



A Zebra Technologies White Paper

Wristband Formatting Best Practices

Key Considerations for Improving Patient Care



Executive Summary

Bar coded patient wristbands are an excellent way for medical centers to improve the safety and quality of care while meeting industry mandates. To gain the most benefit, the information provided on the wristband must afford easy readability, and deliver the right information in the right way. Healthcare personnel who are starting to look at a patient ID solution need to know the key considerations of patient wristbands from a formatting perspective. This is especially crucial during the first 30 days of looking at a patient ID solution.

Like any technology or process, following proven best practices helps ensure a smooth transition to deployment and beyond. The purpose of this white paper is to help healthcare IT staff launch the right wristband system with the right format. Proper wristband formatting makes it easier for nurses and clinicians to perform patient care tasks so that there is no need for workarounds. The result is improved efficiency and quality of care—medical staff is more productive, there are fewer chances for errors, and nurses can provide more focused attention to their patients.

Introduction—Now is the Time for Wristband Deployment

When The Joint Commission first introduced its National Patient Safety Goals (NPSG) in 2003, improving the accuracy of patient identification topped the list, a position it has held with each successive year. Then, in 2006, the Food and Drug Administration (FDA) began requiring unit-dose bar code identification on medications dispensed in healthcare facilities, increasing the demand for solutions that would allow caregivers to ensure an accurate match between patients and medications being administered at the bedside.

Now, as the American Recovery and Reinvestment Act (ARRA) spurs the widespread adoption of electronic health record (EHR) systems at hospitals nationwide, bar code-based systems have also been shown to improve the accuracy of patient records, minimize errors and enhance the overall safety of care. In fact, bar coding is one of the technologies currently under consideration by the Health Information Technology Policy Committee as it formulates the second and third stages of the meaningful use requirements that will go into effect in 2013 and 2015.

Bar code-based systems not only allow caregivers to identify patients and document the associated treatments, but they also enhance the use of EHRs in terms of both accuracy and completeness, ultimately helping to ensure that clinicians have access to the information they need to deliver the safest, most effective care. Identifying patients with bar coded wristbands is a first step healthcare organizations can take to make these improvements. Checking the “Five Rights”—Right Patient, Right Medication, Right Dose, Right Time, and Right Method of Administration—prevents most medication errors.

Bar coded patient wristbands provide the necessary foundation for preventing errors by ensuring accurate patient information is always available at the point of care. Bar code wristbands will improve the effectiveness of five rights checks for medication administration and provide a platform to extend safeguards to other patient care activities.

Properly Formatted Wristbands Meet Joint Commission Requirements

Bar coded wristbands provide a convenient way to comply with the National Patient Safety Goal (NPSG) to “Improve the accuracy of patient identification,” which The Joint Commission has included in its goals annually since 2003. Compliance with the patient ID goal requires that healthcare centers use at least two patient identifiers whenever taking blood samples and administering medications or blood products. A bar coded wristband can provide two forms of identification in one easy-to-access place by encoding the patient name and identification number. The Joint Commission recognized the value of this approach in an FAQ item on its Web site that explains the safety goal:

“The two identifiers may be in the same location, such as a wristband.... Acceptable identifiers may be the individual’s name, an assigned identification number, telephone number, or other person-specific identifier. Electronic identification technology coding, such as bar coding or RFID, that includes two or more person-specific identifiers (not room number) will comply with this requirement.”

Once wristbands contain bar codes to provide basic patient identification, medical IT staff can add numerous other identification, tracking, and data collection applications to take advantage of bar code data entry.

Wristband Best Practices—What They Are, Why You Need Them

After a medical center chooses the bar code wristband, software application, scanners, and other supporting infrastructure, it is time to put best practices in place. Be sure to do this prior to the actual deployment and wristband design to ensure the right processes fall into daily use. Otherwise, the medical center cannot realize the full benefits that properly designed bar code wristbands can deliver.

Numerous studies have shown that between 2 percent and 6 percent of patients are not properly identified by their wristbands. A College of American Pathologists (CAP) study of 217 institutions uncovered 45,197 patient identification errors. Missing wristbands accounted for 71.6 percent of the errors, but erroneous information and illegible text also plague healthcare professionals who rely on wristbands to deliver care accurately.

To ensure patient safety, the wristband must stay on the patient and remain readable for the duration of the hospital stay. It also must uniquely identify the patient in a HIPAA-compliant manner. The process for designing, formatting, and producing bar code wristbands is not much different from traditional wristbands. The following sections define proven best practices so healthcare centers can create a general-purpose wristband program for 90 percent of their patient needs. Adhering to proven best practices lays the foundation for numerous quality and efficiency improvements. After implementing the general program, medical centers can start evaluating their individual needs for specific areas.

Best Practice 1—Repeat 2-D Bar Codes Across the Wristband

Always repeat a two-dimensional (2-D) bar code along the entire length of the wristband so that the band does not require adjustment during scanning. This helps to ensure ease of scanning and prevents the need for nurses to devise workarounds when verifying the patient. Nurses will no longer have to line up the scanner with each individual bar code. They can scan from about a foot or so away, from any direction. If there were just one bar code on the band, they would have to move the band on the patient’s wrist so they could scan it. The extra bar codes eliminate the need to disturb the patient—the bar code is readable no matter how the patient is holding his or her hand.

While there are many different types of bar codes, also known as symbologies, 2-D bar codes serve as limited portable record files and provide commonly needed patient information. This data can include allergies, primary physician, blood type, and reason for admission. 2-D bar code symbologies, such as Data Matrix and Aztec Code, are best suited for patient wristbands because of their overall ease of use. With 2-D, medical staff can encode the desired information in the least amount of space. Doing so leaves extra space available on the wristband for additional text or graphics, or to print the bar code larger, which makes it easier for scanners to read.

Best Practice 2—Use Two Linear Bar Codes

Always use linear bar codes as part of the basic design. Be sure to include at least one, but preferably two, linear bar codes on the wristband to support glucometer readings. This is important because two bar codes help make scanning easier. 2-D bar codes are preferred for lining the band. Current glucometer scanners only support linear bar codes, and not 2-D symbologies. The typical choice for linear bar codes is Code 128 because it is one of the densest linear symbologies. High density means that software applications can encode more information in a smaller amount of space.

Best Practice 3—Include Human-readable Text

Beyond the actual bar code, print with human-readable text the patient's last name and first name on the band so that clinicians can easily read it. Doing so fulfills the second part of the Joint Commission Mandate to identify the patient in two different ways—one is with the bar code, the second is with the human-readable name on the band. While there are currently no recommendations for font sizes, the text should use the largest font possible compared to the other printed information so nurses can read it easily.

Best Practice 4—Include the MRN and FIN

The software that encodes data for healthcare wristbands typically supports standard defaults including the patient's date of birth, age, and sex. Another best practice is to include the medical record number (MRN) and the financial institution number (FIN) in the bar code. This requirement depends on what the software supports. In most cases, this information is part of the standard band format, and driven by the software application that prints the bands. Including this information enables downstream efficiencies and helps streamline the overall patient identification and record-keeping process.

Best Practice 5—Include Check-digits for Security

The last thing a medical center needs is for just any bar code scanner to read a patient's personal information. Adding a check-digit at the beginning of the bar code helps guarantee that only approved patient ID scanners can read the wristband. This prevents chart label scanners or other off-the-shelf scanners from decoding the wristband data. In addition, the check-digit ensures that medical staff actually scans the band at the patient's bedside, and is a major factor for preventing workarounds.

Best Practice 6—Include Print Time and Other Traceability Text

Another best practice to improve security is to add a print time/date and "who printed it" in human-readable text. When nurses find bands that are not on patients, they can go back to the clinicians and find out why they are printing extra bands. This alleviates any type of security concerns with copying the bar code, copying the patient's information, or putting the bands on other patients, etc. It also limits workarounds because the reason why the clinicians print the bands is so they can carry extra bands and scan them away from the bedside. This will ensure they scan them at the bedside.

Consider the following workaround: Clinicians will take a generic wristband and scan it separately as opposed to physically being at the bedside and following all the steps that they are supposed to follow. Adding traceability text helps deter this time-consuming and error-prone workaround.

Best Practice 7—Deploy Thermal Print-on-Demand Printers

Bar coded wristbands are the foundation for positive patient identification and the prevention of serious medical errors. Always choose thermal printers because they produce crisp, clear print quality on all wristbands, so bar codes scan quickly and reliably. Thermal printing's performance and total cost of ownership advantages more than offset the perceived convenience of using an office laser printer for creating wristbands. Thermal is the dominant bar code printing technology used throughout industry for mission-critical operations.

Healthcare quality requirements and usage environments demand the excellent bar code symbol quality that thermal printers provide. Scanners decode the information from bar codes by measuring the differences between narrow and wide elements, and the contrast between dark bars and light spaces. If the ratios or contrast deviates slightly, the bar code may be difficult or impossible to read. A nurse's time is too valuable to waste by repeatedly trying to read poor-quality bar codes, and rushed, manual data entry by a frustrated nurse carries too high of a risk for errors. Printing the bar codes in vertical, or ladder, orientation enables faster, easier scanning than when the printer lays out symbols in a horizontal, or picket fence, orientation.

Thermal printers produce wristbands and labels on demand, one at a time. Laser printers, by contrast, often need to print an entire sheet, which typically includes one wristband and many labels—creating waste and unnecessary expense. Laser printers can be prone to jamming when used to print wristband and label sheets because of adhesive buildup, which is not a problem for thermal printers, which are specifically designed to print wristbands and labels, not documents. The differences in printing and media give thermal printers a total cost of ownership advantage over lasers for bar coding in healthcare. For more information about print technologies for bar coding, see Zebra's white paper "*Patient Wristbanding: The Advantages of Thermal Over Laser Solutions*" at www.zebra.com.



An example of a properly formatted wristband.

Conclusion

Deploying bar coded patient wristbands is simply not enough. To gain the most value, medical centers must ensure that wristbands contain the right information, meet industry mandates, and provide staff with an efficient solution. The reason that nurses and clinicians do workarounds is because the bar code is unreadable, or they cannot scan the wristband without disturbing the patient. Following the best practices discussed above helps eliminate workarounds by providing a repeatable, readable, usable format for general-purpose patient use. Now, medical centers can realize improved efficiency, better patient safety, and higher quality at the point of care.

Zebra Technologies Corporation (NASDAQ: ZBRA) gives customers visibility of critical assets, people and transactions through a broad range of printing and location technologies. Our bar code, card, kiosk and RFID printers as well as real-time location solutions have made us a recognized global leader in providing enabling solutions that identify, track, and manage critical assets, people and transactions for improved business efficiencies. For more information about Zebra's solutions, visit www.zebra.com.

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