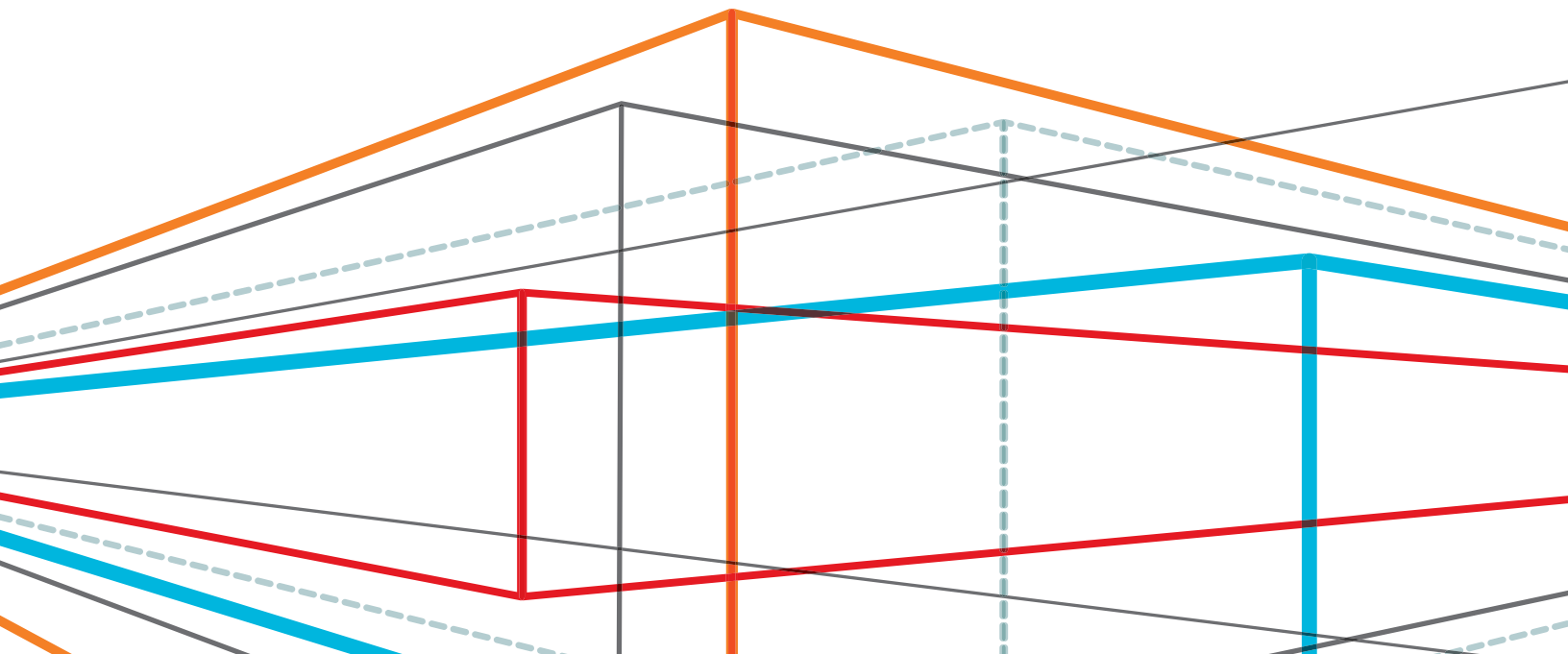


Barcode Labeling in the Lab—Closing the Loop of Patient Safety



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INTRODUCTION

Detecting and preventing errors that threaten patient safety is a closed-loop process that begins at the point of care, extends to independent laboratories, and then back to the caregiver. Sample identification and results reporting errors can lead to misdiagnosis and inappropriate treatment with deadly consequences. A 2006 Wall Street Journal article reported that while malpractice claims for pathology errors are relatively

low, they are the second most costly. In addition to creating a serious risk to patient safety, sample misidentification creates significant financial implications. Redraws, retesting and additional treatment that result from sample errors cost the healthcare industry an estimated \$200 million to \$400 million per year.

ACCURATE LABELING AS “PREVENTATIVE MEDICINE”

Marking and tracking lab samples and specimens with barcodes is a highly effective method for preventing errors before they enter into caregiver workflows. Using barcoding for lab sample management prevents mistakes, improves patient safety, and streamlines laboratory operations. It allows healthcare centers and independent labs to achieve regulatory compliance, while also advancing staff retention and meeting fiscal constraints.

Barcode technologies provide a “virtual voice” to patients, applications and workflows by laying a solid foundation for enhancing patient identification. Barcoding also provides visibility into medical practices, drives efficiencies throughout healthcare applications, and is a key aspect in electronic medical record (EMR) adoption.

SAMPLE LABELING CONSIDERATIONS FOR THE LAB

Healthcare providers have long been aware of the impact of sample misidentification, and continuously look for ways to improve their lab processes. Accurate sample labeling is the best defense against misidentification errors and their significant consequences. Labeling samples at the time they are drawn is a proven method to reduce errors. To protect patients through accurate lab specimen labeling, healthcare providers must address several difficult challenges:

- **Patient ID verification**—Achieve compliance with the Joint Commission’s National Patient Safety Goal (NPSG) to “Improve the accuracy of patient identification”. Meeting the patient ID goal requires that medical staff use at least two patient identifiers whenever they collect lab samples and to label containers used for blood and other specimens.
- **Increasing information**—A standardization of electronic healthcare records means the gathering, storing and linking of more information throughout the patient care process. In addition, blood, tissue and cellular therapy products must be compliant with the ISBT 128 identification standard of labeling—a process simply not attainable with manual labeling.
- **Patient privacy compliance**—HIPAA mandates the use of technologies and processes to protect patient privacy. This requirement extends throughout the healthcare lifecycle, including EMR, samples, medications and independent laboratories.
- **Label sizing**—A label provides the critical link between the physical specimen and all the

information in the systems associated with it. Test tubes, blood bags, slides and hermetically sealed containers all require specific label dimensions. Cost-effective label creation means using versatile printing technology that produces a label in the exact size for the task, and only when it is needed.

- **Legibility**—Medical centers have found that color-coded labels provide a visual indicator of what tests the lab must perform, saving time. Furthermore, because each sample and patient are unique, healthcare providers need a labeling solution that replaces preprinted labels with a system that creates labels on demand, and that will not smudge when exposed to liquids.
- **Durability**—Pathology labs often must store specimens for up to 20 years, which means labels must be durable enough to last and afford resistance to chemicals. In areas such as blood banking and cellular therapies, products undergo cryopreservation, and then are stored for an extended period before patient transplantation.

Barcode labeling of specimens not only delivers accuracy and error-prevention benefits at the point of care, the benefits extend into laboratory operations. Lab staff can scan barcodes to identify samples, record transfers and support test-result entry. Automated data entry is highly accurate, which improves patient safety by eliminating errors. As a side benefit, barcode sample identification and data entry also saves time, enabling lab staff to spend more time on clinical rather than clerical activities, while helping to keep lab costs in check.

YOUR TOOLS FOR ACCURATE SAMPLE IDENTIFICATION

Without accuracy, there is no way to protect the safety of patients and provide them a virtual voice. The accuracy of barcode data entry has been widely estimated at one error per 3 million characters—significantly more accurate than typing or other forms of manual data entry. To ensure proper sample identification, the barcode must be produced correctly and remain affixed to the collection container throughout the life of the sample. Labeling operations are thus essential to the success of barcode-based patient safety and laboratory automation initiatives. Engineered specifically to produce the exact bars and spaces and durable images that barcoding requires,

thermal barcode label printers present the best solution for laboratory labeling applications. Thermal printers are especially effective for laboratory labeling because they require minimal space, support multiple formats and symbologies, can generate very tiny labels, and are easy to load and use for a wide range of applications, including:

- Blood bag labeling
- Cryogenic storage
- Microscope slide labeling
- General lab applications (flat surfaces)
- Vials, test tubes, syringes (curved surfaces)

LABELING LOCATION OPTIONS

To meet positive patient ID mandates, medical staff should create and apply sample labels at the bedside, when they draw the sample. This practice virtually eliminates the possibility of applying the wrong label to the wrong sample. The Valley Hospital in Ridgewood, N.J., 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. Hospitals that have adopted bedside labeling report dramatic reductions in erroneous and misidentified samples. For example, Columbus, Ohio-based OhioHealth collects approximately 19,000 draws per month. After implementing a bedside labeling system

in mid-2007, the facility experienced only two labeling errors. Point-of-care labeling also eliminates the need to re-label in the lab, saving time for laboratory staff. Point-of-care labeling is not a prerequisite for realizing the benefits of barcoding in the laboratory. There are no major technology, integration or cost hurdles to setting up barcode label printing systems in labs. Even in cases where bedside labeling is used, laboratory staff will want on-demand label printing capabilities to follow a clear process with samples being accurately labeled and tracked with barcodes. Labs can barcode files, forms and even test equipment to support efficient, automated operations while reducing costs.

CHOOSING LABELING MATERIALS

The label provides the critical link between the physical specimen and all of the information in software systems associated with it. The range of label sizes and materials available for thermal printers helps automated sample management systems run accurately, efficiently and cost effectively. Thermal printers can quickly and easily be loaded with a variety of media, making it convenient to carefully match specific labels with items to be identified like test tubes, slides, etc., and their environments.

Labeling media and printers work together as a system. Thermal printers are compatible with a wide range of paper and synthetic label material that can stand up to the rigors of laboratory testing and storage processes. This includes exposure to extreme temperatures and chemical immersions, as well as testing in autoclaves,

centrifuges and other laboratory equipment. The durable coatings found on most labels help ensure that barcodes remain sharp and readable throughout the life of the sample.

For top quality and durability, always match label supplies with testing and storage needs, and the specific make and model of the printers used. Adhesives and protective coatings that work perfectly well for labeling one type of container or test may not be ideal for other applications. For example, pathology labs require the ability to store specimens for up to 20 years. In areas such as blood banking and cellular therapies, products are often cryopreserved, and then stored for an extended period before eventual transplantation into a patient. In addition, blood labels must be compliant with the ISBT 128 standard.

CONCLUSION: BARCODE LABELING—CLOSING THE LOOP OF PATIENT SAFETY

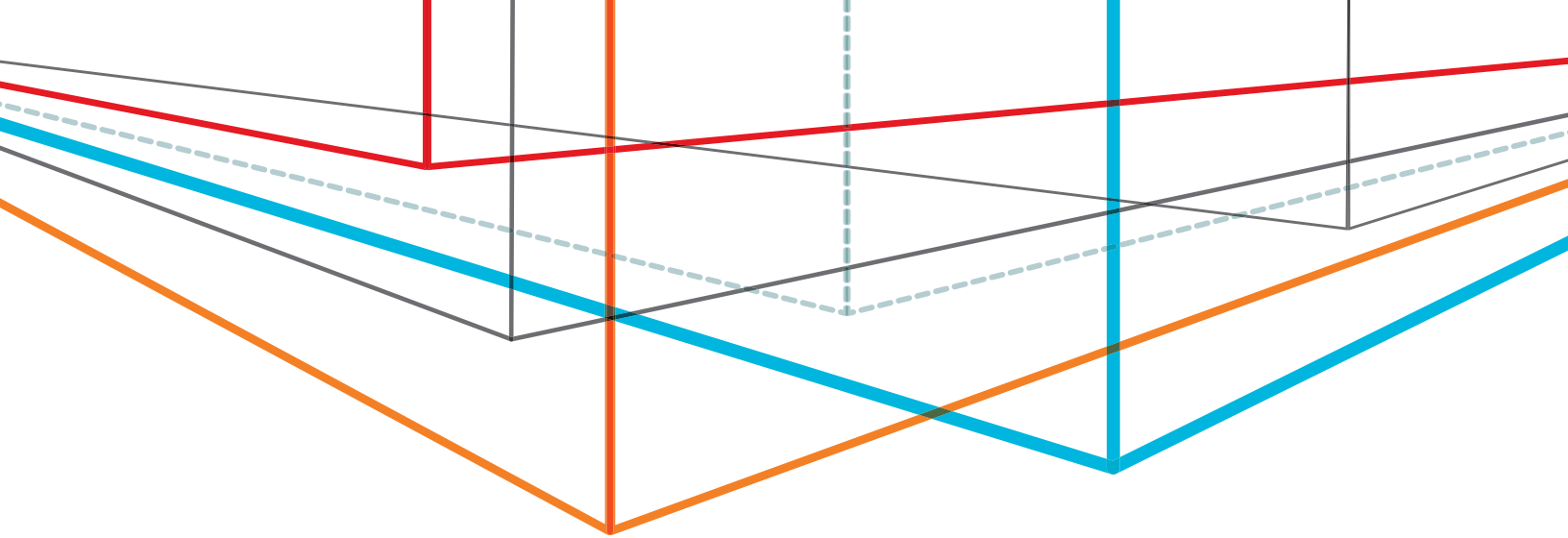
Patient safety is goal number one. What's more, patients want assurance that they are receiving the right care, in the right way, based on the right information. The laboratory is an important line of defense against patient safety errors because of the role it can play in preventing adverse events related to sample misidentification. By establishing processes to accurately label and identify samples, laboratory staff can significantly reduce the incidence of misidentified, lost, or unusable samples, and the related negative consequences, including re-draws, misdiagnosis and inappropriate treatment.

Barcode labeling and sample tracking is a proven method for reducing sample identification and data entry errors while meeting regulatory mandates. Reliability is essential to successful sample labeling and improved patient safety. Barcodes must be of the

highest quality, readable and durable, and label material must be engineered to withstand challenging test and storage conditions, allowing facilities to keep costs under control.

Barcode printing solutions from Zebra can help healthcare organizations and laboratories reduce errors and increase productivity. Now is the time to provide your patients, applications and assets a virtual voice—so you can work with the patient and continue to provide safe treatments and a caring atmosphere.

For more information about Zebra's solutions, visit www.zebra.com



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