SWISSLOG
CASE STUDY

ERLANGER HEALTH SYSTEM

PillPick pharmacy automation ensures patient safety at the Erlanger Health System complex in Chattanooga, TN.

The Hospital

Erlanger Health System, affiliated with the University of Tennessee College of Medicine, is recognized as one of the premier academic hospitals in the southeastern United States. It is classified as a Level-One Trauma Center for adults and is the only provider of tertiary care services in an entire four-state region.

Erlanger is also the regional leader for the treatment of cancer, high-risk obstetrics, and heart and vascular disease, and offers the most diverse scope of services and facilities found anywhere in the region.

The Erlanger Health System complex houses three main inpatient components: Baroness Erlanger Hospital (adult patients), T.C. Thompson Children's Hospital (pediatric patients), and Willie D. Miller Eye Center (ophthalmology patients).

Each year, more than a quarter of a million people are treated by Erlanger's healthcare professionals.

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The Challenge

The pharmacy at Baroness Erlanger Hospital in downtown Chattanooga serves the main hospital and the T.C. Thompson Children's Hospital. Each day the staff is responsible for dispensing 10,000 to 12,000 medication doses to patients. The main campus pharmacy serves a typical daily census of 400 to 500 patients. The pharmacy relied upon a manual cart fill method to dispense meds to the patient. Those manual processes included:

> Physicians entering patient prescriptions.
> Pharmacy staff pulling thousands of medications from shelves.
> Medications placed into trays with patient room number identification.
> Pharmacist double checking meds for accuracy before dispensing.
> Medications transported to patient floors via cart exchange or by the hospital's pneumatic tube system.
> Nurses receiving medications—manually confirming the right drug, right dose, right route, right time, and right patient.
> Nurses administering medications to the patient.

All steps in filling orders and dispensing medications were entirely manual. As with any manual process, there is the potential for errors. Patients with adverse drug reactions are hospitalized eight to 12 days longer and hospitalization costs increase by $16,000 to $24,000 per patient. It is estimated that approximately 770,000 people are injured or die from adverse drug events every year in North America.

In 2004, Jim Lowe, Erlanger Pharmacy Director, moved quickly toward implementing drug automation and bedside scanning of medications to ensure patient safety and reduction of medication errors. The hospital also wanted to improve patient care, enhance the perception among the public of Erlanger as a hospital that cares about patient safety, and meet the demands of regulatory agencies now and in the years ahead.

To move toward bedside verification, the decision was made to barcode medications, automate first dose dispensing, and automate medication inventory. Erlanger pharmacy managers reviewed four competing robotic systems before selecting Swisslog's automated drug management system, PillPick®.

The Solution

Total Automation
The Erlanger team selected PillPick because it offered a complete packaging, storage and dispensing capability in one system. "The Swisslog system can perform more tasks simultaneously than any other robotic system," said Lowe. "Its bar-coding capabilities get you ready for bedside scanning—improving patient safety." The ability to package and dispense not only tablets and capsules, but also vials, liquid cups, syringes, ampoules and blisters was another PillPick advantage. Each step after bulk medications are entered into the system is fully automated, thus eliminating human intervention that could be a cause for dispensing errors.

Packaging
The PillPick process begins when bulk medications are entered into canisters and encoded with medication-specific information. This information is written to a radio frequency (RF) tag and output to barcode labels. The canisters are inserted into a buffer module that automatically loads and unloads them into the packaging unit.

Next, the machine reads the RF tag on the canister to compare the data to the packaging order for accuracy. The patented safety lid on the canister is opened for access to the contents. A bag is cut to length, sealed, then a barcode, unique serial number and other medication information is printed on the bag. The barcode on the bag is verified and a single pill is picked from the canister, dropped into the bag and sealed. The process also works for over-wrapped vials, cups, ampoules, injectables and blisters. The packager can handle manual filling of individual medications for one-of-a-kind or low volume products.

Dispensing/Patient-Specific
Unit doses are then automatically entered into a high-density storage unit, DrugNest. The Erlanger unit can store up to 4,400 different types of drugs with 44,400 doses of medications. If a patient requires more than one daily medication, the robot will select, package and assemble all of the patient's drugs on a patented plastic PickRing. The PickRing is a 24-hour supply of barcoded, patient-specific medications in order of administration. A printed label denotes the medication name, time of administration, as well as the patient's bar-code and a list of other patient medications.

At Erlanger, each package on a PickRing includes the patient's name, age, room number, drug name and dosage amount. There are two PickRing assembly modules in the system. One handles high-volume routine medication packaging and cart fill, and the other is dedicated to handling first doses and high-priority stat orders.

Lockable medication boxes are now in every patient room on every floor making the nurse's job easier and safer. Nurses no longer travel from a central medication room at each nursing unit with each dose. Pharmacists now spend less time on medication cart checks, and dispensing is more accurate. Finally, all medications that are in their original bags can be returned from the nursing units and automatically restocked into storage.

> "This new robotic system enhances the safety of every patient at Erlanger."
>
> — *Jim Lowe*
> *Erlanger Pharmacy Director*

Interface with Siemens Hospital Information System

The PillPick Manager system software interfaces with the pharmacy information system, Siemens SMS. Once a day, PillPick Manager imports the accumulated 24 hour cartfill list from Siemens SMS and uses the list to dispense the cartfill per patient. Patients are billed upon dispense from the PillPick system. PillPick Manager accumulates the dispensing information as well as the list of packages that have been returned to the pharmacy (changed patient order, discharged patient) and exports the data to Siemens once a day for billing purposes.

The Result

The PillPick system has eliminated the need for pharmacists to fill orders by pulling thousands of meds from shelves or checking the work for accuracy prior to transport. Now, PillPick automatically handles all processes once bulk medications are entered into the system. No human interaction with the drugs occurs once the packaging process has been initiated. Erlanger Health System has experienced several benefits of the PillPick system:

> Hand-free automation improved medication accuracy from 96 percent to 99.9 percent.
> Valuable physician and nursing staff time has been redirected to patients.
> Patient confidence in the safety of the hospital is enhanced.
> PillPick packages/dispenses over 90 percent of Erlanger's patient medications.
> Barcode scanning is the basis for bedside scanning.

"This new robotic system enhances the safety of every patient at Erlanger," Lowe concludes.

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