

## THE HARD WORK BEHIND TECHNOLOGY

### VANDERBILT UNIVERSITY MEDICAL CENTER

- ◆ Nashville, TN
- ◆ 840 beds
- ◆ [www.mc.vanderbilt.edu](http://www.mc.vanderbilt.edu)

Vanderbilt University Medical Center is a principal referral center for physicians and patients throughout the region surrounding Nashville. It includes an acute care hospital, a children's hospital, a cancer center, a trauma and burn center, clinics and a medical school.

## STEEEP

### Safe

Bar code-enabled medication administration is widely considered safer for the patient.

### Efficient

The new technology is used to improve workflows, and the information is analyzed to discover other ways to improve processes.

### THE PROBLEM

Vanderbilt's project didn't address a problem so much as it focused on a goal: to become the safest hospital in the United States. It decided to focus on medication errors, which harm at least 1.5 million patients in U.S. hospitals each year and cost \$3.5 billion annually, the IOM estimates.

### THE SOLUTION

Vanderbilt was an early adopter of computerized provider order entry, building its own system in 1994, to attack the biggest contributor to medication errors: illegible or incorrectly written prescriptions. After a number of years working with that system, Vanderbilt officials decided it was time to focus on the next biggest contributor to errors—medication administration errors—by implementing a bar coding system. Officials committed to this in 2006, when a majority of drugs finally carried bar codes on their labels.

### RESULTS

- » Officials are measuring success by usage, and report that 92 percent of medications administered were scanned into the system by September 2008. (The hospital tracks error rates but does not consider this a reliable indicator of success because it is anticipated that the hospital's new reporting system will actually lead to the reporting of more errors, not fewer.)

### BACKGROUND

Vanderbilt University Medical Center is a large teaching hospital. It stepped into information technology (IT) early, building its own computerized provider order entry system in 1994. (In fact, that system was purchased by its IT vendor, McKesson, in 2001.) But Vanderbilt does not jump on the latest-and-greatest information technology bandwagon. It chooses new systems carefully, and fastidiously analyzes systems and processes to squeeze the best use and information out of technology before moving on to the next project.

As part of that process, in 2005, the organization turned its attention toward nurses, adding nursing documentation to an existing electronic medical record system. Because the hospital's vendor specialized in drug delivery systems, it made sense to add the bar coding piece of the puzzle around the same time, explains Russ Waitman, assistant professor of biomedical informatics and director of the clinical IT effort at Vanderbilt.

With support from associate vice chancellor for strategy and transformation Bill Stead, MD, and Harry Jacobson, MD, vice chancellor for health affairs, a bar-coding team was assembled, including Carol Eck, RN, who runs the Cancer Patient Care Center, project manager Kathy Moss, RN, and Karen Hughart, RN, director of system support services. There were also key people from pharmacy: pharmacy informatics manager Fred Hargrove and informatics pharmacists Phillip Stewart and Carly Feldott, PharmD.

The bar coding system was launched in summer 2007 with one nursing unit each week, then adding the children's hospital, oncology, pediatric intensive care unit and dialysis.

TEAM MEMBERS

- » **Carol Eck, RN**  
Administrative Director,  
Cancer Patient Care Center
- » **Carol C. Feldott, PharmD**  
Informatics Pharmacist
- » **Fred Hargrove**  
Pharmacy Informatics Manager
- » **Karen Hughart, RN**  
Director of System Support Services
- » **Harry Jacobson, MD**  
Vice Chancellor for Health Affairs
- » **Kathy Moss, RN**  
Project Manager
- » **Bill Stead, MD**  
Associate Vice Chancellor for  
Strategy and Transformation
- » **Phillips W. Stewart, PharmD**  
Informatics Pharmacist
- » **Russ Waitman**  
Assistant Professor of  
Biomedical Informatics

It wasn't always easy. For instance, nurses had to get accustomed to their medication schedules being more public and subject to analysis of whether they gave a drug according to schedule. Staff nurse Donna Collins, RN, a "superuser" on the bar code project, says it was difficult for many nurses to surrender the right to judge timing of medication doses. "I do think it's worthwhile and do think it reduces medication errors," Collins says. But bar coding takes more time than tracking doses on paper as nurses had done previously, she says, particularly if the nurse deviates from the schedule and has to justify the decision. "We do need to be accountable for why we don't do things in the time" set in the order, she adds.

The systems team sought ways to pull information from the system to improve the quality of care. For instance, the team wanted physicians and nurses to see both dosing and patient status in real time, so they could see how the patient reacted to a medication as the reaction occurred. The team built a means to see quickly when the order was entered and when the medication was given; it also modified the system so it was easy to see the actual dose of a drug was administered.

The bottom line is a system that makes medication administration safer, in part by providing feedback faster than a paper chart audit could, Waitman says. By being as responsive as possible to nurses, he says, scan rates have stayed above 90 percent. "In some units every single medication is being scanned by nursing staff," he says. That compares with typical bar code usage rates below 80 percent, according to Stead.

**PRINCIPLES OF PERFORMANCE EXCELLENCE**

**Reducing Process Variation**

One of Vanderbilt's five organizational goals is to improve the quality of health care delivery. Unfortunately, a significant amount of money spent on health care goes toward unnecessary or inappropriate care, and it is up to health care providers to change that, Jacobson says. "There are a whole variety of tools that need to be developed and applied for health care improvement," he says.

"Health care is the last great cottage industry," Jacobson continues. "We allow lots of independent artisans to practice in an independent fashion when we understand that doesn't lead to high quality, and it doesn't lend itself particularly well to productivity improvement either."

Three goals feed into the organization's top-level quality improvement goal. First is a focus on mortality rates and the factors that go into them; second is a goal of hitting all publicly reported quality measures at least 90 percent of the time; and third is reducing adverse drug events.

**CONTINUAL IMPROVEMENT**

Vanderbilt's focus on improving processes rather than relying on IT to solve problems will continue, as both caregivers and informatics specialists analyze how the bar coding system is used and what information they need to understand the care they deliver. Some of that will be done through number crunching from the system, Waitman says, but that doesn't replace regular rounding on the floors to see what happens daily with clinicians and patients.