician's medication order in the EHR – reviewed by a pharmacist – for the drug, dose, and rate of administration. The information, which includes the patient's medical record number and other patient data, such as weight, is then electronically linked to the Alaris pump. The pump's "brain" contains four modules, each one controlling a drug to be infused.

The nurse scans the patient's wristband to verify his or her identity, scans the drug label, compares the information against the order in the EHR, and scans the barcode on any pump modules containing medicine to be dispensed. That triggers transmission of the order in the EHR and programs the pump. The nurse does a final review to guard against errors, verifies the order, and the infusion can begin.

Freeing the nurse from programming the pump eliminates a "hand-off," a prime risk of medical error, Fulton said, because "the order is living in the pump." Fulton said the present system typically requires nurses to make 21 programming keystrokes; in the integrated world, the number will be 3. Patient safety increases with that 86 percent reduction, she said.

Come together. The hospital launched the Alaris pumps in 2008, implemented Epic in 2011, and installed Epic's latest upgrade in 2014. With the Epic upgrade, the time was right to bring the pieces together, said Sondra May, PharmD, medication safety coordinator for the Pharmacy Department at UCH.

"We're leveraging technology to improve patient safety and enhance nursing practice," she said. "We are always working to

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minimize errors in medicine, and human programming of IV pumps introduces the risk of errors. The integration will take away the risk a large percentage of the time."

May said it's difficult to quantify the number of medication errors the new system could prevent. But she said a rough analysis in 2013 of all intravenous medication errors submitted to Safety Intelligence, the hospital's online system for reporting "patient occurrences," estimated that 31 percent of IV administration errors could have been prevented with integrated smart pump technology.

Doug Evans, RN, PMP, project manager for University of Colorado Health, called patient safety the return on investment for the more than $500,000 UCH invested in pump integration.

All hands on deck. Training for all UCH inpatient and Emergency Department nurses – some 1,500 – begins in October. The integration will eventually go system-wide, with hospitals at UCHealth North (Medical Center of the Rockies and Poudre Valley Hospital) slated to go live in February 2016 and UCHealth South (Memorial Hospital) to follow in April. Fulton said about 1,200 nurses at North and another 1,000 or so at South will receive the training.

Ryan Rohman, RN, MSN, interim vice president and chief nursing officer for Medical Center of the Rockies and executive sponsor for the integration, said the north and south regions of UCHealth are each identifying 10 "super users" who will attend training at UCH in October. These nurses will then assist with go live at UCH. The same collaborative approach will apply on the respective go-live dates for UCHealth North and South, said Rohman.

"Doing that will allow more staff to be with patients during the go-lives," Rohman said. "We're using resources from the system to alleviate potential staffing issues."

Each hospital will staff a command center for its respective go-live date, said Carolyn Sanders, RN, PhD, chief nursing officer for UCH and chief nursing executive for UCHealth. "We're trying to emulate the process we followed in implementing Epic," Sanders said.

One world. The project is also a major standardization effort by UCHealth. A system review showed there were some 6,700 records for infusion drugs in the Epic EHR and nearly 5,000 drug entries in the Alaris pump libraries at the various hospitals, said Demi Jacobi, PharmD, with the medication safety team. After reviewing the drugs, doses, and concentrations, UCHealth pharmacists created a standardized list of 904 Epic records for infusion drugs and 869 Alaris pump library entries – a huge gain for efficiency in the pharmacy, Jacobi said, adding that a change in one medication will apply to hospitals in all three regions.

Similarly, system leaders have done extensive work to standardize the workflows for nurses when they administer the medications, Rohman said.

"We're standardizing our processes to ensure we all practice the same way," he said. "Consistent order sets and medication lists contribute to patient safety. There are fewer points of confusion."

The integration will send medication orders from the Epic electronic health record wirelessly to the Alaris pump.

But standardization means change, and change requires preparation, noted Deborah Bonnes, RN, MS, nursing informatics specialist with UCHealth.

"There is a lot of variety in the way nurses infuse medications," Bonnes said. She is part of a system-wide team that reviewed workflows and developed recommendations for best practices in administering and documenting infusions with the new integrated system.

The work covered a wide variety of areas that affect nurses' work with infusions, from starting boluses to flushing lines to positioning computers in proximity to the pumps to maximize efficiency, and many more, Bonnes said. The team is also discussing the

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procedures for transferring patients to areas that are not going live with the integrated system, such as the Cath Lab and other procedural units. The goal, again, is consistent practice, arrived at through consensus.

"Seeing bedside nurses and nursing leadership from all the hospitals in a room working together to go through workflows and give best practice recommendations has been the most gratifying part of the project for me so far," Bonnes said.

Both vendors worked closely with UCHealth to facilitate the transition, she added. Epic programmers made three separate visits to walk through workflows with front-line staff and collect and implement recommendations from the users.

"It's a great example of a multidisciplinary team pulling together across regions and miles to stand up a complicated intervention," Sanders said. "The project has forced us to standardize our medications, concentrations, and workflows, and we've made difficult decisions together. Each region made sacrifices in the interests of protecting patients and nurturing collegiality."

The integration will not shield the hospitals completely from medication errors. Some medications can't be wirelessly programmed, Jacobi said, such as those dosed in million units and others that require "stepped" concentrations that change over time. High-risk drugs, such as heparin and narcotics, can be electronically programmed for the initial dose, but will need to be titrated manually. Patient-controlled analgesics need manual pump programming today, May said, but wireless integration is on the way.

The success of the change at UCH also rests on many months of preparation, including ensuring a wireless system capable of handling increased traffic was in place; finding and testing all of the more than 1,000 Alaris pumps in the hospital; and checking computers. System-wide, staff inventoried and tested more than 2,100 barcode scanners, and a capital request to purchase additional scanners was approved.

The work promises to be well worth the effort, May said. "It's everyone's responsibility to improve our technology to the utmost capability to improve patient safety," she said. "We've already accomplished so much."