Benefiting From Bedside Specimen Labeling

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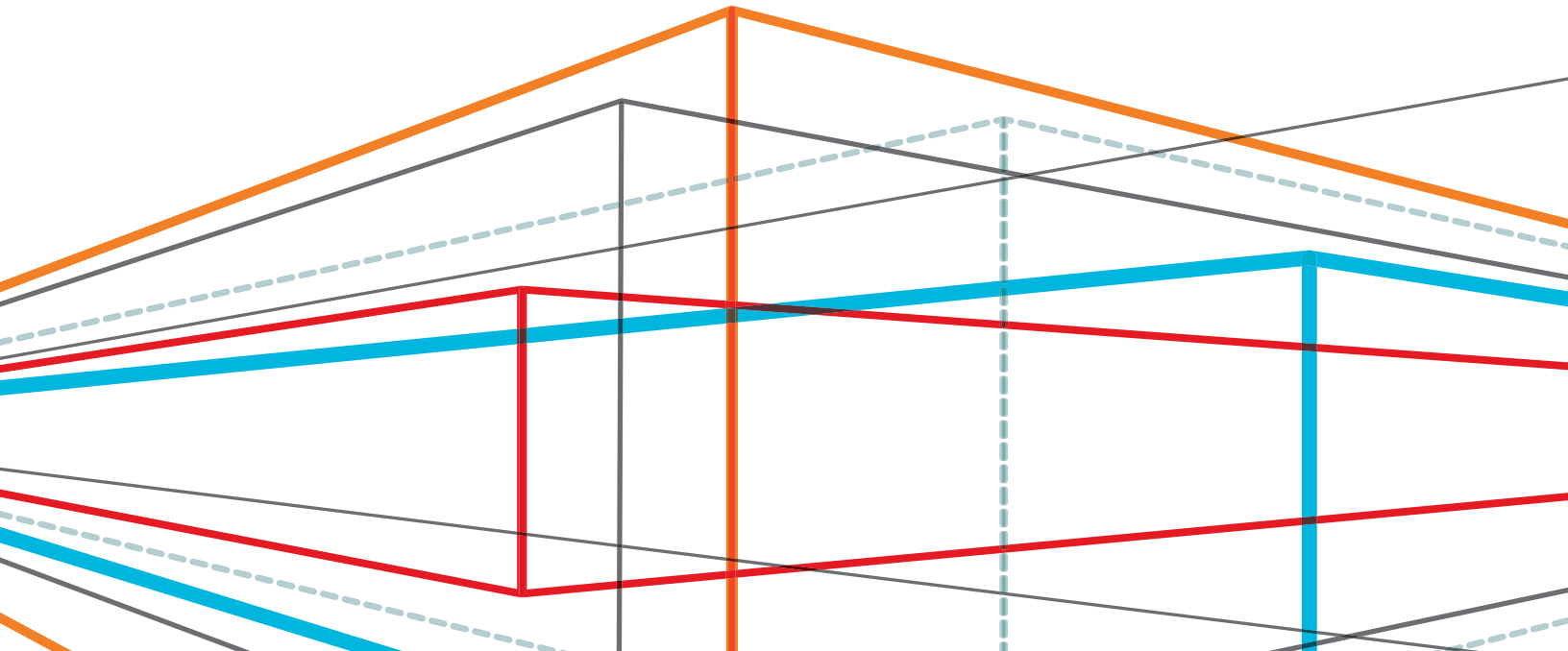

EXECUTIVE SUMMARY

Labeling blood and other samples at the time they are collected improves patient safety and helps prevent a host of problems related to misidentification—including many of the estimated 160,900 adverse events that occur in U.S. hospitals annually because of sample identification errors.[1] There is a strong and growing body of evidence within medical literature that creating specimen identification labels on demand at the patient bedside with a mobile printer can significantly reduce errors. The Joint Commission's National Patient Safety Goals (NPSG) for 2010 advocate the use of two patient-specific identifiers, such as name and birthdate, whenever taking blood or other samples from a patient, and to label the sample collection container in the presence of the patient. Producing specimen labels at the patient bedside and encoding patient identification in a barcode satisfies both The Joint Commission's NPSG and Health Insurance Portability and Accountability Act (HIPAA) requirements. This white paper explains the point-of-care specimen labeling process, documents its benefits, outlines equipment and IT requirements, and provides tips for successful implementation.

IDENTIFYING THE PROBLEM AND OPPORTUNITY

Improved patient safety and care are the main reasons to implement mobile specimen collection labeling. Misidentified samples create a serious risk to patient safety by leading to misdiagnosis and inappropriate treatment. In fact, one of the root causes of wrong site surgery is the switching, mislabeling or incorrect display of test specimens or results, which accounts for 12 percent of wrong site surgeries annually.[2] The case of Linda McDougal, a Wisconsin woman who underwent an unnecessary double mastectomy because her biopsy sample had been confused with another, drew national attention to the problem of sample identification errors and their consequences.[3] McDougal's experience is dramatic, but not isolated. According to one study, one in 18 sample identification errors leads directly to an adverse event.[4]

Another study found 5.8 percent of phlebotomy samples are mislabeled.[5] It is becoming increasingly clear that sample misidentification, which can lead to misdiagnosis, unnecessary treatment and wasteful tests, is a problem with serious patient safety consequences. There is also a significant financial impact. For example, it is estimated that the cost of misidentified specimens adds up to approximately $280,000 per million specimens.[6] One study determined that the redraws, retesting and additional treatment required due to sample errors costs hospitals an estimated $200 to $400 million per year.[7]

WHY LABEL AT COLLECTION?

Accurate labeling at the point of care can prevent many specimen identification errors and resulting problems. Specimen labeling errors accounted for 55.5 percent of identification errors in a study conducted by the College of American Pathologists.[8] Specimen labeling, the most common error, occurred more than twice as much as the second-most common cause. In addition, an analysis of adverse events that occurred at the Veterans Health Administration from 2000 to 2008 revealed that specimen labeling errors during the collection process accounted for nearly 37 percent of the adverse events.[9] By accurately identifying samples, hospitals can eliminate a leading source of identification errors.

The more time and distance between when labels are produced and when they are applied, the greater the chances they will be put on the wrong sample. For example, prior to converting from centralized printing to bedside specimen labeling, the staff at The Valley Hospital in Ridgewood, N.J., identified 63 steps in its phlebotomy collection process where errors could occur. Labeling specimens at the patient bedside eliminated 44 of these steps from the process. After implementing the bedside labeling system, The Valley Hospital reported zero misidentified patients and specimens, zero incorrect specimen containers and zero unnecessary phlebotomies after six months and 8,000 phlebotomies.[10]

The hospital also analyzed specimen identification errors and found that carrying multiple labels into a patient room was the leading cause of specimen mislabeling. Labeling away from the bedside was the second-leading cause.

The reasons for creating processes to prevent specimen labeling errors are clear. So is the value of bedside labeling for specimen identification. Numerous other studies and anecdotal results have shown the practice to be highly effective. Becton Dickinson reported that studies by two of the hospitals that installed its BD.id system for positive patient identification and specimen collection found nearly a 100 percent reduction in specimen collection errors.[11] Similarly, after Beloit Memorial Hospital implemented a specimen collection verification system, the hospital experienced a significant decline in wrong-patient errors related to specimen collection.[12] Many other hospitals and laboratories have reported significant error reductions related to barcode-based patient and specimen identification and point-of-care labeling.

The Joint Commission National Patient Safety Goal (NPSG) 1

NPSG.01.01.01: Use at least two patient identifiers when providing care, treatment, and services.

NPSG.01.01.01 Rationale: Wrong-patient errors occur in virtually all stages of diagnosis and treatment. The intent for this goal is two-fold: first, to reliably identify the individual as the person for whom the service or treatment is intended; second, to match the service or treatment to that individual. Therefore, the two patient/client/resident-specific identifiers must be directly associated with the individual and the same two identifiers must be directly associated with the medications, blood products, specimen containers (such as on an attached label), other treatments or procedures.

Elements of Performance for NPSG.01.01.01: Use at least two patient identifiers when administering medications, blood, or blood components; when collecting blood samples and other specimens for clinical testing; and when providing treatments or procedures. Label containers used for blood and other specimens in the presence of the patient. Processes are established to maintain samples' identity throughout the pre analytical, analytical and post-analytical processes. (Applicable to Joint Commission accredited laboratories)

Implementation Expectations for NPSG.01.01.01: Timely and accurate specimen labeling ensures the correct patient identification from collection through results reporting. The two identifiers may be in the same location, such as a wristband. It is the person-specific information that is the "identifier," not the medium on which that information resides. Acceptable identifiers may be the individual's name, an assigned identification number, telephone number, or other person-specific identifier. The patient's room number or physical location is not used as an identifier. Electronic identification technology coding, such as barcoding or RFID, that includes two or more person-specific identifiers will comply with this requirement.

Source: Commission National Patient Safety Goals Implementation Expectations.

PREVENTING ERRORS WITH POINT-OF-CARE LABELING

There are three essential components to a successful point-of-care labeling system: a mobile computer (which may include a barcode reader) that provides access to real-time draw orders and patient records; a printer that can be conveniently used at the patient bedside; and label media that will remain affixed to the sample container throughout all testing and storage processes.

While wireless network coverage is not strictly required for bedside specimen labeling, wireless technology has become increasingly prevalent in today's hospitals, making the bedside specimen labeling process easier and more efficient. With wireless connectivity, phlebotomists and other caregivers get real-time notification of cancellations, new test requests, patient moves and other changes. The result is a reduction in unnecessary procedures and trips to the central lab for assignment updates. Wireless connectivity also enables activity performed at the point of care to be instantly recorded in the patient's electronic medical record or other clinical system.

Barcoded patient wristbands are not required for point-of-care labeling, but can significantly enhance error reduction by facilitating a convenient, accurate positive patient identification. Joint Commission compliance requires that at least two patient identifiers be used whenever blood samples are taken and medications or blood products are administered. A barcoded wristband can provide two forms of identification in one easy-to-access place by encoding the patient name and medical record number.

Here's how a typical bedside specimen labeling procedure works. Draw orders are downloaded to mobile computers that are issued to the nurses or phlebotomists who collect the specimen sample. At the bedside, the patient is identified, ideally by barcode scanning. The patient ID is matched against a draw order on the mobile computer to verify that a sample is required and the correct patient is being tested. Confirmation can come from checking a record stored in the mobile computer, or through a wireless network connection to a central patient record system. After receiving instant confirmation of the patient identification and sample order, the sample is collected. The mobile computer or network immediately directs the printer to produce an ID label, which is applied to the sample container. Printing labels on-demand, one-at-a-time virtually eliminates the possibility of applying the wrong label to the specimen.

BEDSIDE LABELING IN PRACTICE

Hamilton Medical Center in Dalton, Ga., uses an automated phlebotomy specimen collection system much like the one described above. The 282-bed hospital, which handles more than 1,000 specimen labels per day, implemented the system because it wanted to require two patient identifier checks prior to sample collections, ensure that samples were labeled accurately and give phlebotomists accurate test request information at the time of draw.

The staff of 23 phlebotomists uses wireless handheld computers and mobile printers to manage collection rounds and ensure accurate identification of patients and proper labeling of samples at the bedside. Once the phlebotomist has scanned the patient's wristband, a label containing the patient's information, sample collection time and clinician information is automatically generated by the mobile printer. A record of the collection is stored in the system's database, providing an audit trail of the process and enabling Hamilton to produce management reports detailing specimen turnaround time and workloads.

As expected, the system has produced highly accurate sample identification and a reduction in redraws. Automating specimen collection at the bedside has also resulted in significant time savings for phlebotomists and laboratory management.

In fact, Hamilton Medical Center reported that the system saves each phlebotomist an average of 45 minutes per day. Computerized management reduces the number of variables that phlebotomists have to deal with at the patient bedside, resulting in faster collections. Turnaround times at Hamilton have decreased from 3 percent to 59 percent, depending on the test required.[13]

In addition, new draw orders can be communicated instantly to the handheld computers, so phlebotomists do not need to return to the central lab to get assignments. Wireless communication helps make phlebotomists more productive and saves valuable time.

BEDSIDE LABELING ESSENTIALS—PRINTERS AND LABELS

The specimen label produced at the bedside is the crucial link between the benefits of automated management systems and real-world processes. There can be no specimen accuracy and patient safety benefits without durable labels and consistently excellent print quality. Label readability is the most important criteria when selecting a printer for specimen labeling. Barcodes, text and graphics must be clear and long lasting to provide accurate identification from the time of collection through to final disposal or storage. In addition, printers should be fast enough to produce labels on-demand without inconveniencing the phlebotomist.

Printer ease-of-use is also important. Mobile printers can be worn on belts or shoulder straps, and can also be mounted on carts. Weight becomes an important consideration if the printers will be carried or worn. So does the ability of the printer to perform after being dropped on the floor multiple times. When evaluating printers, it is important to check specification sheets for printer drop ratings. It is also essential to evaluate user-friendliness by observing how easy it is to access printer controls, check indicators and change media during normal printer operation.

Mobile printers can connect directly to hospital wireless networks, which enables draw orders to be sent directly from a laboratory information management system or other central application. If wireless printers are used, they should support the same security protocols used for mobile computers.

High barcode scan rates are essential to the success of specimen identification. Therefore, it is important to have a basic understanding of barcode symbols and how each print technology produces them.

Scanners decode the information from barcodes by measuring the differences between narrow and wide elements, and the contrast between dark bars and light spaces. If the ratios or contrast are slightly off, the barcode may be difficult or impossible to read, or may be read incorrectly. It should be noted here that when clinicians are unable to get an accurate scan, they often think the fault lies with the barcode scanner rather than with the label. However, the majority of barcode misreads are the result of problems related to the print quality of the barcode found on the label. Appropriate printers and supplies greatly reduce the chances of these problems occurring, and thus are important contributors to patient safety.

LABEL QUALITY MATTERS

Label media works in concert with the printer and is a major variable in image quality and durability. The finished label includes a substrate material, adhesive and, often, a protective coating. Each element must be carefully selected for the specific usage environment and checked for compatibility with the specific make and model of mobile printer. Otherwise, print quality and longevity problems can result.

It's fairly easy to find substrate, coating and adhesive combinations that work well at the bedside. The challenge is finding label media that will maintain excellent print quality throughout the life of the sample and withstand all test and storage conditions, even if exposed to blood, water, xylene, disinfectants, hand sanitizers and UV light.

General-purpose, commodity-type labels may seem suitable because they can easily affix to the specimen container when the sample is taken. However, the labels may fall off if the adhesive isn't specifically formulated to withstand cold storage, sterilization, centrifuge and other conditions. Even if the label remains on the container, the barcode and text may become unreadable if moisture causes smudges or tears, or if air pockets form between the container and the label.

Thermal printers are compatible with a variety of label materials engineered specifically for use in laboratory environments. For example, some labels are manufactured with invisible ink colors that can be activated by direct thermal printers on demand—enabling staff to create visual cues or highlight important information as needed. Hospitals and labs should consult with a supplies specialist when specifying specimen tracking labels, because of the many variables involved and the many product options available.

CONCLUSION

Barcoding is a proven, accurate and reliable way to identify samples. Printing and applying specimen container identification labels at the point of care promotes patient safety by improving sample identification and reducing opportunities for errors to enter the process. It also satisfies The Joint Commission's National Patient Safety Goal, and by encoding patient identifiers in a machine-readable barcode, protects patient privacy in accordance with HIPAA. Point-of-care labeling also saves time for phlebotomists, nurses and technicians who collect samples because they don't have to return to the lab to pick up the labels, while streamlining workflow in the lab by eliminating the need for relabeling.

Zebra Technologies is a leading manufacturer of specialty thermal and laser printing solutions, including wireless, mobile, high-volume and wristband printers designed to meet the unique needs of the healthcare market. Zebra solutions help healthcare organizations reduce errors and increase productivity while protecting patient safety and privacy. Now is the time to provide your patients a virtual voice—so you can work with the patient and continue to provide safe treatments and a caring atmosphere. Information about Zebra barcode, card and RFID products can be found at www.zebra.com/healthcare.

END NOTES

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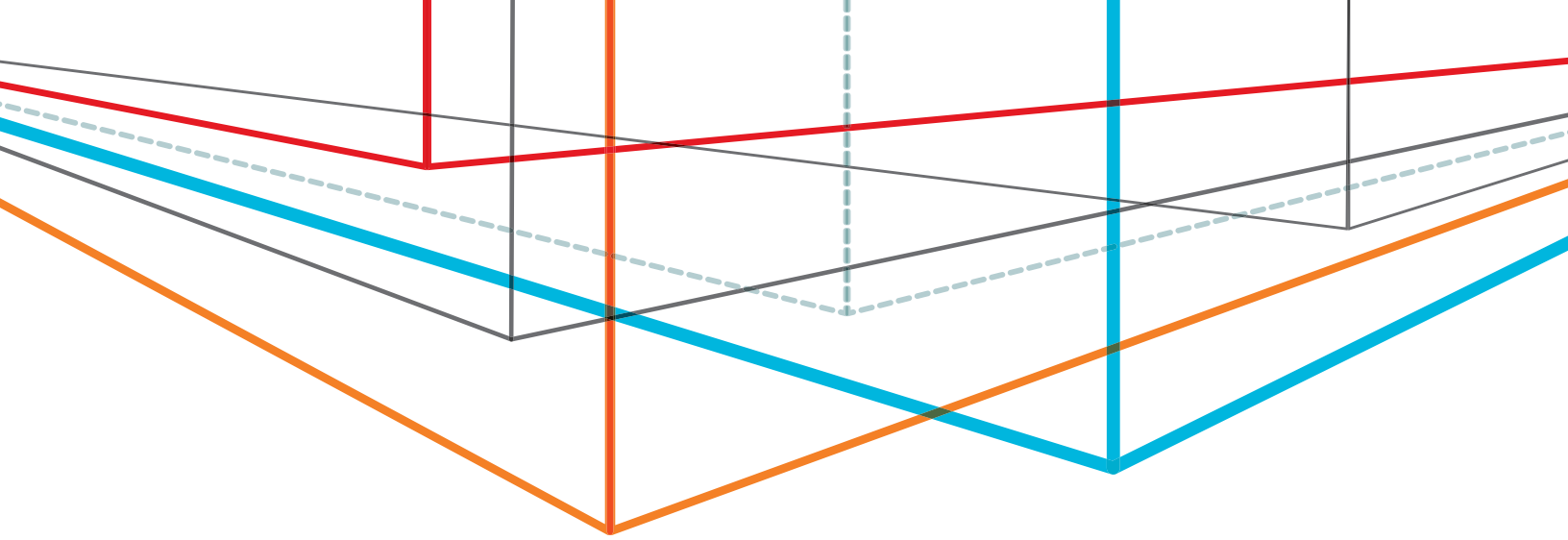

Corporate Headquarters
+1 800 423 0442
inquiry4@zebra.com

Asia-Pacific Headquarters
+65 6858 0722
apacchannelmarketing@zebra.com

EMEA Headquarters
+44 (0)1628 556000
mseurope@zebra.com

Latin America Headquarters
+1 847 955 2283
inquiry4@zebra.com

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P1028739 Rev. 2 (02/13)