

An Introduction to PillPick™

Important questions every hospital pharmacy should consider before implementing pharmacy automation

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Medication Errors

Automated packaging and dispensing systems for filling patient orders are becoming common in US hospitals as a result of increased public knowledge related to medication errors. The Institute of Medicine reports that up to 98,000 deaths result from medication errors in our country alone.¹ While the majority of the medication errors result from incorrect orders and transcriptions, almost half of the medication errors occur because of dispensing errors or administration errors.² When addressing medication errors, it is not as important as *who was involved* with the error, as much as *how it can be avoided*.

How can medication errors be reduced?

Bar coding initiatives have the potential to dramatically reduce medication errors during dispensing and administration. According to the former Health and Human Service Secretary Tommy Thompson, "bar codes can help doctors, nurses and hospitals make sure they give their patients the right drugs at the appropriate dosages."

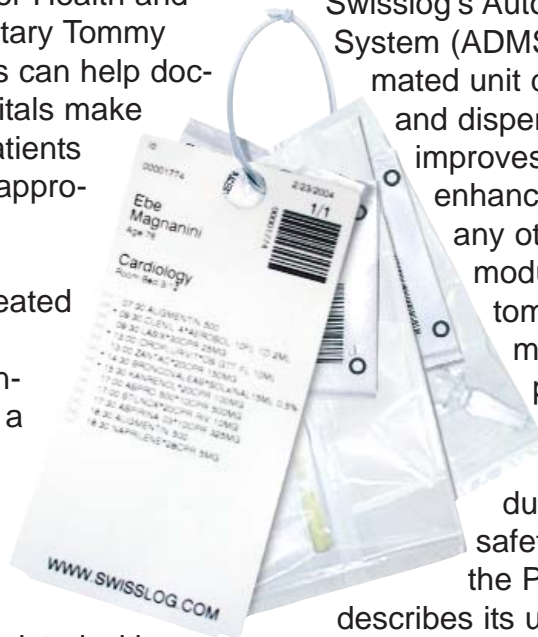
A unit-dose drug is created when a single drug is taken from its bulk container and placed into a labeled package. Bar-coding of unit doses enables hospitals to implement bedside verification systems, whereby a nurse is assisted with technology in administration of drugs to patients. In a typical administration cycle



utilizing bedside verification, a nurse will scan the barcode on the unit dose and scan the patients chart or wristband in order ensure that the "five rights" are met: right patient, right drug, right dose, right route, and right time.

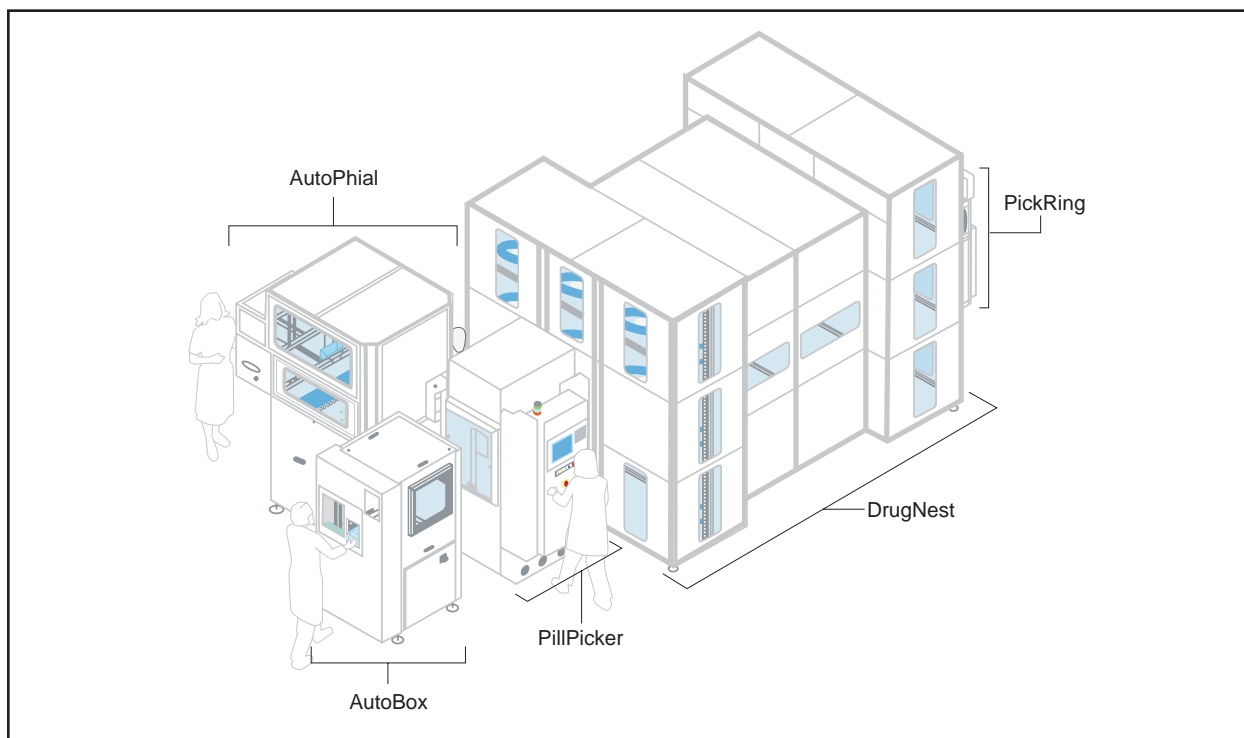
Reducing Medication Errors Through Pharmacy Automation

The PillPick system, a product within Swisslog's Automated Drug Management System (ADMS) portfolio, is a fully automated unit dose packaging, storage, and dispensing system which improves pharmacy productivity and enhances patient safety. Unlike any other system, PillPick is a modular system enabling customers to choose a feature set most appropriate for their pharmacy operation, and it is fully integrated which enables increased productivity and greater patient safety. This paper introduces the PillPick system and describes its unique benefits, as well as presents seven questions that should be asked when considering a pharmacy robot.



¹ Institute of Medicine "To Err is Human: Building a Safer Health System" 2000

² Leap et al



General Pharmacy Work Flow with PillPick

Bulk pharmaceutical items are first packaged, bar-coded, and labeled into individual unit doses. Unit doses are then automatically placed into buffer storage for future retrieval and dispensing to patient floors, tagged for individual patient administration.

Once a physician has ordered a drug for a patient, the order is sent to pharmacy for verification before the dispensing process begins. This can be done in an asynchronous or synchronous manner for first doses and cart fill respectively.

The PillPick Manager Software receives the electronic patient orders, sorts them by priority, and separates them into two groups; automatic dispensing and manual picks. The PillPick system automatically prepares a patient specific, 24 hour supply of unit doses grouped together on a plastic ring called the PickRing™. The PickRing also contains a label with the

patient data, a list of drugs for the 24 hour supply, administration time, and other data as desired by the hospital.

As PickRings are automatically dispensed, the system simultaneously provides a report of the drugs that are not on the PickRing. These are typically doses that are low in volume and therefore are manually picked, refrigerated drugs, or large size items. With this list the pharmacy technician is able to manually pick the drugs and label them with a bar-coded label provided by the PillPick system. As an alternative, Swisslog's offers a storage and dispensing unit called [BoxPicker](#). BoxPicker is either integrated into the PillPick solution or can be a stand alone unit, similar in functionality to a vertical carousel.

Typically, all patient drugs are loaded into carts and transported to the nursing units and stored in a medicine room or directly in the patient room, after which the drugs are administered by nursing to the patient.

Medications returned from the patient floors can be automatically restocked into PillPick and credited to the patient account, if not billing on administration.

Seven Questions to ask when choosing a Robot

1. Is it multi-tasking?

Pharmacies bustle with activity; packaging, cart-fill or cabinet restocking, first doses, stats, returns, IV prep, etc. While the majority of tasks can be scheduled, there are many tasks that are completed on demand. For example, stat orders and first doses must be verified and filled regardless of the time they arrive. An effective automation solution will optimize these functions and allow the hospital pharmacy to adapt the automation to their desired work flow.

The PillPick System allows extreme flexibility and support of unique work flows, as it performs up to three tasks simultaneously. This allows the operators to compress the cart fill time, or simultaneously produce first doses during the cart fill, package during the dispensing process, or return drugs at any time.

2. What is the process for returned drugs?

In a centralized distribution system, 20 to 30 percent all drugs dispensed are returned to the pharmacy. This is a result of patient discharges, transfers, discontinued medications, or order changes. Further, *Pro re nata* drugs (PRNs), if part of the pharmacy's centralized distribution, comprise a significant portion of the returns.

The return process can be very time intensive. If a hospital is not billing upon administration, the pharmacy must sort all returned unit doses and credit the patient before returning medications to stock.

Further, many types of packagers will create a patient specific "strip" of drugs; i.e. all the oral solids on a patient order are attached to each other in a strip. This creates benefit for the administration of drugs, as they are organized and grouped together in a convenient format. However,



when these drugs are returned for reasons outlined earlier, the unit doses are separated and placed into shelf stock. This reduces the advantages of automation, in that these returned unit doses cannot be included in a patient "strip" any longer. As a result, returned doses have a higher probability of expiration resulting in higher drug costs.

The return process can also create potential for error. Lot codes should be checked for drug recalls. Expiration dates must be checked and each unit dose should be reviewed to determine whether or not it should be returned to storage or discarded. If one of these steps is missed, the potential for administration of a recalled or expired drug exists.

The PillPick addresses many of these pitfalls of the return process. The PillPick system places a serial number embedded in the barcode on each and every unit dose. This serial number provides tracking through the entire pharmacy supply chain (downstream of the packaging) and

when a unit dose is returned, the system checks lot codes for drug recalls and expiration dates.

Further, the return process with PillPick is very efficient. The unit doses are simply placed onto the return conveyor via the return window, with the barcodes facing out, and the robot completes the return process. As each bag is scanned, PillPick determines whether or not the dose should be returned to stock or rejected. At this time, inventory is automatically credited, and if not billing the patient as part of the administration, the patient is also credited.

3. How much of the packaging, storage, and dispensing process is automated?

Simply put, the more human intervention, the greater the probability for error. A system that minimizes human manual processes will reduce the potential for human error. In addition, the time required for manual processes do not add value, and cost valuable time and money.

The PillPick's integrated approach allows for full automation. When the Pillbox is filled and verified by a technician, it is not touched by human hands until it is dispensed on a PickRing. Other systems have independent packaging systems that are not integrated into the storage unit. This means that a technician must perform the packaging, a pharmacist checks the individual unit doses, and then the doses are prepared to be stored.

With PillPick, instead of checking each single unit dose, a single check is performed for a canister (PillBox) of up to 1500 oral solids. Not only does this save valuable pharmacist time, it avoids the mundane and error prone method of checking each individual unit dose.

4. How much of the formulary will the robot accommodate?

The higher the percent of the formulary that is automated, the more effective the solution. For example, if a patient requires 15 drugs for a 24-hour period, and 5 of the drugs are dispensed on an automated solution, the other 10 items must be manually picked. As a result, the pharmacy is not fully optimizing the work flow and more importantly, the human process has potential to create opportunities for error. On the other hand, if all 15 of the patient's drugs are automated, the opportunity for error is minimized and the pharmacy operates efficiently.

The PillPick system has the capability of holding up to 60,000 unit doses and as many as 6000 line items. Further, it can store oral solids, ampoules, vials, syringes, and other items.

For items that are too large or bulky to fit inside the PillPick system, Swisslog provides other automated solutions to provide a 100% bar-coding solution as well as the automated storage and dispensing of these items. In this manner, Swisslog's PillPick provides a complete automated bar code solution.

5. What are staffing implications of Pharmacy Automation?

In some cases, automation is sold via a return on investment approach. While an automated solution provides significant cost savings, many of the cost savings are "soft." For example, an automation solution may save pharmacist check time, but this typically does not result in a reduction of FTEs, rather it allows staff to be redeployed to more value-added activities.

The PillPick's integrated approach allows "hands free" operation from the time the canisters of drugs (PillBoxes) are prepared and checked, to the time the drugs are dispensed on the PickRing. In some automated storage and dispensing systems, each package requires a pharmacist check before manually loading them onto the storage and dispensing system. Therefore, if 1000 drugs are packaged, up to 1000 pharmacist checks are required. With PillPick, a PillBox of 1000 drugs are checked once and automatically transferred to the storage and dispensing module. In this case, the efficiency is obvious – one check per 1000 versus 1000 checks.

As stated earlier, the return process is simple, safe, and efficient. The unit doses are simply placed onto the return conveyor via the return window, with the bar codes facing out, and the robot completes the tasks.

As a result of these features, the required staff for operating the system is lower than any other solution on the market.

6. Can the system package oral solids, as well other items? E.g. ampoules, vials, syringes, blisters, etc?

Oral solids typically comprise 70-80% of a hospital's formulary. Oral solid packagers are virtually commodity products, however they do not provide a 100% solution. Some over wrap products also exist, but they are highly manual. A single drug (ampoule, vial, etc) is prepared one at a time.

On the contrary, very few products exist that can package (or over wrap) other items. Without addressing the significant portion of non-oral solids, the automation solution is not optimal. In addition to auto-



matically over wrapping in high volume, the PillPick can also cut blister cards into individual unit doses and over wrap. This allows these items to be placed on the PickRing and provide downstream efficiency to the administration of medications. This ability to automate the packaging of all drugs in the pharmacy is unique in the automation industry.

7. What are the benefits of automation to the Pharmacy's customers; e.g. nursing?

The PickRing is one of the most significant benefits of the system, as the PickRing prepares the hospital for bedside verification while optimizing the administration of drugs. To illustrate, picture a nurse sorting through a drawer of 15 drugs looking for a particular drug, versus having all 15 drugs assembled on a ring, in order of administration. In the latter case, the nurse would look at the PickRing label, see that the particular drug is the third drug scheduled for administration, and flip to the correct unit dose for administration.

The drugs are organized in a way that is very nurse friendly, listing not only the drugs that are assembled on the PickRing, but additionally the drugs that

are stored elsewhere such as dispensing cabinets or refrigerators. The ability to customize the PickRing again supports the optimum work flow within your health-care facility.

And an additional advantage, drugs on a PickRing dramatically reduces borrowing and missing medications. First by organizing the drugs and making them readily accessible, and by capturing them on a ring, nursing is less likely to “borrow” drugs. This in turn benefits the patient, and the nurse, as well as the pharmacy.

Each unit dose on the PickRing is checked for accuracy one last time before the ring is sealed and dispensed. This ensures the highest level of safety.

Conclusion - Why PillPick?

Patient Safety is the primary impetus for the PillPick system. PillPick provides a 100% bar-coded solution and through its automated and integrated modules, eliminates many manual steps required by other competitive systems. The guideline is simple – eliminate human intervention and the potential for error is dramatically reduced.

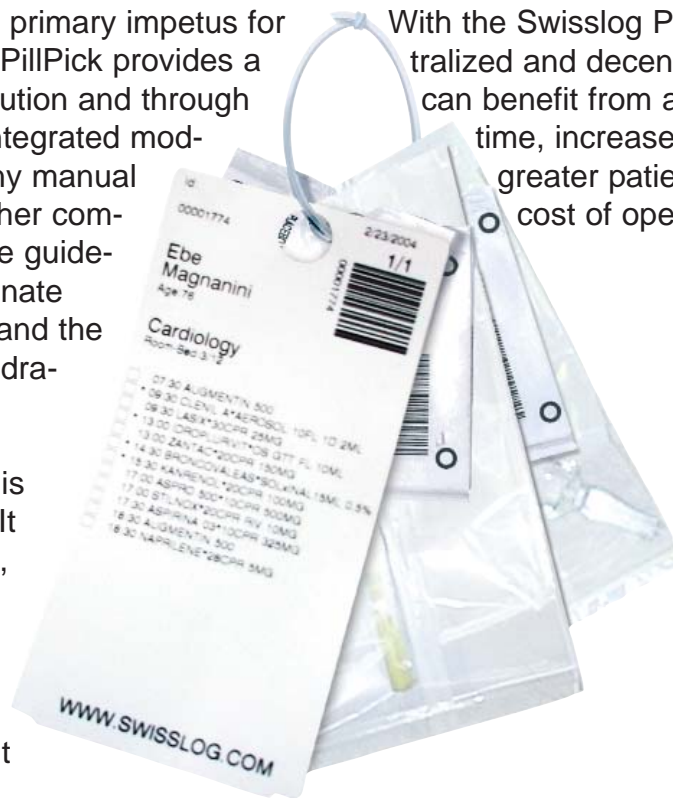
The PillPick system is also quite versatile. It supports centralized, decentralized, and hybrid pharmacy operations. Since the system is also based on modules, it

can be adapted to the needs of individual pharmacies. Among the options is the ability to over-wrap prepacked items, storage capacity, inbound loading buffers, and up to two dispensing options. Further, it can grow with the facilities needs without any loss of initial investment.

A highlight of this versatility is the PillPick’s ability to multi-task. The system can perform up to three tasks simultaneously. This allows the operators to compress the cart fill time, or simultaneously product first doses during the cart fill, package during the dispensing process, or returning drugs at any time.

Lastly, it is facility friendly. With only 55 lbs per sq. foot standard ceiling height, there is virtually no facility in which it is not easily installed.

With the Swisslog PillPick system, centralized and decentralized hospitals can benefit from a faster turnaround time, increased productivity, and greater patient safety at a lower cost of operation.



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