



Improving Medication Management and Lowering Drug Costs Through Automated Drug Dispensing

LAS VEGAS IS AMONG THE FASTEST-GROWING cities in America. Since 1980, its population has quadrupled, and since 2000, the city has added about 6,000 new residents each month. For a hospital pharmacy, accommodating the needs of a community undergoing such dramatic change poses unique challenges, especially as patient-acuity levels rise. Against this backdrop, MountainView Hospital — a part of the HCA system of 190 hospitals and 91 outpatient clinics — and its pharmacy department were preparing to comply with a corporate mandate to scan bar coded medications at the point of care.

Our obvious first step was to ensure all of our unit dose medications were bar coded. We examined several internal and external options for bar coding our medications, considering cost, FTE requirements, and overall efficiencies. We knew that buying medications in bulk instead of manufacturer unit-dose packaging would save us 10% right off the top, and McKesson's PakPlus-Rx contracted, in-house repackaging service was the best choice for us, because it ensures more than 95% of our medications are bar coded by a dedicated resource. To supplement the PakPlus-Rx service, our pharmacy staff packages the remaining 5% of our medications using the same equipment the PakPlus-Rx technicians use. We have cross-trained some of our technicians so they can package medications when the McKesson technicians are not on duty.

As we evaluated our bar coded, unit dose packaging options, we also considered McKesson's ROBOT-Rx automated dispensing system to automate the storage, dispensing, returning, restocking, and crediting of bar coded medications in our central pharmacy. We asked ourselves, "What can an automated dispensing system do for us that we're not already doing ourselves?" The short answer was daily cart fill. Using ROBOT-Rx, we could eliminate the manual daily cart fill and get back about six pharmacist and technician FTE hours every day—time we could devote to clinical activities.

Furthermore, we analyzed what an automated dispensing system could deliver in terms of productivity and cost efficiencies. During our analysis, we found that the cost of antibiotics per patient day had increased 20% during 2002 and 2003. We believed that,

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in addition to directly impacting patient safety, an automated dispensing system could help lower overall pharmacy costs through bulk buying, electronic inventory management, and pharmacist redeployment to clinical activities.

MountainView installed ROBOT-Rx in September 2003. In this new environment, the ROBOT-Rx system dispenses scheduled and first-dose medications to patient-specific envelopes. A small footprint of AcuDose-Rx unit-based cabinets located in the emergency department is used for stat medications and narcotics. Technicians transmit the envelopes to nursing units via Swisslog's Translogic pneumatic tube system, and our nurses use Lionville 800 Series carts equipped with Dell laptops and Metrologic 9540 bar code scanners as medication administration platforms.

With an automated cart-fill process, our team was then able to spend more time on impacting patient care. The pharmacy instituted new protocols, and the clinical pharmacist trained staff pharmacists on how to perform clinical interventions. We focused on where the "big money" is — areas such as IV-to-PO conversion, renal dose adjustment, antibiotic optimization, revised ICU-sedation protocols, and reducing post-operative side effects. Several medication-use initiatives have also been implemented, including meperidine-usage reduction, ketorolac-usage reduction, and increased pneumococcal vaccine utilization. In fact, MountainView Hospital now ranks in the top 3% of hospitals nationwide in this Medicare quality measurement. We are constantly adding more cost-savings initiatives to our agendas. One of the latest is a therapeutic switch of Avelox for Levaquin.

Since our ROBOT-Rx implementation, MountainView has expanded from a 192- to a 255-bed facility, and frequently, the census goes even higher. In addition to medication volume increases, the pharmacy has also adapted to rising levels of patient acuity. To best measure performance and cost factors, the pharmacy adopted "doses dispensed per adjusted patient day" as a standard metric. This approach more accurately reflects the actual pharmacy workload. And, because in some ways it parallels the Medicare case mix index, it is a measure that is easier for hospital finance and administration people to understand.

After analysis, we found that our doses dispensed per adjusted patient day were increasing more than 10% annually, which translates into an increase in pharmacy workload. But, we have transferred that additional workload to ROBOT-Rx. In fact, two years later we are doing 20% more work with 10% fewer people.

The process of calculating our post-implementation drug costs was pretty straightforward, but I wanted to examine how ROBOT-Rx impacted total

pharmacy expenses. I reviewed the cost and value of bulk medication buying, bar code packaging economies, and improved inventory control. Before implementation, savings to the hospital were projected to be about \$620,000. However, the hospital actually exceeded projections by almost 40%, with a savings of nearly \$860,000. Our patient-intervention savings climbed even higher—exceeding \$1.3 million in 2004 and \$1.6 million in 2005. To calculate our patient-intervention savings, we counted only true savings in supply costs. For example, we calculated the savings from therapeutic interchanges by multiplying the difference in cost per treatment-day by the number of treatment days in the month. We did not include estimated values for factors such as adverse reactions avoided or clinicians' time saved.

We further analyzed the impact of automated dispensing by dividing our total drug cost by adjusted patient day. We found that since the implementation of ROBOT-Rx, the drug cost for adjusted patient day continued to decline each year. At the end of the second full year of using automated dispensing, we were 8% below budget—even though drug price inflation was nearly 10%. In addition, our 2006 year-end numbers indicate that our cost of drugs per adjusted patient day is 6.9% lower than it was in 2005.

HCA's nationwide benchmarking statistics for its 190 hospitals further illustrates the efficiency of MountainView's pharmacy department. HCA bundles hospitals into comparative groups based on volume (patient days for the quarter), and MountainView is normally grouped with 15 to 18 other facilities. For the last six quarters, we have been ranked first in our group in the "pharmacy productive man-hours per adjusted patient day" measurement. In the third quarter of 2006, we averaged 0.442 man-hours per adjusted patient day — the lowest in our group of 17 facilities, with the highest figure at 0.769. Furthermore, from 2003 to 2005, we reduced our man-hours per adjusted patient day by 10%.

There is no doubt that pharmacy automation can free up your staff members' time, but how you use that time is the key to maximizing your investments in technology. If you use the time to perform clinical interventions, introduce pharmacy-driven protocols, and change drug-handling processes, you can substantially lower bottom-line costs to your organization. Medication management is the secret to savings, and the more people you use in that area, the more dollars you will save. ■



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