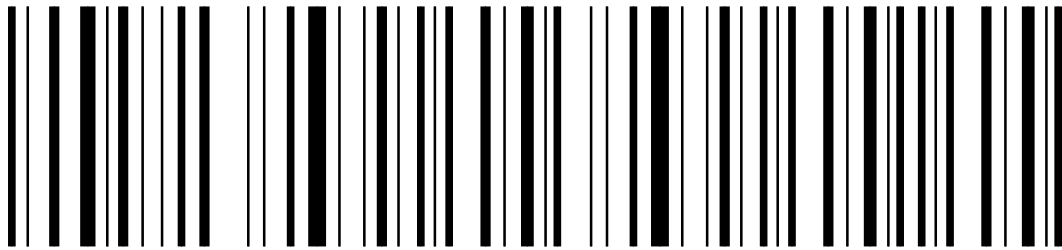


Patient Safety Applications for Bar Code and RFID Technology



APPLICATION WHITE PAPER



Zebra Technologies



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Bar coding and radio frequency identification (RFID) solutions are at the heart of many patient safety initiatives in hospitals across the country. These proven technologies enable nurses, pharmacists, lab technicians, therapists, and other healthcare professionals to record and verify information more quickly and accurately than by handwriting or keyboard data entry. The significant reduction in errors that results from automating data entry and access to patient information dramatically improves patient safety and, in fact, actually saves lives.

Today, hospitals are using bar coding and RFID to protect the accuracy of critical patient-care processes, including the dispensing and administration of medications and blood products, the collection and tracking of specimen tests and x-rays, and the verification of surgical specifications. Furthermore, in addition to maintaining accurate inventories of medications and supplies, bar coding and RFID are helping hospitals effectively manage and locate medical equipment and other assets, track file locations, assist in charge capture, detect and deter counterfeit products, and maintain and manage materials. Equally important, hospitals benefit significantly from the efficiency gains that bar coding and RFID applications deliver. This guide provides a brief introduction to how to take advantage of bar coding and RFID technologies in a variety of healthcare applications.

Wristbanding / Positive Patient Identification

Positive patient identification provides the foundation for error prevention and improvements in numerous patient-care applications. The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) has repeatedly made “Improving patient identification” a top National Patient Safety Goal (NPSG) because of its importance and potential to improve many processes. Bar code and RFID wristbands facilitate positive patient identification by providing an automatic, secure, and convenient way to collect and access accurate patient information, thereby eliminating manual data entry and the associated opportunity for error.

Patient data is encoded in a bar code or RFID tag in the wristband when it’s printed. Data is read and recorded by scanning with a bar code or RFID reader, instead of by manually reading the wristband to verify the patient. Readers are integrated with a computer or PDA that looks up the scan data in a database and displays the patient information for the nurse or other caregiver. Wristband scanning can also be used to enter data into systems. Applications can be set to automate the “Five Rights” check and to positively identify the patient before any procedure is started or chart entry is accepted. Entering patient data by scanning eliminates transposition errors and other mistakes related to manual data entry.

A bar coded wristband can provide two forms of identification in one easy-to-access place by encoding the patient name and identification number. Including two forms of patient ID on the wristband satisfies JCAHO National Patient Safety Goals and aids HIPAA compliance, because information encoded in a bar code instead of being expressed in text satisfies HIPAA privacy requirements. The patient may be identified by encoding his or her name in the wristband, or by assigning a random, unique patient ID number that can be encoded and printed in human-readable text. This approach satisfies both JCAHO and HIPAA requirements.



Pharmacy Dispensing

Typically, the pharmacist scans a unit-of-use bar code provided by the pharmaceutical manufacturer on each medication he or she dispenses to fill a prescription. The National Drug Control (NDC) number is encoded in the bar code and is automatically recorded when the symbol is scanned. The scanner is interfaced to a database or other software application that checks the NDC against the prescription order to validate that the correct medication and dosage were dispensed. An immediate alert is issued if there is a discrepancy. Lot codes and expiration dates are also commonly encoded on unit-of-use labels and can be used to trigger appropriate alerts. Most bar code systems also automatically record the date and time of all transactions to provide an audit trail.

At the same time, hospitals are striving to meet the 2006 JCAHO National Patient Safety Goal that requires labeling for all medications and medication containers. In many cases, while the unit-of-use label provided on the medication container by the pharmaceutical company may meet the new FDA bar coding requirements, it doesn't meet the identification requirements needed for the unit-dose package or container going to the patient's bedside. For example, many drugs are delivered to hospitals in bulk rather than at the unit-dose level. And, a large percentage of medications administered are special compounds that are mixed in the pharmacy that require patient-specific unit-dose labels. Increasingly, pharmacists are investing in bar coding and RFID solutions that enable them to easily produce their own unit-dose labels, which they then scan to record the release of the prescription.

Medication Administration

The FDA estimates that full adoption of bar code medication administration systems would reduce preventable medical errors by 50 percent, although many hospitals that use such systems have reported even more impressive error-reduction rates. For example, Beloit Memorial Hospital reduced medication errors by 89 percent and 74 percent in two wards where it implemented a bar code medication administration system. (See the case study in the Resource Library section of www.zebra.com for more information.)

In automated medication administration, bar code scanning is used to drive a computerized "Five Rights" check. Prior to dispensing medication, the nurse scans the bar codes on his or her own ID badge, the patient wristband, and the unit-dose medication label. (ID cards and wristbands may have RFID tags instead of bar codes.) Application software on a handheld or cart-mounted computer quickly performs a database check to confirm the medication to be dispensed conforms to an order for the patient. Bar code administration applications deliver hospitals an excellent return on investment (ROI) because they can be implemented independently of much more expensive CPOE and EMR systems.

Specimen Collection

With this application, before taking a sample, a phlebotomist or nurse scans the patient's bar coded wristband and checks a mobile computer to verify the correct patient, the specifications of the order, and that the sample hasn't already been taken. While the sample is being drawn, a mobile printer automatically produces a bar coded ID label to accurately identify the sample. The staff member then immediately applies the label to the sample container, thereby significantly reducing the possibility of it being misidentified. Hospitals have proven that this point-of-care solution for specimen identification delivers higher accuracy rates than orders and labels that the lab prints centrally and distributes to the patient floors.





S a m p l e M a n a g e m e n t

In the lab, incorporating bar code labels on test tubes, slides, and sample containers enables technicians to track specimens throughout the testing process all the way through the reporting of results. The required tests can even be encoded on the sample label in a two-dimensional (2-D) bar code or RFID tag to eliminate any chance of confusion as to what tests should be performed. At the same time that bar coding aids test results recording and improves patient record accuracy, it provides measurable process improvements and time savings for laboratory staff.

T h e r a p y / T r e a t m e n t V a l i d a t i o n

Similar to medication administration, wristband scanning for patient verification can help surgical teams, respiratory therapists, radiology technicians, physical therapists, and other caregivers ensure they are providing the right treatment or service for the right patient. Scanning the wristband and entering a procedure code triggers a database lookup to verify that the procedure is indicated and has not already been performed. John Radcliffe Hospital in the U.K. has integrated bar code scanners for patient wristbands with its handheld glucose meters. Scanning the patient wristband before the glucose reading ensures results are recorded accurately for the correct patient, with no manual data entry required. (See the full John Radcliffe Hospital case study on www.zebra.com for more information).

P a t i e n t S e c u r i t y

Wristbands can be incorporated into physical security systems, which hospitals often implement using RFID wristbands. RFID chips can be embedded within bar coded wristbands to provide an invisible, unobtrusive form of protection. The chip on the wristband is read when the patient attempts to leave the ward, which may sound an alarm, trigger a notification at the nurses station, or even lock the door. In healthcare settings, RFID wristbands are typically used to protect infants, Alzheimer's patients, and others deemed a high risk.

C h a r g e C a p t u r e

A bar code or RFID wristband can facilitate efficient charge capture by enabling a staff member to scan and enter charge codes in a PDA or PC rather than handwriting the patient information for later entry into the billing system by an administrative clerk.



Non-medical Applications

Wristband scanning can also facilitate quick, accurate entry of patient information for meal orders and various optional services. In addition, healthcare facilities can take advantage of bar codes in many ways that do not involve patient care. For example, bar coding is one of the most widespread and effective tools used throughout business and industry for managing assets and materials, including many applications that can be adapted for the healthcare environment. For example, inventory records can be kept accurately and updated automatically by scanning bar codes on supplies as they are delivered or dispensed. Basic bar code inventory control and material management systems will build an accurate record, but applications can also issue low-stock alerts and generate reorder notices.

Bar code and RFID staff ID badges are a convenient and more effective way than time cards to record time and attendance for payroll applications and can also be used for automated access control.

Hospitals can also improve equipment availability and utilization by using bar code or RFID labels to record asset locations and assignments. For example, staff can be required to scan an asset ID label and their own ID card to sign out equipment for use. So, a nurse would sign out an IV pump by scanning its bar code label and her own ID card, and entering the location (e.g., patient room) where the pump will be used. This process builds an accurate system that can be conveniently accessed to provide asset visibility. Asset management software applications can provide alerts and notifications if assets have not been returned in a timely manner or if they exhibit unusual usage patterns. Improving asset utilization reduces losses and capital equipment needs.

Summary

Healthcare providers have found numerous ways to use bar codes and RFID to improve patient safety and care as well as to manage their staff and resources more efficiently. Zebra has other white papers and materials at www.zebra.com that examine applications in more depth. Visit the Patient Safety page in the Industry Solution section of the site for more information and to access customer case studies about bar coding in healthcare environments. The following white papers, available free from the Resource Library section of www.zebra.com, may also be of interest:

- Adopting Bar Code Labeling in Hospital Pharmacies
- Beyond Point of Care: Benefiting from Unit-of-Use Bar Code Traceability in the Life Sciences Supply Chain
- Evaluating Print Options for Hospital Bar Code Labeling
- Issues and Opportunities for Introducing Bar Code Systems in Hospitals
- It's All in the Wrist: Improving Patient Safety with Bar Code Wristbands
- The Do's and Don'ts of Selecting Hospital Bar Code Labels and Wristbands
- Improving Security with Identification Printing
- Increasing Profits and Productivity: Accurate Asset Tracking and Management with Bar Coding and RFID



Zebra Technologies Corp. (NASDAQ: ZBRA) is a world leader in bar code, RFID and ID card printing with an installed base of more than 5 million units, including systems at healthcare facilities for unit-of-use labeling, prescription label printing, patient wristband printing, materials management, security, and employee identification. Together with its partners, Zebra has the experience, industry knowledge, and specialized products needed for successful pharmacy implementations. Zebra is also a leader in standards development that actively participates in the work of life sciences industry associations so that it will be prepared to meet the emerging needs of its customers. Contact Zebra at +1 800 423 0442 or visit www.lifesciences.zebra.com for more information about bar code printing solutions for healthcare.



Zebra Technologies

333 Corporate Woods Parkway
Vernon Hills, IL 60061-3109 U.S.A.
T: +1 847 793 2600 or +1 800 423 0442
F: +1 847 913 8766
www.zebra.com

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