

Pharmacy Informatics

Barcode Medication Administration: Old News or Work in Progress?

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Proposal

- Our job is not done until we use technology:
 - to enhance medication safety
 - to improve workflow efficiency
 - to capture all necessary documentation



More Tools than Just Basic Barcode Scanners

Aligning the Right Tool, for the Right Job

Work Smarter, Not Harder

- Product (Patient) Identification:
 - Optical product identification (BCMA)
 - Radio-frequency identification (RFID) tags
- Outside the scope of the presentation:
- Additional Levels for Med Prep
 - Gravimetric
 - Raman spectroscopy
- Additional Levels for Patient ID
 - Biometrics



<https://www.psqh.com/analysis/crossing-the-medication-safety-chasm/Eight-Commonly-Used-Techniques-for-Drug-Analysis-PharmiWeb.com>



Product Identification

- Optical Product Identification
 - 1D linear barcodes
 - 2D barcodes
 - Direct part marks (DPM)
 - Optical character recognition (OCR)
 - Optical character verification (OCV)
 - Other unique patterns/image recognition/machine learning
 - 3D
 - Etc.
- RFID Product Identification
 - Active
 - Passive
 - Near Field Communication (NFC)
 - Etc.



Advantages of RFID

- RFID doesn't need line of sight
- An RFID tag is read/write
- RFID tags are durable and reusable
- Data can be encrypted
- RFID tags can store more data
- Read rate is greatly increased (can read multiple tags at a time)

The infographic is titled "BARCODE VS RFID" and compares the two technologies across several key areas. At the top left, a barcode is shown with the numbers "6583 3254" below it. At the top right, an RFID tag is shown. The infographic is divided into two main columns: Barcode and RFID. The Barcode column lists three disadvantages: 1. "BARCODE SCANNER PLACED DIRECTLY IN FRONT OF EACH LABEL TO WORK PROPERLY." (illustrated with a green eye icon). 2. "BARCODE CAN ONLY BE READ, AND THE DATA CAN NEVER BE CHANGED." (illustrated with a red prohibition sign over a barcode scanner). 3. "BARCODE ONLY TRACKS ITEM TYPE CAN'T DISTINGUISH BETWEEN INDIVIDUAL ITEM." (illustrated with a blue ID card). The RFID column lists three advantages: 1. "NO LINE OF SIGHT NEEDED SCAN IN ANY DIRECTION" (illustrated with a cardboard box and a scanner). 2. "RFID TAGS CAN BE READ, AND THE DATA ON THE TAG CAN BE REWRITTEN OR MODIFIED AS NEEDED" (illustrated with a hard drive). 3. "RFID ALLOWS FOR EACH ITEM TO HAVE IT'S OWN UNIQUE IDENTIFICATION" (illustrated with a fingerprint). The Ruddersoft logo is at the bottom center.

BARCODE VS **RFID**

BARCODE SCANNER PLACED DIRECTLY IN FRONT OF EACH LABEL TO WORK PROPERLY.

BARCODE CAN ONLY BE READ, AND THE DATA CAN NEVER BE CHANGED.

BARCODE ONLY TRACKS ITEM TYPE CAN'T DISTINGUISH BETWEEN INDIVIDUAL ITEM.

NO LINE OF SIGHT NEEDED SCAN IN ANY DIRECTION

RFID TAGS CAN BE READ, AND THE DATA ON THE TAG CAN BE REWRITTEN OR MODIFIED AS NEEDED

RFID ALLOWS FOR EACH ITEM TO HAVE IT'S OWN UNIQUE IDENTIFICATION

Ruddersoft



Why are 2D (GS1-128) Barcodes Not the Minimum Standard???

- > 2 Million US dollars
Simple Linear Barcode

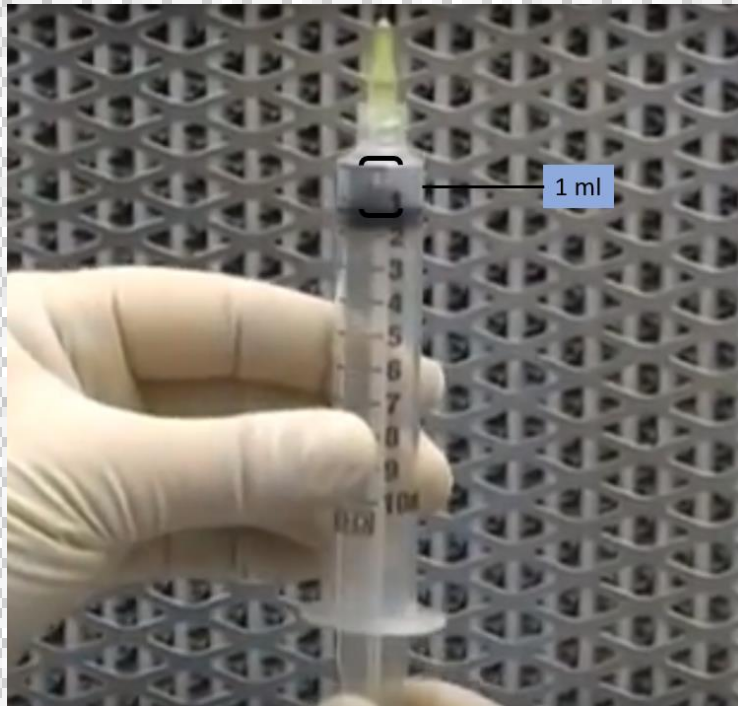


Even Beyond Just Product Identification

Inspection



Gauging










Leapfrog Hospital Survey: Barcode Code Medication Administration, 2018 Report

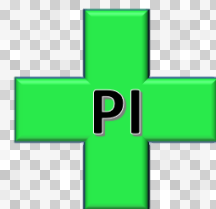
Leapfrog's Standard

- Implement a BCMA system linked to an electronic medication administration record in 100% of the hospital's medical and/or surgical units (adult and pediatric), labor and delivery units, and intensive care units (adult, pediatric, and neonatal)
- Scan both patient and medication bar codes in 95% of bedside medication administrations in BCMA-equipped units
- Use a BCMA system that includes all seven decision-support elements identified as best practices by the Leapfrog BCMA Expert Panel
- Implement all five best-practice processes and structures to prevent workarounds of the BCMA system

- A formal committee to oversee BCMA use
- Backup systems for hardware failures
- A help desk to respond to BCMA issues in real-time
- Conducting real-time observations of staff using the BCMA system
- Engaging with nursing leadership on BCMA usage

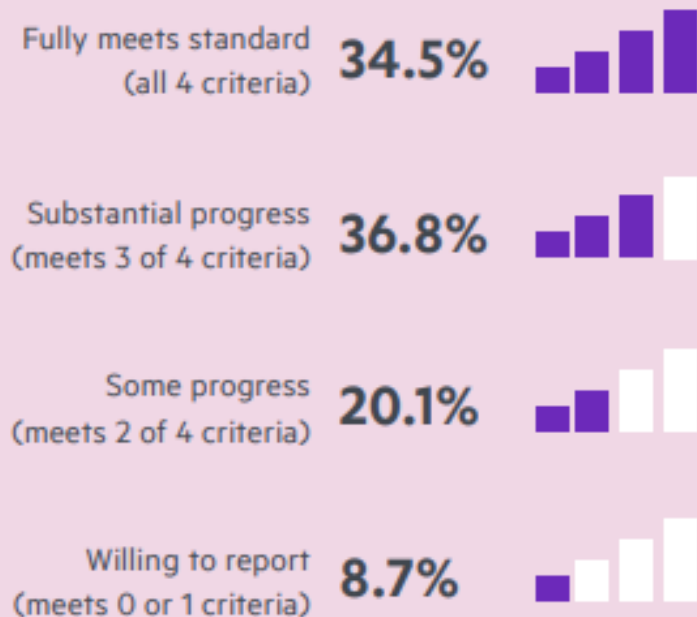
FIGURE 3: Missing Decision-Support Elements in BCMA Solutions

Vital sign check	78.0%	
Patient-specific allergy check	51.1%	
Second nurse check needed	12.8%	
Wrong time (early/late warning)	2.7%	
Wrong dose	0.6%	
Wrong patient	0.4%	
Wrong medication	0.0%	



Leapfrog Hospital Survey: Code Medication Administration, 2018 Report

FIGURE 2: How Hospitals Measure up on BCMA

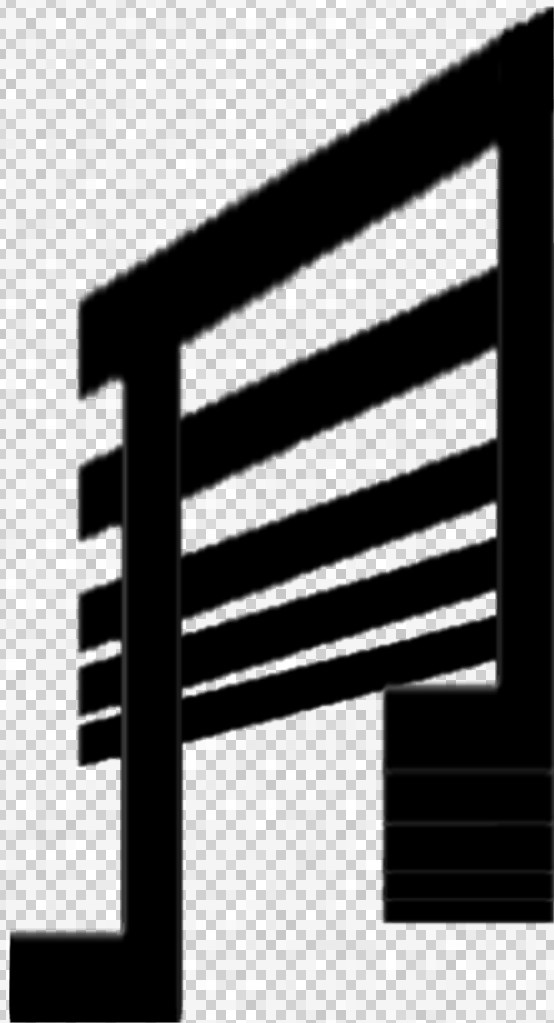


A Closer Look at Where Hospitals are Falling Short

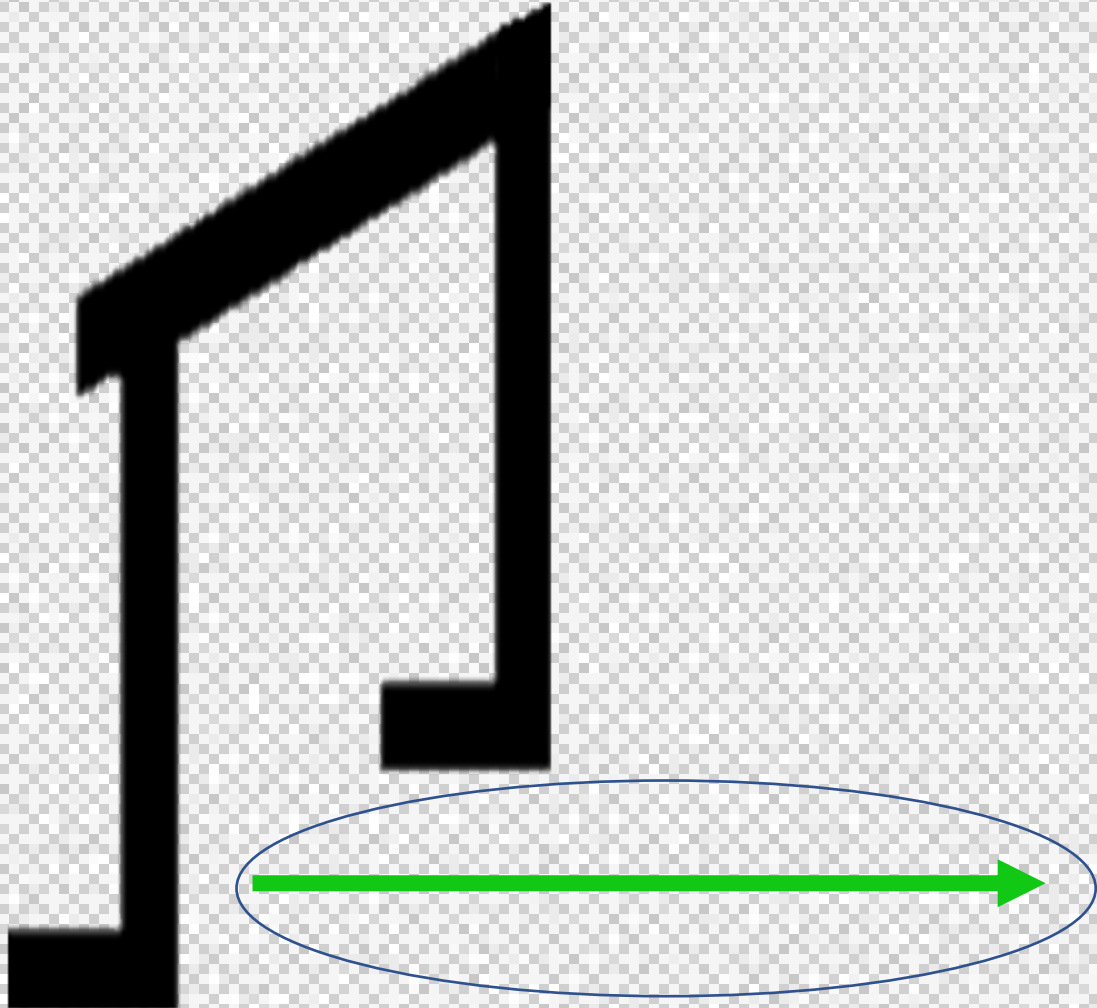
Of hospitals reporting that they lack at least one of the four requirements for Leapfrog's BCMA standard, the most disappointing lapse — and dangerous from a patient safety perspective — is that 42.0% are failing to scan both the patient and the medication for at least 95% of bedside medication administrations. This means that more than two in five hospitals that have implemented BCMA technology simply aren't using it consistently enough to safeguard all their patients.



Current Leapfrog Thresholds



Recommendation Here



The Bigger Point Here

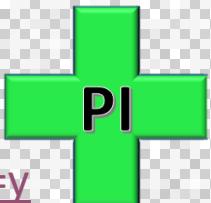
- Why are these areas not commonly included in BCMA metrics?
 - Procedures spaces
 - Imaging
 - Anesthesia
 - Outpatient clinics
 - Immunizations



In the Clinics

- I Found this Interesting Presentation
 - Implementing Bar Code Medication Administration in the Ambulatory Realms
 - 2021 Summer Institute in Nursing Informatics (SINI)
- This is pretty much saying what I am saying!

Following a patient harm event, Vanderbilt University Medical Center (VUMC) vowed to implement BCMA in all ambulatory and procedural areas.



What Did They Learn?

Qualitative Results

Protects patient & nurses

“ I feel safer knowing that the system will alert me if I am about to make an error – it is better for the patient and my license. “

Saves Time

“Scanning of immunizations saves me a lot of time and I don’t have to worry I entered the numbers wrong”

Metrics

“As a manager, it is helpful to have scan rates and know where to where are doing well or where to focus attention.”

Saves Money

“ Capturing the correct NDC codes allows us to take advantage of 340B pricing and as a whole will save money.”



What Did They Learn?

Medication Alerts and Abandonment Rates

7/13/2020-12/2/2020

Count

Total Medication administration
7/13/2020-12/2/2020

54,154

Administrations with warnings that fired

2764 5%

Meds not administered after warning
fired

262 0.5%

Only definitive error avoided
5 Wrong patient scanned

Warning Type	Count	%
MAR Off Schedule Warning	1574	56.95%
MAR NDC No Order For Patient Warning	781	28.26%
MAR Dose Warning	280	10.13%
MAR Admin On Completed Med Warning	46	1.66%
MAR NDC Order Is Not Active Warning	40	1.45%
MAR Admin On Discontinued Med Warning	32	1.16%
MAR Wrong Patient Scanned Warning	5	0.18%
MAR Admin On Expired Med Warning	4	0.14%
MAR Cumulative Dose Warning	1	0.04%
MAR Multiple Required Scans Warning	1	0.04%
Grand Total	2764	



Being a Leader in Barcode Medication Administration Requires Change

- In areas that give medications, but not using performing BCMA, start investigating gaps and opportunities to start incorporating into workflow
- Selecting/pushing vendors to provide the highest usability and effectiveness of BCMA
- Advocating for FDA /Manufacturers labeling requirements to adopt minimum standards that include such 2D formats on all medications (have machine readable lot numbers and expiration dates)
- Overall, being relentless in the improvement of workflows and systems to further reduce the possibility of misadventures



Ending Thoughts

- Despite all the advances in healthcare now and into the future, if we can not do the simplest part of a process safely, then we can only expect to be disappointed



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Thus,



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