Breast Milk Bar Coding Systems: Innovations Supporting Clinical Practice to Improve Patient Safety

Identification:
Medical institutions across the United States have continually sought technology to ensure safe and effective administration of medications and blood products, and to provide appropriate identification and labeling practices of lab specimens. Since 2006, Mercy Medical Center (MMC) has used a bar coding medication administration (BCMA) system. After the successful implementation of the BCMA system, nursing leadership investigated expanding this application to include the management of breast milk (BM) for patients in the 26 bed level III Neonatal Intensive Care Unit (NICU). While mismanagement of BM in our institution is a rare occurrence, in an effort to improve safety practices related to identification, administration, management, and labeling of BM, we implemented a unique and innovative breast milk bar coding system to reduce the likelihood of errors and provide a better monitoring system for near misses associated with breast milk management.

Problem:
- Single staff member verification process for breast milk (BM) management (storage, acceptance, fortification, labeling, and administration)
- Labeling Issues
  - Inconsistent BM container labeling practices
  - Loss of patient labels on BM containers in freezer, secondary to condensation
  - Warming of BM in water baths caused dislodgement of patient labels or smearing of patient identifiers
- Near-miss reporting system was not specific for BM

Identification of Problem:
- NICU staff identified the inconsistencies in practices and verification process

Baseline Data:
- Rare occurrences of mismanagement of BM over the past 3 years
- No formal reports of near-misses related to BM, possibly secondary to non-specific reporting system or unidentified errors in management and administration process
**PROCESS:**

**Methodology to Develop a Solution:**
- Hospital administration sought to improve the patient verification for BM handling and administration through the utilization of a preexisting technology within the institution. Scanning the patient’s wristband bar codes prior to administration of medications has proven to be successful in decreasing medication related issues.
- A partnership was developed with a vendor that already supported our existing medication bar coding technology.
- Mercy Medical Center became a beta testing site for the verification of a breast milk bar coding technology.
- An **AIIM** (assessment, improvement, implementation, and measure) Project format was used to develop the implementation of the program
  - **Assessment** –
    - A critical analysis was done to identify problems that existed within the present BM handling and administration process
    - Algorithms were developed that compared our present practice with the technological pathways
    - These algorithms were used to develop testing scenarios for the beta testing
    - Monitoring of near-miss and misadministration reports

**SOLUTION:**

**Solutions: Implementation of breast milk bar coding system (BMBCS)**
- **Improvement** –
  - Labels
    - Implementation of **CRYO** labels that would improve labeling issues
      - Adhesives properties of labels that would ensure that the labels remained attached to containers while in water or the freezer
      - Patient identifiers remained visible despite warm water baths
    - Use of printed bar coded labels with patient identifiers (name, MRN, date of birth)
  - Patient & Container Verification
    - Confirmation of correct patient prior to administration
    - Confirmation of a match between containers during the combining of multiple containers of BM
  - Improved labeling of storage bins for BM in refrigerator and freezer with patient identifiers
- **Implementation** –
Phase I (April 09 – July 09)
- Beta testing
  - Education of staff
    - Computer based self learning module
    - 1 hour hands-on learning session
    - On-site product managers and beta testing team during “GO LIVE”
  - Education of parents
    - Beta team representative met with each mother that was pumping BM and discussed changes in the BM handling process
- Development of tools
  - How-to-guides for staff reference – algorithm based
  - Parent information guides

Phase II (Nov 09 to present)
- Reeducation of staff on enhancements and workflows using the BMBCS – September/October 2009
- Implementation of bar coding enhancements – (late October 2009)
- Development of new BMBCS guidelines

Measuring of Impact of BMBCS
- Monitoring of near-miss and mismanagement of BM reports
- Monitoring of staff compliance with new system
- Monitoring of staff concerns related to BMBCS

**OUTCOMES:**

Initial Data for Phase II

<table>
<thead>
<tr>
<th></th>
<th># of Containers Received into BMBCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 2009</td>
<td>814</td>
</tr>
<tr>
<td>December 2009</td>
<td>508</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measuring Compliance</th>
<th># Babies Receiving BM (OG/NG, or bottle) in NICU *</th>
<th># Babies With Stored Containers</th>
<th>% Compliance of Staff with System</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 2009</td>
<td>19</td>
<td>6</td>
<td>31.5 %</td>
</tr>
<tr>
<td>December 2009</td>
<td>9</td>
<td>3</td>
<td>33.3 %</td>
</tr>
</tbody>
</table>

* Exclusively breastfed and infants that were NPO during their entire stay were eliminated from data.

Determining Rate of

<table>
<thead>
<tr>
<th></th>
<th># of</th>
<th># Babies Breastfed</th>
<th>% Babies Receiving</th>
</tr>
</thead>
</table>
### Breastfeeding Population in the NICU

<table>
<thead>
<tr>
<th>Month</th>
<th>Admissions</th>
<th>only or Receiving BM</th>
<th>BM or BF in NICU</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 2009</td>
<td>35</td>
<td>20</td>
<td>57.0%</td>
</tr>
<tr>
<td>December 2009</td>
<td>43</td>
<td>14</td>
<td>32.5%</td>
</tr>
</tbody>
</table>

** Infants that remained NPO during entire admission were eliminated from data.