

MEDICATION MANAGEMENT: CASE HISTORY

# Technology's Impact on Reducing Medication Errors

At Danville Regional Medical Center, not a single medication is administered without the benefit of bar code verification technology.

By Patsy Sublett, M.S.N., R.N.-C.

**W**e all know the statistics by heart—an estimated 44,000 to 98,000 patients die every year because of needless medical errors in the very places they should be recovering from illness or injury.

At Danville Regional Health System in Danville, VA, we were just as alarmed by these findings as every healthcare provider in the country. However, long before the Institute of Medicine (IOM) report, "To Err is Human," was released, our staff understood the power of technology to optimize the care provider's daily workflow and to help ensure patients' safety and well-being.

Danville Regional Medical Center (DRMC), 50 miles north of Greensboro and the centerpiece of the health system, is a 350-bed acute care hospital. Among many services, it offers an outpatient testing center, comprehensive surgical services, a 24-hour emergency department, a cardiac rehabilitation program, a cardiac catheterization lab, complete radiology services, pediatric services, critical care unit and laboratory services.

Since 1996, our nurses have used traditional and wireless computer technology at the point of care to improve assessment, documentation and patient safety. Following the publication of the IOM report, we formed a multidisciplinary team to address the specific issue of medication errors and to analyze Danville's medication administration process enterprise-wide.

## Benefits of Bar Coding

Our team of nurses, physicians

and hospital administrators had three objectives:

1. Streamline workflow;
2. Reduce medication errors;
3. Improve patient safety.

To reach these objectives, we needed to re-engineer medication use processes and implement the most effective medication administration information technology. This included reducing paper records as much as possible to eliminate human error.

As part of this effort, Danville implemented Siemens Medical Solutions Health Services Corporation's medication management solution, which uses technology to support the entire workflow of medication ordering and delivery. DRMC had been a long-time Siemens customer, and when we learned they would have a medication administration bar code product ready in 2000, we asked to be a beta site for it.

The bar code component of the Siemens solution is called Med Administration Check, an application that helps DRMC nurses to verify and document administration at the point of care. The two major technology elements of Med Administration Check are wireless computers containing electronic medical records that are mounted on a medication cart and wheeled into the patient's room, and wireless bar code scanners.

Here's how it works: The nurse uses the wand to scan the bar code on his or her ID badge, which provides login to the system, and an online medication administration work list is displayed on the com-

puter. The bar code on each medication to be administered is scanned, and the system automatically checks the scanned medication vs. the medication ordered.

The medication on the work list is highlighted in green and with a check mark if four of the five "rights" of administration (medication, dose, time, route) are verified. Then the nurse scans the bar code on the patient's wristband to verify the fifth right—the right patient. If there is a discrepancy—for example, the medication that was scanned is the incorrect medication for the patient about to receive it—a red window appears on the computer screen, warning the nurse that one of the five rights is being breached, preventing a potentially fatal error.

If all five rights are verified, the nurse administers the medication and selects the 'chart' button. The online documentation is updated, and the medication is automatically charted and charged, eliminating paperwork that takes up valuable time during a nurse's day.

## Implementation and Feedback

Implementation of the Danville beta site began in October 2000. By March 2001, Med Administration Check had been fully deployed in a 38-bed acute care unit dispensing 350 to 450 medications per day to urology and nephrology patients. The multidisciplinary approach used to introduce the new application did garner support among the clinical staff, but we also encountered challenges when switching to these new procedures.

The biggest hurdle for many nurses was getting into the habit of wheeling the wireless computers into their patients' rooms every time they administered medication. Ultimately, there was only an eight to 10 week learning curve for the nursing staff to become comfortable with the system, thanks to ongoing training and an atmosphere of candid dialogue among nurses and managers.

Following success of the beta project, within one year we rolled out Med Administration Check enterprise-wide on a total of 13 nursing units using 70 wireless computers and bar code scanners. Today, all DRMC nurses use the system, and no DRMC inpatient anywhere in the facility receives medication without using the bar code verification technology. We have also eliminated all hard copy, paper charting; all medication administration is charted online.

### Errors Reduced, Workflow Improved

Studies have shown that only 2 percent of the nation's healthcare facilities have fully implemented bar code technology to administer medication. Based on DRMC's success, I am optimistic that this number will rise significantly.

It did not take long for us to realize value—the new system prevented three potential medication errors during the *first week*. Since enterprise-wide implementation in early 2002, DRMC has documented *an average of 84 to 264 potential errors prevented each week*. The system has since earned overwhelming support from the nursing staff by relieving their apprehension about making errors, reducing their administrative burden, and promoting accurate docu-

mentation and charge capture, thereby improving efficiency.

The non-punitive medication variance reporting system has created an environment that accepts change to improve quality and patient safety. In other words, technology has eliminated the often-conflicted obligation colleagues feel to report errors that they see happening because the system does it for them. More importantly, it helps prevent errors before they occur.

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We have seen additional improvements in clinical workflow, specifically in the pharmacy area where Med Administration Check has gained widespread acceptance by the pharmacy staff. The nursing and pharmacy staffs have formed a closer working relationship. All new medication orders entered by pharmacy are displayed in the system with an indicator to alert the nurse that it is a new order. The nurse then verifies the medication against the original physician's order, which decreases medication errors at the transcription phase.

An average of 50 phone calls per day to the pharmacy have been eliminated because the system facilitates message communication between nurses and the pharmacy. Fewer interruptions to the pharmacy order entry process means a decreased chance for potential medication errors. The system also

alerts the nurse if there is any clinical data that must be collected at the time of medication administration, which promotes complete documentation. That information is transferred to the clinical repository and enables physicians to view the patient's complete status at the touch of a button.

Other system features that made a difference at DRMC include:

**Online drug inquiry function.** The nurse can easily look up information on a medication prior to administration. This decreases the potential for an error and has helped provide patient education.

**Laboratory results** are available online in real time. With a mouse click, the nurse can display laboratory values and verify that there are no values that may contraindicate the administration of a medication.

**The system alerts** the nurse if a medication is being administered too soon after the last dose, protecting patients from medication overdoses. At least 10 to 12 potential errors per day are averted because of this functionality.

Danville Regional Medical Center is leveraging the best available technology to make life easier for our clinical staff, but more importantly, to make sure we provide the safest possible care for our patients. Our results are powerful proof that clinical expertise, combined with information technology, can save lives.



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