Accurate Medication Administration: **Reduce Errors with Barcodes**



SEE MORE. DO MORE.



Accurate Medication Administration:

Reduce Errors with Barcodes

While it is the intent of healthcare safety reports to bring both attention and action to issues such as patient safety, a glance through studies conducted over the years shows how intractable a problem the issue can be. For example, the Institute of Medicine's (IOM) 1999 report, "To Err is Human", noted that preventable medical errors cause up to 98,000 deaths and 770,000 adverse events in the U.S. each year. Jump forward several years, and a 2006 follow-up to the 1999 IOM study still found that at least 1.5 million preventable Adverse Drug Events

(ADEs) occur each year: 400,000 in hospitals, 800,000 in long-term care settings and approximately 530,000 among Medicare recipients in outpatient clinics.

The good news for healthcare providers is that even as these reports have been compiled, technological advances have yielded numerous tools that can be used to improve patient safety and help providers come into compliance with an array

of regulations. Some of these regulations have been developed subsequent to the IOM report's finding that "the majority of medical errors do not result from individual recklessness or the actions of a particular group – this is not a 'bad apple' problem. More commonly, errors are caused by faulty systems, processes and conditions that lead people to make mistakes or fail to prevent them."

One such set of regulations, for example, was issued in 2004, when the U.S. Food and Drug Administration (FDA) issued a Barcode Rule that requires drug manufacturers, re-packers, and re-labelers to apply unit-dose barcodes containing products' National Barcode (NDC) numbers to the immediate package of most prescription drug products, including biological products. While the rule imposed no requirements on hospitals, it did encourage hospital compliance. The FDA estimated that "the barcode rule will result in more than 500,000 fewer adverse events over the next 20 years, thereby reducing medical errors by 50 percent.¹ " In a similar vein, the Joint Commission established a set of National Patient Safety Goals, which require that healthcare personnel check two patient identifiers when providing care, treatment or services.



Patient safety, however, is not the only reason healthcare providers and suppliers have been moving to new labeling and tracking technologies. The IOM report stated that each ADE can add up to \$8,750 to the cost of a hospital stay, so if there are an estimated 400,000 in-hospital preventable ADEs per year in the United States, the annual cost can run well over \$3 billion². ADEs can result from the wrong medication being prescribed, the wrong medication being distributed by the pharmacy or the wrong administration of the medication at the bedside. Indeed,

a 2002 report from the Archives of Internal Medicine found that almost one in five medication doses administered in hospitals is given in error. Finally, in addition to the costavoidance aspect of patient safety that technologies such as barcoding provide, barcode data greatly improve the accuracy of charge capture, pharmaceutical inventory management, drug utilization and best-practice compliance.

Barcodes Assure the "Five Rights" of Medication Administration

When considering the best way to ensure the safe and efficient administration of medication, it's important to remember that the cornerstone of medication administration safety is the principle of the "Five Rights" – right medication, right dose, right time, right patient and right route. In other words, information about both the patient and the medication at the point of care is critical to the success of such a program, and must be accessible in a concise, on-demand and process-specific manner in order to expedite rather than impede the clinical activity of hospital staff.

Among technologies for medication errors, bar-coding solutions have become increasingly popular across the healthcare sector because they are relatively easy to implement, demonstrate a consistent ROI and can be used in a broad array of applications. Furthermore, in attaching clear and accurate identification to each patient, barcode labels give patients a "virtual voice" which can communicate critical information about the patient even if the patient can articulate that information in a conversation. Barcoding is also viewed by healthcare CIOs and clinicians as a forerunner of more comprehensive patient-safety initiatives such

¹"FDA Issues Barcode Regulation," February 2004. U.S. Food and Drug Administration, Department of Health and Human Services. ²"Preventing Medication Errors: Quality Chasm Series," 2006. Board on Health Care Services/Institute of Medicine. as e-prescribing, computerized physician order entry (CPOE) and the electronic medical record (EMR). With such technology, healthcare organizations can achieve true digital and clinical transformation of patient care – and make healthcare "faster, better and cheaper."

See More, Do More with Barcodes – From the Patient ID to Medication Labeling

The first step, of course, is understanding how barcoding works. Barcodes record text information in an encoded format, and the barcode serves as an index key in clinical databases. In a medication administration application, barcode architectures often include a bar-coded wristband issued to the patient at the time of admission. Nurses' ID badges and medications also carry barcodes. At the time a medication is administered, all three barcodes are scanned at the bedside. This assures an identical match between patient and medication, and also identifies the practitioner administering the medication. In other words, matching barcodes from medicine to adminstrator to patient guarantees that the "Five Rights" of patient medication administration are systematically "checked off." In other clinical applications, hospitals and health systems use barcoding to "tag" unlabeled unit-dose medications, manage clinical inventory and assets, and record interventions for each patient receiving medications. Hospital pharmacies scan unit-dose packaging to improve security, build an audit trail and automate inventory record keeping.

It might help to look at the process more closely. In a system in which barcoding is being used to ensure proper medicine administration, one- or two-dimensional barcodes are issued to patients upon hospital admission. Prior to administering a medication at the bedside, a nurse scans the patient's (Joint Commission and HIPAA compliant) barcoded wristband to confirm the patient's identity. The scan acts as a key to open the patient's record in a centralized medical database where each patient record contains indications, advisories and restrictions concerning care administered to that patient. Once the accuracy of the patient/medication has been confirmed, the nurse scans his/her badge to record the time and source of the medication administration. In a study conducted by the U.S. Veterans Affairs, this method of medication administration was found to reduce the incidence of medication errors by 86.2 percent. Unit-Dose Medication Barcodes accurately identify medications by type, recommended dosage and frequency of administration at the unit-dose level, thus providing nurses with a "second check" and decision support tool in the administration of patient meds. Again, nurses can combine the information contained in the unit-dose barcode with the patient wristband to ensure the "Five Rights" of patient safety.

That, of course, is how the system is supposed to work, but to appreciate what such a system can do for an actual healthcare provider, it helps to look at a real-life example.

Barcodes in Action

Thibodaux Regional Medical Center is a 185-bed acute care facility in Thibodaux, Louisiana, that provides inpatient and outpatient care for the people of Lafourche and seven surrounding parishes. In recent years, the medical center has increasingly moved toward a paperless environment while also implementing bedside medication verification (BMV). Part of that process involved changing its approach to patient wristbands. After all, paper labels created paper waste, and didn't hold up well in the hospital environment.

According to Maria Clause, RN, a clinical analyst at the center, "With each admission we were printing labels and slapping a sticker on a plain wristband. The paper labels would get wet and wear off quickly. We needed a reliable way to produce patient wristbands that scanned 100 percent of the time and didn't degrade."

"With each admission we were printing labels and slapping a sticker on a plain wristband. . . We needed a reliable way to produce patient wristbands that scanned 100 percent of the time and didn't degrade."

> Maria Clause, RN Thibodaux Regional Medical Center

Moreover, Thibodaux sought a solution that would help prevent nurse workarounds in BMV. After hearing about the Zebra® HC100TM Patient I.D. Solution at an industry conference, Thibodaux first tested the durability of the new, barcoded wristbands by trying them on nurses, who wore them for a couple of weeks without noticing any degrading. With that success, the hospital brought printers into admissions and the emergency room. As another part of the decision, Thibodaux compared the costs of printing paper labels and the HC100 printers and found them comparable, especially given the rate at which staff had to reprint their paper labels.

Clear Identification with **Barcodes prevent Workarounds**

Mindful that nurses sometimes find workarounds to processes, the medical center put a plan in place to ensure that nurses take all steps required for BMV. In particular, they wanted to prevent nurses from scanning barcodes from patient folders instead of patient wristbands - as is required for BMV. Well before the hospital implemented BMV, Thibodaux conducted

extensive research to understand potential workarounds in the industry. As a result, when Thibodaux nurses administer medication, they are only able to scan the wristband for patient identification. Barcodes from chart forms will not scan, ensuring they are unable to circumvent the process.

As Danna Caillouet, physician analyst, RN, described it, "Before we went live, we knew about potential

workarounds and put a plan in place - a checkpoint between the nurse and patient that protects patient safety. That was a huge win for us. We're a step ahead of everyone else at conferences because we did so much homework prior to our implementation."

"Before we went live, we knew about potential workarounds and put a plan in place – a checkpoint between the nurse and patient that protects patient safety. That was a huge win for us."

> Danna Caillouet, RN Thibodaux Regional Medical Center



Thibodaux has seen a number of benefits with the HC100 bands. First, they create bands on-demand much more quickly than before. Wristbands come out of the printer ready to go, instead of staff having to pull off and affix sticky labels to a band. The HC100 bands hold up to moisture and use much better than their paper bands did. Finally, durability and a greater number of barcodes on bands contribute to near-perfect patient scan rates.

> Thibodaux Regional's experience demonstrates how implementing effective bar-coding systems can help healthcare providers comply with regulations and improve workflow efficiencies, while improving patient safety records and saving on the potentially heavy costs of adverse drug events. The key to ensuring that the "five rights" of patients are met when it comes to medicine administration is making sure that providers can accurately access and track the right

patient information.

Barcodes Result in both Accuracy and Peace of Mind

Regardless of where in the care process a provider engages with a patient, the heart of ensuring appropriate and effective care lies in ensuring that the right patient is being treated the right way given his or her condition. At root, that means being sure of the patient's identity and being sure that the right medications or treatments are being administered. The efficiency and clarity that barcoding brings to patient identification ensures that the patient will be treated in accordance with the "five rights" of medication administration, even as it makes the care process more efficient and increases the provider's peace of mind that the best care is being delivered. And for the patient, barcoding provides a "voice" by which critical information is communicated, thus ensuring that he or she is an equal partner along the road to better health.

About Zebra Technologies

A global leader respected for innovation and reliability, Zebra Technologies Corporation (NASDAQ: ZBRA) offers technologies that give a virtual voice to an organization's assets, people and transactions, enabling organizations to unlock greater business value. The company's extensive portfolio of marking and printing technologies, including RFID and real-time location solutions, illuminates mission-critical information to help customers take smarter business actions.

For more information about Zebra's healthcare solutions, visit http://www.zebra.com/healthcare.



Positive Patient Identification: Enhance Safety with Barcodes



SEE MORE. DO MORE.



Positive Patient Identification:

Enhance Safety with Barcodes

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 each successive year. Indeed, the first line in the 2012 edition reads, "NPSG.01.01.01- Use at least two patient identifiers when providing care, treatment or services." It goes on to explain, "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."

For healthcare providers, complying with this requirement took on an added layer of complexity when, in 2006, the Food and Drug Administration (FDA) began requiring unit-dose barcode identification on medications to be 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.

As the Office of the National Coordinator for

Health IT's (ONC) Policy Committee formulates the second and third stages of the Meaningful Use requirements that will go into effect in 2013 and 2015, barcoding is one of the technologies being considered as a solution to the need for more accurate patient identification systems. Barcode-based systems not only allow caregivers to identify patients and document the associated treatments, but they also enhance the use of electronic health records (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. Moreover, at a time when providers are looking everywhere for ways to both become more efficient and reduce the cost of care, barcoding provides an approach that streamlines the patient identification process, both when a patient is admitted and when he or she is subject to tests or bedside care.

Barcoding: Giving the Patient a "Virtual Voice"

According to a 2010 study conducted by the Agency for Healthcare Research and Quality, barcode-based systems can reduce medication administration errors and drug-related adverse events when used in combination with an electronic medication administration record (eMAR). Similarly, the IOM report stated that preventable medical errors cause up to 98,000 deaths and 770,000 adverse events in the U.S. each year. Moreover, according to Centers for Disease Control (CDC) estimates, another 90,000 deaths result from the up to 2 million infections patients acquire in U.S. hospitals.

> While adhering to the "five rights" of medicine administration – Right Patient, Right Medication, Right Dose, Right Time and Right Method of Administration – can ensure the prevention of most medication errors, too often the "five rights" check is flawed because it fails to guarantee the right patient. Indeed, currently, approximately 5 percent of patient wristbands are erroneous or missing altogether. In short, missing, poor-quality and incorrect wristbands are a major contributing factor to many adverse events. With barcoded patient wristbands, healthcare providers can implement a key foundation for preventing errors by ensuring accu-

rate patient information is always available at the point of care. In addition, barcodes systems provide patients with clear, accurate, always-available identification, thus giving them a "virtual voice" in their care from start to finish.

See More and Do More with Barcoded Wristbands

The barcode is simply an alternative to text for expressing information. Anything that can normally be printed on a wristband can be encoded in a barcode. The barcode frequently serves as a key to a database. Because barcodes store data in less space than is required for the same text, barcoded wristbands can include more information than traditional text wristbands. In addition, two-dimensional (2D) barcodes can store exponentially more information, so they can serve as portable records or could even allow a digital photograph of the patient to be encoded on the wristband and viewed on a PC or portable computer whenever the barcode is scanned.

The biggest advantage bar-code wristbands provide in health-



care settings is not in the amount of information they hold, but in how they enable information to be presented and recorded. A study of wristband problems by the College of American Pathologists (CAP) found that 6.8 percent contained erroneous data and 7.7 percent had illegible data. With barcoded wristbands, as long as information is entered accurately when patients are admitted, nurses, doctors, medical assistants, lab technicians and other personnel can be sure that the patient will be identified correctly and the right information will be presented every time the wristband is scanned.

Bar-code scanning is extremely accurate – much more accurate than any manual means of information recording. Studies have shown that skilled typists make an average of one error per every 300 keystrokes. Arguably, busy nurses can hardly be expected to do better, and will most likely do worse. In contrast, the error rate for barcode data entry is less than one per 3 million scans.

Visibility and Efficiency

Bar-code wristbands can be beneficial wherever patients need to be identified or information needs to be recorded. Improved accuracy and time savings translate into benefits in any environment, and the improved accuracy in particular ensures that patients will have a solid identification foundation upon which the rest of their health record can be built. The best-known uses for bar-code wristbands are in conjunction with automated medication administration or computerized physician order entry (CPOE) systems. While ONC did not include barcoding in the 2011 Meaningful Use requirements, a significant portion of the guidelines that hospitals must meet to demonstrate compliance involve medication administration. In order to meet these objectives, most facilities will rely on an eMAR. It helps, then, to take a closer look at how barcode-based medication administration works.

Patient ID Foundation for Medication Administration and Other Applications

When a barcode system is in place, the nurse scans the wristband to identify the patient with a barcode scanner that is interfaced to a mobile or bedside computer. The nurse then scans the barcode on the medication. Application software then compares the medication to information in the patient's electronic record, which was called up by the wristband scan, to verify that the patient should be receiving the medication at the indicated dosage and method at that time. The nurse continues after getting a confirmation or warning – often accompanied by an audible beep – on the computer screen. Finally, nurses scan their own barcoded ID badge to record who administered the medication. The system essentially automates the "Five Rights check, with the wristband scan verifying the right patient, and the database lookup from the medication scan verifying the other elements."

Barcoded Wristbands: A Look at What's Working

While policymakers are still just considering uses for bar-code wristbands, the technology has already been used with notable success. For example, the Veterans Affairs (VA) implemented point-of-care scanning for medication administration at all 173 of its hospitals after reducing errors by 86.2 percent during a trial. Another example comes from Northwestern Montana, where Kalispell Regional Medical Center (KRMC) has 139 steps built in to help ensure patients receive medication correctly. Previously, the hospital pinpointed patient identification as an area for improvement, inspiring its Positive Patient ID initiative. Before upgrading, the paper wristbands KRMC used required multiple scanning attempts. A small wrinkle in a band left it unscannable and the paper didn't hold up well over time.

"It was frustrating because you'd have to do things over and over again when it should only take once," said Kim Knutson, charge nurse. "You're taking time away from your patient because you're trying to get an armband."

"It was frustrating because you'd have to do things over and over again when it should only take once. You're taking time away from your patient because you're trying to get an armband."

> Kim Knutson, Charge Nurse Kalispell Regional Medical Center

The solution? Pacific ID, a barcode solutions company, implemented a new patient ID scanning solution at the hospital that included scanners from Code Corp. and Zebra® HC100TM printers. The Zebra HC100TM Patient I.D. Solution combines a direct thermal printer with easy-to-load cartridges containing Zebra's durable Z-Band® wristbands. Nurses simply insert cartridges into the printer to produce wristbands with barcodes and text that stay readable long after paper bands would degrade.

"It was one of the easiest implementations that I've ever done with nurses," said Pat Mulberger, clinical informatics nurse.

"It was one of the easiest implementations that I've ever done with nurses. There's always something wrong that the nurses will find, but they didn't find anything wrong with this process."

Pat Mulberger, Clinical Informatics Nurse Kalispell Regional Medical Center

"There's always something wrong that the nurses will find, but they didn't find anything wrong with this process."

The new solution improved KRMC's process at multiple points. The small footprint of the HC100 printers means they fit compactly at nurses' stations, in admissions and registration, and it's easy to drop a new cartridge in the top when one runs out. To print, staff click on the patient's name on the computer, print out the band and put it on the patient. The Zebra printers detect wristband size – adult, pediatric

or infant – and automatically calibrate settings for optimal print quality. At the critical point of medication administration, nurses have a computer and scanner in the patient's room. Nurses ask patients first to verify their names, and then dates of birth as a secondary identifier. The patient's record comes up on the computer and the nurse scans the wristband to ensure the two match. If so, the nurse scans the medication to ensure the right time, right route and right dose, and the nurse is alerted to anything that doesn't match.

The new patient identification scanning solution has delivered multiple benefits for the hospital. Staff members now get wrist-

bands on patients more quickly, without the need to assemble them. Most importantly, the new wristbands stay readable, making it easier for nurses to accurately identify patients and administer medication. Indeed, KRMC reports 100 percent readability.

Barcoded Wristbands: Foundation for the Best Possible Care

It's hard to overstate the importance of patient safety throughout the provider care process. Indeed, figures from the IOM report and other studies indicate just how serious the problem is. And yet, the technology exists to help providers ensure that their patients receive the care they want and deserve. One fundamental piece of that guarantee involves making sure that patients are

> properly identified from the moment they enter a healthcare facility to the moment they leave. Clear and accurate patient identification gives the patient a "voice" in his or her care, even when there's no possibility of a direct conversation, that both the patient and the provider can count on. By extension, that "voice" significantly increases the chances that the patient will have access to all the "five rights" of medi-

cine administration.

Accurately coded patient wristbands give providers and patients alike the confidence that they're both in the right place and either giving or receiving the proper care. More specifically, scanning patient wristbands can help prevent errors in specimen collection and processing, administration of tests and therapies, patient transfers and meal management, plus several administrative and billing activities. Finally, uses can be expanded without requiring changes to information on the wristbands or the equipment used to produce them. In short, accurately coded wristbands can be the foundation for the best care possible.

About Zebra Technologies

A global leader respected for innovation and reliability, Zebra Technologies Corporation (NASDAQ: ZBRA) offers technologies that give a virtual voice to an organization's assets, people and transactions, enabling organizations to unlock greater business value. The company's extensive portfolio of marking and printing technologies, including RFID and real-time location solutions, illuminates mission-critical information to help customers take smarter business actions.

For more information about Zebra's healthcare solutions, visit http://www.zebra.com/healthcare.





Specimen Collection and Tracking: Improve Accuracy with Barcodes



SEE MORE. DO MORE.



Specimen Collection and Tracking:

Improve Accuracy with Barcodes

The greater use of health IT is often advocated as a critical way to introduce greater efficiency, and thus lower cost, into the nation's healthcare system. In particular, as providers of all sizes grapple with increasing financial constraints and, quite often, with associated reductions in staff, increased automation has the potential to make healthcare organizations more efficient even as it provides added assurance that patients are being properly cared for. But while many of the benefits of new technologies can be summed

up in terms of efficiency and cost savings, easily as important are the benefits that can be realized in the area of patient safety.

For example, an estimated 160,900 adverse events occur in U.S. hospitals annually due to sample identification errors. Misidentified samples create a serious risk to patient safety, leading to misdiagnosis and incorrect treatment. Indeed, a study conducted by the College of American Patholo-

gists found that specimen labeling errors accounted for 55.5 percent of identification errors. In fact, a leading cause of wrong-site surgery is the switching, mislabeling, or incorrect display of test specimens or results.

Another study found 5.8 percent of phlebotomy samples are mislabeled¹, and 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. While patient safety is arguably the chief concern, financial considerations are not far behind. For example, it is estimated that the cost of misidentified specimens adds up to approximately \$280,000 per million specimens². One study determined that the redraws, retesting and additional treatment required due to sample errors costs hospitals an estimated \$200 million to \$400 million per year³.

Finally, beyond the core safety issues and financial costs associated with mislabeling of specimens, there is a larger, more intan-



gible cost that extends across the entire healthcare system. As the landmark 1999 report from the Institute of Medicine, To Err is Human, put it, "Errors also are costly in terms of loss of trust in the health care system by patients and diminished satisfaction by both patients and health professionals. Patients who experience a long hospital stay or disability as a result of errors pay with physical and psychological discomfort. Health professionals pay with loss of morale and frustration at not being able to provide the

best care possible."

Clear Identification Right from the Start

So what can healthcare providers do to avoid these kinds of errors? One answer is to take advantage of the latest information technologies and implement a point-of-care labeling system. For starters, it has been determined that the more time and distance between when labels are pro-

duced and when they are applied, the greater the chance they will be put on the wrong sample. For example, prior to converting from centralized printing to bedside specimen labeling, 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.

Streamline your Labeling Process

There are three essential components to a successful point-ofcare 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

¹ Giuseppe Lippi, Gian Luca Salvagno, Martina Montagnana, Massimo Franchini, Gian Cesare Guidi, "Phlebotomy Issues and Quality Improvement in Results of Laboratory Testing," Clin. Lab. 5+6/2006.

² Valenstein PN, Raab SS, Walsh MK. Identification errors involving clinical laboratories: A College of American Pathologists Q- Probes study of patient and specimen identification errors at 120 institutions. Arch Pathol Lab Med. 2006;130:1106–1113.

the patient bedside; and label media that will remain affixed to the sample container throughout all testing and storage processes. Linking all three components, wireless technology simplifies bedside specimen labeling. Medical staff gains access to realtime notifications, new test requests, patient moves and other changes. This helps reduce unnecessary procedures and trips to the lab for assignment updates. Wireless connectivity also allows staff to instantly record activity performed at the point of care into the patient's electronic medical record.

In this more streamlined process, 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 mobile printer to produce an ID label, which is applied to the sample container. Printing labels on-demand, right at the patient bedside, virtually eliminates the possibility of applying the wrong label to the specimen.

Barcoding lets Patients be Heard

Providers considering an investment in technology such as barcoding are bound to look first and foremost at the benefits that will be most immediately relevant to their organizations. But patients, too, stand to gain from barcoding. In particular, the increasing use of electronic healthcare records means that more information is being gathered and stored throughout the patient care process. An accurately barcoded label can be linked automatically with all the other information associated with the patient. Moreover, the clarity and ease of producing barcoded labels comes as close as possible to eliminating the chance that a specimen will be mistakenly identified or associated with the wrong patient. In short, barcoding essentially gives the patient a voice in his or her own care, and it ensures that that voice will be heard loud and clear.

Bedside Specimen Sampling Successes

Hamilton Medical Center in Dalton, Ga., implemented an automated phlebotomy specimen collection system similar to the previously described system. The 282-bed hospital, which handles more than 1,000 specimen labels per day, chose the system because it required two patient identifier checks prior to sample collections, needed to ensure accurate sample labeling and provided phlebotomists accurate information at the time of draw.

> The system produced highly accurate sample identification and reduced redraws. Automating specimen collection at the bedside yielded significant time savings for phlebotomists and laboratory management. In fact, the center reported that the system saved each phlebotomist an average of 45 minutes per day. What's more, the new system helped reduce the number of variables that phlebotomists

encountered at the patient bedside, resulting in faster collections.

Germany's University of Göttingen Hospital also realized similar benefits. The hospital's clinical chemistry lab processes some 1,500 patient samples and performs up to 12,000 analytic procedures each day. In total, this amounts to roughly 4.2 million analyses per year. In the light of this volume, the decision was made in 1999 to provide access to all clinical findings from every clinical work station in the hospital using the ixserv clinical work management system offered by ixmid in Cologne. The system not only offers a completely web-based overview of clinical findings on a daily basis, but also enables cumulative findings to be reviewed quite quickly using a graphic presentation method that shows the progress that has been made. To facilitate patient identification, the University of Göttingen Hospital uses label printers from Zebra Technologies to produce barcode labels that accurately identify patient samples and allow for laboratory tasks to be completed in a more efficient manner.

"Today, our daily lab routines are really built around label printers from Zebra," Dr. Hillmar Luthe explained.

As the system is designed, ixserv sends the actual test orders electronically to OPUS::L, the laboratory information system. The actual test-tube samples are then sent to the lab for further pro-

³Bologna L, Hardy G, Mutter M. Reducing specimen and medication error with handheld technology. Presented at 2001 Annual Conference and Exhibition. Healthcare Information and Management Society, Feb 4-8, 2001, Chicago, IL, cited by Margaret Herrin in "A Pledge of Safety: How one laboratory automated its specimen collection process to increase productivity, streamline workflow and improve patient care." ADVANCE for Administrators of the Laboratory, October 2006.



"Today, our daily lab routines are really built around label printers from Zebra." Dr. Hillmar Luthe University of Göttingen Hospital

cessing. Once all of the tests have been completed, the clinical results are transmitted back to ixserv electronically.

As Ernst Münster, managing director of ixmid, explained it, "Without barcode labels, it never would have been possible to organize work in such a manner. In selecting desktop printers from Zebra, we gained access to extremely durable, yet cost-effective printers that are easy to use as part of our overall system. They also really save us a lot of space."

"Without barcode labels, it never would have been possible to organize work in such a manner. In selecting desktop printers from Zebra, we gained access to extremely durable, yet cost-effective printers that are easy to use as part of our overall system."

> Ernst Münster Managing Director, ixmid

By relying on barcode labels, hardly any advance work orders need to be generated. This results in annual savings for the University of Göttingen Hospital of up to 60,000 Euro. Even more importantly, however, no more errors occur when samples are processed. As the number of analytic procedures and the need for greater data security and efficiency increases, so will the use of barcode labels in healthcare.

Barcoding Connects the Right Patient to the Right Care at the Right Time

Barcoding is a proven, accurate and reliable way to identify samples. Printing and applying specimen identification labels at the point of care promotes patient safety by improving sample identification, reducing opportunities for errors. Indeed, it has been demonstrated that reducing the time and distance between when labels are created and when they are applied to samples also reduces the chance that a specimen will be mis-identified. Moreover, barcoding specimens from the point of care ensures accurate identification throughout the entire care process. It also guarantees that the patient's "voice", which identifies and connects the patient accurately with his or her records, will be seen and heard from the moment care begins. Perhaps most importantly, point-of-care labeling also saves time for medical staff, freeing them up to spend more time focusing on their patients, which will improve both the patient's experiences and the provider's overall qualtiy of care.

About Zebra Technologies

A global leader respected for innovation and reliability, Zebra Technologies Corporation (NASDAQ: ZBRA) offers technologies that give a virtual voice to an organization's assets, people and transactions, enabling organizations to unlock greater business value. The company's extensive portfolio of marking and printing technologies, including RFID and real-time location solutions, illuminates mission-critical information to help customers take smarter business actions.

For more information about Zebra's healthcare solutions, visit http://www.zebra.com/healthcare.



Produced by MedTech Media Custom Group. © 2012 71 Pineland Drive, Suite 203 • New Gloucester, ME 04260 • 207.688.6270 • www.medtechmedia.com