Improving Human Milk Provision in a Level IV NICU: Project HOME

Anthony Piazza, MD
Professor of Pediatrics
Director of Quality Improvement
Emory University Division of Neonatal–Perinatal Medicine
Children’s Healthcare of Atlanta Emory NICU

Kacey Nation, MSN, RNC-NIC, CBC
Quality Administrative Resource Nurse
Children’s Healthcare of Atlanta
Emory NICU

Disclosures
- Kacey Nation: No financial disclosures; Emory Conference on Breastfeeding Planning Committee Member
- Anthony Piazza: Has no financial disclosure but is an executive board member for CHNC and leader of CHNC CIQI Collaboratives
- Data for use in this presentation were supplied by Children’s Hospitals Neonatal Consortium, Inc. (CHNC). Any analysis, interpretation, or conclusion based on these data is solely that of the authors, and CHNC specifically disclaims responsibility for any such analysis, interpretation, or conclusion.

Objectives
- Understand the Level IV NICU environment and the challenges that exist in supporting Human Milk Use and Lactation in the Level IV NICU
- Understand how Quality Improvement can be used to facilitate increased use of Human Milk in a Level IV NICU
- Demonstrate the support for QI in the national collaborative Project HOME
**Agenda**
- Overview of Egleston NICU
- Factors that impact supporting lactation at a non-birthing children’s hospital NICU
- Brief overview of Quality Improvement concepts
- Quality Improvement through CHNC Project HOME
- Discuss how Human Milk provision can be supported in even the most critical scenarios: case studies

**Egleston NICU**
- Emory/Atlanta’s Region
  - Egleston, Grady, Emory Midtown
  - 32 perinatal hospitals; 1 birthing center
  - Additional support to other regions
- Facilitate transport
  - Neonatal RN and RT
  - Provide mini-NICU on transport
- TH, INO, HFOV, pressors, CT
- Outreach Education
  - kim.case@emory.edu
  - Scan to receive newsletter

**Egleston NICU**
- Tertiary Non-birthing Hospital
- Patient Population
  - Birth age, birth weight, DOB at admission, and cGAs vary
  - Complex conditions/medical problems
  - Specialized NICU Programs
  - Surgical Treatment
    - Complex congenital or acquired conditions
    - General, ENT, Neurosurgery, Cardiothoracic, Urology
    - Pediatric Anesthesia
  - Medical Subspecialists
    - Cardiology
    - Neurology
    - Endocrinology
    - Hepatology
    - Heme/Oncology
    - Pulmonology
    - Infectious Disease
- Fetal Care Consult Service
- ECMO
- Research
Most Common Reasons for Admission (2022-2023)

- 30% Surgical Eval/Surgery
- 10% Respiratory
- 9% PDA
- 8% Neuro (not HIE)
- 7% FTT
- 7% Anomalies/Syndrome
- 5% Cardiac
- 1% ECMO eval
- 0.5% Cooling

Most Common Referral Sources

- 77% Level III NICU
- 5% Level II NICU
- 2% Level I/Other

Current State

- 50 beds
- Private, semi-private, and open rooms
- 3 "sections" that have historically been used to separate patients by acuity
- ~550 admissions/yr
- Designated by GA as a Level IV NICU by state per AAP national standards

Future State

- 60 beds
- Open with 55 beds
- Incrementally increase to 60
- Room to expand up to 72 beds total
- All private rooms
- Opens September 29, 2024
Current State Interdisciplinary Team

<table>
<thead>
<tr>
<th>Medical</th>
<th>Nursing</th>
<th>Respiratory</th>
<th>Nutrition</th>
<th>Rehab</th>
<th>Social Work</th>
<th>Case Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 MDs</td>
<td>25-35</td>
<td>4-7</td>
<td>2 Dietitians</td>
<td>IT</td>
<td>3 Resource Nurses</td>
<td>11 Case Mgmt</td>
</tr>
<tr>
<td>Fellow</td>
<td>Nurses</td>
<td>Respiratory Therapists</td>
<td>2 Occupational Therapists</td>
<td>2 Nurse Navigators</td>
<td>2 Nurse Navigators</td>
<td>2 Nurse Navigators</td>
</tr>
<tr>
<td>APPs</td>
<td></td>
<td>1 Physical Therapist</td>
<td></td>
<td></td>
<td>2 Nurse Navigators</td>
<td>2 Nurse Navigators</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 Nurse Navigators</td>
<td>2 Nurse Navigators</td>
</tr>
</tbody>
</table>

Agenda

- Overview of Egleston NICU
- Factors that impact supporting lactation at a non-birthing children's hospital NICU
- Brief overview of quality improvement concepts
- Quality Improvement through CHNC Project HOME
- Discuss how Human Milk provision can be supported in even the most critical scenarios: case studies

CHOA at EG NICU: Strengths at Baseline
**Hospital Support**
- Lactation diet (3 meals a day)
- Lactation station & microwave for steaming
- Pumping rooms
- Donor human milk program
- Bedside "Hospital Grade" Pumps
- Human Milk Room
- Milk Management System

**Supportive Interventions**
- Kangaroo Care
- Oral Care with HM

**Kangaroo Care: Impact on Human Milk**
- Kangaroo care positively impacts rates of Human Milk feeding and breastfeeding during hospitalization, at discharge, and after discharge.
- Dose-dependent relationship between KC and BF at DC has been identified.
Kangaroo Care: Exclusions

- Major surgical procedure within last 24 hours
- Within 72 hours of a new tracheostomy
- Poorly controlled pain
- Eligibility for more unstable patients, including those with critical airways, CDH, chest tubes, physiologic instability, on HFOV, post code events, or any other concerns

Oral Care with Human Milk

**NO exclusions**

Teach parents as soon as they are present and allow them to provide oral care as they wish

Oral Care Story: Miley

“Being able to offer my baby my milk in the smallest amount but that would benefit her and me so much made my heart skip. I love that I am able to be a part of her recovery. The bonding is a little different but it connects me to her.”

Presented with Permission
EG NICU: Challenges

- Distance
- Resource/Transportation
- Amplified anxiety/other mental health concerns
- Lack of resources
- Prenatal intent

EG NICU: Challenges

- Varied SES
- Support at OSH & in community

Payor At Discharge
- Open Records
- Combined Public/Private
- Not Insured, Self-Pay
- Private
- Public
- Unknown

EG NICU: Challenges

- Complex Diseases
  - Prolonged NPO
  - LDA
  - Surgeries

- P.O. Delays
  - Maturity
  - Missing out milestone of developmental milestones
  - Tube feeding culture
  - Volume-focused culture

- Extensive LOS
Agenda
• Overview of Egleston NICU
• Factors that impact supporting lactation at a non-birthing children's hospital NICU
• Brief overview of quality improvement concepts
• Quality Improvement through CHNC Project HOME
• Discuss how Human Milk provision can be supported in even the most critical scenarios: case studies

Quality Improvement Definition
"In health care, quality improvement (QI) is the framework we use to systematically improve the ways care is delivered to patients. Processes have characteristics that can be measured, analyzed, improved, and controlled...."

Agency for Healthcare Research and Quality

IHI Model for Improvement
Framework for QI Methodology:

- Develop SMART Aim & Measures
- Collect baseline data
- Observe & document current process
- Identify key drivers
- Identify process failures
- Quantify process failures
- Identify interventions/testable ideas
- Design & execute PDSA cycles
- Make decisions based on learning
- More PDSA cycles & scale up
- Implement successful interventions
- Develop & execute a sustainability plan
- Plan for spread as appropriate

Framework for QI Methodology: KDD

- Aim
- Primary drivers
- Change

Framework for QI Methodology: PDSA

- Predict how changes will impact topic at hand
- Test changes on small scale in a rapid fashion
- Adapt/adopt/abandon as appropriate
- Implement after small scale tests have proven to have positive impact in various conditions
Framework for QI Methodology: Iterative Changes

Agenda
- Overview of Egleston NICU
- Factors that impact supporting BF at a non-birthing children's hospital NICU
- Brief overview of quality improvement concepts
- Quality Improvement through CHNC Project HOME
- Discuss how Human Milk provision can be supported in even the most critical scenarios: case studies

Challenges to Improve Level IV NICU’s Care
- Small disease-specific populations at each center
  - Minimal data
  - 25 years behind in knowledge
  - Poor definitions of disease
  - Difficult to develop RCTs
  - Use eminence rather than evidence
  - Extrapolate best care practices from other populations (neonatal, adult)
- Benchmark complications of prematurity are pre-existing at admission
  - ROP, NEC, IVH, BPD
- Medical complexity
  - Need for surgery or other significant intervention
**CHND Patient Accrual**

- NOW 30,000 new EOCs/YR
- Total EOCs recently surpassed 300,000
- Unique patients: > 288,000

**CHNC Workstreams**

- Admissions (EOC's) entered into CHND by year

**CHNC CIQI Collaboratives**

- Infrastructure and history of successful "collaborative" QI projects
- Support from QI experts
- QI education and mentorship
- Database for some measures
- Data entry, display and analysis platform
- Resource from all members in the collaborative
  - Monthly meetings and Huddles
  - Listserv
  - Multidisciplinary
  - Similar barrires
  - All levels of QI knowledge and activities
  - Transparency and collaboration
CHNC Project HOME

**Primary Goal:** improve number of NICU patients who are DC on HM

18 months action period with 6 months of sustain

Use some data from CHNC database and additional measures

**PROJECT HOME Measures**

| HOME-1: Human Milk at Discharge |
| HOME-2: Human Milk at 28 days of life |
| HOME-4: Physician/APP feeding education to lactating parent (72 hrs) |
| HOME-5: Education to lactating parent with 72 hrs |
| HOME-6: Documented needs assessment within 72 hrs |
| HOME-7: Weekly multi-disciplinary rounds related to Human Milk |
| HOME-8: HM oral care |
| HOME-9: Skin-to-skin/kangaroo care |
| HOME-10: First oral attempts to be at breast |
| HOME-11 (optional): Human milk at 14 days of life |
| HOME-12: Human Milk exposure error rate |

**Process Measures**

- **Education (72h)**: MD/APP, RN, IBCLC
- **Equipment (72h)**: Pump Access
- **Weekly Assessments**: Interdisciplinary HM Rounds
- **Milestone**: Oral Care, Kangaroo Care, HM PO feeds at the breast
Project HOME SMART Aim

Increase percentage of infants (admitted ≤ 7 days and discharged ≤ 120 days) receiving parental milk at discharge from NICU by a target of 10% from baseline by December 31, 2024

<table>
<thead>
<tr>
<th>Baseline</th>
<th>Recommended Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 80%</td>
<td>Maintain or increase rate</td>
</tr>
<tr>
<td>≥ 70%</td>
<td>80%</td>
</tr>
<tr>
<td>≥ 60%</td>
<td>70%</td>
</tr>
<tr>
<td>≤ 59%</td>
<td>60%</td>
</tr>
</tbody>
</table>

PROJECT HOME SMART Aim

1. Maintain our discharge on human milk rate at 80% or increase the rate by December 31, 2024
2. Increase healthcare professional education on supporting lactating parent to provide human milk
   - Nursing
     - Increase number of CBCs from 8% to 15% by end of year 2024
   - Attendings, fellows and APPs
     - 30% of attendings to complete lactation-related education by end of 2024
     - 100% of neo fellows to complete lactation-related education
     - 30% of APPs to complete lactation-related education

Egleston SMART Aim

1. Maintain our discharge on human milk rate at 80% or increase the rate by December 31, 2024
2. Increase healthcare professional education on supporting lactating parent to provide human milk
   - Nursing
     - Increase number of CBCs from 8% to 15% by end of year 2024
   - Attendings, fellows and APPs
     - 30% of attendings to complete lactation-related education by end of 2024
     - 100% of neo fellows to complete lactation-related education
     - 30% of APPs to complete lactation-related education
**Project HOME Timeline**

- **First CHNC Meeting**
- **First EG NICU Meeting**
- **October 2022**
- **Met with Students January 2023**
- **Weekly emails to staff February 2023**
- **Data Collection began March 2023**
- **Heavy data tracking begun April 2023**
- **SmartText with Smartdata in MD note 72h May 2023**
- **CBC (13 RNs) Patient Experience Survey Questions Added June 2023**
- **Huddle Moment July 2023**
- **WBFW: coolers August 2023**
- **Weekly Rounding Tool Down to 1 Dietitian Milestone Date Cards Changed September 2023**
- **Early Mobility Rounds October 2023**
- **CBC Course December 2023**

**PDSA #1**

- **Primary Drivers:**
  - Staff Education & Engagement
  - Family Education & Engagement

**Intervention:** Promotion of Lactation Milestones (Oral Care, KC, First PO feed at breast)

**PDSA #1: Promote Milestones**

- **Project HOME**
  - I should receive oral care with human milk by **August 26.**
  - I should kangaroo with my parent who is pumping by **September 5.**
  - When it’s time for me to eat by mouth, please offer breastfeeding first!

- **Created sign**
- **Started Tracking**

- **May 2023**
- **April 2023**
- **June 2023**
- **placing at bedside; poor tracking**
Cycle 1 | Cycle 2 | Cycle 3
---|---|---
Test Description: | Milestone Dates | Milestone Dates
Location of test: | EG NICU | EG NICU | EG NICU
Date of test: | June 2023 | July 2023 | August 2023
Test Conditions:
- Placed Milestone Dates at Bedside on marker boards with dates applicable to that patient

Test Results:
- 2/4 eligible for Oral Care with HM by 4 Days of Admission received by 4 Days (50%)
- 3/5 eligible for KC by 14 days of admission received by 14 days (60%)
- 3/6 eligible for first PO feed at breast completed by 14 days of admission
- 8/8 eligible received Oral Care prior to 4 days of admission (100%)
- 4/7 eligible to KC before 14 days of admission received by 14 days (57%)
- 2/5 eligible for first PO feed at breast completed by 14 days of admission
- 7/10 eligible for Oral Care before 4 days of admission received oral care by 4 Days (70%)
- 3/4 eligible for KC by 14 days of admission received by 14 days (75%)
- 2/3 PO fed at breast for first PO feed (66%)

PDSA #1: Promote Milestones

PDSA #1: Promote Milestones, Engage Families

Oral Care with Milk by 4 Days

P - Chart
Kangaroo Care by 14 Days P - Chart

First PO Feed at Breast P - Chart

PDSA #2
Primary Driver: Staff Education & Engagement
Intervention: Weekly emails to staff and medical team
PDSA #2: Weekly emails to staff/providers

- Included information about milestones and data
- Early on, served to educate/remind
- Abandoned because unsustainable by the owners

Other PDSAs

- Milestone collages
- Development of an interactive App with student team
- Patient family liaison engagement
- Provider emails
- EMR build for documentation
- Partner with EPIC® Breastfeeding Program for provider education

- Coolers for parents
- Bathroom poster
- CBC class for nurses
  - Increased from 12 to 26 CBCs
- Bedside oral care kits
- Transport coolers for admissions
- Bi-weekly RedCap Survey
- Resource nurse engagement

PDSA: Quality Moment Calendar
**PDSA: Weekly Human Milk Rounds**

- Weekly Human Milk Rounds with Interdisciplinary Team
  - Audited by dietitians
  - Documented in MD/APP progress note

---

**Weekly Human Milk Rounds P - Chart**

What happened here?

Direction of Improvement
**Weekly Human Milk Rounds P - Chart**

End of Sept: down from 2 to 1 Dietitian

Direction of Improvement

**QI Sustainability: Team Member Ownership**

- Reliance on small number of people may impact sustainability
- Longevity is impacted by resource allocation

**Oral Care with Human Milk by 4 Days P - Chart**

What happened here?

Direction of Improvement
Here, the attempted roll out of the milk management system impacted other pieces of our system.
**Biggest Challenges**

- RN champion early knowledge of QI processes
- Information dissemination – large staff & medical team
- Macrosystem support
- Staff engagement
- Small project team

**QI: Nursing Barriers to Engagement**

- Lack of time
- Heavy workload
- Lack of adequate resources (human, financial)
- Lack of staff leadership
- Lack of leadership support
- Lack of organization internal/external support
- Lack of patient engagement

**QI: What is driving improvement?**

- Early MD/APP conversations
- Early IBCLC contact & pump securement
- Family involvement with oral care with HM
- Conversations occurring among interdisciplinary team due to the promotion of the process measures/milestones
QI: Spread and Adoption by Others

- QI involves small changes approached in a systematic way.
- Best changes are sustainable after ramping up & ready to spread/adopted.
- Can adapt the process to your time/resources/system.
- Minimal # of cases/patients. Smallest possible changes.
- Use "early adopters".
- Don’t have to know everything about QI.
- Theories
- Tools
- Creating Charts.

IHI: How to Improve

IHI: Tools
Agenda

• Overview of Egleston NICU
• Factors that impact supporting lactation at a non-birthing children’s hospital NICU
• Brief overview of quality improvement concepts
• Quality Improvement through CHNC Project HOME
• Discuss how Human Milk provision can be supported in even the most critical scenarios: case studies

Case Study #1: Emily

• Born 9/21 in Savannah at 33wk6d GA; prenatally diagnosed coarc & microarray positive for Wolf Hirschhorn Syndrome
• 27 y.o. G1
• Cesarean due to worsening PIH
• IUGR; BW 1.36kg
• CPAP at delivery
• Transferred 9/22 11:17am to EG from Savannah for management of CHD

Case Study #1

• Transported by Savannah’s Transport Team
• UVC/UAC: TPN, PGEs
• CPAP
• Cardiology workup: EKG, ECHO
  – Severe hypoplastic arch, severe CoA, dysplastic PV, and moderate to severe tricuspid regurgitation
  – Guarded prognosis, uncertain cardiac surgery candidacy in the future
Case Study #1

Pump within 6 hours of birth? Yes!

Bring milk when you/your family come!

Current volumes

Supply & Demand!

Supported at OSH? Yes!

Pump at home?

Case Study #1

- September 23: Worsening apnea, intubated; UVC removed
- September 24: NeoPICC placement; Dad & grandparents have been visiting—brought MOM; First Oral Care with HM
- September 25: Mom visits for the first time; IBCLC meets with mother at bedside
- Weekly Human Milk Rounds: Physician inquires about pumping & encourages KC; Kangaroo Care facilitated (ETT, UAC, PICC)

What did we miss here?
Case Study #1

- September 23: Worsening apnea, intubated. UVC removed.
- September 24: NeoPICC placement. Dad & grandparents have been visiting—brought MOM.
- September 25: Mom visits for the first time. First Oral Care with HM.
- September 26: IBCLC meets with mother at bedside. Weekly Human Milk Rounds.

No clear reason not to do KC this day!

Case Study #1

- September 27: Feeds started 9/27.
- October 30: Transferred to NICU. Still receiving small MOM feeds at transfer.

Lactation status as of October 17:
- Pumping: 6 to 7 times/24h
- 400mL/24h

Case Study #1

- November 7: Coarc Repair
- January 30: Final IBCLC contact. Mom reports infrequent pumping and dwindling supply.
- February 28: Discharge Home
- February 16: Last HM feed
- January 29: Transfer to CACU
**Case Study #1: Challenges**
- C-Section
- From Savannah (staying at RMH)
- Intubated
- Multiple lines with a critical drip

**Case Study #1**
- LOS: 159 days
- Pumping: appx 130 days
- Human Milk feeds: 142 days ±

**Case Study #1: Successes**
- Mother began pumping within 6 hrs of birth @ OSH
- Parents had resources & ability to be at Egleston/stay at RMH
- Early contact by Egleston IBCLC
- Inquiry about pumping & encouragement to kangaroo by physician
- Oral care ASAP
- Kangaroo care facilitated when mother was ready by team
Case Study #2: Jane

- Born 9/28 at 38w4d via cesarean
  - Oligohydramnios, IUGR, gastroschisis
- 17 y.o. G1; BW 3.06kg
- Transferred immediately after birth from SW Atlanta by Angel II Transport Team for gastroschisis care

Case Study #2

- Arrived 9/28 @ 5:21pm
- PIV: TPN
- No respiratory support
- Surgery at bedside and placed silo on 9/28 @ 7:45pm

Case Study #2

- Lactation Consultant calls mom 9/29 10:00am
  - Did not pump within 6 hours of delivery
  - Does not have a pump at the OSH yet
  - Education about pumping, supply/demand
  - Inquiry about access to a pump at home
  - Requests milk be brought to EG when she comes
**Case Study #2**

### October 1
- NeoPICC
- 2L NC due to desaturations
- OG to Sudden
- Siso reductions daily
- No respiratory support
- Grandmother brought MOM
- Oral Care

### October 2
- IBCLC followup
- Pumping 4-5x/day
- 4 oz per pump

### September 29
- OG to Suction
- Silo reductions daily

### October 5
- Attempted sutureless closure of gastroschisis unsuccessfully
- Intubated due to decreased respiratory effort following procedure & need for morphine PRN

### October 6
- Gastroschisis closed in the OR

### October 7
- IBCLC followup, mother not pumping
- Frequent reinforcement
- Education/support

### October 11
- IBCLC followup—oversupply reported
- Counselled

### October 15
- Patient still intubated, weaning on pain medication strips
- 23:15 Kangaroo care session facilitated

### October 20
- First oral feed of MOM

### November 14
- M5 65 mL QIH PO

### November 24
- DC home on HM
Case Study #2: Challenges

- C-Section
- Young Mother
- Complicated Gastrochisis/Pain Management
- Pumping Inconsistencies
- Missed the Golden Hour

Case Study #2: Successes

- Mother initiated milk expression upon IBCLC intervention
- Mother at bedside often/consistently
- Oral care ASAP
- Kangaroo care facilitated by team as soon as baby could tolerate

Summary

- Human milk and lactation is important across the spectrum of NICU care
- Human milk provision is impacted by multiple factors and processes within the level IV NICU
- Quality Improvement is a feasible approach to improving human milk provision, support, and human milk at discharge
References


