Case Study

At a Glance

Organization

Cookeville Regional Medical Center
Cookeville, TN

Solution Spotlight

- Horizon Meds Manager™
- PakPlus-Rx®
- ROBOT-Rx®
- MedCarousel®

Critical Issues

- Reduce the risk of medication errors
- Position for bar-code point-of-care administration and computerized physician order entry systems
- Reduce labor-intensive cart fill and first dose operations
- Improve efficiency in a tight labor market
- Contain increasing costs

Results

- Improved medication dispensing accuracy to 99.9%
- Avoided a projected 215 potential ADEs annually, saving more than $1 million
- Cut missing medications by 37%
- Reduced cart fill labor by 44%
- Improved cabinet fill labor by 82%
- Accelerated medication picking time by 60%
- Trimmed medication inventory costs by 20%
- Projected ROI of 136% percent over five years

McKESSON
Empowering Healthcare

Cookeville Regional Medical Center

Patient Safety Thrives in Rural Tennessee Hospital following Pharmacy Automation Conversion

Overview

Community growth fueled the rise of a small, country hospital into a regional medical center. When an admittedly reluctant pharmacy turned to automation solutions, the results were significant increases in patient safety, productivity, and cost containment—an outcome that paid back the investment in less than two years.

Challenges

When Opless Walker was hired as Cookeville General Hospital's first pharmacist in 1971, the small, country hospital had just 19 doctors and less than 50 beds. For several years afterward, he and one technician performed all pharmacy duties and were on 24-hour emergency call every day.

As the community grew, so did the hospital, the pharmacy staff, and its responsibilities. In just over a generation, Cookeville Regional Medical Center became a modern, thriving 247-bed regional referral center with access to the most advanced treatment options in the world.

Cookeville Regional provides inpatient, outpatient, rehabilitation and emergency care in addition to a host of specialty services such as The Heart Center and The Cancer Center. With more than 140 physicians providing care in 36 specialties, the facility serves 14 counties in the heart of the Upper Cumberland region in middle Tennessee. The hospital is a publicly owned facility. The Board of Trustees is appointed by Cookeville city government.

Cookeville Regional Medical Center scored in the top 25 percent of hospitals nationwide in patient satisfaction for 2005 and 2006 for both Inpatient Services and Emergency Services.

The hospital continues to grow today. The hospital is in the midst of an $80 million expansion to accommodate a 10-15 percent annual patient census growth. Furthermore, because Cookeville is consistently named one of America's 10 most popular retirement destinations, the hospital's patient acuity rate steadily trends higher.

Despite this advancement, however, medication distribution hadn't changed much since Op Walker founded the hospital's pharmacy practice. The pharmacy staff—nine pharmacists, 12 full-time and 13 part-time pharmacy technicians—continued to pick, pack, check, stock, and conduct medication inventory by hand. Scheduled medications were distributed via a 24-hour cart fill. First doses were dispensed by pharmacy or retrieved by nurses from one of 17 unit-based medication cabinets. The average daily dispensing volume was 2,500 doses.

"I told the board, 'Take a good look in the mirror. Patient safety is an issue facing you and your family every day. If you or a loved one gets ill or injured, they're coming here. Don't you want them to have the best care possible?'"

Opless Walker, Pharm.D.

Director of Pharmacy

"Up until 2001, I was not sold on automation," explained Walker, Cookeville Regional's pharmacy director. "I believed a human being trained as a pharmacist or technician, and with the proper check systems in place, could be expected to do a good job and put out a quality product error free."

Yet, the system proved unproductive and fraught with potential failure points. Pharmacists spent significant time on repetitious order entry, and dispensing, checking, and distributing medications. There was little time available for clinical activities. Similarly, the nursing units also followed manual medication dispensing processes. The management team believed its manual-based pharmacy processes were contributing to potential medication errors due to misfills, as well as controlling medication inventory in the pharmacy and at medication-dispensing cabinets.

For instance, pharmacist checks of overnight cart fill picks revealed as many as 35 picking errors each shift. While uncovered errors were corrected prior to leaving the pharmacy, it underscored larger challenges within the hospital's medication-use cycle.

Answers

First-hand research about pharmacy automation changed Walker's mind. "I've totally turned around," he said. "I'm sold on automation because it potentially eliminates virtually all human error factors."

While Walker recognized the value of bar-code automation technology with regards to medication safety, workforce productivity, and cost containment, he needed to convince the administration and the board of the city-owned hospital.

Walker presented his research findings—including a detailed workflow study, cost-benefit analysis, and site visit results. "My priority is patient care," said Walker. "I told the board, 'Take a good look in the mirror. Patient safety is an issue facing you and your family every day. If you or a loved one gets ill or injured, they're coming here. Don't you want them to have the best care possible?'"

The board unanimously approved a sweeping, three-phase modernization initiative impacting all areas of the medication-use process. The first phase, launched in 2006, focused on central pharmacy automation, and included:

- **Horizon Meds Manager™ (HMM)** pharmacy information system. All pharmacy orders are processed through this system. HMM also integrates with Connect-Rx®, the database and workflow platform that powers pharmacy automation.

- **PakPlus-Rx®** packaging service. The onsite packaging service ensures a continuous supply of bar-coded medications is always available. Also, because all medications are bar coded, it provides an inherent double check, helping to prevent dispensing errors from occurring before they ever have a chance to happen.

- **ROBOT-Rx® system.** The robot automates medication storage, dispensing, returning, restocking, and crediting functions for about 450 of the hospital's most commonly used medications. Technicians operate the robot and pharmacists perform a 10 percent random check. The system dispenses about 2,200 doses as part of the cart fill. Medications are dispensed into patient-specific, bar-coded envelopes. The robot also dispenses most first doses. Overall, ROBOT-Rx accounts for approximately 92 percent of all medications dispensed by the pharmacy.

- **MedCarousel® system.** Technicians use MedCarousel to pick medications for cabinet filling and for some first doses. The rotating

shelves, bar-coding, and pick-to-light technology improve picking accuracy and speed. The high-powered inventory management software improves inventory turns and reduces medication costs.

Nurses retrieve some first doses, as well as PRN and floorstock medications from 17 previously installed unit-based cabinets. The cabinets also interface with a controlled substances software for narcotics. Said Walker, "We're getting a lot less calls from nursing. Nurses are reporting far fewer missing or incorrect medications."

Results

Despite continued patient census growth, central pharmacy automation has dramatically improved medication safety, productivity, and cost containment, according to Walker.

Medication Safety

"We've gone from 35 nightly cart fill picking errors to zero," Walker said. "We also increased our clinical pharmacy practice. The result is prevention of approximately 215 adverse drug events (ADEs) per year, saving our hospital a projected $1,010,500, based on FDA estimates for ADEs." Other results include:

- Improved medication dispensing via ROBOT-Rx to 99.9 percent accuracy.
- Cut medication picking and restocking errors by 80 percent through MedCarousel.
- Reduced the number of missing medications by 37 percent.

Workforce productivity

Pharmacy automation led to dramatic productivity increases, Walker said, including:

- Reduced cart fill time by 44 percent.
- Improved cabinet fill time by 82 percent.
- Speeded the medication picking process by 60 percent.

Financial Performance

"The pharmacy automation pays for itself in several key ways: reduced inventory, reduced potential litigation, and reduced patient stays," Walker said. "After all is said and done, our net income is very good." The hospital is on pace to realize a payback period of 1.8 years, and a return on investment of 136.5 percent over five years. Other results include:

- Trimmed medication inventory costs by 20 percent.
- Projected savings of $18,000 per year by buying medications in bulk form.
- Experienced a first-year cost avoidance of $11,200 from reduced expired medications.

Additionally, Cookeville Regional has established the foundation for the next two phases of its closed-loop solution: bar-code point-of-care administration and computerized physician order entry systems.

Conclusion

While the tangible outcomes are significant, Walker believes that the hospital also is benefiting from a fundamental shift in public perception with regards to medication safety. As a taxpayer-funded facility, the hospital's pharmacy automation project required public approval. It was a highly visible issue that generated much publicity and anticipation.

"Patients, physicians, staff, administration, and board members all have seen the highly visible, fundamental changes we accomplished through pharmacy automation," said Walker. "The medical staff and nurses now see pharmacists making a difference in the patient care areas, and the pharmacists feel more a part of the healthcare delivery team." For instance, clinical pharmacists carry PDAs with them during rounds and use them to access pharmacological references when consulting with physicians.

"One of these days, I'm going to retire. When I walk out of this institution, I want to be able to look back and know that I left it a safer place. With pharmacy automation, I have that peace of mind."

Opless Walker, Pharm.D.

Director of Pharmacy

Walker continued, "The impact has been profound. There is a much higher degree of medication safety awareness, and the perception is that Cookeville Regional is among the most quality-conscious hospitals in Tennessee."

A critical component to the current and future success at Cookeville Regional is following a systems approach when it comes to technology. Very few companies can provide organizations with everything they need. But at Cookeville Regional, experience has shown that working with a single-source company can enhance the functionality of each individual product because of inherent integration benefits.

Approaching all pharmacy automation and clinical systems workflow with a more holistic view allows the hospital to drive best practices, ensure optimal process change, enhance communications, and enable the best care possible. On a more practical level, this systems approach means:

- One system backbone to use and maintain
- One interface to install
- One support desk to call
- Solutions that grow together

As Cookeville Regional advanced from Phase I to Phase II and Phase III, the transition will be much easier because of this single-source company approach.

McKESSON

McKesson Automation Solutions
500 Cranberry Woods Drive
Cranberry Township, PA 16066
724.741.8000
www.mckesson.com

AUTO 150_6/08