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## Scan Mania

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Slowly but surely, hospitals are turning to bar coding technology to streamline and improve the accuracy of dispensing medication and other elements of patient care. Although bar coding is not an inexpensive technology—a system can cost up to $1 million in some cases—it can yield important benefits for hospitals in the form of reduced medication errors, higher quality of patient care, greater operational efficiencies, and lower costs.

Brigham and Women's Hospital, a 720-bed medical center in Boston, has used bar coding extensively in its pharmacy department with significant success. All drugs in the pharmacy have their bar codes scanned into the system when they arrive in the receiving area of the pharmacy and are placed in the drug storage retrieval system. Because about 50% of drugs do not have bar coding on their packaging when they are delivered to the hospital, Brigham and Women's runs a repackaging center to label each drug with an appropriate bar code to ensure 100% availability of bar coded medication.

Whenever the pharmacy dispenses drugs to a patient, the bar code is scanned into the system, which checks to make sure the medication and the dosage are correct. The hospital uses a two-dimensional bar coding system that allows it to put more information in a smaller space, such as lot number, national drug code (NDC), and expiration date. With this much information in the bar code, the hospital is able to track expiration dates and product recalls and, if necessary, send messages to nurses to prevent dispensing of expired or recalled drugs.

Brigham and Women's bar-coded drug inventory system tracks the more than 7,000 items on hand. Every time a drug is dispensed, the system notes that and automatically places an order to replenish supplies to maintain perpetual inventory. "This allows the hospital to manage the ebb and flow of its inventory better, so there is never too much or too little on hand," said Bill Churchill, the hospital's director of pharmacy.

Although the hospital credits the pharmacy bar coding effort with a one-time savings of $250,000 to $300,000 from reduced inventory costs, Churchill admits that it will be a challenge to calculate savings beyond that. "You are preventing something, so quantifying the cost savings associated with that can be difficult," he said. Nevertheless,
the hospital is prepared to try and has received a grant from the National Institutes of Health to study the cost effectiveness of bar coding.

**Next stop, perfection?**
So far, the use of bar coding in the pharmacy has increased Brigham and Women's medication dispensing accuracy to 99.3%. Many might think that is a significant achievement, but Churchill is not completely satisfied. "There is still the potential for 2,000 errors annually, even with 99.3% accuracy," he said. "That is a significant amount of error." By using bar coding to drive out errors in the pharmacy dispensing process, including selecting the right product, Churchill believes a 100% accuracy rate is a realistic goal. Indeed, four weeks into a second study of medication accuracy, the hospital had made no errors.

Brigham and Women's has expanded the use of bar coding into other areas. Each patient gets a bar-coded wristband so the hospital can scan patient information when when taking blood samples or dispensing medication. The next step is to implement bar coding in the hospital's blood bank, clinical lab, and at the patient's bedside so that each blood sample receives a bar code to identify the patient and the destination of the sample.

Brigham and Women's is not alone in using bar coding. Indeed, as bar coding becomes ingrained in the pharmacy, hospitals reap important benefits as pharmacists are freed from routine administration and have more time for important clinical work. Albert Einstein Healthcare Network in Philadelphia has used bar coding in its pharmacy along with a dispensing

robot since 2001. Since then, the network has reduced dispensing-related medication errors by 40% while reducing its pharmacy staffing requirements.

The network has used the financial savings from bar coding to redeploy pharmacists onsite in three patient care units to work with physicians and nurses directly in patient care and answer patient questions. &#65533;As you can imagine, that is a very expensive model,&#65533; said Beth Duffy, the network&#65533;s vice president of healthcare services. &#65533;But it helps to improve patient safety and satisfaction.&#65533;

**Glimpse the future**

The move toward widespread use of bar coding gained momentum this spring when the US Food and Drug Administration issued regulations requiring drugmakers and blood suppliers to add bar codes to most products within two years. In addition, the Joint Commission on the Accreditation of Healthcare Organizations has made improving the accuracy of patient identification one of its key goals, and bar coding is one of the more prominent tools that can help hospitals to achieve that goal.

However, before implementing bar coding technology, hospitals must recognize that this system will require some changes to operational procedures and processes. &#65533;Changes in workflow require a lot of discussion to plan and prepare because people get used to doing things in a certain way,&#65533; said Duffy. Thus, training costs can be significant for a bar code system that most employees will be using.

It&#65533;s also important to understand processes and apply the technology appropriately, said Mark Hopkins, chief operating officer of the academic and community hospital division of the University of Pittsburgh Medical Center in Pittsburgh. In Hopkins&#65533; view, bar coding is the most economical way to validate the match between the patient and the medication. Hopkins said the data collected through bar code scanning when dispensing medication can help hospitals identify trends in errors and eliminate missing doses and documentation errors.

Although hospitals should strive for 100% accuracy, they need to recognize the continuing possibility of human error, warned Hopkins. &#65533;Technology is not 100% perfect,&#65533; he said. &#65533;People will find workarounds to do what we are trying to prevent.&#65533;

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