Dockside to Bedside: A New Paradigm for Health System Medication Management

In the distributor-lead paradigm, a closed-loop solution provides the most efficient, best practice model available for each health care organization by integrating, automating, and monitoring each pharmaceutical-related transaction from purchase order to patient.

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As provider organizations pursue BPOC (bar code-enabled point-of-care) technologies, they should evaluate the drug distribution companies’ abilities to provide value in designing a best practice model for a more efficient, safe, and cost-effective medication supply chain.

There are many sources of wasteful spending in health care, and the estimated cost is staggering. The Institute for Healthcare Improvement estimates the United States could cut 15 to 30 percent of its $1.4 trillion annual health care tab by operating more efficiently and improving quality. Eliminating preventable medical errors alone would save $37.6 billion, according to the Institute of Medicine (IOM). Medication errors are the most common preventable mishap and each one may add more than $2,000 to the cost of hospitalization, translating to approximately $2 billion in annual spending nationally. VHA, Inc. estimates that reducing the overuse of just three antibiotic therapies would result in a $1 billion savings. The inefficiencies of the traditional medication use process and the potential gains from correcting them are so significant that health care providers are focusing cost-control efforts on medication management.

Pharmaceutical costs are among the most costly line item expenses on any hospital’s budget, second only to personnel expenditure. Understandably, hospital executives are continually trying to streamline and maximize the efficient use of this costly but critical resource. However, the medication supply chain is a complex system with a myriad of failure points that can lead to inefficiencies and higher costs. Operational inefficiencies create waste and add costs. By some estimates, drug diversion alone can account for 5 to 7 percent of a hospital’s annual pharmaceutical expenditure.

Clinical factors likewise contribute to inefficiencies in medication management. Physicians may order medications that do not comply with known best practices. The appropriate medication may be delayed in getting to the patient, diminishing or negating the intended therapeutic effect. In some cases, the correct medication will even be given to the wrong patient. Recognizing these trouble spots and seeking to realize the financial benefits of process improvement, hospitals are searching for viable solutions from reliable suppliers.

A New Paradigm

Today hospitals are largely unable to quantify the financial impact of medication errors, waste, diversion, and the subpar clinical outcomes that result from common medication use practices. The lack of transparency results from a complex, multistep medication use process that relies on inadequate integrated information technologies and manual processes that are inefficient, ineffective, and dependent on the infallibility of short-staffed, overworked clinicians. In addition, some technologies fail to deliver optimal results if the users do not leverage the full array of clinical decision support provided by the systems. To address the weak links in the medication management process, hospitals must integrate the systems that track medications from the loading dock to the bedside – at central receiving, in the pharmacy, during distribution, at the point of administration, in charge capture, and in prospective analysis of clinical outcomes (see Figure 1).

Traditionally, health care information technology (HIT) companies have provided component solutions for medication management, but an integrated medication supply chain is larger than any one HIT vendor is able to address. Instead, pharmaceutical distributor organizations are emerging as the best-positioned entities to provide cost-effective solutions, unifying each step of the medication management process while leading positive process transformation. In the distributor-lead paradigm, once-disparate HIT companies are now unified and anchored to larger drug distribution companies, allowing for

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Figure 1 Total Pharmacy Management Solutions

comprehensive product and service offerings, nontraditional financing options, and unmatched interoperability among the various components of a closed-loop medication supply chain.

Pharmaceutical distribution companies have long felt the pressure of eroding margins and increasing customer demand to offer value-added services that distinguish themselves. These pressures have resulted in industry consolidation over time, leaving just a few major drug distribution entities competing for virtually the entire national market share. This highly competitive landscape has provided a venue for health care organizations to leverage their distributor partnerships for the best possible drug purchasing terms and for access to products and services designed to increase efficiency, reduce costs, and improve medication safety. Consequently, long-term multiproduct distribution contracts have advanced the concept of a closed-loop medication use process well beyond the initial clinical meaning wherein the ordering, transcription, dispensing, and administration of medications are linked technologically and procedurally. A distributor-lead closed-loop solution augments these clinical objectives with operational improvements in inventory control, reduced waste, and efficient staff allocation. Ultimately, the financial returns on operational improvements may be the driving force behind ever-expanding patient safety initiatives.

In the distributor-lead paradigm, a closed-loop solution integrates, automates, and monitors each pharmaceutical-related transaction from purchase order to patient, providing the most efficient, best-practice model available for each health care organization. The appropriate practice model for each hospital is determined through a careful analysis of current processes and technologies. This assessment serves a critical role in optimizing a return on investment plan. Unfortunately, better care is not rewarded with better payment in the current health care system. Financial incentives are such that longer hospital stays and intensive care resulting from adverse drug events may have a positive financial impact on the hospital. While there are well-documented statistics around cost avoidance of medication errors, patient safety remains less definable by standard return on investment models than a new MRI scanner.

If we assume that quality care costs more initially, allocations must be made and savings must be found elsewhere to budget for quality improvement. While clinically alarming, it is economically convenient that the medication use process within hospitals today is hindered by inefficiencies that represent vast potential savings. For example, the use of automated packaging equipment may reduce pharmaceutical costs. In most hospitals with more than 200 beds, the conversion from manufacturer-supplied unit dose (UD) packages to bulk oral solid packaging results in significant savings. This savings has been shown to be $0.05 per oral solid dose if a facility is willing to move from UD to bulk of the same brand. If the facility moves from UD to best-priced generic, the savings increase to $0.065 to $0.10 per dose. As a 250-bed hospital may process more than 1,000,000 oral solid doses annually, the institution may expect savings of $65,000 or more.

However, the assessment of each hospital’s formulary to identify the optimal mix of manufacturer UD packages to bulk oral solids or contractor-repackaged UD medications is a laborious analysis for any pharmacy director. This is especially true for the pharmacy leaders of multifacility health systems with centralized purchasing of pharmaceuticals, who are able to benefit from larger economies of scale through purchasing optimization. However, optimization requires access to massive amounts of drug usage and pricing data—a resource uniquely available to drug distribution companies. A distributor partner is able to assist hospitals and health systems by assessing current drug purchasing patterns and recommending product changes that more cost-effectively provide the pharmacy with bar coded UD packaged medications—the building blocks of medication safety.

Inventory management systems, drug usage analysis, and pharmacy automation are just a few of the value-added offerings that a distributor organization may offer to help a hospital recover funding for patient safety systems and other quality improvement tools. A drug distribution company is able to consolidate offerings in such a way that acquisition may proceed without hard-to-come-by capital funds. A single, predictable monthly operating line item can provide a hospital with medications, pharmacy automation equipment, a BPOC system, and implementation services. With a distributor able to offer, or partner to provide, the necessary components of a closed-loop medication management system, a pharmacy transformation toward improved patient safety at a lower cost of care is becoming reality.

Figure 1 Total Pharmacy Management Solutions

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The Technology

At the crux of each distributor organization’s technology offering is a suite of bar code-enabled technologies designed to streamline inventory control, improve the accuracy of medication order fulfillment, ensure safe medication administration to patients, automate medication administration documentation, collect performance data, and capture medication charges at the point of care. Practically speaking, these information technologies have been contributing to medication supply chain improvement at pioneering hospitals for years, but a FDA mandate that bar codes be placed on medication packaging and blood and blood components intended for transfusion within two years, fueled the adoption of bar code technologies and drove the distributor-lead paradigm into the mainstream.

For some time, drug distributors have leveraged the power of bar codes, and more recently RFID transmitters, to expedite order reconciliation processes when medications are received by the hospital. Handheld bar code scanning systems reduce product check-in times from three hours to 45 minutes or less, with greater accuracy and efficiency than the previous manual.

In the pharmacy, technicians use automation equipment to print small bar coded labels for all products that are not bar coded prior to receipt, then stock the various automation devices, shelves, and drawers. Utilizing a combination of purchasing manufacturer bar-code-labeled UD packages, outsourcing repackaging, and in-house automation to package and label bulk volumes, hospitals are able to cost-effectively and safely achieve almost 100 percent bar code labeling of all medications. Using bar codes and online product images, pharmacists ensure packaging verification before medications are distributed to decentralized automated dispensing cabinets, carts and/or nurse servers in the patient care areas.

Bar code applications have taken longer to expand into the clinical environment but are now being adopted at a rapid pace. With more than 38 percent of medication errors occurring at the point of administration – of which only 2 percent are intercepted before reaching the patient – BPOC technology is quickly gaining recognition as the top patient safety technology available for immediate results. The FDA bar code rule was drafted with the expressed intention of driving BPOC system use across the nation. A 2004 survey of chief information officers by the Healthcare Information Management Systems Society found that bar coding systems are now favored over computerized physician order entry systems, signifying a major shift in IT priorities.

To use a BPOC application, nurses scan their identification badge to log on to a bedside computer. They then scan the patient wristband to bring up his medication orders on the screen. Finally, the nurse scans the medication. The system confirms that the nurse has identified the right patient, medication, dose, time, and route of administration before she gives the medication to the patient. The system automatically records the administration to the hospital’s medication administration record (MAR) and enables medication charge capture at the time the patient receives the dose rather than when the dose is dispensed. As medication orders may change, patients may refuse medications, or a medication may be temporarily unavailable to the nurse; charging upon dispensing often requires that pharmacy staff credit unadministered doses back to the patient’s account. In a mid-sized hospital, this crediting activity can consume half of a full-time pharmacy technician position. Payers also benefit from the more accurate billing resulting from point-of-care charge capture for medications, specimen collections, transfusions and even supply charges.

BPOC systems offer additional patient safeguards and workflow efficiency tools such as “Five Rights” error checking, look-alike and sound-alike alerts, maximum daily dose warnings, allergy alerts, weight-based dose checking, access to an online drug reference, formulary comments, nursing documentation tools, automated documentation to a real-time electronic MAR, and advanced error reporting. Users of BPOC systems have documented up to 86 percent reductions in medication administration errors. Equally important, BPOC systems also provide data to identify the upstream errors that originate during prescribing, transcribing, or dispensing – fueling process improvement throughout the medication use process.

The Power of Data

Early customers of distributor-lead medication management systems have successfully streamlined inventory control, improved the accuracy of medication dispensing, reduced waste, eliminated paperwork and administrative tasks and, most importantly,
Likewise, payer organizations that are contemplating a quality reimbursement model will rely on hospital information system data to measure best practice compliance and clinical outcomes. As these best practices relate to medication use, BPOC systems are uniquely able to provide data on the exact time medications are administered to the patient rather than forcing payers to rely merely on the physician's orders or time the dose was dispensed from the pharmacy. This distinction enables more accurate studies of clinical quality measures that hinge on the temporal nature of medication data, e.g., whether aspirin is administered within 24 hours of admission for acute myocardial infarction.

Conclusion
The distributor-lead paradigm is predicated on the wise spending of limited capital and optimization of the organization's human resources. To think that a distributor can achieve a closed-loop solution through wholesale replacement of hospital IT systems is impractical. Instead, the success of this paradigm relies on a comprehensive understanding of existing practices, processes, volumes, and solutions that maximize efficiencies and protect current investment in technologies within the health care organization. While maximum benefit stems from a comprehensive implementation of solutions, incremental value can be gained through a phased deployment approach appropriate for each hospital and health system.

Bar-code-enabled medication management systems are a significant part of the future of health care technology and are surging in clinical use since the FDA ruling in February 2004. For hospitals, these technologies are more affordable and achievable than ever before, and industry consultants estimate that nearly all hospitals will implement BPOC technologies in the next five years. As provider organizations pursue this goal, they should evaluate the drug distribution companies' abilities to provide value in designing a best practice model for a more efficient, safe, and cost-effective medication supply chain. While there are early success stories of this paradigm operating around the country, not all distributors are equally positioned to deliver value today. Ultimately, the success of the distributor-lead paradigm is incumbent upon providers daring to demand more value from their distribution partner.