



# A Multi-Vendor Approach to Restructuring Medication Management Systems

**W**ith 361 licensed beds, Central DuPage Hospital (CDH) is a community hospital serving the Chicago suburbs. We have a joint venture with Children's Memorial Hospital and Loyola University Medical Center for Oncology, and have achieved many admirable distinctions, including the JCAHO Gold Seal of Approval and Special Award as well as *Hospital and Health Networks* magazine's "Most Wired" and "Most Wireless" awards, and being named one of *U.S. News & World Report's* "Best Hospitals of 2007". CDH is second in Illinois in volume of surgical procedures, and our inpatient pharmacy reviews about 325,000 orders per month, including IVs and compounded sterile preparations.

In the last three years, CDH has implemented a sophisticated, closed-loop bar coded medication program, and leveraged it to get substantial value—both clinically and operationally—from our existing resources. While patient safety has been the driving force, we have also embraced automation as a tool to provide higher quality of care for our patients and to improve our service to our clinicians. Our pharmacy automation is a visible reinforcement of our commitment to return pharmacists to a deeper role in clinical activities.

## Evaluating the Environment

To prioritize our patient safety and service needs, we first evaluated our medication use environment. CDH had already made a commitment to automated dispensing cabinets (ADCs) for distributing many of our medications, and in concert with nursing, we opted to build upon that commitment. Early in our planning, we determined that our nurses' top priority was for first doses, and ultimately all doses, to be accessible from the cabinets on their units. That is the fundamental principle around which our system is designed.

We focused on many safety initiatives during the remodeling and restructuring of our processes, including building a USP <797>-compliant cleanroom and implementing bar coded medication administration (BCMA). As we embarked on those projects, we became aware of other, broader advantages that automation could bring to our medication management systems.

## A Multi-Vendor Environment

As opposed to working with one vendor for all of our medication management systems, CDH works with a healthy mix of vendors. We have chosen to take a best-in-class approach, seeking out the optimal products, regardless of the vendor, for each stage of our medication-use process.

We use McKesson for both our hospital and pharmacy information systems, and Cardinal supplies our Pyxis MedStation ADCs. We ultimately selected McKesson's Horizon Admin-Rx platform for BCMA and EMAR, as we were already working with McKesson's Horizon Meds Manager pharmacy system; it just



Photo courtesy of Central DuPage Hospital

Central DuPage Hospital chose a best-in-class approach to creating a cartless medication distribution system.

made sense to work with the same vendor across these platforms. We continued working with Cardinal as our wholesaler, and expanded our use of ADCs to 50 Pyxis MedStations on our patient care units to accommodate our growth in patient services. We installed the ADCs in a dual, mirrored configuration, with each cabinet stocked with the same medications, to help improve nursing access to medications at high-volume med-pass times. Now 95% of our doses are stored in the Pyxis MedStations and are available for dispensing as soon as a pharmacist authorizes a physician's order or "profiles" the order in the McKesson system. Some STAT orders and extraordinary first doses are sent from the central pharmacy using Swisslog's Translogic pneumatic tube.

In order to create the space needed for our new cleanroom and improve our inventory control and order-picking efficiency, we installed two Talyst AutoCarousels to automate the storage and retrieval of our 1,000 most-used line items. In addition to streamlining our order-picking process, the carousels have cut our storage footprint in half.

We also selected Talyst AutoPharm software to link our pharmacy information system, ADCs, and inventory control system, and to drive the systems that handle unit dose bar coding, order picking, and wholesale ordering. By interfacing with our Pyxis MedStations, AutoPharm informs the pharmacy, in real time, of "critical lows" and "stock outs" on the nursing units, driving the cabinet-replenishment process. This inventory management capability has helped us efficiently manage medication inventory and ordering, despite having more Pyxis MedStations in place.

As part of our efforts to ensure that all medications going to the nursing floors have consistent packaging and machine-readable bar codes at the unit dose level, we installed Talyst AutoPack, a unit dose packaging system for bulk oral medications. In addition, we addressed bar coding in our cleanroom by implementing ForHealth's IntelliFill i.v., an automated syringe-filling robot that draws up, verifies, and bar codes up to 300 syringes per hour. Interestingly, over the last two years, we have also demonstrated that safety can be enhanced and costs reduced by assigning patients pre-filled insulin pens, versus vials. Furthermore, because the pens are bar coded, they work well within our BCMA environment.



## Case Study

### Safety and Operational Results

Our pre- and post-BCMA data revealed a more than 50% reduction in administration errors after the implementation of house-wide bar code scanning. We are confident that every scan increases patient safety, and with this in mind, we use a “five scan” approach in our medication-use system. We scan doses at the following points:

1. When doses are loaded into the carousel from the wholesaler
2. When doses are pulled from the carousel by a technician, prior to the pharmacist’s check
3. When doses are checked by a pharmacist
4. When doses are loaded into the Pyxis MedStations
5. When nurses administer doses to patients, following a wristband scan

In addition to these patient safety benefits, we have realized operational benefits as well. For instance, our average first-dose turnaround time has reduced dramatically, from a former high of three hours to now less than 30 minutes, and it is often less than 15 minutes before a dose is available for dispensing on the nursing unit.

As mentioned earlier, we have improved our efficiency in order picking through our use of automation. Twice a day – at 7:00<sub>AM</sub> and 3:00<sub>PM</sub> – and under pharmacist supervision, our technicians perform AutoPharm-driven cabinet replenishment “pulls” from our AutoCarousels, refrigerators, and the limited shelving that remains in the pharmacy. Using a report generated by AutoPharm, our technicians are typically able to complete order fills in two to three hours.

Once a pulled replenishment order is visually verified and scanned by a pharmacist, it goes into a plastic tote for delivery. In contrast to our old cart-fill system, a single technician can now do the Pyxis restocking for the entire hospital. In addition, two to three man-hours are dedicated on the night shift to loading on-demand medications, another step in achieving our cart-less model.

### Lessons Learned

From our experience thus far, we have learned several key lessons. First, an effective automation process takes a team – a significant collaboration of pharmacy, nursing, and administration. Furthermore, we have learned to aim for continuous improvement. For example, at the outset, we purchased all medications possible in bar coded unit dose from the manufacturer. By carefully reviewing our contracts, we have identified opportunities to save money using our AutoPack to package more oral solids in house.

Our new medication management system has also enabled us to reassign both pharmacists and technicians to higher-value work. Now the majority of our PharmDs are decentralized, and they can perform on-screen reviews and profile approvals of incoming orders remotely. Best of all, they spend significant face time with nurses and physicians, contributing to a better patient experience at Central DuPage Hospital. ■



*Elaine M. Rodriguez, PharmD, MBA, (right) is the director of pharmacy at Central DuPage Hospital, where she has worked for the last three years. She previously was on staff at Loyola University Health System for 18 years.*

*Keith Hickey, (far left) RPh, has been the pharmacy manager at Central DuPage Hospital for the last year, after being on staff at Loyola University Health System for 26 years.*

Also pictured is Dave Printz, CIO and executive vice president of telecommunications, data, and facilities at CDH.

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### ◄ High-Volume Unit Dose Packaging Machine

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