

# Reducing Medication Errors with IT and Process Change

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The publication of *To Err is Human* broke the silence in the healthcare industry and has made it possible to have discourse on both the scope and possible solutions to the problem of medical errors-medication errors in particular.<sup>1</sup> Data on the numbers of deaths and injuries attributable to medication errors have been widely distributed and debated in the past few years. But whether you think 44,000 to 98,000 deaths due to medical errors is an exaggeration or an underestimation, all agree that healthcare in the United States should be doing a better job at addressing patient safety.<sup>2,3,4,5</sup>

According to *To Err is Human*, medication errors are estimated to account for more than 7,000 deaths annually and for increased hospital costs of about \$2 billion for the nation as a whole. The problems associated with medication errors include death and serious injury, increased cost to treat subsequent problems, increased length of stay, inappropriate documentation leading to third-party payer refusals, bad claims, fraud charges, and reimbursement cutbacks. Research has shown that medication errors occur most often in four process areas: ordering, transcription, dispensing, and administration. The Agency for Healthcare Research and Quality (AHRQ) reports that 39 to 49 percent of medication errors occur at the time the physician writes the order. Another 11 to 12 percent occur during transcription. Dispensing the medication accounts for 11 to 14 percent of errors, and 26 to 38 percent occur when the nurse administers the medication.<sup>6</sup>

## How Was the Local Problem Assessed?

Danville Regional Medical Center, a not-for-profit 350-bed community hospital in Piedmont, VA, has been involved with a quality improvement project to reduce medication errors since 1999. The hospital started by creating a multidisciplinary medication management implementation team, which consisted of nursing, pharmacy, quality improvement, administration, and information systems personnel. The hospital also decided to partner with its information systems vendor to obtain a clear view of the hospital's current practices and its variances from stated procedures and to identify opportunities for improvement through process change and technology introduction.

Danville has a nonpunitive system for reporting medication variances to create an environment that promotes patient safety. In fact, there are incentives for nursing to report variances to encourage complete data collection and identify areas needing process improvements. Because the reporting is self-reporting and the nursing units have incentives to report, it is not surprising that most of the variances reported are in administration and transcription.

## What Was Done to Solve the Problem?

With the recognition that medication variances occur and hospital administration's drive to use data and process to improve safety, several opportunities were identified to reduce the number of medication variances. These included standardizing medication use process; improving documentation of patient allergies, height, and weight; decreasing the number of phone calls to the pharmacy; and improving documentation legibility. Danville also looked to information management technology to address quality and monitoring of the medication process.

### *Technology*

Danville had already addressed the dispensing process by installing a robot in the central pharmacy to dispense most routine, scheduled medications. The next step to tackle was administration and documentation of medications. A system that consists of an online medication administration record and administration checks using bar-code scanning was selected and implemented. Nurses access the system through mobile PCs that communicate via a wireless local area network. The PCs are mounted on carts in the nursing units, and each has a wireless bar-code scanner.

### *Process*

The major process change was using the bar-code scanning. It involved a work flow redesign in which nurses scan each drug and the patient's wristband. The process forces the nurse to perform a controlled quality process. The information system provides both work flow support and error checking. The medication administration record is presented in a work list view, so the nurse sees the drugs that need to be administered for a given patient within a defined time frame. The nurse then removes the drugs from the medication cart and scans them for correctness.

Scanning verifies that the nurse has the right drug, dose, and time and is administering the medication via the right route. The nurse then enters the patient's room and scans the patient's wristband to verify the patient. The system also provides the nurse with tools to ensure complete documentation by enabling collection of vital signs, pain assessments, and other clinical data at the time of administration. The nurse selects a chart icon after the patient receives the medication, and the documentation is immediately captured and stored.

The system warns the nurse if there is a discrepancy in any of the five "rights": right patient, right drug, right dose, right route, and right time. The system alerts nurses to past-due medications and can be set to prevent administration of medications too early. Reports from the system help monitor the medication use process and track variances.

The system also has a messaging capability that enables the nurse to send a message about a particular drug order directly to the pharmacy. An average of 50 phone calls per day to the pharmacy have been eliminated. Fewer interruptions to the order entry process decrease the potential for medication errors. The system provides additional references to the nurse from the medication administration record such as the ability to look up and print a clinical monograph about a given drug in both clinician and consumer versions.

Danville Regional Medical Center believes that this new system will improve patient outcomes and could save lives. To date, the system has been deployed in six patient care areas, and it will be fully deployed hospital-wide by the end of the year. The early results from the initial units have been encouraging. Not only have errors been prevented, but charting compliance is up and the timeliness and accuracy of charting have improved, as has the rapport between nursing and pharmacy.

## Notes

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