

# PSQH



PATIENT SAFETY & QUALITY HEALTHCARE

March/April 2015

Volume 12, Issue 2

## Clinician Support: Five Years of Lessons Learned

REDUCING INTERRUPTION FATIGUE

PERIOPERATIVE SURGICAL HOME

PREVENTING FALLS ACROSS  
THE CONTINUUM

BYOD POLICIES

# Better Barcoding

By David Crist

Hospitals seeking to conquer the stubbornly persistent problem of patient safety can start by expanding the adoption of barcoding technology into all areas of the hospital, from the patient room to the lab to the pharmacy. Although barcoding outcomes to date may have fallen short of expectations, it's important to recognize that both the technology and utilization are maturing, providing the opportunity to make great strides toward improved safety and quality of care at a fraction of the time and cost investment required for an enterprise-wide electronic health record (EHR) implementation.

So why has barcoding fallen short in healthcare? The vast majority of hospitals have implemented some type of barcode system, primarily for patient identification and medication administration. However, the persistently high rate of patient error and adverse medical events indicates that most healthcare systems are not using the technology to its fullest potential.

## A Stubborn Challenge

The healthcare industry has continued to struggle with patient safety issues in the past decade. Despite a host of safety initiatives, the numbers indicate little progress:

- Laboratory sample errors cause nearly 161,000 adverse events annually (Valenstein et al., 2006).
- de Wet & Bowie (2009) found that an adverse event occurred at a rate of 1 per 47 consultations, and 42% of those were judged preventable.
- The Department of Health and Human Services (2010) concluded that one in seven Medicare patients are injured during hospital stays,

and that adverse events contributed to the deaths of as many as 15,000 patients per month.

- Classen et al. (2011) found that errors and adverse medical events occur in one-third of hospital admissions, as much as 10 times higher than some previous estimates.
- Surgeons perform the wrong procedure on patients 20 times a week and operate on the wrong person with the same frequency (Mehtsun et al., 2013). A total of more than 4,000 so-called “never events”—events experts agree should never happen—occur each year in U.S. hospitals.

The introduction of the barcode medication administration (BCMA) concept and subsequent evidence supporting its efficacy is significant to the industry and the patient.

For example, a study at the University of Iowa Children's Hospital (Morris et al., 2009) found that BCMA reduced preventable adverse drug events (ADEs) in a neonatal intensive care unit by 47%. A study in the *Journal of Nursing Administration* (Poon et al., 2008) reported that the time nurses spent providing direct patient care increased after implementation of a BCMA system. And research published by the Society for Academic Emergency Medicine (Bonkowski et al., 2013) associated BCMA implementation in the emergency department with reducing medication administration errors by nearly 67%, and wrong dose errors by 90%.

From a safety perspective, there's no question that BCMA should be used to verify the Five Rights: the right patient, right drug, right dose, right route, at the

right time. In fact, hospitals seeking to qualify for federal incentives by meeting Stage 2 Meaningful Use objectives must automatically track medications from order to administration using “assistive technologies” in conjunction with an electronic administration record (eMAR). BCMA can be used to document compliance because it qualifies as eMAR technology.

## Moving Beyond BCMA

However, BCMA is just one part of the equation for improving patient safety. Mark Neuenschwander, a leading expert in the field of medication dispensing automation and barcoding point-of-care systems, noted in a joint presentation we made at the HIMSS14 conference, that even a state-of-the-art bedside scanning system can't alert nurses to medication preparation or dispensing errors, such as the wrong strength of the right drug.

Additionally, a study published in the *Annals of Internal Medicine* (Poon et al, 2006) reported that implementing barcoding technology in a hospital pharmacy decreased the target dispensing error rate by 85% and the rate of all dispensing-related potential ADEs by more than 60%. The simple use of a barcode system within the hospital pharmacy to identify medications down to the unit/dose level and the subsequent tracking of medications at the point of administration will directly impact patient safety, in light of the high volume of medications dispensed from hospital pharmacies. Barcoding medications in hospital pharmacies also supports healthcare and safety compliance initiatives.

To make a measurable impact on patient safety, barcode scanning and

printing should be integrated into pharmacies, laboratories, and all patient interactions across the healthcare enterprise. Any time providers perform an action on or for a patient, best practices dictate scanning the barcode labels with accurate drug-, test- and patient-specific information, then generating a data record entered directly into the patient's EHR.

Proper identification is critical whether patients are being admitted or operated on, receiving medication or meals, or having something collected from them. For example, incorrectly labeled items such as mother's milk, blood, stem cells, bone marrow, specimens and biopsies can result in misdiagnosis and improper—even life-threatening—treatment, as in the case of blood transfusion errors.

### Point-of-Care Labeling

To encourage hospitals to take a more holistic view of barcoding and patient monitoring, Neuenschwander prefers to use the term BPOC—barcoding at the point of care—rather than BCMA. He compares barcoding to seatbelts, pointing out that technology helps save lives when it is well designed and used responsibly and regularly. In his view, safe labeling practices provide an essential foundation for the success of any barcoding system and should include:

- **Proximity.** On-demand printing of barcoded labels and wristbands at the point of care ensures that the labels don't get lost, left behind in rooms after patients are discharged, or attached to the wrong items. It also reduces the risk of safety-compromising clinician error resulting from distractions, interruptions and heavy workload.
- **Readability.** Busy clinicians need to be able to quickly, easily, and accurately scan and print barcodes the first time.
- **Durability.** Barcoded identification labels must be readable throughout a patient's hospital stay, even after

repeated scanning. For patients, that requires antimicrobial wristbands that can survive exposure to soaps, solvents, blood, and other elements. For medications, label media must also be able to withstand moisture, refrigeration, and freezing.

### The Role of the Printer

New ID printers with wireless, transportable functionality have arrived on the healthcare scene, and they have been specifically engineered to support patient monitoring and safety at point of care. Healthcare CIOs, IT directors, lab managers, and nurses have expressed the need for this type of on-demand printing of admissions wristbands, labels for medication, laboratory, trauma, and surgery, to bedside identification of patients and specimens, to printing matching mother and infant identification wristbands in labor and delivery.

It is important to note that the availability of mobile printing capacity does not automatically promote patient safety. The key is to seamlessly integrate mobile and cart-based printing solutions into workflow, encouraging clinicians to view them as tools for providing safer, more efficient, higher quality care rather than another administrative burden they need to work around. To be effective, these solutions must integrate easily with the hospital's existing admission, laboratory information and EHR systems, yet also be able to meet patient ID, barcoding, and monitoring needs well into the future.

Faced with competing technology priorities, forward-thinking hospitals are taking a closer look at the promise of "barcoding 2.0"—next-generation advances such as ID printing solutions in wireless, mobile formats—that are making it even easier to seamlessly integrate barcoding into clinician workflow and support safety at point-of-care. This evolution is critical to fulfilling barcoding's potential as a patient safety game-changer. ■

**David Crist** is president of Brother Mobile Solutions. He may be contacted at [David.Crist@brother.com](mailto:David.Crist@brother.com).

## REFERENCES

- Bonkowski, J., Carnes, C., Melucci, J., Mirtallo, J., Prier, B., Reichert, E., Moffatt-Bruce, S., & Weber, R. (2013, August 15). Effect of barcode-assisted medication administration on emergency department errors. *Academic Emergency Medicine*, 20(8), 801–806.
- Conway, J., Federico, F., Stewart, K., & Campbell, M. J. (2011). *Respectful management of serious clinical adverse events (2nd Edition)*. Cambridge, MA: Institute for Healthcare Improvement.
- Institute of Medicine. (2000). *To err is human: Building a safer health system*. L. T. Kohn, J. M. Corrigan, & M. S. Donaldson (Eds.). Washington, DC: National Academies Press.
- Institute of Medicine. (2007). *Preventing medication errors*. P. Aspden, J. A. Wolcott, J. L. Bootman, & L. R. Cronenwett (Eds.). Washington, DC: National Academies Press.
- Mehtsun, W. T., Ibrahim, A. M., Diener-West, M., Pronovost, P. J., & Makary, M. A. (2013, April). Surgical never events in the United States. *Surgery*, 153(4), 465-472. doi: 10.1016/j.surg.2012.10.005.
- Morriss, F. H., Abramovitz, P. W., Carmen, L., & Wallis, A. B. (2009, August). Nurses don't hate change. Survey of nurses in a neonatal intensive care unit regarding the implementation, use and effectiveness of a bar code medication administration system. *Healthcare Quarterly*, 12(Sp), 135–140. doi:10.12927/hcq.2009.20981
- Neuenschwander, M. (2014, February). Presentation at HIMSS Annual Conference and Exhibition, Orlando, FL.
- Poon, E. G., Cina, J. L., Churchill, W., Patel, N., Featherstone, E., Rothschild, J. M., et al. (2006, September). Medication dispensing errors and potential adverse drug events before and after implementing bar code technology in the pharmacy. *Annals of Internal Medicine*, 145(6), 426–434. doi:10.7326/0003-4819-145-6-200609190-00006
- Poon, E. G., Keohane, C. A., Bane, A., Featherstone, E., Hays, B. S., Dervan, A., et al. (2008). Impact of barcode medication administration technology on how nurses spend their time providing patient care. *Journal of Nursing Administration*, 38(12), 541–549. doi:10.1097/NNA.0b013e3181818ebf1c
- Poon, E. G., Keohane, C. A., Yoon, C. S., Dittmore, M., Bane, A., Levzion-Korach, O., et al. (2010, May 6). Effect of bar-code technology on the safety of medication administration. *New England Journal of Medicine*, 362(18):1698-707. doi:10.1056/NEJMs0907115
- Valenstein, P. N., Raab, S. S., & Walsh, M. K. (2006, August). Identification errors involving clinical laboratories: A College of American Pathologists Q-Probes Study of patient and specimen identification errors at 120 institutions. *Archives of Pathology & Laboratory Medicine*, 130(8), 1106-1113.

