Welcome to
Patient Identification and Transfusion Safety: Six years of Experience with Bar Code Scanning
March 24, 2011

Objectives

- Understand the key steps in transfusion barcode tracking.
- Understand the potential gains in patient safety that can be achieved with barcode technology.
- Understand how barcode scanning can be effectively implemented and maintained through collaboration with Anesthesia and Nursing.
- Understand how barcode technology may evolve.
Poll: Tell us your position

- Transfusion Service Medical Director (Pathologist)
- Transfusion Service Manager (MT/CLS)
- Laboratory Personnel
- Anesthesiologist
- Nurse
- Compliance coordinator
- Industry representative
- Other

National Patient Safety Goal #1

NPSG.01.01.01
- Use at least two patient identifiers when providing care, treatment, and services.
- EP 1. Use at least two patient identifiers when administering medications, blood, or blood components; when collecting blood samples and other specimens for clinical testing; and when providing treatments or procedures.
- The patient’s room number or physical location is not used as an identifier.

National Patient Safety Goal #1

NPSG.01.03.01
- Eliminate transfusion errors related to patient misidentification.
- EP 1. Before initiating a blood or blood component transfusion:
  - Match the blood or blood component to the order.
  - Match the patient to the blood or blood component
  - Use a two-person verification process or a one-person verification process accompanied by automated identification technology, such as bar coding.
Resources

- CLSI Documents:
  - GP33-A—Accuracy in Patient and Sample Identification
  - AUTO02-A2—Laboratory Automation: Bar Codes for Specimen Container Identification
- The Joint Commission
- Frequently Asked Questions (FAQs)
  - http://www.jointcommission.org/Standards/FAQs
- Standards Interpretation Group
  - Phone: 630-792-5900, Option 6
  - Online: http://www.jointcommission.org/Standards/OnlineQuestionForm

Cross reference of CLSI documents related to Joint Commission standards
- Go to www.clsi.org > Resources > Crosswalks > The Joint Commission Crosswalk

CLSI-Joint Commission Teleconferences
- Planning additional topics for next year
- Watch online: www.clsi.org > Education > CLSI - Joint Commission webinars
- May 4, 2011 Noon EST; Jean Patel, PhD from the CDC
  - Validation of AST Methods for the Implementation of the Carbapenems and Cephalosporin Breakpoints

Bar Code Technology and Transfusion Safety: Five Years of Experience Points Toward Future Software Standards

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Polling Question

- Are you currently using bar code scanning in the transfusion process?
- A) Not at all
- B) Only in the Blood Bank itself
- C) In the Blood Bank and at other steps

The Major Points

- Bar code technology is mature/practical
- Its use is steadily increasing
- It can clearly be used to significantly increase transfusion safety at all key steps in the transfusion process
- Current HIS and LIS transfusion software products do not use its full potential
- Programming standards are needed

Transfusion Safety

- Transfusion is clearly a very complicated process with multiple steps and handoffs
- One widely quoted reference estimates that one mis-transfusion event occurs for every 12,000 units of RBCs that are transfused. *
- The reduction of transfusion error is a Joint Commission patient safety goal
- Various forms of technology have been shown to reduce error – but there is no consensus yet about best practice

Status Of The Problem At UIHC
Prior To 2005

- A two witness/two signature policy had been put in place after a sentinel event
- Mis-transfusions were being detected and reported to the FDA about every 2.5 years
- For UIHC this translated to one event detected per 43,000 units of RBCs transfused
- However, since mis-transfusions go undetected about 50% of the time, our rate was probably really one per 1.25 years and one per 21,500 units – and therefore only modestly better than the estimated national average (one per 12,000)

How Was The Problem Approached At UIHC?

- In 2003, grants were available from the AHRQ to develop and test new technologies to improve patient safety. We submitted a proposal.
- The aims of the proposal were to:
  1) use bar code technology
  2) use mobile wireless devices
  3) with a computerized system, require successful scans in all key steps involving patient identification in transfusion
  4) evaluate and report the results
  5) make a final, bite the bullet recommendation

What was required to get the work done?

- A multidisciplinary team had to:
  1) evaluate and select labels, printers, and computers on wheels (cows)
  2) evaluate, install and test a wireless system for all relevant care areas
  3) develop and validate the software
  4) undertake side-by-side pilot studies and then train over 1800 staff
  5) make a final, bite the bullet recommendation
How does the system work?

- There are four key scanning steps:
  1) Sample collection
  2) Sample arrival
  3) Blood product dispense
  4) Blood product administration
The system permanently records key details
- Date
- Location
- Operator
- The time of the initial scan and of the termination of the interaction

New scanning operations added after the system was activated
- Scan for OR proxy
- Simplified scan for multiple blood products
- Scan for products returned to Blood Bank scan
Also, a new audit step was added after the system was activated:

- Upon request, the system will compare products dispensed, administered, and returned - and shows discrepancies.
- A member of the QA staff reviews and evaluates the data on a daily basis.
- PSNs created for all skipped scans (0.8%).
- Nursing QA or Anesthesia follow up with employees who fail to scan properly.

So-what actually happened?

- The system was well-received.
- The system provided a powerful new way to comprehensively track and analyze errors in the transfusion process.

How are errors categorized in the computerized system?

- Wrong step
  - operator selects wrong transaction
- Mis-scan
  - operator fails to execute a proper scan
- Skipped step
  - a transaction is either never begun or left incomplete
- Prevented identification error (PIE)
  - a bar-code mismatch is detected!
Focus: Prevented Identification
Errors are detected at all steps

- Sample collection – 4.5 PIEs per month
- Sample arrival – 0.1 PIEs per month
- Blood product dispense – 5.3 PIEs per month
- Administration – 1.13 PIEs per month

Focus: Errors at the Administration Transaction

- Across the institution, PIEs are detected at administration ~ once every 27 days
- Across the institution, the scan completion rate at administration is ~ 99%
- If the processes are assumed to be independent, then a mis-transfusion event would be expected to occur about every 3236 days (~ 8.85 years) on average.

Potential Increase In Safety With The Bar Code Based Transfusion System

- Based on the fact that we were previously likely experiencing mis-transfusions every 1.25 years, the new system may be about 7 times safer than its two-witness, two-signature predecessor.
- Given that the national estimate of mis-transfusion is one per 12,000 units of RBCs, and that we transfuse about 155,300 units in 3236 days, the new system may be about 13 times safer than the national average.
How has the system changed things?

- The system is now widely accepted as a critical patient safety function. Nursing and Anesthesia are very strong proponents.
- The reliable and unambiguous nature of the data generated has driven further process analysis and improvement.

Options for Further Technological Enhancement

- Additional scanning steps for the ORs
- Unique identifier tags (digits) for barcodes used on patient wristbands
- Integration of RFID technology as it becomes more feasible and cost-effective

Again: The Major Points

- Bar code technology is mature/practical
- Its use is steadily increasing
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Publications: UIHC Experience

- Enhancing Transfusion Safety With An Innovative Bar-Code-Based Tracking System. Askeland et al. Healthcare Quarterly 2009 Special Issue: 82-86

Polling Question

- Do you think that the use of barcode scanning for any use (such as medication administration or specimen labeling) is likely to increase in your hospital in the near future?
  - A) yes
  - B) no
  - C) not sure

Polling Question

- Do you think national software guidelines for transfusion safety should be developed?
  - A) Yes, standardizing software will make HIS and LIS integration easier
  - B) No, it’s too early and could limit innovation
  - C) Not sure
Barcode Scanning for Blood Transfusion Safety – A Nursing Perspective

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Background

- Prior to implementation identification required a two person check at sample collection and blood administration
- High risk and complex process
- Nursing documentation of blood administration was either in the EMR called Informm or on a paper flowsheet
- Goal with barcode scanning was to accurately identify the patient and the product as well as reduce errors in blood transfusion process

Barcode Scanning – Nursing Perspective

- Barcode scanning reduced a complex and laborious identification process to a more streamlined and safer process
- Process of collection went from 9 steps to a consistent 3 step process
- Process of administration went from 14 steps to the same 3 step process
- Simplicity in using a computer on wheels
- No need for dual banding of the patient (one for the patient wristband and the other for the blood band)
- More likely to catch an identification error using the barcode system than with the manual system
Our Journey Continues

- Using different systems
  - Epic – CPOE and documentation
  - IPR – Scanning of blood and samples and tracking system for blood
  - Cerner – Blood Bank
- Not all elements of the process have been transitioned into our new EMR
- Awaiting new blood bank system
- Need to transition scanning into new system
- Some services not integrated into the new system
- Refinements to system – continuous quality improvement

Polling Question

- How are you documenting administration of blood products?
  a) Via EMR
  b) Paper chart
  c) Paper Flowsheet
  d) Other

Polling Question

- What does your documentation include?
  a) Vital signs
  b) Signs/symptoms of reaction if present or not,
  c) Education
  d) Two-patient identifiers: between blood product and patient
  e) Time transfusion initiated and stopped/completed
  f) Volume transfused
  g) Other additional information
Barcode Technology & Transfusion Safety
Implementation in the Operating Room

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Progression of Systems
Initial Training

Content similar to the ‘House’.
Sample, identification, administration

• Five days in O/R cafeteria. Early & late shifts
• Three workstations with instructors
• Attendance record
• One on one follow-up for absentees
• 20 minutes

Initial preparation

• Computer workstation and scanner at every anesthesia location
• Barcode printer in every O/R and location
• Proxy identification system
  – Initially: paper anesthesia record
  – Now: electronic anesthesia record (EAR), Proxy Card for all

Paper proxy
How did we do?

What’s different in the O/R?

Special to O/R

- No Improper transfusion was ever given
- Barcode wristband removed or inaccessible
- Rapid, massive, transfusions [10,000 / year]
- Restricted, cluttered workspace
- Pre-checking multiple blood products
- Proxy & scanning new & alien to workflow
- Unforeseen bar-code insecurities

- Later: O/R workflow incompatible with EMR order management
Now what?

- Personal analysis [me, personally]
- Individual follow up – “How come?”
  - “I know I did it!”
- Persisting education:
  - M&M
  - Faculty meetings
  - Quarterly PI – outcome feedback
  - Experience
- Software & process improvement

Software

Good

Not so good!

Process

- Pre-check on delivery to O/R
  - Imperfect, legacy, ‘two-person’ check
- Clean-up ‘sweep’
- [Reconciliation of ‘empties’ not implemented]
Poll Question

• How many of you retain & use empty product containers to reconcile or confirm blood product use?
  • Don’t know
  • No
  • Yes – important method
  • Yes – supplemental method

Adverse event [PSN] reports persist
Implementation of EMR/EAR

Office of Operational Excellence

• Retrospective RCA
• Prospective FMEA – exhaustive analysis
  – Multidisciplinary
  – Leadership participation
  – On-going

What did we find?
What did we do?

• Improved pre-check of product delivery
• Improved exit ‘sweep’
  – Products
  – Identifying labels & log-in
• Improvement of proxy & workspace

Where are we now?
What’s next?

Pending Technology
- Barcode patient identification integration into EAR
- Barcoded blood-product identification and reconciliation integrated into EAR and EMR
- [Eliminates the proxy & the second interface, automates blood product tracking]

Anticipated Technology
- Smart [RFID tag?] chip identification of patients and products
- [Patient care area workstation ‘lockdown’]

QUESTIONS????

Thank you!
Please take a moment to complete the brief evaluation. We appreciate your feedback.

Please join us on May 4 for our next webinar on Validation of AST Methods for the Implementation of the Carbapenems and Cephalosporin Breakpoints