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First Prize Safety at the Bedside: Handheld Technology to Improve Medication Administration

Parkview Medical Center is committed to supporting its nurses in their efforts to insure that medications are administered to patients as safely and effectively as possible. In 2005, Parkview paid particular attention to this issue and convened a multidisciplinary medication administration team with representation from pharmacy, nursing, information systems, and administration. As the team discussed the medication process, it began to focus on a Zen-like realization that ultimately led them to the improvement implementation for which they have won this year's Partner in Patient



Nurses at Parkview Medical Center use a wireless handheld system to assist in compliance of the five rights of medication administration.

Photo by John Recor

Safety contest. The realization was that “you don’t know what you don’t know,” or to paraphrase the final question from the October 7 presidential debate, the team wondered, “What don’t nurses know and how will they learn it?”

The team recognized that the last chance to stop a medication error is at the bedside, but the nurse at the bedside, at the “sharp end” of care, about to administer medication to a patient, had no way to know if an error had occurred earlier in the process. Eileen Dennis, chief nursing officer at Parkview, identified important questions that nurses often can’t answer at the bedside: “Has the drug been transcribed correctly? Has it been discontinued recently? Has the medication packaging been correctly labeled? Is the dosage correct? Have new medications been ordered for this patient that I’m not unaware of? The possibilities are endless.” The team shared the nurses’ fear of not knowing how many medication errors were occurring. Further, the team realized that a good tracking

mechanism would help solve this problem and that technology would have to be part of the solution.

To address this weak point in the process, Parkview Medical Center implemented a barcode point-of-care solution designed to eliminate medication administration errors. The system uses a relatively small, handheld device that nurses carry with them during their entire shift. The device is linked wirelessly to the pharmacy. When a nurse scans a patient’s wristband, the device displays accurate up-to-date medication information for the patient, as well as reminders to ensure the Five Rights: right patient, right drug, right dose, right route, and right time. The device tracks all medications for patients assigned to each nurse. It alerts the nurse when doses are due and when medication orders have been added or discontinued. It also prompts the nurse to document data such as pain scales and vital signs for each patient.

Beyond ensuring the accuracy and safety of medication administration at

the bedside, the team anticipated that the technology could improve other aspects of the work environment for nurses. With increased confidence that medications were being managed, administered, and documented correctly, confidence would improve, enhancing the hospital's culture of safety and blame-free environment. In addition, the team hoped that the tool would help nurses improve their organizational and time management skills.

Weaknesses in Original System

Before Parkview implemented the handheld system, medication administration began when the unit secretary received a medication order from a physician, transcribed it, and scanned it to the pharmacy, where it was profiled. Nurses verified orders by signing off medication administration records (MARs) that were handwritten by the unit secretary. The pharmacy printed, updated, and distributed the MAR. In addition, at midnight, the pharmacy would print reconciliation sheets, which nurses used to retrospectively identify MAR errors. That was the first opportunity the nurse had to verify that the medication had been profiled correctly, though several doses of the drug might have already been given.

This system posed many challenges:

- The turnaround time for profiling an order often was unacceptable.
- A lack of communication and understanding between nursing and pharmacy sometimes led to finger pointing.
- All checks and balances were manual, and it could take hours, days, or weeks to track down a medication discrepancy.
- There was no easy way to close the documentation loop for pain scale, high profile meds, patches etc.

Parkview saw immediate improvement in medication errors shortly after nurses started using the handheld system. Prior to implementation, Parkview

conducted a study of medication error using a landmark study by Barker et al. (2002) as a guideline. Through nurse observation, 250 medication doses were monitored. The pre-implementation study found that 20% of the doses had an associated error. The biggest percentage of error (18%) involved medications given at the wrong time. This data was in line with the Barker et al. study, which reported 19% total errors. Parkview repeated the study after implementation of the handheld system and found that the total error rate had dropped to 8%. The data also showed that prior to implementation, 97% of nurses failed to use two identifiers before administering medication, and 85% did not record clinical observations on the MAR. Post implementation, 100% of nurses checked two identifiers, and 100% recorded clinical observations on the MAR.

Further Improvements to the System

The results showed definite improvement, which was very encouraging, but Parkview's leadership felt there were more gains to be made. They knew that any technology must be used correctly and consistently to yield its full benefits. Through continuous education, ongoing innovation, and administrative support, Parkview has achieved additional improvements from the technology used to improve medication administration.

Nursing leadership at Parkview knew that waiting until midnight to retrospectively reconcile MARs was error prone. They asked the technology vendor to work with them to create a way for nurses to verify medications in real time. A new software module for the handheld system was implemented in 2006, which has added another layer of safety to medication administration. In fact, over a 12-month period, quarantined orders (orders with an error or discrepancy) dropped from 1.3% to 0.8%. Because of the success of Parkview's innovation and collaboration with Parkview, the vendor now offers this module to its customers.

The system requires compliance for documentation of pain scales, high-profile medications that need a witness before administration, omission of medications, and tracking of patch placement sites and labs. These were all things that Parkview had struggled to solve before using the handheld system. During the first 19 months of implementation, data was collected to ensure that all medication administration documentation was completed at the bedside. The compliance rate climbed from 70% to a high of 96%.

The pharmacy turnaround time for profiling a new medication order dropped from 45 to 15 minutes.

In the past, nurses could override Pyxis to gain access to an override list of medications; overrides were significantly reduced with the new medication administration process. Currently we utilize a very small override list that speaks strictly to emergent patient needs. If nurses receive the "No order found" message, they are expected to research the problem instead of overriding the alert. Data shows that during 5 months of data collection, overrides dropped from nearly 3% to under 0.5%.

Another advantage of the new medication administration system is that it provides a solid audit trail. In the past, medication discrepancies were difficult if not impossible to reconcile; now they are easily resolved. The system helps identify fraud and ensures accurate billing from Pyxis.

The handheld technology is based on barcoding. Barcode scanning accompanies the administration of all medications. Witness scanning is required with insulin and heparin dosing. This technology provides safety at many levels. All patients have barcoded wristbands, and all medications are dispensed in unit doses with barcodes. All syringes have barcoded labels with name and strength of medication. Look-alike sound-alike medications are clearly identified. Auxiliary labels flag all medications that contain odd strengths.

An unexpected benefit of the new system is improved time keeping for employee attendance. The nurse's name

badge contains a barcode that allows them access to the handheld system. They must have their name badge in order to administer medications. The badge is also used to swipe in and out of our time-and-attendance system. In the past, if a nurse forgot his or her badge, the clock in-and-out times had to be manually edited by the supervisor. Now the name badge is imperative because it links the nurse to his or her handheld. These days, nurses rarely forget their name badges, and editing of the attendance system has all but disappeared!

And finally, in February of 2007 Parkview became an alpha site for the development of a phlebotomy specimen collection module. In January 2008, Parkview went live with the module throughout the facility. Through the handheld, the module provides real-time information about lab tests ordered for a particular patient. The phlebotomist scans the armband and immediately has access to all tests currently ordered for

that patient. The handheld also prints labels at the bedside, which the phlebotomist attaches to the specimen before leaving the patient's room. This module assures that the correct labs are drawn on the correct patient, and that they are correctly labeled at the bedside.

Change Management

Charles F. Kettering once said, "The world hates change, and yet it is the only thing that has brought progress." This is certainly true at Parkview, where clinicians have endured many system and cultural changes over the years and have learned that consistency, persistence, and the ability to stay the course lead to success. Such was the case with improvements to the medication administration process. Some nurses embraced the new system and technology from the beginning. They recognized its value and welcomed the new tool. Most experienced some trepidation. Many nurses were not computer literate, and the learning curve

was daunting to them. There was anxiety and job dissatisfaction related to the use of the handheld.

Nurses complained of a loss of control over certain aspects of the work environment. A handful of nurses admitted up front that they just were not up for the challenge and chose to quit their jobs and move on to other facilities. Parkview leadership responded to all of these needs by providing a hotline that is available 24/7. The nurses who eagerly accepted the new system became trainers and cheerleaders. They were available on the floor especially during the implementation stage for each unit.

A few nurses did their best to work around the technology in an effort to continue doing what they had always done. The checks and balances of the system, however, quickly identified these people. Senior administration demonstrated their support by writing a discipline policy for nurses who subvert the new process. Actions can range from counseling and more education all the way to immediate dismissal.

It has been 3 years since the first nursing unit went live with the new system. We have come a long way and are proud to report that compliance with our use of the new system for medication administration is 98%.

The next step is to roll the system out to the critical care areas. In addition, at the request of our surgical and emergency department clinicians, we are evaluating the appropriateness of this technology in their areas as well. **IPSQH**

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TECHNOLOGY OVERVIEW

Parkview Medical Center uses the CAREt system from IntelliDOT for bedside medication administration.

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