

An *Extra Dose* of Safety

Installation of a bar-coding system drives an entire workflow redesign at a non-profit hospital and healthcare network.

When St. Luke's Hospital implemented a mobile wireless point-of-care solution for medication administration at patients' bedsides, it wanted to do more than simply automate old manual processes. The non-profit organization wanted to develop a new workflow process that delivers an extra dose of safety to patients and efficiency to nursing staff, by dispensing medications via compact metal cabinets mounted on the wall outside patient rooms.

St. Luke's Hospital, Bethlehem Campus, is a tertiary-care teaching hospital that serves as the flagship of Pa.-based St. Luke's Hospital & Health Network, a regional, integrated network of hospitals, physicians and other related organizations providing care in Lehigh, Northampton, Carbon, Schuylkill, Bucks, Montgomery, Berks and Monroe counties. The network includes four hospitals, more than 42,700 annual admissions, 1,100 physicians, and more than 6,000 employees and 1,000 volunteers.

Prior to implementing the bar-code scanning system in 2005, St. Luke's reconsidered its standard practice of dispensing meds from 150-pound rolling carts. "Our nurses had been pushing the carts down the halls, locking them in place outside each patient's room, then taking a paper medication record and gathering all the meds from the carts before going to the patients' bedsides," said Nancy Dean, manager of clinical information systems development for St. Luke's. It had never been an ideal system, because the carts were too large to fit through the doorways of the patient rooms. Nurses had longed for a more efficient process

that brought the dispensing units closer to the patients. What's more, they realized they also would be managing smaller laptop computer carts once the bar-code system was implemented. "Our nurses knew they wouldn't be able to push the big med cart in addition to a smaller cart with a laptop—you just don't have enough hands," said Dean.

Opportunity for Improvement

Working with senior consultants from Pennsylvania-based InfoLogix, as well as with representatives from McKesson, the provider of the hospital's automated medication administration system, St. Luke's assembled a task force made up of staff members from nursing, pharmacy, respiratory therapy and IT in a major patient safety initiative the hospital called, "An Extra Dose of Safety." The task force considered a number of options for improving workflow once the bar-

Source

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code system went live, ensuring no stone went unturned in designing the safest, smoothest process for administering meds to patients. “We wanted to be sure we built as many layers of safety as possible into the workflow process,” said Dean. “And, we wanted to do it in a time-neutral way, where we weren’t reducing our nurses’ productivity or adding a time-intensive step to the process.”

First, the task force looked at outfitting the laptop carts with drawers that would hold daily quantities of the meds patients needed. At first blush, the concept made sense, given the fact that the devices for scanning the barcodes on the meds would be tethered to the carts. But pharmacy representatives on the task force disagreed, pointing out that stocking the mobile carts would be like trying to hit many moving targets—much more difficult than the department’s traditional process of replenishing meds daily in the large dispensing carts. “That was one of the key pieces in designing our workflow,” said Dean. “How does pharmacy do a daily exchange to get the next 24 hours’ worth of scheduled medication to the patient? Since every nurse on the floor is equipped with a laptop cart, it would have been a challenge for the pharmacy technician to locate each cart and make the exchange.”

In addition, with the number of nurses typically decreasing from the day to the evening to the night shift, it also would have been difficult to stock the carts consistently knowing that nurse-to-patient assignments would change during the course of the day. For example, a cart stocked in the morning with medications for Mr. Smith and Mrs. Jones, might be used at night by a nurse taking care of Mr. Smith, Mrs. Jones and Ms. Patel.

The Obvious Choice

It soon became clear that wall-mounted cabinets either inside or outside patient rooms would be the logical solution. The task force spoke with staff at a hospital in Reading, Pa. that had implemented a successful system using the cabinets inside patient rooms. “But we decided against that approach, again looking at efficiency from the pharmacy’s perspective,” said Dean. “To do the daily exchange of medications, the pharmacy technician would have to go inside the patient’s room, where there might be an activity or procedure by a physician. Instead, we decided to mount the cabinets on the wall immediately outside the patient rooms.”

Granted, the task force had to compromise on its original goal of putting the dispensing device next to the patient’s bedside, but what St. Luke’s gained in efficiency now that nurses don’t have to wield two carts to dispense medications—and the fact that the solution pleases pharmacy as much as it does nursing—more than compensates. Dean describes these basic steps in the new workflow process:

- **Distribution.** On daily medication exchange rounds, the pharmacy technician rolls a cart filled with enve-

lopes containing the day’s medications—one for each patient. Each envelope has been filled robotically and bar-code verified by the technician before leaving the pharmacy.

- **Placement.** The technician goes to the appropriate wall-mount cabinet for each room, opens the cabinet by entering a secure access code on the cabinet’s keypad, and sets the medications inside. The cabinets are equipped with an interior metal bar that holds the envelope securely, as well as a shelf for liquids and other medications that might be packaged in oversize containers.
- **Flagging.** The technician places a small yellow plastic flag that adheres to the side of the cabinet to indicate that the daily med exchange has been completed. A red flag indicates new medications that have been ordered by the physician. (Narcotics and floor stock medications that may need to be administered immediately are kept in a separate floor stock cabinet elsewhere in the unit. It also integrates into the automated medication administration system.)
- **Dispensing.** Nurses access a screen on their laptops to view the medication schedule for each of their patients. At the appointed administration time, a nurse takes a laptop cart to the wall-mount unit, opens the cabinet by entering a secure access code on the unit’s keypad, removes the appropriate meds, puts them on the laptop cart and rolls it into the patient’s room. The nurse goes through the required bar-code scanning safeguards at the bedside prior to medication administration.

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A Strong Success

St. Luke’s 99-bed campus in Allentown, Pa., was the first to implement the new workflow process in 2005. The 480-bed Bethlehem campus followed in 2006. Plans are in place to implement similar processes at St. Luke’s 62-bed Quakertown facility in the first half of 2007 and later in the year in outpatient areas such as the oncology clinic where, according to Dean, “We want the safest possible process for cancer drug administration.”

The hospital’s 80 percent bar-code scan rate for medication administration is a key indicator that the new workflow process is working. “The rate is extremely high for the industry,” said Chris Sunda, senior consultant with In-

foLogix who worked closely with Dean and the workflow task force as the bar-code system was implemented. “I get calls on a daily basis from hospitals that are just not successfully implementing bar-code administration. A lot of it has to do with the fact that their workflow wasn’t good to start with and that they didn’t take the opportunity to redesign their processes. You can never get to the 80th percentile if your nurses don’t know where the drugs are, or what bins they are in or what carts they are on.” The wall-mount cabinets at St. Luke’s and the process designed around them have effectively removed any confusion among nurses over the location of the med carts.

For St. Luke’s, which twice was chosen as one of the nation’s best hospitals by the *100 Top Hospitals: Benchmarks for Success* study (1997, 2001), the 80th percentile is a baseline for an ongoing medication safety initiative. According to Dean, the hospital’s goal is a 90 percent scan rate. “So often the barcodes won’t scan because of the way the label has been applied by the manufacturer,” she said. “We’ll be focusing on issues like this going forward to help increase our scan rate, as well as studying any warnings the system does issue during the administration process and the nurse’s response.” In this way, St. Luke’s can easily zero in on any high-risk areas.



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In addition, since the new process was implemented, St. Luke’s has undergone its routine annual inspection by the Pennsylvania Department of Health. Inspectors found all aspects of the process in compliance with regulations for patient safety.

The Nursing and Pharmacy Perspective

Initially, pharmacy staff believed that having to refresh individual cabinets rather than the big rolling carts that served multiple patients would cause a drop in their productivity. However, once beyond the learning curve, the impact was not as significant as staff predicted. “Under the old system at the Bethlehem facility it used to take us a good hour to do the cart exchange,” says Laura Tyndall,



St. Luke’s Network Pharmacy Director. “The new system extended the delivery time by only about 15 minutes.”

There was some additional staff training and scripting to do since pharmacy technicians were now out on the floors and having more contact with patients. The technicians also took infection control training as a safeguard because, in some instances, there wasn’t adequate space on the wall outside patient rooms to mount the cabinets and meet life safety regulations. In those cases, the cabinets were mounted inside the rooms, requiring technicians to enter the rooms to perform the daily medication exchange. Regardless of the unexpected steps, Tyndall believes the new, safer workflow process is well worth the extra effort. “It’s much better than the previous system and a step in the right direction,” she says.

Tyndall also adds that there is more room in the pharmacy now that envelopes have replaced the large, heavy medication cart cassettes that held the drawers for filling. “Space is at a premium for us,” she says. “I was glad to see the big carts go.” Nursing also gives the new workflow high marks. With the med cart system, a single cart was used to administer meds to 10 or 12 beds. Typically, more than one nurse shared the med cart, which required some coordination when it came to passing meds. “The wall-mounted system eliminates the need to share the cart, so we have more real-time administration of medications,” says Carol Kuplen, senior nurse executive at St. Luke’s.

It also enables the medication dispensing system to be brought closer to the patient, which, according to Kuplen, is much safer. “Think about the ways medication errors are made,” she says. “When a nurse has to walk from wherever the med cart is to the patient’s room, there’s always the potential of going into the wrong room.”

For more information on InfoLogix wall-mount cabinets, visit www.infologixsys.com

Mobile Intelligence and Expertise

InfoLogix worked with St. Luke's in designing the wall-mount units to meet unique requirements of individual rooms and units, and also to ensure engineering and fire-safety codes were met. "Nothing mounted in the hallway can extend farther than three inches from the wall," says Dean. "We had to make sure the cabinets did not exceed that."

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State regulations also differed among the various units, such as Critical Care. Therefore, it was necessary to examine each unit separately to ensure compliance. For example, one regulation disallows stationary objects to be installed on a wall above a handrail in a hallway. "If the handrail was to the left, we hung the cabinet to the right," says Sunda. "We had to look at every wall to determine the best positioning, according to how the cabinet door swung open—to left or right." In some instances, depending on the needs of the nursing unit, InfoLogix installed cabinets with doors that pull out to provide a workspace. The new workflow is part of the total mobile wireless point-of-care solution InfoLogix implemented for the hospital. The solution uses wireless communication for real-time decision making, and bar-code scanning for verification of medications.

Key Takeaways

- **Increased safety.** The transition from bulky med carts to compact, wall-mounted cabinets is the centerpiece of a strategy designed to increase safety rates in the administration of medications to patients.
- **Strong performance.** With the new process, nurses are bar-code scanning 80 percent of the meds they administer to patients—a high rate in an industry where some hospitals score 30 percent in the first few months after implementing a bar-code system.
- **A new, improved workflow design.** St. Luke's wasn't timid about redesigning workflow from scratch rather than simply automating old processes with a bar-code scanner system.
- **A collaborative effort.** St. Luke's attributes the new system's success to its partnership with senior consultants from InfoLogix, who collaborated with the hospital's nursing, pharmacy and IT staffs to develop a winning solution.

The Importance of Partnership

For hospitals considering a similar workflow design, Dean offers a few suggestions: 1) Understand that such an effort is not simply an IT project, it's a patient safety project as well; 2) It must be collaborative. Be sure to involve nursing, pharmacy and respiratory therapy along with IT and the vendor; 3) Do not expect peak performance right away. With any major redesign, it takes several months for staff to become comfortable with the new system. **HMT**