A Breastmilk Management System Improves Patient Safety

Session #68, February 21, 2017 (8:30-9:30 am)

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Caroline Steele, MS, RD, CSP, IBCLC
Speaker Introduction

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Speaker Introduction

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Conflict of Interest

James Cappon, MD
Has no real or apparent conflicts of interest to report.

Caroline Steele, MS, RD, CSP, IBCLC
Speaker fees for CE approved programs from Abbott Nutrition (no product discussion; all CE programs on safe breastmilk handling and breastfeeding).
Agenda

• Quality at CHOC Children’s
• Identifying the need for a breastmilk management program at CHOC
• Stages of program implementation
• Outcomes and metrics
Learning Objectives

• Outline primary risks associated with human milk handling within the hospital setting

• Describe how health IT and bar code scanning technology can reduce risk of fortification errors and human milk misadministration

• Describe how health IT and bar code scanning technology can improve efficiencies and reduce costs

• Summarize regulatory standards related to human milk handling within the hospital setting
CHOC Children’s Mission Statement:

To nurture, advance, and protect the health and well-being of children
CHOC Definition of Quality

The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.

At CHOC this means delivering exceptional quality pediatric healthcare services characterized by high reliability and best practice performance levels.
Mortality Rate (O/E)
Serious Harm Rate, FY12-present

CHOC and CCMH Serious Patient Harm Event Rate (Data is FYTD)

- Actual
- Target
- Trend
CUBS (Connecting Users, Building Safety)
Implementation of a Breastmilk Management System

• STAGE I: Failure Mode Effects & Analysis (FMEA) Team

• STAGE II: Breastmilk PI Team

• STAGE III: Breastmilk Handling Implementation PI Team

• STAGE IV: Breastmilk Bar Code Scanning Team
Benefits Realized for STEPS™ Value Categories

- Reducing breastmilk administration errors
- Preventing over 300 breastmilk errors per year
- Reducing time for breastmilk preparation by 1 hour per day
- Elimination of 0.5 FTE for cost savings of $30K/year
Stage 1: FMEA

• 13 multi-disciplinary team members

• Initiated as a result of 3 errors occurring in a short time period

• Review of every step of the process
  – Collection
  – Storage
  – Transport
  – Administration
  – Discharge

• GOAL: Identify all potential failure points within the process
## Risk Priority Number (RPN) Scoring

<table>
<thead>
<tr>
<th>Severity</th>
<th>Likely Occurrence</th>
<th>Detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No effect</td>
<td>Almost never</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
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<td>5</td>
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<td>6</td>
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<td>7</td>
<td></td>
<td></td>
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<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Hazardous</td>
<td>Failure almost certain</td>
</tr>
</tbody>
</table>

\[
\text{RPN} = \text{Severity Score} \times \text{Occurrence Score} \times \text{Detection Score}
\]
FMEA Results

• Key concepts
  – NICU alone administers over 10,000 breastmilk feedings/month
  – RN may handle breastmilk 12x per shift
  – Risk of confirmation bias & reduced sensitivity
  – Cumbersome process with inadequate double checks at key points

• 282 potential failure points (RPN scores 1-810)
  – Root causes determined for top 85 (RPN scores ≥160)
  – Evaluated detectability of potential failure points

• Considered consequences of not taking action
  – Potential patient harm (bodily fluid exposures)
  – Regulatory citations & HIPAA breaches
  – Financial impact (cost of labs, prophylaxis, fines)
  – Family satisfaction
FMEA Conclusions

• NICU alone administers over 10,000 breastmilk feedings/month
  – RN may handle breastmilk 12x per shift
  – Risk of confirmation bias & reduced sensitivity

• Results identified need for process redesign
  – Unclear and cumbersome process with inadequate double check at key points
  – Contamination risk due to space constraints

• Consequences of not taking action
  – Potential patient harm (bodily fluid exposures)
  – Regulatory citations & HIPAA breaches
  – Financial impact (cost of labs, prophylaxis, fines)
  – Family satisfaction
Stage 2: Breastmilk PI Team

- 11 multidisciplinary team members

- Objectives:
  - Redesign process based on identified failure points & root causes
  - Meet current regulatory guidelines and best practices
  - Support CHOC’s strategic plan (Excellence & Infrastructure)

- Proposal to Senior Leadership for a 2 phased approach to address the issues
  - Phase I: Centralized Breastmilk Handling
  - Phase II: Breastmilk Bar Code Scanning
Stage 3: Breastmilk Handling Implementation Team

• 16 multidisciplinary team members
• Finalized processes for centralized breastmilk handling
• Updated policies & procedures
• Provided staff education
• Go live date January 11, 2013
Process Redesign

• Repurposed current Formula Room to accommodate centralized breastmilk & formula prep (obtained health department approval)

• Registered Dietetic Technicians (DTRs) began preparing all breastmilk, unit dosing, & distributing
  – Initially ~70,000 feedings/year (avg 200/day)

• Process required a double check (verbal & sign off) of name & MRN on every bottle at each step in the process

• Addressed 63 of the top 85 (74%) potential failure points
Stage 4: Bar Code Scanning Team

- Multidisciplinary team of 5 core + ad hoc team members

- GOAL: Identify & implement scanning system to address remaining potential failure points

- Identified system from Timeless Medical as best option to meet needs
  - Interface with EMR (Cerner) for ADT & orders
  - Automated previous manual processes (all calculations and labeling) increasing patient safety
Providing Bar Code Labels to Mothers

• RN scans baby’s armband to generate labels to give to mother

• Mothers label pumped milk using the provided bar code labels

• Mother handwrites in the date & time milk was pumped on the label
Receiving Milk

• Mother drops off milk with nurse

• Nurse ensures bottles are labeled and stores in breastfeeding fridge or freezer

• Techs pick up milk and scan into inventory
Receiving Milk, Cont’d.

### RECEIVE BOTTLES

Please enter the details for each bottle of milk you are receiving below.

**NOTE:** If you would like to copy all items from the first row, to all of the rows beneath it, please click the “apply to all” button.

<table>
<thead>
<tr>
<th>BARCODE</th>
<th>HINDMILK</th>
<th>FOREMILK</th>
<th>BOTTLE STATE</th>
<th>SELECT PUMPED DATE / TIME</th>
<th>VOLUME</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOT00F4ZG</td>
<td>No</td>
<td>No</td>
<td>Deep Frozen</td>
<td>Oct 12 2016</td>
<td>11:00</td>
<td>mL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Nutrition Lab Fre</td>
</tr>
<tr>
<td>BOT00F4ZH</td>
<td>No</td>
<td>No</td>
<td>Deep Frozen</td>
<td>Oct 12 2016</td>
<td>11:00</td>
<td>mL</td>
</tr>
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<td>11:00</td>
<td>mL</td>
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<tr>
<td>BOT00F4ZJ</td>
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<td>Oct 12 2016</td>
<td>11:00</td>
<td>mL</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Nutrition Lab Fre</td>
</tr>
</tbody>
</table>
Preparing Feedings

Order interfaces from EMR

**PREPARE BOTTLES**

Scan Bottle(s)

<table>
<thead>
<tr>
<th>Bottle(s) Scanned</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOT001HOY</td>
</tr>
<tr>
<td>BOT001HOZ</td>
</tr>
<tr>
<td>BOT001H10</td>
</tr>
<tr>
<td>BOT001H11</td>
</tr>
</tbody>
</table>

**Prepared**

<table>
<thead>
<tr>
<th>Total available</th>
<th>200.00 mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Plain Using</td>
<td>96.00 mL</td>
</tr>
</tbody>
</table>

Measure to 24 cal/Oz

Order interfaces from EMR
Bedside Scanning/Feeding

**FEED BABY**

Scan the baby’s barcode

AC100000000

Cancel  Next >>

**FEED BABY**

Scan the bottle’s barcode

Cancel  << Previous  Next >>

**FEED BABY**

Bottle BOT001H12 can now be fed to baby Baby Boy Test and will be disposed of by the system.
Bedside Scanning—Wrong Baby

FEED BABY

This bottle (BOT001H02) is assigned to another baby.

Scan the bottle's barcode

BOT001H02

Cancel  <<< Previous  Next >>
Discharge Process

**DISCHARGE BULK**

Scan bag barcode

[Cancel] [Next >>]

**DISCHARGE BULK**

You are discharging bottles in the bag BAG00004Z.

Scan the baby’s barcode:

[Cancel] [<< Previous] [Finish]

**DISCHARGE BULK**

You have successfully discharged bag BAG00004Z as well as the Bottle(s) that were in it.
Data Interface from Bar Code System to EMR

<table>
<thead>
<tr>
<th>Time</th>
<th>10:00 - 10:59</th>
<th>09:00 - 09:59</th>
<th>08:00 - 08:59</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition Assessment</td>
<td>* Feeding Readiness</td>
<td>1 - Awake</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Feeding Readiness Status</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Appropriate to Feed</td>
<td>OK to PO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NPO</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ice Chips Given</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type of Liquid</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Feeding Method</td>
<td>PO, NGT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BBM info sheet signed</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scanned BM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scanned BM Content</td>
<td>EBM with Neosure</td>
<td>24.000</td>
</tr>
<tr>
<td></td>
<td>Scanned feeding Callaz</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scanned Discharge EBM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Current Lactation Status

- Current Lactation Status
- Pumping
- Breastmilk Inventory

92 bottles equaling 3919.6 mL

(Note: If pt is a multiple, total inventory number reported here is the total amount stored in the Nutrition Lab divided equally between each hospitalized sibling.)

![Chart showing Average Daily Pumping Volumes]
### Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Wrong Baby’s Milk</th>
<th>Expired Breastmilk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wrong milk actually fed</td>
<td>Wrong milk scanned (near misses)</td>
</tr>
<tr>
<td><strong>Prior to Changes</strong></td>
<td>3</td>
<td>---</td>
</tr>
<tr>
<td>• May 2010-Dec 2012</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Bedside Prep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Manual Double Check</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FY 2013 (Phase I)</strong></td>
<td>0</td>
<td>---</td>
</tr>
<tr>
<td>• Centralized Prep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Manual Double Check</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FY 2014 (Phase II)</strong></td>
<td>0</td>
<td>110</td>
</tr>
<tr>
<td>• Centralized Prep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Bar Code Scanning</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Time Efficiency & Cost Savings

Ongoing Monitoring/Updates

• Daily/weekly evaluation of system reports
  – Data on near misses reported to bedside staff

• Root cause analysis of errors/breaches in protocol

• Changes in scanning system based on advances in clinical practice
Benefits Realized for STEPS™ Value Categories

- Reducing breastmilk administration errors
- Preventing over 300 breastmilk errors per year
- Reducing time for breastmilk preparation by 1 hour per day
- Elimination of 0.5 FTE for cost savings of $30K/year
Questions?

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Remember: Complete your online session evaluation