ZEBRA

Make No Mistake:
Positive Patient ID Saves Lives

HOW A VERMONT MEDICAL CENTER USES ZEBRA POSITIVE PATIENT ID TO DRAMATICALLY REDUCE HUMAN ERROR AND IMPROVE PATIENT OUTCOMES

First, do no harm. Although not strictly part of the Hippocratic oath, this statement has become a cardinal rule all physicians and healthcare professionals live by.

Nationally recognized for its outstanding patient care, Southwest Vermont Medical Center (SVMC) is a four-time winner of the prestigious Magnet award presented by the American Nurses Credentialing Center (ANCC). SVMC is one of only 30 hospitals in the world and only the third hospital in New England to earn this distinction for a third time.

The medical center is part of Southwestern Vermont Health Care, an integrated health system serving 70,000 people in Bennington and Windham counties in Vermont, eastern Rensselaer and Washington Counties in New York, and northern Berkshire County in Massachusetts. As part of its commitment to patient care quality, SVMC instituted a system wide initiative to enhance patient safety and reduce the possibility of human error.

Through this initiative, SVMC became an early adopter of Barcode Medication Administration (BCMA). Recognizing the important role that barcoding plays in healthcare quality, the medical center implemented a comprehensive hospital wide admissions-to-discharge integrated barcoding system designed to improve clinical accuracy across all areas of care. These include patient admissions, specimen collection, medication administration, CPOE and patient record documentation. Although the incidence of errors was rare, the project aimed to eliminate any potential for life threatening mistakes.

With funding support through the Agency for Healthcare Research and Quality (AHRQ), the new system targeted reducing manual medication transcription and administration errors through the use of BCMA and electronic medication administration record (e-MAR) technologies.

SUMMARY

Customer
Southwestern Vermont
Medical Center
Bennington, Vermont

Industry
Healthcare

Challenge
Deploy a positive patient ID system to significantly reduce the chance of human error and increase patient safety

Solution
- Zebra HC100 and LP2844 1D and 2D barcode printers
- Zebra program language software tools and media (1" x 11" wristband labels)

Results
- Seamless and efficient implementation of hospital enterprise wide barcoding system
- Enhanced Barcode Medication Administration (BCMA) compliance
- Reduction in employee process workarounds
- 80% reduction in medication dose admission scanning errors
- Improvement in patient care and safety

PATIENT IDENTIFICATION ENSURES VERIFICATION OF PATIENT RIGHTS

✔ **Right patient**

✔ **Right drug**

✔ **Right dose**

✔ **Right method**

✔ **Right time**

BARCODE MEDICATION ADMINISTRATION

At SVMC, the BCMA system primarily addressed administration errors that can happen while giving medication to a patient. These tend to be reported more often than transcription or other medication administration process errors. BCMA involves scanning not only the medication being administered but also patients' identification wristbands, which are the cornerstone of every hospital patient identification system.

PATIENT RIGHTS

Wristbands assure that, even if a patient is sleeping or unconscious and unable to state his or her own name, nurses can confirm that the correct medication is being given to the correct patient. Patient identification ensures verification of all patient rights—right patient, right drug, right dose, right method, right time. Once the medication is administered, the system automatically updates the patient's e-MAR, protecting against the risk of missed or extra doses.

ELIMINATING WORKAROUNDS

To be successful, a BCMA system needs to be easy to use and reliable. The fact is, when nurses are busy, if a system is difficult to use or if it takes more time than the verification system it replaces, it creates a situation where workarounds happen at a higher rate. A "workaround" occurs when it is easier to bypass the electronic system and

manually complete the task. Numerous studies have shown that workarounds greatly reduce the safety-enhancing benefits of a BCMA.

To be most effective, a BCMA system needs to be utilized by nurses at an optimal rate. Unfortunately, many hospitals report nurses are utilizing the barcode scanning system only 85 to 90 percent of the time. That means one out of 10 doses are not being scanned, creating the opportunity for a tragic error to occur.

THE 1D AND 2D BARCODE MIX

Barcode technologies are evolving, leading to a mix of both 1D linear barcodes and 2D barcodes capable of holding more data. As 2D barcodes become more popular, the question is not whether to support 1D or 2D barcodes. The fact is, 1D barcodes will continue to play a major role in healthcare for the foreseeable future. By choosing Zebra, SVMC can support both 1D and 2D barcodes.

2D BARCODE ADOPTION

The team decided to adopt a 2D data matrix barcode to mediate the problems identified with the linear barcodes. 2D barcodes are much more reliable than their linear counterparts, storing data with greater error correction in a smaller space. Because 2D barcodes have higher error correction and are "scannable" from any angle, they can be printed smaller without compromising their integrity. The decision was made to repeat the

barcode around the length of the wristband. This way only a small portion of the wristband needs to be visible to the scanner in order for it to be read correctly.

CHOOSING ZEBRA

When it came time to deploy its new BCMA system, SVMC chose a Zebra positive patient ID system consisting of barcode printers, imaging equipment, software tools, and media, or labels. There were two major reasons behind the choice. First, the Zebra system was both reliable and easy for nurses and other healthcare professionals to use. Second, and equally important, the Zebra system is capable of printing and utilizing both 1D and 2D barcodes in any environment. In addition, with correct integration, Zebra systems are compatible with any healthcare information system (HCIS).

SUCCESSFUL LAUNCH

Initially the nurses at SVMC were concerned that the new system would negatively impact the time they could spend caring for patients. They soon learned that was not the case. "If you get your system efficient enough, then the safety mechanism in it has improved patient care and really hasn't taken any time away from it," states Janis Yannoti, RN.

The hospital had a tremendously successful launch and implementation of its Zebra enabled BCMA system. The project started in the ICU and was systematically rolled out to the hospital's other units over the next year. Since that time over two million medication doses have been administered. Nurses have been able to achieve an average medication scan rate of over 95% and a patient identification scan rate in excess of 99% for inpatient units. Even more impressive, these results have been sustained over a five-year period.

THREE STRATEGIES FOR SUCCESS

The hospital utilized three strategies that were instrumental in achieving this level of success. First, a multidisciplinary project team collaborated on the components and implementation of the BCMA system. Second, tools to measure scan rates and continuously report progress to each department were developed. Finally, potential workarounds were identified, along with solutions to avoid them, by engaging frontline nurses in the process of selecting hardware and scanning devices.

Using a multidisciplinary approach to develop its system was of utmost importance at SVMC. As a Magnet Hospital for Nursing Excellence, SVMC provides a professional practice environment that supports frontline healthcare providers and encourages their participation in collaborative research to improve patient care. The project team was led by a clinical nurse specialist and included physicians, pharmacists, IT analysts, nurses, and personnel from the education and quality/safety departments. Their core philosophy was simple: make it easy for the nurses to do the right—and the safe—thing.

NURSE PARTICIPATION

"Implementation relied heavily on the involvement of our nurses," says Charles Still, IT Project Manager. "We had ideas as technical people of how things would work. But those ideas can be completely different when you bring them to the actual patient bedside where you are delivering care."

The team spent two years planning the transition from paper to electronic medication administration, focusing its activities on establishing barcodes for both the medications and the patient wristbands. One of the biggest breakthroughs of the initial design phase was the realization that the standard

2 MILLION + MEDICATION DOSES ADMINISTERED:

95%+
Average medication scan rate

99%+
Patient identification scan rate for inpatient units

5 YEARS
Results have been sustained over a five-year period

80%
Reduction in inaccurate medication dose administrations

linear 1D barcodes produced an unsatisfactory scanning experience for the nurse at the bedside.

Feedback from nurses indicated that the curvature of a linear barcode around a patient's wrist made it difficult to scan. It required the nurse to use both hands to scan—one to stretch out the barcode to make it as flat as possible and one to operate the scanner. This created delays and out-of-sequence work. If the barcode was out of sight, a sleeping patient may have to be awakened so that the wristband could be scanned.

Along with 1D linear barcodes, SVMC's IT personnel added 2D data matrix barcodes to patient wristbands. The new wristband was tested by frontline nurses, who confirmed that it was easier to scan than the wristbands with only linear barcodes. They also found that even if one or more of the 2D barcodes were wrinkled or damaged, the repeated code could still be scanned on a different part of the wristband. The consistent involvement of nurses was part of the strategy of identifying potential problems that could lead to workarounds prior to implementation, and also to establish buy-in to the project.

CHOOSING A BARCODE PRINTER

Once the 2D barcode was selected and tested, the project team set about the task of choosing hardware to print and scan the new wristbands. Originally, the wristbands were printed on labels using a laser printer. The labels were then affixed to a plastic wristband. This system was problematic because it was difficult to remove the labels from the backing and the labels were paper, so they were too easily damaged by tearing and by contact with fluids. The laser method also required an entire sheet or half sheet of labels be printed, even if only one was needed. This created a costly waste of wristbands that needed to be destroyed for HIPAA compliance.

The spare labels also created a potential workaround. With extra labels, frontline users could affix the extra labels to a patient's chart and scan it, instead of the wristband, to avoid disturbing the patient. The possibility for human error is increased dramatically if this type of workaround is common in an organization.

THERMAL WRISTBAND PRINTERS

To overcome these challenges, the project team selected direct thermal wristband printers from Zebra. Thermal printers are designed specifically for barcoding and produce lasting, durable barcodes that can be easily scanned at the point of care. The hospital found that the thermal wristbands were able to survive a week of wear, 24 hours under water, and temperatures up to 130° Fahrenheit. In addition, thermal printers create one wristband at a time, reducing waste and the potential for a privacy breach or a workaround.

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>
> Georgia Curtis, RN, SVMC unit nurse

When the team compared the thermal printers to laser printers, they found there was no significant cost difference between them. They also learned that thermal printers do not use ink, toner, or ribbons, creating additional savings.

Nurses found the Zebra thermal printers were very easy to load and required little maintenance, making them ideal for networked use anywhere in the hospital. In addition to implementing wristband printers in the patient admissions area, SVMC placed printers on the patient floors so that nurses could produce replacement bands when needed.

Georgia Curtis, RN, a unit nurse at SVMC commented, "It is a much nicer system to work with. I don't think I would want to go back to the old way. This is the safest way for both the nurses and the patients."

EASE OF 2D BARCODE PRINTING

A final point of interest related to printers was the relative ease of printing 2D barcodes. The software to create the images resides in the printers, not the application software, making it no more difficult to print 2D images than it is to print linear barcodes.

Finally, even though some hospitals must invest in newer scanners with CCD sensors to read 2D symbols, the cost for these scanners continues to decrease. A reliable 2D scanner can be purchased for a few hundred dollars.

HIGH COMPLIANCE RATES

Nine years into its BCMA project, SVMC continues to experience medication scanning rates above 95% and patient wristband scanning rates in excess of 99% on inpatient units. The 2D barcode wristbands remain in use, as do the thermal wristband printers.

"The Zebra system helps the nurse rest assured that if they are using the process correctly, then they are giving the medication correctly," commented Barbara Richardson, RN, MSN, Clinical Nurse Specialist. "The nice thing is we were given the time and the resources to implement it correctly."

THE SAFE CHOICE IS THE EASY CHOICE

BCMA systems have clinically shown to reduce wrong patient, wrong medication and wrong dose errors. The technology alone, however, is only part of the solution. Ongoing multidisciplinary team collaboration involving clinical as well as administrative personnel is needed to monitor the system continually. At SVMC, performance monitoring with feedback is provided to each user as part of the Zebra system's quality safety status dashboard reporting tool, playing a critical role in helping implement an ongoing culture of safety throughout the organization.

The SVMC BCMA barcoding solution has proven to be effective in all area's of patient care and drives positive overall results. The Zebra positive patient ID system is making the medical center significantly less susceptible to human error and lessening the likelihood of potentially dangerous workarounds. The system's 2D barcodes on patient wristbands improve the ease of scanning for positive patient identification at the bedside, making the safe choice also the easy choice.

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For more information about Zebra's full line of positive patient ID solutions, visit www.zebra.com/identity

ZEBRA

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

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

EMEA Headquarters
zebra.com/locations
mseurope@zebra.com

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