Using Bar Code Technology to Improve Patient Safety
Objectives

- Analyze the need for and benefits of a BPOC system for specimen collection.
- State recommended guidelines for specimen collection including National Patient Safety Goals.
- Evaluate technical requirements including hardware and software considerations.
- Identify strategies for adoption of the technology.
- Prepare metrics for measuring the impact of a bedside labeling program.
Case for Change

- Joint Commission National Patient Safety Goal #1 requires two patient identifiers when providing care, treatment or services.
- When collecting blood bank samples a two person process must be used or an automated ID technology.
- All specimens must be labeled at the bedside and in front of the patient.
- The College of American Pathologists recognizes patient identification as a cardinal safety goal.
The Impact of Identification Errors

- Incidence of mislabeling errors found to be as high as 7%. (Howanitz, PJ, Renner SW, Walsh MK)

- The American College of Pathologists has performed more than 130 studies on specimen errors.

- 34%-58% of total lab errors mislabeled specimens. (Bonini P, Plebani M, Ceriotti F, Rubboli F.)
Impact on Safety

1 of every 18 lab errors results in an adverse event.

Extrapolated to all the nation’s hospital-based laboratories:

160,900 adverse events per year as results of mislabeled specimens

(Valenstein PN, Raab SS, Walsh MK)
Interventions to increase awareness and emphasize patient ID can decrease errors.

One institution decreased errors from 7% to 3% over two years. (Howanitz PJ)

Tracking and immediate investigation decreased errors from 47% to 14% in another. (Quillen K, Murphy K)
Bar Code Technology

- The Food and Drug Administration has proposed bar coding at the point of care for medication and blood product delivery.
- One institution was able to decrease identification errors by 77% after the implementation of bar code technology.

(Bolgna LJ, Mutter M)
Our Story
Where is Howard County General Hospital??
Who is Howard County General Hospital??

- The only acute care medical facility in Howard County, Maryland.
- Provided services to over 186,000 people in 2009.
- 227 beds
Inpatient Services

- Cardiology
- Critical Care
- Gynecology
- Medicine
- Neonatology
- Obstetrics
- Orthopedics
- Pediatrics
- Perinatology
- Psychiatry
- Surgery
Outpatient Services

- Anti-Coagulation Clinic
- Diagnostic Imaging
- Emergency Medicine
- Psychiatric Emergency Unit
- Rehabilitation
- Sleep Services
- Surgery
- Wellness/ Health Education
- Wound Care Center
Major Service Lines

- Cardiology
- Obstetrics
- Oncology
- Orthopedics
- Pediatrics
- Psychiatry
- Surgery
• Fifth largest private employer in Howard County
• 1,700+ full and part-time employees
• 60% live in Howard County
Fiscal Year 2009 Utilization Stats

- 74,653 Emergency Room Visits
- 17,425 Inpatient Admissions
- 3,084 Newborn Deliveries
- 13,309 Surgical Procedures
Our Laboratory

- Receives over 500,000 specimens per year
- Receives on average 1,400 specimens per day
- Sends out on average 200 specimens per day
Our Blood bank

- Transfusions per year
  - 4,695 Packed Cells
  - 645 Fresh Frozen Plasma
  - 278 Pheresed Platelets
  - 501 Rhogam doses
Our Story

- All specimen collection decentralized and performed by patient care technicians and registered nurses.
- PCTs and RNs receive extensive education on the importance of patient ID
Problem – Mislabeled Patient Specimens

- Wrong patient or multiple names on specimen tubes.
- More than one patient in a single specimen transport bag.
- Missing handwritten blood bank label or error in handwritten blood bank label such as transposition of numbers.
Problem Solving Approach Used – PDCA

**PDCA (Plan–Do–Check–Act)** - a four-step model for carrying out change. Just as a circle has no end, the PDCA cycle should be repeated again and again for continuous improvement.
Problem Solving Approach Used – PDCA

PDCA Steps:

Plan - Plan a change, aimed at improvement.

Do – Carry out the change (preferably on a small scale).

Check – Check the results – what was learned?

Act – Adopt the change, abandon it, or run through the cycle again.
**Plan** - Organized a focus group of Nurses and Patient Care Technicians (PCTs) to analyze current process.

**Do** – Made minor modifications to labels and focused attention and staff education, accountability, and disciplinary measures.

**Check** – Result - no measurable decrease in labeling errors.

**Act** – Made decision to run process through a second PDCA cycle.
PDCA Cycle #2

**Plan** - Organized a selection committee to evaluate and ultimately select a phlebotomy positive patient ID solution – a Request for Proposal (RFP) was distributed to five vendors.

Keys to system selection decision included:
- bedside patient ID barcode scanning
- bedside specimen label printing
- real-time wireless communications

Committee unanimously agreed on the vendor and product of choice – contract was negotiated and signed.
Plan - Organized a **Project Management Team** to develop the initial Phase 1 implementation plan and a **Project Implementation Team** to execute the Phase 1 implementation plan.

**Phase 1 Project Scope:** Six (6) inpatient units

**Project Management Team** – Included the Director of Nursing, applicable nurse managers, Clinical Education, IT, and the Laboratory’s LIS Coordinator.

**Project Implementation Team** – Included the above, plus a PCT from each inpatient unit.
Plan - Evaluated, selected, and deployed the required hardware needed for the Phase 1 implementation (PDA and COW deployment).

- Wireless PDAs
- Wireless Printers
- Computer on Wheels (COW)
PDCA Cycle #2 (continued)

**Do** - Initially implemented the system on one pilot inpatient unit – 3South (October 2006) and monitored results.

Once pilot unit was proven to be stable, proceeded with implementation in the remaining five (5) inpatient units – 1North, 4South, IMC, MCU, and SSU – monitoring results as well (October - December 2006).

Extensive staff training was required and was completed right before each unit’s Go LIVE date.
PDCA Cycle #2 (continued)

**Check** – Measured and compared mislabeled specimen statistics before, during, and after Phase 1 implementation of system.
Total Mislabeled Specimens

Post-MobiLab: Units 4S, 3S, IMC, SSU, MCU, 1N
Act – Continued monitoring results of the system’s impact on mislabeled specimens.

Implemented Phase 2 and Phase 3 (final) implementations.


Phase 3 Project scope included Ambulatory Surgery and PACU (6/2009)
Total Mislabeled Specimens

Post-MobiLab: Units 4S, 3S, IMC, SSU, MCU, 1N, ICU, NICU
LABORATORY BENEFITS

- FASTER RECEIVE PROCESS
- NO MORE HANDWRITTEN INITIALS TO DECIPHER
- NO TRANSCRIPTION ERRORS ON HANDWRITTEN BLOOD BANK LABELS
- NO MORE SECOND SIGNATURE REQUIRED ON BLOOD BANK LABELS
**MEDITECH RECEIVE ROUTINE**

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Patient</th>
<th>Coll Time</th>
<th>Coll By</th>
<th>Recvr Date</th>
<th>Recvr Time</th>
<th>Recvr By</th>
<th>Func</th>
</tr>
</thead>
<tbody>
<tr>
<td>0325:CG00001R</td>
<td>DAHL, BARD E <em>TEST</em></td>
<td></td>
<td></td>
<td>03/25/18</td>
<td>1514</td>
<td>NEASU</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Account</th>
<th>Location</th>
<th>Unit Number</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0000000035873</td>
<td>45</td>
<td>000000324</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age/Sex</th>
<th>Room</th>
<th>Coll Cat</th>
<th>Coll Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>402</td>
<td>POOL</td>
<td>03/25/18</td>
</tr>
</tbody>
</table>

---

**HOWARD COUNTY GENERAL HOSPITAL**

**JOHNS HOPKINS MEDICINE**
# MOBILAB RECEIVE PROCESS

## Create Receive Specimen Batch

**Batch**: 6  
**Description**:  
**INL Receive Batch**: 6  
**Created**: 03/25/10 1530 NEASU  
**Lab Database**: LAB.HMD  
**Status**: OPEN

**Received By**: NEASU  
**Receive Printer**:  
**Aliquot Printer**:  
**Workcard Printer**:  

<table>
<thead>
<tr>
<th># Specimen</th>
<th>Cnt#</th>
<th>Collected</th>
<th>Patient Name</th>
<th>Account</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>03251G00001R</td>
<td>03/25/10 1306 NEASU</td>
<td>DAHL,BABE TEST*</td>
<td>00000035873</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NO MORE HANDWRITTEN BLOOD BANK LABELS!
Results To Date

All Mislabeled Specimens
2007-2010

<table>
<thead>
<tr>
<th>Month</th>
<th>Number of Specimens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>5</td>
</tr>
<tr>
<td>Feb</td>
<td>11</td>
</tr>
<tr>
<td>Mar</td>
<td>12</td>
</tr>
<tr>
<td>Apr</td>
<td>18</td>
</tr>
<tr>
<td>May</td>
<td>17</td>
</tr>
<tr>
<td>Jun</td>
<td>13</td>
</tr>
<tr>
<td>Jul</td>
<td>8</td>
</tr>
<tr>
<td>Aug</td>
<td>6</td>
</tr>
<tr>
<td>Sep</td>
<td>7</td>
</tr>
<tr>
<td>Oct</td>
<td>6</td>
</tr>
<tr>
<td>Nov</td>
<td>7</td>
</tr>
<tr>
<td>Dec</td>
<td>5</td>
</tr>
</tbody>
</table>

Month
Sources of Errors

- Training: new employees putting multiple patients in one transport bag.
- Technology not implemented: Dialysis
- Wireless network down
- Unable to scan wristband
Foundations of Success

- Patient focused attitude leading to teamwork between laboratory and nursing managers and staff
- Committed IT department. Robust wireless network KEY.
- Investment in sufficient equipment.
- Immediate follow up and accountability
- Sharing of data and celebration of success with staff.
Thank you for listening!!

Presenters:

Nancy Smith, MAS, RN  Senior Director Patient Care
Howard County General Hospital
(410) 740-7790
nsmith@hcgh.org

Sue Neal-Lyman BS MT (ASCP)  LIS Coordinator
Johns Hopkins Hospital Laboratory at Howard County General
(410) 740-7629
sneally1@jhmi.edu


5. Quillen K, Murphy K. Quality Improvement to decrease specimen mislabeling in transfusion medicine. *Arch Pathol Lab Med.* 2006;(130):1196-1198
