A culture of medication safety:
How CHRISTUS Spohn Health System uses automation to improve standardization and re-deploy pharmacists to clinical functions

Summary

CHRISTUS Spohn Health System, a 1,000-bed health system based in Corpus Christi, Texas, used automation to standardize processes, improve medication management, enhance medication safety and re-deploy pharmacists to clinical functions. To achieve this goal, CHRISTUS Spohn centralized distribution for all six facilities through Med Safety Central (MSC)—a central location that dispenses 80% of the medications administered within the system. CHRISTUS Spohn also installed the Alaris System smart infusion technology and the PHACTS portfolio of products to achieve bedside medication verification (BMV).

Because of inventory management and pick-and-fill process improvements, CHRISTUS Spohn was able to relieve pharmacists of distributive functions and re-deploy them into clinical functions. The changes have enabled pharmacists to play a clinical role in the neonatal intensive care unit (NICU), oncology and discharge and electrolyte counseling. This has positively impacted medication safety and finances at CHRISTUS Spohn. The PHACTS portfolio of products and additional CareFusion technology components continue to play a key role in CHRISTUS Spohn’s continuous push toward enhancing its culture of medication safety.
**Introduction**

Health systems across the country are working on strategies that can help them re-deploy pharmacists to clinical functions to meet the Pharmacy Practice Model Initiative (PPMI), an initiative of the American Society of Health System Pharmacists (ASHP) and the ASHP Foundation. With limited budgets, one strategy currently showing positive results involves the implementation of medication automation and safety tools that can help standardize processes and reduce pharmacist time spent on distributive functions.

CHRISTUS Spohn Health System is one example of a hospital system that implemented key technology components to help accomplish these goals. CHRISTUS Spohn is the region’s largest charity care provider and not-for-profit healthcare system. The system consists of six hospital campuses: CHRISTUS Spohn Hospital Corpus Christi (Shoreline, Memorial and South), CHRISTUS Spohn Hospital Alice, CHRISTUS Spohn Hospital Beeville and CHRISTUS Spohn Hospital Kleberg (Kingsville). With 1,000 beds and an average census of 700 patients, CHRISTUS Spohn consistently ranks as a leading health system in the area and has received national recognition for several pioneering programs, including cardiac care, clinical excellence and oncology.

With concerns over averting potential medication errors making national headlines, CHRISTUS Spohn decided to evaluate its medication management processes and develop an action plan to further increase medication safety and standardize processes across the health system. Joe High was brought on board as the Regional Director of Pharmacy (DOP). With a dedicated team in place, he set forth with the goal of implementing the right technologies to improve medication safety and move pharmacists closer to patients.

**Implementing the plan**

CHRISTUS Spohn’s plan included implementing the Alaris System smart infusion technology and the PHACTS portfolio of products to support BMV and computerized patient order management, along with other technologies in the pharmacy. These new technologies would help reduce the risk of medication errors and enable pharmacists to spend more time on nursing units—to create a deeper effect on patient care. After completing the implementation of the Alaris System, CHRISTUS Spohn turned to the PHACTS portfolio of products to support BMV system implementation.

High had previously implemented BMV at another facility, so he knew what hurdles to expect. Not all medications come individually packaged and barcoded, so the biggest challenge he identified was variability in packaging.

> “I think packaging bulk bottles to unit of dose is the highest risk activity that hospitals do. If a retail pharmacy makes a mistake, one patient is harmed. If a hospital pharmacy makes a mistake, 100 patients can be harmed. Having standardized processes is key in a hospital pharmacy.”

Mark Thomas, Executive Director for Safety & Reliability Systems, shared the same concerns. “One of the top risks we identified was the variability that would be created by having six points of origin for developing barcodes for meds that needed to be packaged. We were concerned with so many varying systems that once meds reached the bedside, they wouldn’t scan properly, and that would allow for workarounds to occur. That’s a true risk for the patient.”

CHRISTUS Health selected the PHACTS portfolio of products as the next suite of medication management technology to be installed system-wide.

The PHACTS portfolio of products includes the Pharmogistics* inventory management and workflow administration software, PharmoPack* medication packaging
and barcoding technology and PharmoCode™ barcode labeling system. This technology allowed the health system to:

- Discontinue six siloed operations that lacked standardization
- Centralize medication distribution for six facilities into one location
- Move forward with successful BMV implementation
- Re-deploy pharmacists to clinical functions
- Help ensure a safer and more efficient medication management system

Re-shaping the medication management process

Prior to implementing the PHACTS portfolio of products, each of the six CHRISTUS Spohn hospital pharmacies was responsible for its own buying and medication management processes. During the planning meetings, the team decided the best approach was to create MSC, a central location that now dispenses approximately 80% of the medications administered at each facility.

“Now that we have the PHACTS solution, what used to take us four hours only takes us an hour and a half,” said Rodriguez. “Not only are we much more efficient at picking meds, but safety and accuracy have been improved.”

Improving the pick-and-fill process

Prior to implementing the Pharmogistics software, picking medications was a time-consuming process. “We had a pick area for liquids, one for ointments, another for solids and yet another for refrigerated meds,” said Gina Rodriguez, Chief Pharmacy Technician. “We would pick for one Pyxis MedStation® system at a time, going in a circle around this room. It took four hours for a single hospital.” The central pharmacy now pulls drugs for the Pyxis MedStation systems for all six facilities.

Previously, filling the Pyxis MedStation system was also tedious and inefficient. Now, pharmacy technicians utilize barcode technology for fulfillment, which helps promote a higher level of accuracy, efficiency and medication safety. This improvement has led to a 99.99% compliance rate with the technology. “Since the meds are all pre-packaged, it’s more efficient for the tech to pull them out, scan them, double check the medication and label and put them in the Pyxis MedStation system,” said Rodriguez. “Scanning each drug we pull from the bin to stock in the Pyxis MedStation system is like a double check to ensure it’s the correct item, which gives us a real sense of safety.”

Pharmacists have also been freed from cart fill double checks. “Each of the facilities only receives just enough stock to fill our Pyxis MedStation systems,” shared Evans. “All of the meds are barcoded and ready to go, so pharmacists only need to check meds that are going directly to patients. That has freed up pharmacist time.”

“We used to buy, stock and check everything locally,” shared John Evans, Director of Pharmacy for CHRISTUS Spohn Hospital Alice and CHRISTUS Spohn Hospital Beeville. “When we decided to move forward with BMV, we knew it would overwhelm our staff to add all of the new processes to meet the requirements. MSC allows us to optimize our staff’s time and use a group buying strategy to maximize discounts and minimize overages.”

“The PHACTS solution was a great help in setting up MSC,” said Donna Suver, Senior Technician and Supervisor. “It plays a big part in helping us to manage inventory more effectively and streamline our processes.”
CHRISTUS Spohn has been able to more effectively and consistently manage inventory since the implementation of the Pharmogistics software. “We put together standard operating procedures (SOPs) so that each facility would do things the same way. If someone doesn’t follow the SOP, they have to document why. It’s great to have everyone doing things the same way,” said Rodriguez.

Because all facilities now follow the same procedures, they’ve been able to make improvements across the system. “We’ve been able to shift inventory from shelves in the pharmacy to the Pyxis MedStation systems, which has given us better control of dating,” said Rodriguez. CHRISTUS Spohn also does a monthly cycle count on all medications in the carousels. “Doing a cycle count on all meds in the carousels each month has helped us get a better handle on expirations, and dramatically cut down on waste and expired meds,” said Suver.

Inventory turns and buying have improved as well. Buyers now rely heavily on reports from the Pharmogistics software to assist them in ordering, which has reduced the chance for human error and has given them a better feel for inventory turns. “Our goal was to have 14 inventory turns, but we are currently up to 20 inventory turns per year,” said Rodriguez. “For example, we are now re-ordering Avelox IVs daily.”

The system has also helped pharmacy manage their short list (often referred to as ‘want books’). “If I have a short list of items I’m out of and they have min, max and par levels built into the Pharmogistics software, they’ll automatically be put on an order list,” said Suver. “So if I miss something on my short list, it will be caught in that umbrella of protection and will still get re-ordered.”

For BMV to function properly, all medications have to be barcoded at the unit dose. This is a challenge without the right tools and processes, but the PHACTS solution has enabled CHRISTUS Spohn to consistently obtain or produce unit-dose packages for bedside verification through the BMV system.

Pharmacists spend only one hour per day checking the pre-packaging. Having medications pre-packaged and barcoded in the pharmacy through the PHACTS portfolio of products helped enable successful implementation of BMV at the bedside.

In addition, having the right tools and processes in place is key when it comes to compliance. Nurses at CHRISTUS Spohn Hospital Corpus Christi South currently have a 95% compliance rate with scanning the medication and patient. “The number of meds that are barcoded incorrectly is extremely small for our region,” said Thomas. “This really reduces the tendency for nurses to work around a failing system.”

High believes that medication safety has been increased since the implementation of the new system. “The system allows us to have a high level of confidence that we’re getting it done correctly. We brought the local Rotary Club in to tour the MSC area and see our latest technology. One member’s grandfather was a patient at one of our facilities and got to see the technology work firsthand. When the nurse scanned a medication that was about to be administered to the patient, she determined it was the wrong med and was able to prevent that error from happening.”
The scan at the bedside is the third scan in the triple barcode check at CHRISTUS Spohn. “Our triple barcode check reduces the chance a wrong med will ever reach a patient,” explained Suver. “It all starts with the Pharmogistics software where meds are scanned on removal from the carousel. Then the med is scanned again when it is filled into the Pyxis MedStation system and one final time before being administered to the patient.”

Having this extra layer of protection is especially important for facilities without a pharmacist on-site 24 hours a day. “Alice and Beeville campuses don’t have a pharmacist on-site 24 hours a day. While we have someone working remotely, the Pyxis MedStation system will be on override at some point,” said Evans. “If a nurse overrides the system and selects a wrong med, the barcoding will prevent that med from reaching the patient. I think barcoding prevents a lot of errors from reaching patients in hospitals where there isn’t a pharmacist on-site 24 hours.”

Re-deploying pharmacists to clinical functions

Studies show that having pharmacists available on the nursing units can reduce medication errors, so many hospitals are working toward this goal. Because resources are tight across the nation, these hospitals are looking for ways to make process changes that free pharmacists’ time for re-deployment to clinical functions.

CHRISTUS Spohn has been able to make great progress toward re-deploying pharmacists to clinical functions due to increased efficiencies and standardized processes.

In addition to freeing pharmacists from many distributive functions, CHRISTUS Spohn has also moved one pharmacy tech into a more clinical role, alleviating the pharmacist of some additional duties. “One tech pulls labs for patients and gathers the info for the pharmacist to review,” said Rodriguez. “After she completes the work, the pharmacist then double checks it.” These changes have enabled CHRISTUS Spohn to re-deploy pharmacists out on the floor for clinical functions.

For example, CHRISTUS Spohn Hospital Corpus Christi South has a pharmacist available on the NICU floor, CHRISTUS Spohn Hospital Corpus Christi Memorial has fully implemented floor-based rounding teams and the other facilities are working toward that goal as well. CHRISTUS Spohn Hospital Corpus Christi Shoreline was also able to release one pharmacist to work in the oncology area.

Figure 1

The PHACTS portfolio of products has enabled CHRISTUS Spohn to improve efficiency and accuracy in these medication management processes:

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<th>Benefit</th>
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<tr>
<td>62.5% reduction in time spent on pick process</td>
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<tr>
<td>Added level of safety for fill process</td>
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<tr>
<td>20 inventory turns per year</td>
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<td>Elimination of pharmacists from cart fill double checks</td>
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<td>Reduction in expired meds and waste</td>
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“Having a pharmacist where they need to be is making a financial and medication safety impact,” shared High. “We’re still waiting for more data to come in, but the pharmacist is making a real difference in oncology. The cost per case in oncology went down 40%, which is huge since our number-one drug spend is in oncology.”
Pharmacists have more time for other clinical functions as well, said Evans. “Another area where we’ve been able to make an impact is with electrolyte counseling. When a physician writes an order for electrolytes, the pharmacist calculates the dose after evaluating lab results and consulting with nursing,” said Evans. “We also have a computerized data-mining application to help us locate patients in real time that could benefit from pharmacist counseling. We can have all these programs that tell us who to see, but if we didn’t have the time to go see them, none of them would be effective.”

Making a difference with discharge counseling

The community hospitals have been able to take the clinical pharmacist role to the next level by bringing a pharmacist in to do discharge counseling with patients. “We had one patient who was discharged on 13 meds,” said High. “The pharmacist was quickly able to identify that the patient was missing a necessary diabetic medication, but also did not have the funds to pay for that many meds. After the evaluation, the pharmacist was able to drop the patient from 13 medications down to three, plus adding the missing diabetic medication. That would have been missed if we didn’t have a pharmacist on the discharge counseling team.”

Re-admission rates have also been positively impacted by this change. “By getting a pharmacist involved in discharge counseling, the re-admission rate has dropped from 24% to 13%,” shared High. Suver said, “Since implementing discharge counseling, we’ve seen a lot of patients who would have previously gone to the ER go to see their primary care provider instead. This simple change saves the hospital money and heads off re-admits.”

Affecting the bottom line

While many of the medications used at CHRISTUS Spohn are low-cost, high-volume items like generics, financial results are occurring with high-cost-per-unit meds like Crofab. “Before, we’d have nearly $60,000 in stock of Crofab at one facility and another $60,000 of stock at another facility that was kept ‘just in case’ we got three rattlesnake bites at the same time,” said Evans. “On top of that, we had no way of knowing what stock was where. We’ve now addressed issues like this with high-cost-per-unit meds, so we don’t have excess stock at one location.”

“Having a pharmacist available for counseling on complex meds has been tremendously helpful since they know meds better than anyone,” said Pam Bradshaw, Chief Nursing Officer. “Bringing a pharmacist in for discharge counseling for meds allows nurses to focus on other patient education aspects.”

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Figure 2

By improving efficiency through automation and implementing process changes, CHRISTUS Spohn has seen these clinical improvements:

- Drop in re-admission rates from 24% to 13%
- Pharmacist availability for discharge and electrolyte counseling
- Pharmacist re-deployment to clinical rounds
- Pharmacy tech clinical functions performance
- Successful BMV implementation with 95% compliance rate
**Moving forward**

CHRISTUS Spohn will expand its goals of getting more pharmacists into clinical roles and closer to patients, where they can directly affect care and safety. They also hope to implement a program for pharmacy technicians to become more involved in the patient discharge process. In addition to pharmacy techs scanning to fill medications, soon nurses will also scan to remove medications from the Pyxis MedStation system.

The health system also plans to add narcotics from the Pyxis C’Safe® system as an Inventory Storage Area (ISA) into the PHACTS system. “Narcotics will have their own separate location, so if we get a stockout of morphine or Norco for example, we’ll get an alert at the carousel screen so we know we need to go pull more,” said Suver.

CHRISTUS Spohn Health System is pleased with the processes and technologies it has invested in, including the PHACTS portfolio of products.

“The PHACTS solution has done its primary job of supporting our culture of medication safety through the BMV implementation, and I believe it will continue to support us in the future,” said Thomas.
CHRISTUS Spohn's results reflect the hospital system's medication management process in combination with Pyxis technologies.

References