BUNDLING UP BEST PRACTICES: IMPROVING OUTCOMES FOR VERY LOW BIRTH WEIGHT INFANTS

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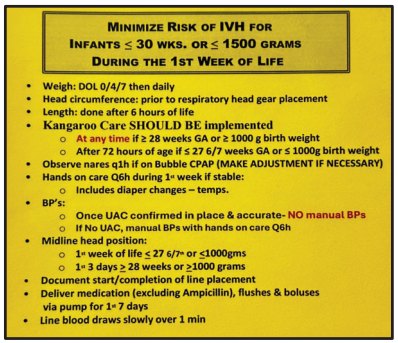
Background

- Very low birth weight infants (VLBW) are at higher risk for brain injury, especially within the first 72 hours after birth, with higher incidences of developmental delays.
- Interventions such as aggressive resuscitation, mechanical ventilation, excessive handling, and improper positioning can lead to rapid changes in cerebral blood flow, leading to neurodevelopmental disability.

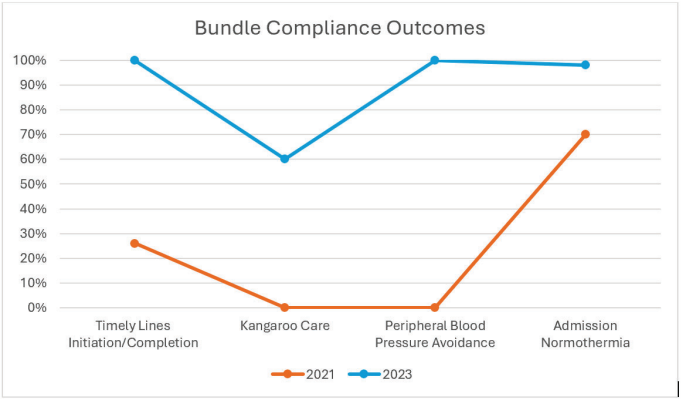
Description

- Small Baby Care Bundle (SBCB) was created to minimize the risk of IVH
- Includes infants ≤30 weeks or ≤ 1500 g for the first 7 days of life
- SBCB elements include: admission normothermia, umbilical line placement within 1 hour, cessation of peripheral blood pressures, HUS DOL 7, avoidance of invasive ventilation, promoting early kangaroo care, minimal handling/proper positioning.

- Education given to interdisciplinary staff and families, brightly colored SBCB cards were placed on the incubators and a SBCB EMR order set was created.



Outcomes



- Intraventricular hemorrhage rates decreased from 16.2% (2021) to 11.4% (2023). Periventricular leukomalacia rates decreased from 2.6% (2022) to 0% (2022), decrease in invasive ventilation from 30% to 12%.

Conclusions

- Creating, implementing and sustaining standard interventions for VLBW infants can decrease brain injuries and morbidity.

References

Cohen Children's Medical Center
Northwell Health℠

Leadership Toolkit: How to Engage & Incentivize your Staff

Tara Lyngaas BSN, RNC-NIC, NE-BC
Academy of Neonatal Nursing
September 5th 2024

McLane Children's
BaylorScott&White

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Background

- In 2022 our Nursing Engagement Survey, People Survey, NICU saw a decrease from 85% employee engagement to 78%. It was realized amongst Leaders that Nursing engagement in is decreasing and is harder to build trust and engagement throughout the new culture of Nurses.
- What was realized:
  - Same incentives used over time, no longer work
  - Same Top performers doing all the work
  - Staff dissatisfier when leaders continue to plead for participation; decreasing morale and engagement
  - Employee Engagement across mixed generations were all decreasing.

Agebreak	Response	Employee Engagement
25 or Younger	14	91.4%
25-35	40	83.0%
36-45	22	77.3%
45-50	6	56.7%
51-54	6	76.7%

Problem

- Leaders system wide have realized decreased levels in staff engagement due to a lack of diverse rewards and recognition.

Interventions

- Creation of Leader Tool kits that increase the engagement by utilizing rewards and incentives to motivate modern day nurses across all generations in our new nursing culture.

Implementation Plan

Phase 1: Incentives

Do not make changes on a balanced schedule, all schedule incentives are subject to the schedulers approval

Scheduling

One less Major holiday for a schedule
One less Minor holiday for a schedule
Skip Yellow Rotation (NICU)
Set 6 week schedule (no moving)
One less weekend shift on schedule
Free Mental Health Day-
- Get a PTO day on NEXT schedule, sign up for one less shift)

Increase Morale

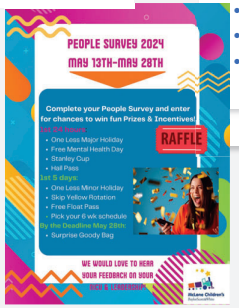
Free Float pass-skip floating to another department, go to next on list
Hall Pass- Skip having a student for a shift
Iced Coffee Bar from Leadership
Stanley cup
Re-do breakroom
Pick your assignment for the shift

Phase 2: Flexible Scheduling

What has changed?
- The way staff used to have to match up and find schedule partners to work anything less than <12hours
  - Ex. 3 nurses paired up to work 8 hour shifts (7a-3p, 3p-11p, 11p-7a)

What do staff want?
- Flexibility when NEEDED, not consistently. To accommodate work-life balance, family needs, childcare needs etc.

New Change:
- Opened 12 hours shifts for CORE staffing, leaving open partial shifts to accommodate staff who needed a more flexible schedule that shift/week
- Staff able to sign up with self-scheduling to have partial shifts instead of 12 hour shifts when needed

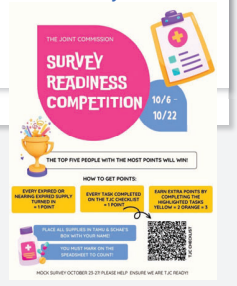


Results

- **TJC Survey Readiness-**187 expired supplies; 2nd round- 800 expired supplies
- **NDNQI Survey-** 63% completion in 1st week
- **Pulse Survey 2023-** 48% completion in 1st 48hrs
- **People Survey 2024-** 76% completion in 1st 24 hours
- **Flexible Schedule Implemented March 2024**

Implications for practice

- **Key Features:**
  - Incentives based on- work life balance, improved scheduling, self-care or improvements to work environment in addition to goodie bags/candy bars
  - Communicate to key stakeholders on accessibility, adaptability and ease of Tool Kit.
- To help efficiently roll out initiatives/education
- Improve time to complete engagement Surveys
- Accomplish mandatory requirements timely
- Improve survey readiness
- Increase staff well-being



Have Questions or what more information? Contact us:

Implementing Theraworx Safely in the Extremely Low Birth Weight Population

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Linnea Lockett, MSN, RN, NPD-BC, RNC-NIC, CLC, Michelle Hempel, MSN, RNC-NIC, C-ELBW,
Vinayak Govande, M.D.
Baylor Scott & White McLane Children's - Temple, TX

Background

Starting in January 2024 McLane Children's NICU was looking for a safe product to use on a variety of gestational ages to improve infection prevention and improve diaper rashes. CHG bathing wipes are predominantly used on term infants only due to risk of absorption. Newborns and premature infants in the NICU have sensitive and less mature skin that is more apt to absorb ingredients in cleansers that we use. It's essential to choose wipes that are free from fragrances, alcohol, preservatives, and harsh chemicals.

Problem Statement

Our Level IV NICU, with 51 beds and an average daily census of 48 patients, has seen a significant increase in diaper rashes and varying infections in the last year.

Objective

To show safety and efficacy of Theraworx in the neonatal population. To improve infection prevention, decrease diaper rash occurrences, and improve overall skin conditions for all gestational ages in our NICU with the implementation of Theraworx.

Neonatal Skin Condition Score
Dryness
1 = normal, no sign of dry skin
2 = dry skin, visible scaling
3 = very dry skin, cracking/fissures
Erythema
1 = no evidence of erythema
2 = visible erythema, < 50% of prepped area
3 = visible erythema, ≥ 50% of prepped area
Breakdown
1 = none evident
2 = small, localized areas
3 = extensive

Implementation

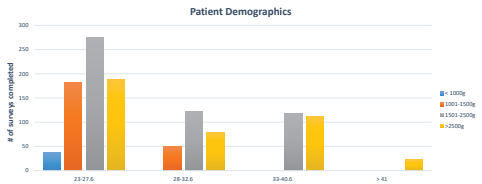
Plan
- Theraworx q shift daily treatment for > 28 weeks CGA + 7 days old & in diaper area after each stool
- Created Microsoft Forms survey for staff to complete with each application
- Neonatal Skin Condition Scores (NSCS) to be documented in health care record

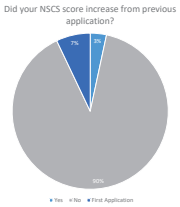
Do
- Rolled out initial education on Theraworx use
- Started Theraworx daily application for treatment and diaper wipes for > 28 weeks CGA + 7 days old
- Staff completing survey & NSCS for each application

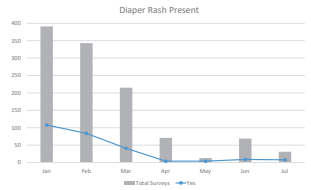
Check
- Reviewed data in Forms survey & NSCS Scores
- Noted increased redness on some surveys after initial application; Clarified with manufacturer to be normal when initially fighting bacteria & will subside within 48 hrs

Act
- Education on initial redness that should resolve within 48 hrs being normal process in antibacterial properties
- Decreased patient population to 25 weeks CGA + at least 7 days old
- Continue to evaluate survey and NSCS data

Results







Outcomes Discussion

Out of 1164 surveys returned, only 3% (39) documented yes for increasing NSCS scores for dryness and redness. However, several were documented as increased redness prior to the re-education on how Theraworx fights bacteria and can show redness for 48 hours upon initial application. A few others documented skin tears and conditions that did not relate to the Theraworx application.

Even as gestational ages were decreased, no adverse events were documented. Minor side effects noted were increased skin dryness across all of the gestational ages; however, standard application of an emollient after use improved the dryness.

Our diaper rash presence decreased significantly by using a daily treatment and with every stool. We started at 27.62% of patients using the wipes having a diaper rash to 19.07% in March. Scoring diaper rashes was included in the survey, and while some still developed redness to the diaper area, we saw a significant decrease in denuded rashes.

Implications for practice

Due to no significant findings, we will be lowering the criteria for neonatal usage to 23 weeks and 7 days old. Results will be shared within our hospital system NICUs to encourage implementation and would be expected to be replicable in other NICUs as well.

Have questions or want more information? Please contact us!

Cleveland Clinic
Hillcrest Hospital

Caring for the Caregiver: *Cough Drop Anyone?*

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Postpartum

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Background

- A Postpartum (PP) caregiver identified the need for a cough drop while at work and one was not available.
- Wellness initiatives are only offered hospital-wide, not at caregivers' home-base.
- The idea to provide for the needs of caregivers while on duty was realized.
- The Professional, Enrichment, Engagement & Retention (PEER) Committee was tasked to implement a plan to provide for all caregivers essential and emerging needs.
- This led to the creation of a **Caregiver Care Kit** to be kept in the unit.

Literature Review

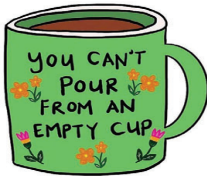
- Caring is the foundation of nursing, but the primary focus is on nurse-patient relationships.
- Caregivers desire to have their own needs met, which can lead to better patient outcomes.
- **Caring begets caring.**
- Nurses are **inspired** to care by being cared for themselves.
- Nurses recognized that caring for each other was essential to keeping **nurses' energized**.

Objective/Purpose

To meet the needs of all caregivers on the unit for the most inconvenient or emerging personal needs.

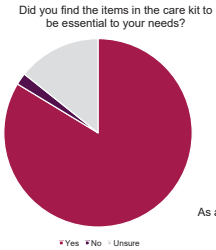
Methods

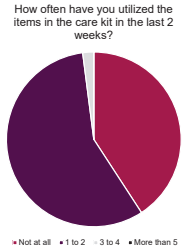
- Caregivers provided feedback and ideas for items they'd like added to the kit.
- It was decided by the PP Shared Governance Committee that items would be purchased using money from the unit's Sunshine Fund.
- Items purchased included; cough drops, sanitary pads, hair ties, and breath mints.
- The caregiver kit was created using a decorated box.
- An inventory list of items was created.
- The kit and its location were announced to caregivers via huddles and emails.

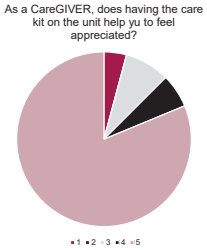


- PP caregivers were sent a survey on the caregiver kit to determine:
  - If caregivers know the location of the kit
  - How often they use it
  - What items they use most often
  - If items are essential for their needs
  - Additional items they would like included
  - If the kit makes them feel appreciated

Outcomes







Conclusions

- This concept was shared with the hospital-wide Shared Governance Council.
- Results of survey shared with PP caregivers.
- Opportunity exists to spread the concept with other nursing units to improve staff morale.
- Caring behaviors demonstrated by nurses have been linked to an increase in patient satisfaction scores.

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SG130-0923

Reducing the use of Mechanical Ventilation Utilizing Non-Invasive Methods of Surfactant Administration: A Program Evaluation

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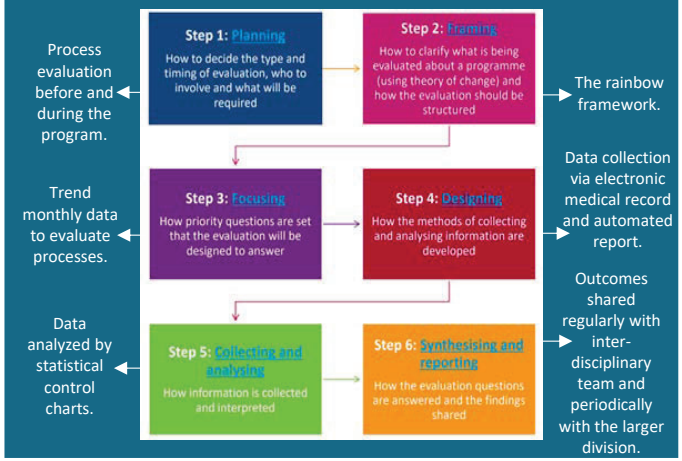
Background

- Surfactant is commonly given through an endotracheal tube (ETT) and followed by continued mechanical ventilation which can contribute to the development of bronchopulmonary dysplasia.
- Newer surfactant techniques such as INSURE (INtubate-SURfactant-Extubate) and LISA (Less Invasive Surfactant Administration) both include an immediate return to non-invasive ventilation (NIV) and therefore, decrease the need for mechanical ventilation by up to 60%.

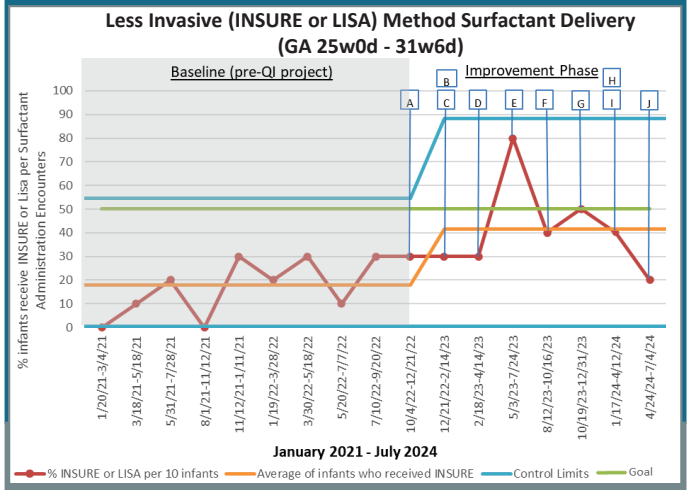
Objective

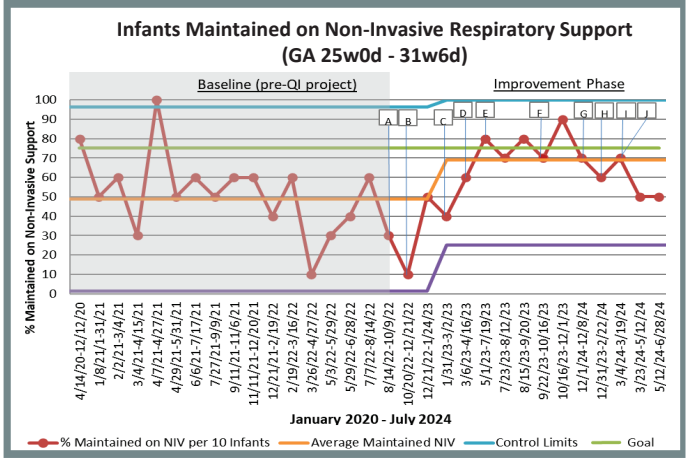
To evaluate a quality improvement initiative to increase the percentage of infants born between 25w0d – 31w6d who receive surfactant via INSURE or LISA and are maintained on NIV before and during program implementation (Sep 2023- Sep 2024).

Methods



Results





Results

Label	Date	Action
A	Sep 2022-Nov 2022	Assembly of a multidisciplinary team & planning interventions Review of baseline data
B	Dec 2022	Implementation of chinstraps for all infants on NIV
C	Jan 2023-Mar 2023	Division education on the benefits of NIV Planning of small baby delivery room respiratory bundle
D	Apr 2023	Roll-out of the small baby delivery room respiratory bundle
E	Jun 2023-Aug 2023	Testing of new NIV interfaces Unit education and roll-out of new NIV
F	Oct 2023	Division education on standardized INSURE pathway Division education on clinical surfactant guidelines
G	Dec 2023	Creation & implementation of INSURE clinical pathway within EMR Creation & implementation of surfactant administration pathway
H	Jan 2024-Feb 2024	Less Invasive Surfactant Administration (LISA) pathway creation LISA division education
I	Mar 2024	LISA roll-out
J	Apr 2024	LISA criteria revised for older gestational ages (27w0d minimum) to optimize the safety of this new procedure

Conclusion

- This QI project has increased the average percentage of preterm infants who receive surfactant via INSURE and LISA methods as well as those maintained on non-invasive ventilation.
- However, there has been a recent downtrend in both the percentage of infants given surfactant via INSURE/LISA and maintained on NIV.

Future Steps

- Continue case reviews
- Unit re-invigoration and enthusiasm for LISA/INSURE and NIV
- Re-education and increased awareness through quarterly unit newsletters
- Implementation of LISA/INSURE in the delivery room

References

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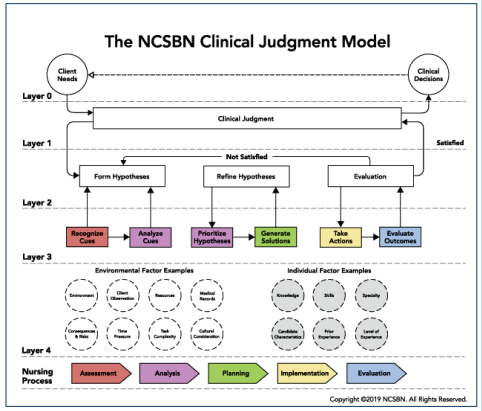
Baby Steps to Expertise: Implementing Newborn Case Studies to Develop Clinical Judgment in Nursing

Jilleen McEvoy, MS, RN, Jennifer Truax, MS, RNC-OB, C-EFM, Caitlin Dreisbach, PhD, RN

University of Rochester School of Nursing

Introduction

- Research shows that new graduate nurses do not demonstrate sufficient critical thinking and clinical judgment skills when transitioning to practice (Englund, 2020).



(NCSBN, 2024)

- An innovative strategy to harness these skills is through unfolding case studies.
- Unfolding case studies engage learners in active learning, fostering clinical decision-making and prioritization skills.
- By applying theoretical knowledge to realistic scenarios, learners are better prepared to analyze complex situations, enhancing their competency.

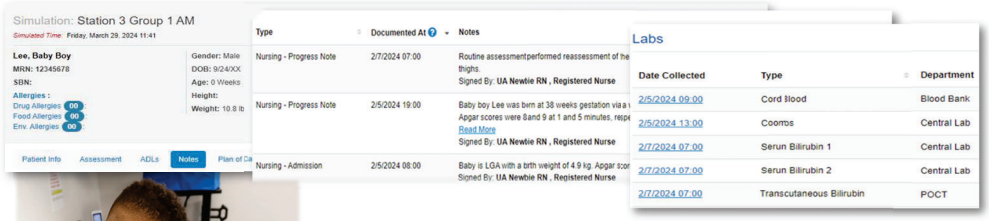
(Baker & Blakely, 2023; Englund, 2020; Leynes-Ignacio, 2023; Meiers & Russell, 2019; Miller et al., 2022; Munn et al., 2021)

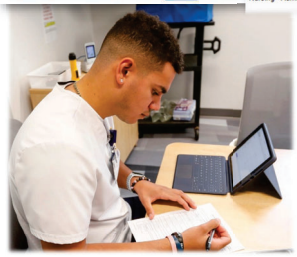
Objectives

- The overall objective was to create an engaging, active learning experience for nursing students, while also providing formative assessments of student learning.
- The development of the unfolding case studies was mapped to specific learning objectives within the course's newborn-care module, including:
  - Describe normal & abnormal physiological & developmental characteristics of a newborn.
  - Differentiate key anatomic, physiologic, & behavioral changes that occur as the neonate transitions to extrauterine life.

Methods

- Two unfolding case studies on newborn-related content were developed and implemented in an undergraduate nursing course, based on the NCSBN Clinical Judgment Model (2024).
- The case studies focused on two major newborn concepts that aligned with the course learning objectives: neonatal transition to extrauterine life and neonatal hyperbilirubinemia.





- Learners were provided essential information related to the clinical scenarios in a simulated electronic health record (EHR), including client vital signs, lab work, and other assessment data. This information was updated by faculty in real-time, as the scenarios progressed.
- With faculty guidance and clinical resource tools provided in the EHR, learners evaluated the changing status of the patient and modified their care considerations, based on the evolving information.

Results

- A total of 101 learners completed the unfolding case studies across two semesters.
- Based on a post-survey implemented, 91% of learners self-identified meeting the learning objectives.
- According to the post-survey results, the majority of learners recognized the benefits of using unfolding case studies to deepen learning. Examples of specific feedback included:
  - "great active learning experience"
  - "kept me engaged"
  - "very beneficial & helpful"

"I really enjoyed being able to apply and witness the information…"

- Faculty evaluated student demonstration of four cue-based behaviors including:
  1. Collects & interprets subjective & objective data.
  2. Appropriately prioritizes interventions related to client data with rationale.
  3. Includes basic safety principles in action plan to reduce risk of harm to client.
  4. Incorporates the nursing process to provide client & family-centered care.
- Based on faculty feedback, all students achieved the learning objectives, demonstrating clinical judgment.

Limitations

- The number of learners was limited to two semesters of students examining only two scenarios. Expanding the number of case studies across future semesters would provide more data and may also enhance the educational experience for students.
- Learners were also limited by large class sizes. Ideally, learners should work in small groups of up to 5 learners, to promote engagement.

Conclusions

- Considering the impact of unfolding case studies on clinical judgment among nursing students, implementing this educational strategy in neonatal nursing orientation programs can aid in the transition to practice and optimize both nurses' competency and patient outcomes.

Contact Information & References

Scan for more information and references

Acknowledgments

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- Dr. Luis Rosario-McCabe, DNP, RN, CNE, CNL, WHNP-BC
- Jennifer Zugnoni, MS, RN, CPN, CNEcl - simulation educator

Reimagining the NICU Orientation Process for New Graduate Nurses through a Collaborative Model

Atrium Health Levine Children's

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Background

Nurse retention is an issue nationwide and a nursing leadership priority. Neonatal Intensive Care Unit leadership at a Level IV 95-bed academic medical center identified this concern and created a task force to identify gaps and discuss solutions to increase retention rates for new graduate nurses. Educators, preceptors and leaders analyzed this information to create a structured orientation model. This project analyzes the first year results of this model and implications for future development of orientation programs in nursing units.

Purpose

The purpose was to change the fundamental structure of orientation to a team-based approach. NICU leadership ensured that new graduate nurses were hired in cohorts, allowing for collaboration and a learning support structure. They spent the first part of orientation with clinical educators to learn the basic tenants of neonatal care before being placed with a formal preceptor, with a goal of better preparing them for learning opportunities with their preceptor. Formal preceptors, mentors, and resource personnel were assigned to new graduate nurses throughout their first year in the NICU.

Implementation

The NICU orientation model created a consistent and multi-faceted support structure throughout the nurse's first year of practice.

Onboarding, Weeks 1-3

- The new graduate nurse starts in NICU Academy, an 8-day educational program led by the NICU Clinical Educators that provides NICU specific content through lecture, hands-on experiences, simulations, and 1:1 time in the unit with the NICU Clinical Educators. This education program is provided to the nurses prior to starting with their formal preceptor.

Preceptorship, Weeks 4-15

- The new graduate nurse is assigned to a formal preceptor, maintaining consistency for both the orientee and the preceptor. The preceptor is responsible for requesting assignments and tracking the new graduate nurse's progress throughout the next 12 weeks. The Clinical Educators check in with both the orientee and the preceptor every 2 weeks.

Supported Independent Practice, Weeks 16-28

- The new graduate nurse in their supported independent practice or "buddy" shifts are independently practicing but have an experienced nurse in their neighborhood that they know they can go to for guidance, questions, and support as needed. This "buddy" is assigned at the beginning of each shift.

Continued Support, Weeks 29-52

- The new graduate nurse continues in their independent practice, but has an assigned 1:1 mentor for the remainder of their first year, and continues to have group mentors identified each shift through the NICU Mentor Program.

Results

Overall, 54 new graduate NICU nurses have onboarded utilizing the NICU orientation model from June 2023-August 2024.

There was a 24% increase in new graduate nurse retention rates from 2022 to 2023.

NICU Retention Rates

	Overall Nursing Retention %	New Grad Nurse Retention %	# of New Grad Nurses
2021	58%	60%	25
2022	74%	54%	35
2023	77%	78%	27
2024	95%	100%	35

Surveys were distributed to new graduate nurses and preceptors throughout the orientation program.

- 100% of new grad nurse respondents stated that the formal educational program made them feel prepared to start in the unit with their preceptor (n=36).
- 94% of new grad nurse respondents stated that the education program improved their knowledge in feeding, assessment skills, IV insertion, thermoregulation, EMR charting, and common equipment (n=36).
- 99% of preceptor respondents stated that the orientee's transition to the unit has been smoother than previous precepting experiences (n=11).
- At 6 months of being in the unit, 80% of new graduate nurse respondents stated that felt supported by their preceptors, mentors and leaders and that they felt part of the team. 100% of respondents said they are enjoying being a NICU nurse (n=10).

Implications and Future State

Creating a multi-faceted onboarding approach may help close gaps for new graduate nurses having difficulties assimilating to the unit and may correlate with improved retention rates. Longevity of staff members may improve quality of patient care, unit culture, and safety in a specialized environment such as the NICU.

Neonatal Withdrawal Signs Trajectory Associated with Length of Treatment

Jennifer Shearer Miller, PhD, RN

Statement of Problem

There is a lack of understanding regarding why some infants require prolonged treatment for newborn withdrawal and others do not.[1-4]

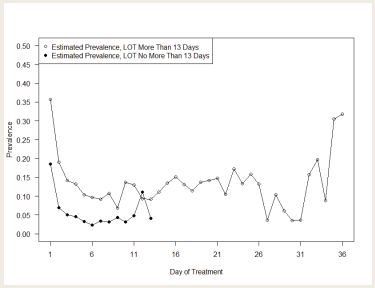
Literature Review

Newborn withdrawal occurs frequently in infants with 40-80% of cases requiring pharmacological treatment[1,2]. The length of treatment (LOT) varies from non-existent to several weeks or months[3]. This study examined prevalence trajectories of each withdrawal sign to provide insight on why some infants do require prolonged treatment.

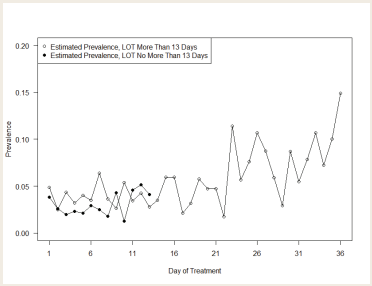
Methodology

A retrospective analysis of infants diagnosed with newborn withdrawal (N=182) between 2018 and 2020 examined withdrawal sign prevalence trajectories and the relationship between LOT and these trajectories.

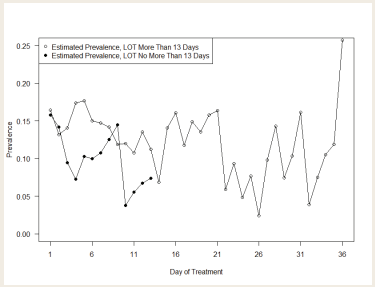
All available observations during the first 24 h post-treatment initiation period were considered the first day of treatment. The analyses included the daily mean withdrawal scores and item prevalence through the first 36 days of treatment, corresponding approximately to the 95th percentile of our sample's LOT. For comparisons, we created two groups of infants based on our sample's median LOT and compared their mean scores and item prevalence. We then asked if the LOT was associated with item prevalence trajectories.



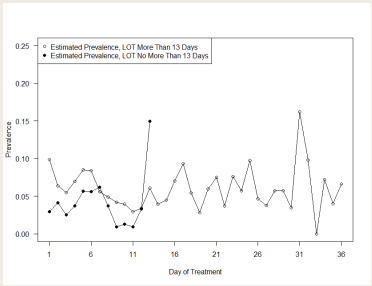
Daily prevalence of continuous high-pitched crying by LOT groups on any given day during treatment.



Daily prevalence of Sleeps Less than 1 h after feeding by LOT groups on any given day during treatment.



Daily prevalence of Loose or Watery Stools by LOT groups (D) on any given day during treatment.



Daily prevalence of Loose or Watery Stools by LOT groups on any given day during treatment.

Findings

Central nervous and gastrointestinal system item prevalence decreased in the first three days followed by an increase over time in the extended LOT group. After two weeks, trajectories of high-pitched crying, sleep duration, regurgitation/ projectile vomiting and loose/ watery stools were found to have sporadic increases to greater than or equal to initial prevalence.

Implications

Findings suggest that comprehensive assessment of high-pitched crying, regurgitation, loose stools and amount of sleep after feeding may provide a clearer understanding of expected LOT. Further research is needed to better understand why the resurgence of certain signs occurs later in the course of treatment.

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THE UNIVERSITY OF TENNESSEE KNOXVILLE

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Easy on Me! Benefits of Neonatal Massage in the NICU

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MAGNET RECOGNIZED AMERICAN NURSES CREDENTIALING CENTER

Background

- The Neonatal Intensive Care Unit (NICU) can expose the preterm neonate with complex medical conditions to an array of chronic stressors, including painful medical treatments, separation from parents, and burdening stimuli.
- Massage therapy has been shown to increase physical growth, weight gain, and promote gastrointestinal function as well as create a positive experience for premature infants.
- The SENSE program provides a breakdown of appropriate sensory experiences based on the infant's gestational age. Massage is one of the sensory experiences recommended when and after an infant is 32 weeks.

Literature Review

- A review of the literature included randomized control trials, systematic reviews, meta-analyses, and prospective quasi experimental studies.
- The review showed that daily infant massage on medically stable infants can improve feeding tolerance, digestion, elimination, and weight gain (Choi, Kim, Oh, Lee, Kim, Kang, 2016). In the studies reviewed, neonates were massaged at least once a day.
- This research has demonstrated that massage is a safe and low-cost intervention that contributes to the development of hospitalized preterm neonates.
- A confounding factor to note would be the consistency and quality of massage given by the parents which could in turn affect weight gain (Alvarez, Rodriquez-Gonzalez, Roson, Lapena, Gomez-Salgado, Fernandez-Garica, 2019).

Purpose/Aim

PICO Question

- Do NICU neonates 32 weeks and greater who receive the recommended number of neonatal massages per the SENSE program, compared to those that do not receive massage, experience consistent weight gain from initiation of neonatal massage through discharge?
- Consistent weight gain is defined as a daily weight increase of 15-20 g/kg/d for neonates less than 2000 grams and 20-40 g/d for infants greater than 2000 grams.

Average Daily Weight per Gestational Age

Process

Setting

- 12 bed level III Neonatal Intensive Care Unit

Implementation

- Staff experienced didactic education and simulation of neonatal massage
- Parents received education and simulation from the NICU staff.
- Neonates meeting inclusion criteria and deemed medically stable by a medical care provider, received massage per SENSE guidelines per gestational age.
- Weekly weights were recorded from the electronic health record to monitor weight gain.

Sample size

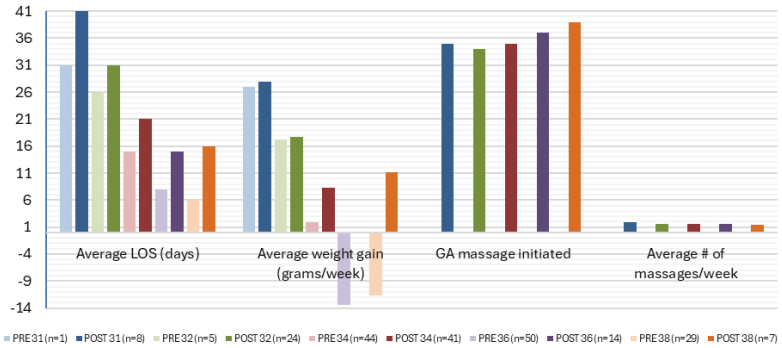
- Inclusion Criteria: Neonates equal to or greater than 32 weeks gestation with no exclusion criteria and/or deemed medically stable by an attending care provider.
- Exclusion Criteria: Neonates requiring respiratory support greater than 2 Liters of high flow nasal cannula and Fi02 greater than 21%; antibiotics; fractures, wounds & incisions; immunizations within the last 48 hours; skin disorders; IVH; genetic anomalies; congenital heart malformations; CNS dysfunction; peripheral IV and/or central lines; sedation for procedures; inconsolable; or receiving phototherapy.

Data Measurement

- **Usual Care Group**: A retrospective review was conducted neonates who met inclusion criteria, to determine weight gain for length of stay.
- **Intervention Group**: A retrospective review ascertained neonatal weight gain for length of stay, in neonates meeting inclusion criteria who received massage per SENSE program recommendations.

Outcomes

Pre/Post Massage Data Comparison



- The data is still under review for statistical significance of implementing massage, however it has been determined that there is an overall positive correlation between those infants that received massage and those that did not.

Outcomes continued

- Due to the overall positive correlation of weight gain when massage was used, we can conclude that it is beneficial for neonates in the Neonatal Intensive Care Unit to receive massage.

Occupational therapist works with mother to provide massage for her infant in the Neonatal Intensive Care Unit.

Implications for Practice

Practice

- Consider having the Occupational therapist meet with all parents of neonates meeting inclusion criteria to discuss importance of massage and educate on technique.
- Place charting reminders at all computer stations to encourage staff to chart massages appropriately.

Research

- To better understand the long-term side effects of massage, more studies are needed.

Recommended change:

- Offer all neonates, 32 weeks gestation and above meeting inclusion criteria, infant massage per SENSE program recommendations in the Neonatal Intensive Care Unit.

Catholic Health
Good Samaritan
University Hospital

Improving patient experience through parental empowerment, learning and shared decision making

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Introduction

"Diversity and inclusion are about giving value to every human being, no matter our differences."

– Matia Robotics

Patient experience is one of the major criteria used in determining quality of service, delivery and patient satisfaction. We are committed to promoting health equity by addressing the underlying social determinants of health for all. Family-centered care in the NICU is the model used to promote equity and support to the whole family.

Methods

- Participate in an equity project with other NICUs throughout New York State.
- Engage with former NICU parents; collaborate with them to implement better policies, practices and services.
- Implement social determinant screen on all families to identify social and economic environment, access to care, public health and prevention and physical environment.
- Initiate "Commit to Sit" program with all neonatologists, pediatric specialists, nurses, physical therapist, social work and lactation providers.
- Improve family-centered care.
- NICU Parent Reported Experience Measure (NPREM) Survey; capture parent or primary caregiver's feedback on their experience of their infants care during their infants NICU stay.
- Task Force RN Team – collect monthly data/audit charts.

Quarter: _____ **Year:** _____

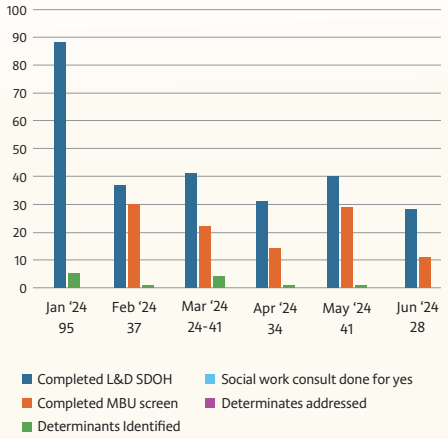
My NICU has:	Completion Status:
1. A standardized process for using a screening tool to identify Social Determinants of Health (SDoH) needs for all birthing persons.	☐ Completion status ☐ Have not started ☐ Working on it ☐ In place
2. A standardized process for linking parents/families to needed community services and resources of SDoH needs.	☐ Completion status ☐ Have not started ☐ Working on it ☐ In place
3. A standardized process for provision of medically trained interpreter services for all parents/families who have identified a preferred language other than English.	☐ Completion status ☐ Have not started ☐ Working on it ☐ In place
4. A standardized process for providing general educational materials in plain language.	☐ Completion status ☐ Have not started ☐ Working on it ☐ In place
5. A standardized process for identification of the birthing person's preferred name.	☐ Completion status ☐ Have not started ☐ Working on it ☐ In place
6. A standardized process for identification of the birthing person's preferred pronouns.	☐ Completion status ☐ Have not started ☐ Working on it ☐ In place
7. A standardized process to offer antenatal consultations remotely (e.g., telehealth, telephonic, FaceTime, webcams, tablets).	☐ Completion status ☐ Have not started ☐ Working on it ☐ In place
8. A standardized process for collecting data on the race and ethnicity of the infant.	☐ Completion status ☐ Have not started ☐ Working on it ☐ In place
9. A standardized process for reviewing infant data that is stratified by race and ethnicity.	☐ Completion status ☐ Have not started ☐ Working on it ☐ In place
10. A standardized process for providing mandated anti-racism education for all staff.	☐ Completion status ☐ Have not started ☐ Working on it ☐ In place
11. A standardized process for providing mandated trauma-informed care education for all staff.	☐ Completion status ☐ Have not started ☐ Working on it ☐ In place

Results

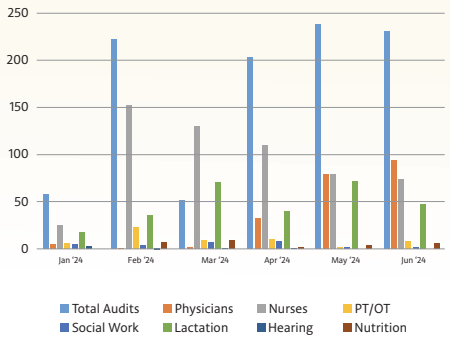
Evidence shows "quality of care delivery across NICUs varies greatly and vulnerable populations may be at risk for receiving suboptimal care, translating into suboptimal outcomes."

Improve neonatal outcomes, reduce disparities and improve family experiences of care.

SDOH on NICU Mothers



Commit to Sit



Conclusions

Our NICU Equity initiative helped discover and implement solutions that advance health equity in our NICU. It gives our health care team a deeper understanding of what constitutes respectful care within our NICU arena, promoting family-centered care rooted in dignity, autonomy, respect and shared decision making.

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Catholic Health
Good Samaritan
University Hospital

Good Samaritan University Hospital's journey to improving birth equity

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Background

The objective of the collaborative includes developing or improving upon anti-racist policies and practices at our hospital with the goal of improved clinical care, experience of care and perinatal outcomes amongst diverse birthing people across New York State.
Our team is committed to promote the principles of justice, equity, diversity and inclusion in our work and to be considerate and deliberate in our efforts to address discrimination and barriers to inclusion.
The Patient Reported Experience Measure (PREM) survey helps us learn about the experience a birthing person has during their delivery stay. The survey is anonymous and is stratified by race, ethnicity, gender and language. It is available in 11 languages and takes only a few minutes to complete.

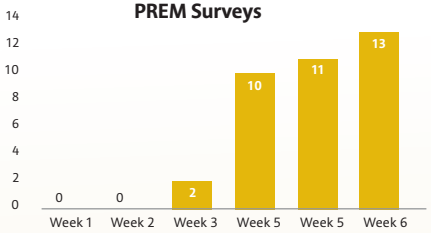
We aim to increase our PREM surveys by 50% within the next 3 months and hope to achieve this by:

- Educating the nursing staff on the importance of their patient participating and submitting the survey.
- Having the birth registrars speak to the mother/significant other when handing out the birth certificate packet.
- Displaying poster visual cues in all patient rooms with a QR code for mother/significant other to download on their phone and fill out.

Planned changes

1. Implement PREM to improve the experience of Black/Hispanic birth people.
2. Integrate PREM feedback into work.
3. Support birthing people in participation in shared decision-making.
4. Share patient satisfaction data with staff and community.
5. Ensure that birthing people understand why race, ethnicity and language data are being collected.
6. Ensure that birthing people understand PREM and its role in helping to improve care and ensure racial equity.
7. Ensure that birthing people understand the concept and process of shared decision-making.
8. Educate and train the staff on how to ask demographic intake questions including those on race, ethnicity, gender identity and language data and its inclusion into the EMR.

Results



Measure: Quarterly Data Too: I Structural Measures 2023

1.	Written policies and procedures addressing equitable care.	In place
2.	A written action plan to achieve equity benchmarks, which includes shared decision-making.	Working on it
3.	Any type of anti-racism education/ training program for staff. This may include cultural competency, implicit bias, equity or diversity and inclusion trainings.	In place
4.	Racial, ethnic and linguistic justice incorporated into job descriptions or appraisals/evaluations for all labor and delivery staff.	Working on it
5.	Patient Reported Experience Measure (PREM) survey implemented and offered to every birthing person before discharge from the delivery stay.	In place
6A.	Race and ethnicity data collected for birthing people.	In place
6A1.	Perinatal data stratified by race and ethnicity reviewed to develop targeted actions.	In place
6B.	Language data collected for birthing people.	In place
6B1.	Perinatal data stratified by language reviewed to develop targeted actions.	In place
6C.	Gender data (beyond the categories of female/male) collected for birthing people.	In place
6C1.	Perinatal data stratified by gender reviewed to develop targeted actions.	Haven't started
7.	Written process and procedure to handle complaints from birthing people (and/or their families) that report inequitable care and/or episodes of miscommunication, disrespect and neglect during their delivery stay.	In place

Conclusions

Poor survey submissions at the beginning of implementation made us look at ways to encourage and support our patient population to embrace the PREM survey. We included our birth registrars who are both bilingual and our survey submissions came up. We learned that honest responses from our patients benefit our facility and identifying opportunities to enhance leadership engagement, staff education, respectful patient partnership and reporting/systems learning. This in turn will improve the patient experience.

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"Many people impact birth equity, but it's important to know that you have the power to make a difference in your pregnancy and birthing process."

– Chicago Birthworks Collective

Positive Touch in the Neonatal ICU

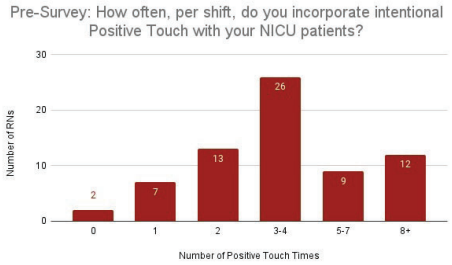
Elsbeth O'Fallon, RN, BSN; Peter Kaelble, RN

Background

- Premature infants have immature sensory systems
- Positive touch was defined as neurodevelopmental care, specifically non-pharmacological strategies for providing comfort
- Positive touch in the NICU setting promotes improved neonatal development and reduction of stress levels for infants and their families
- There is limited to no nursing education on performing positive touch during nursing school
- Nurse experience and awareness is varied regarding providing positive touch and developmental support for the premature infants in the NICU
- The Developmental Therapy team, NICU nurse managers and educator all served as stakeholders for this project

Baseline Data

- Observation from the NICU leadership suggested varied nurse experience and inconsistent performance of positive touch for premature infants delivered by nurses
- Teaching parents about positive touch was inconsistent
- An initial survey was sent to the NICU nurses asking, "How often per shift do you incorporate intentional Positive Touch with your NICU patients."
  - This included education of parents in performing Positive Touch



University Hospital of Colorado

PICOT

In nurses in the NICU, how does education regarding Positive touch affect the frequency of Positive Touch provided to patients Q shift?

Review of Literature

The project team collaborated with the UCHealth library databases to conduct a review of literature that included the following key words:

- Premature, neurodevelopmental care, therapeutic touch, positive touch, neonatal ICU
- Databases used included: CINAHL, PubMed, Cochrane databases
- 22 articles were evaluated, and 6 articles met inclusion criteria

Summary

- Positive touch in the premature infant and NICU setting has been shown to improve neurodevelopment, hemodynamic stability, and can also reduce family stress and improve bonding with infant
- Positive touch includes Kangaroo Care (skin to skin), containment holding, gentle un-swaddling, infant massage, non-nutritive sucking and positioning
- Kangaroo care has the most scientific research to support its benefit
- Education of nurses is most beneficial when performed using multi-modal approach for presentation of data.

Best Practice Interventions

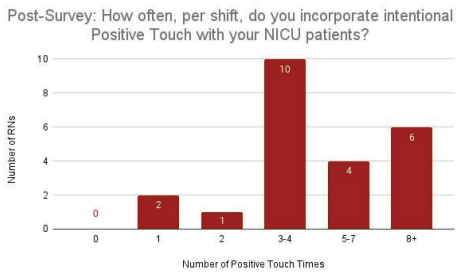
- Evidence from the literature on the benefits of performing Positive touch in the NICU population, supports education of nurses in this hospital NICU to standardize and improve use of Positive touch

Best Practice Outcome Measures

- The frequent use of Positive touch in the NICU benefits premature infants and their families.

Implications

- There was sufficient evidence to initiate education of nurses in the NICU about Positive Touch for neonates to increase the incorporation of this technique Q shift.



Neonatal Intensive Care Unit

Intervention

- To provide education to nurses about Positive touch and evaluate the frequency of providing Positive touch Q shift pre- and post- education.
- Education was provided through multiple modalities including poster development, Microsoft Sway, and was reinforced in person during a staff meeting.
- This education was made available to nurses for 4 weeks prior to the post-education survey.

Target Audience:

- Nursing staff on the NICU unit

Data Collection and Evaluation

- The pre-education survey was initiated the week before beginning the education time frame. Following education, a post-survey was completed to assess the frequency of positive touch use and to evaluate for change.
- The surveys were announced during huddle and in newsletters attached with a QR code.
- The data from both surveys were evaluated graphically to assess the change in frequency in the use of Positive touch Q shift.

Outcomes

- Pre-survey results:
  - 69 nurses responded
  - 68.1% incorporate Positive touch >3 times Q shift
- Post-survey results:
  - 23 nurses responded
  - 86.9% incorporated Positive touch >3x Q shift
- **Conclusion**: Education of nurses improved the frequency of Positive touch in the NICU.

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Deprivation and Invasion
Can Oral Aversion be Prevented?

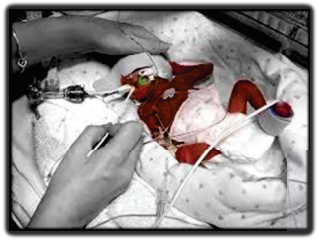
Barbara O'Rourke RN-NIC TIP

Blank Children's Hospital
UnityPoint Health

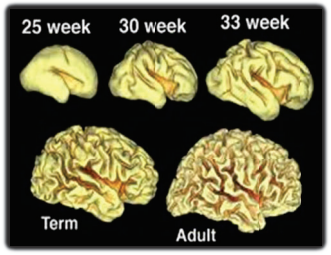
Rationale / Background

BEFORE
I was born

I tasted and swallowed the amniotic fluid.
This fluid has the scent of my mother.



VLBW Infant (≤ 1500 gm)
Oral invasion every 3-6 hours
Delayed oral feeding...gavaged
Deprivation of sucking & swallowing
Difficulty with feeding: 80%



Major reason for increased risk:
The structural differentiation of the brain is occurring rapidly between 23 to 32 weeks

Before oral attempts are offered
The 23wk infant will undergo 9-11 wks of suctioning, tubes, oral care, & pacifiers, during the most critical time of structural differentiation brain.

Milk Drop Clinical Practice Initiative

Table 1. Number or volume of milk drops offered was limited and based on corrected gestational age or status

CGA / status	Milk Drops with gavage feedings	Document as volume
NPO	See orders	No
24 -26 weeks	≤ 4 drops	No
27-28 weeks	≤ 0.1 ml	No
29-30 weeks	≤ 0.3 ml	No
31-33 weeks	≤ 0.5 ml	No
34-36 weeks	≤ 1.0 ml	No
≥ 37 weeks	≤ 2.0 ml	No

Table 2. Major Findings

Gestational Age	Number per group	Control Avg LOS (days)	Intervention Avg LOS (days)
24	2	135	90.0
25	3	127.7	86.0
26	6	90.8	88.8
27	5	98.2	53.0
28	5	64.8	56.8
29	6	65.8	56.8
30	9	55.4	47.2
31	20	38.5	41.5
32	16	34.6	30.1
33	27	24.1	23.6
TOTAL	99	48.30	44.11

*Difference in overall average LOS statistically significant (p= .004).

9 of the 10 intervention groups had a shorter length of stay

Background:
The NICU infant often receives invasive medical procedures that may have a negative impact on the oral sensory and oral motor functioning of the premature infant. The transition from gavage feedings is often challenging, with many infants staying longer in the NICU to achieve oral feeding competence.

Research Design:
- Initial pilot study
- Followed by quasi-experimental research design

Setting:
- Level III family centered NICU
- 42 bed single and multiple rooms

Subjects:
- NICU infants born at 24 wks to 33 +6 wks gestation.
- Intervention group: a convenience sample of 99 premature
- infants who were offered milk drops.
- Control group: a convenience sample of 99 premature infants who had been discharged and not offered milk drops.
- Infants matched on gender and gestational age alone.

Major Findings: Table 2
- Subject infants had significantly shorter lengths of stay
- Subject infants had significantly less average adjusted costs
- ❖ Estimated savings : > $663,000.00 on these 99 infants.

Implications for practice:
- Simple, no expense intervention of giving milk drops
- Allows premature infants enjoyable oral experiences

Connecting the dots
HUNGER + MILK DROPS = ENJOYMENT

Milk drops
with FULL gavage feedings
Consistency = synaptic development

Setting the stage:
Cares are done - now time to enjoy
On side-midline - safer- less energy
Boundaries - secure - comforting
Scent cloth = my mother
Hands to face - organize - self comfort

A drop of milk

Offer
swab / pacifier

Accept or not
based on cues

You are a participant
You are in control

Small Baby Program

Jacqueline Pahor MBA, MSN, RNC-NIC
Michele Dobnikar MSN, RN

Abstract

The neonatal intensive care unit (NICU) is experiencing an increase in the number of younger gestational age infants we are resuscitating (i.e. 22-week gestation). Evidence-based nursing practice has led to the development of the small baby program, which is tailored towards reducing intraventricular hemorrhages (IVH), bronchopulmonary dysplasia (BPD), pulmonary hemorrhages, retinopathy of prematurity (ROP), pneumothoraces, and length of stay. A specialized team of nurses learn to care for these fragile infants and their families while engaging in family centered care. This program is designed for neonates less than 28-weeks gestation and/or less than 1000 grams. The small baby program helps to recharge current practices by promoting leadership, accountability and a just culture, all while increasing staff and family satisfaction.

Introduction

- Fairview NICU exceeds the expected performance in relation to pulmonary hemorrhages, IVH, ROP and length of stay in ELBW infants compared to other NICUs with successful small baby programs.
- Infants born at 23 and 24 weeks of gestation, once considered non-viable are now routinely surviving, and some institutions are demonstrating remarkable success even prior to 23 weeks (Fathi et al, 2021).
- Although the survival rate of extremely low birth weight (ELBW) infants has improved with advances in neonatal intensive care, many survivors are discharged from the hospital with neurodevelopmental delays and/or chronic medical problems (Morris et al., 2015).

Mission

- To design a Small Baby Program (SBP) tailored to the extremely low birth weight (ELBW) population.

Vision

- To improve not only mortality but also morbidities in ELBW infants by providing better care for a better life.

Materials

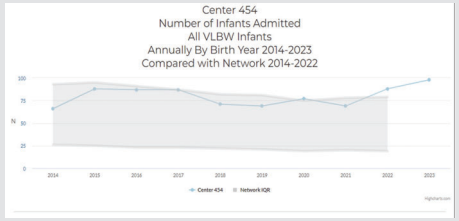
- CINHAL was used to compile research articles
  Keywords included: Extremely Low Birth Weight, Micro Preemie, Small Baby Unit, Small Baby Program, Neonatal Intensive Care Unit, NICU
- Utilized other institutions Small Baby Program Guidelines including Nationwide Children's Hospital and University of Iowa Health Care Stead Family Children's Hospital
- Attended online course through Nurse Builders called 'Small Baby Unit/ Program' where we took guidelines taught to us and applied to our unit to start the construction of our own Small Baby Program.

Values

- **Quality & Safety**- Ensure the highest standard of care and excellent outcomes by decreasing intraventricular hemorrhage (IVH) rate, bronchopulmonary dysphasia (BPD) rates, retinopathy of prematurity (ROP) rates, pulmonary hemorrhage occurrences, pneumothoraces, and decreasing length of stay.
- **Patient/Family Satisfaction**- Improve in communication due to having clear and consistent guidelines amongst the multidisciplinary team. Increasing family involvement in care from the beginning of life and improving discharge readiness.
- **Empathy**- Create a team dedicated to providing care to this specialized group of neonates and their families, who work towards understanding what these families are going through. Providing continuity of care to create joy and celebrate milestones.
- **Teamwork**- Work together to provide care and consistency for those staff who take pride and ownership in caring for ELBW infants. Being present for their first 8-10 weeks allows for detailed report to the new medical and nursing team upon graduation from SBP.
- **Innovation**- Create SBP to improve patient outcomes, transforming the care of ELBW infants.
- **Professional Development**- Promote leadership, accountability, and a just culture by providing quality improvement tools and methods to focus on team-based care and the primary nursing model.

Objectives

- Create a multidisciplinary committee to create and enforce the Small Baby Program
  - Physicians
  - Neonatal Nurse Practitioners
  - Management Team
  - NICU RNs
  - Respiratory Therapist
  - Therapies (Physical, Speech, Occupational)
  - Dietitian
  - Social Workers
  - Pharmacist
- Development of clear, consistent guidelines pertaining to:
  - Fluid, electrolyte, and nutrition
  - Cardiology
  - Delivery Room Management
  - Admission/ Golden Hour
  - Thermoregulation
  - Skin Care
  - Hematology
  - Neurology and Pain Control
  - Respiratory
  - Infection
  - Families as partners in care
- Education for staff
  - Multidisciplinary
  - Mix of didactic and hands-on skill-based training
- Cohort the ELBWs in a designated space
  - Admission into a specific area with low noise, low stimulation, and decreased lighting
  - Neonates will stay in this designated space from birth until 30 weeks of corrected gestation



Conclusion

By implementing the Small Baby Program, The Cleveland Clinic Fairview Hospital NICU can anticipate an increase in quality of care, staff satisfaction, parent education and infants discharged without morbidities. We are also hoping to notice a decrease in mortality rates, IVH, pulmonary hemorrhages, pneumothoraces, and length of stay.

Expected Benefits

- ✓ Increase in patient and family satisfaction
- ✓ Promoting professional development
- ✓ Develops a strong partnership between medical and nursing leadership
- ✓ Improved outcomes in ELBW infants
- ✓ Ongoing team engagement
- ✓ Consistency of care among ELBW infants
- ✓ Decrease in staff burnout and fatigue

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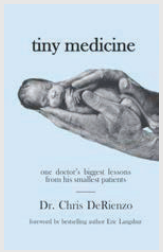
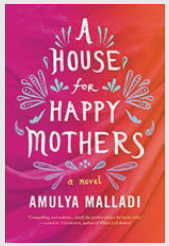
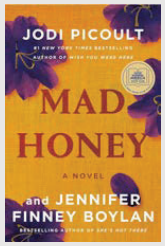
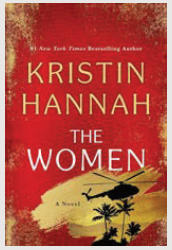


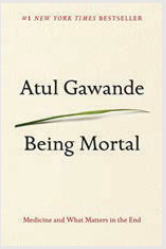


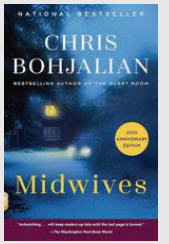


Neonatal Nurses Book Club

Jeanne Perino MSN, APRN, NNP
Kylie Cavanah MSN, APRN, NNP-BC







OVERVIEW

Reading clubs can serve as a social experience - a place for support, learning, and collaboration. The NCCU Critical Care Unit (NCCU) book club began with the common interest of reading. Additional goals included creating a positive work culture, increasing staff morale and resilience and providing an opportunity for socialization. Nurses also received continuing education units (CEUs) for attending the book club.

HOW IT STARTED

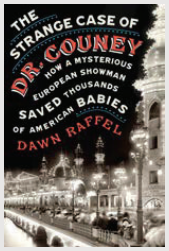
The NCCU Book Club was founded in September 2016 by 2 night-shift nurses with a common love of reading and a desire for socialization outside of the workplace. There was also the hope that attending the club would create a positive work culture and increase staff morale and resilience. Later we found that when books that have some connection to health care are chosen and learning objectives are developed, the book is eligible or CEUs via the Ohio Nurses Association (ONA). To earn CEUs staff members must read the chosen material, attend the allotted time for discussion, and complete an evaluation form.

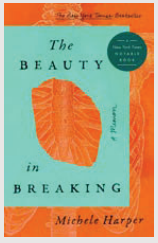
OUTCOMES

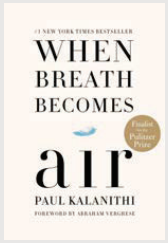
Since its inception in 2016, members of the NCCU Book Club have read a total of 67 books. Knowing that nurses learn from a variety of methods, 4 movies were also included based on books with a connection to nursing. Over 185 CEUs have been awarded, and at its peak there were 55 participants, including nurses, nurse practitioners, speech therapists, respiratory therapists, and physicians. Book club also catered to all ages, with participants ranging from 21 to 90.

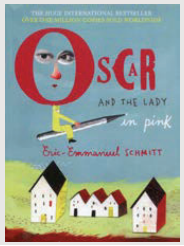
CONCLUSION

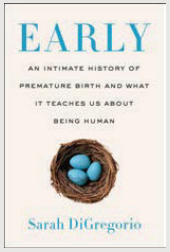
Reading is a popular leisure-time activity, and sharing ideas about books via a book club is most always a positive experience for those involved. Book clubs can be a means to foster community by bringing people together to exchange ideas. By sharing common experiences and discussing ideas, feelings of loneliness and isolation can be diminished. In addition, feelings of community and teamwork have developed during the course of reading and discussing books.

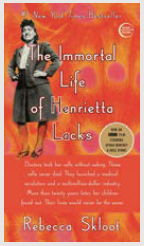


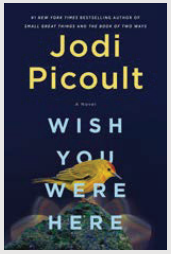


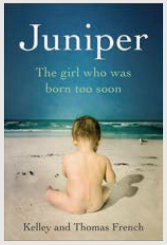












Empowering Rural Nursing: Navigating Solutions for Promoting Exclusive Breastfeeding in Near Border Communities

Neda Shamsalizadeh
Ph.D., MS, RN
San Diego State University Imperial Valley Campus

Introduction

The American Academy of Pediatrics and the Association of Women's Health, Obstetric and Neonatal Nurses recommend exclusive breastfeeding for the first six months of an infant's life.

According to the Centers for Disease Control and Prevention (CDC), the duration of breastfeeding depends on many factors, such as latching issues, mothers' concerns about infant nutrition and weight gain, lack of family support, and absence of supportive work policies, such as parental leave.

Although Hispanic mothers are more likely to initiate exclusive breastfeeding, they are less likely to continue it and more likely to initiate bottle feeding within the first two days after giving birth.

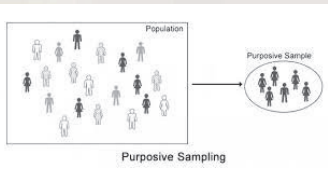
The World Health Assembly has set a global target of increasing exclusive breastfeeding for infants under 6 months to at least 50% by the year 2025.

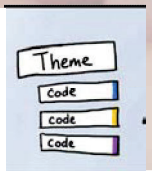
Gaining insight into nursing care challenges and developing evidence-based strategies to address them can support successful initiation and continuation of exclusive breastfeeding.

The aim of this study was to explore nursing care challenges for exclusive breastfeeding in Imperial Valley, a rural community near the border, to propose strategies that are culturally competent.

Method

Qualitative study





Findings

Impact of Geographic region

Nursing shortage and inadequate education

Culture of breastfeeding

Family role

Health care policy

Conclusion

Engaging nurses in finding strategies that are regionally and culturally practical is significant for achieving mother and infant optimal health.

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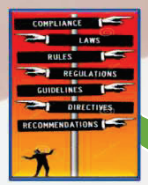
Implications for Clinical Practice



Policy changes
- Increase baby-friendly hospitals
- Mandate long-term paid parental leave
- Provide workplace facilities and flexible working hours

Acculturation
- Educate public
- Eliminate stigma

Provide support

Establish cross-border health care coordination

Exclusive breastfeeding

Involve family members in breastfeeding education

Provide support groups

•Provide continuous education

Improve mother's self efficacy

Cultural Sensitivity in Mother-Baby Nursing: How to Improve the Patient Experience

Linda A. Smeltzer, BS, RNC-MNN, MLS(ASCP)
WellSpan York Hospital, York, Pennsylvania

Purpose

Patient experience is an important indicator of a hospital's quality and effectiveness. Cultural sensitivity plays a significant role in patient experience. The purpose of this evidence-based quality improvement project was to improve patient experience for postpartum mothers and their families of ethnic minority.

Background

- Our institution experienced a 25% increase in births from ethnically diverse communities in the past 2 years.
- Patient experience scores were low for mothers of ethnic minorities

Practice Question

In postpartum women of ethnic minority, how do culturally sensitive nursing care practices, compared to current unit practices affect patient satisfaction?

Model/ Synthesis of Evidence

EBP Model: Johns Hopkins Evidence-Based Practice model.

Databases: PubMed, CINAHL, and EBSCO

Keywords: *ethnic minorities, postpartum, maternity, nursing ,culturally sensitive care", patient experience*

Postpartum Experiences of Ethnically Diverse Mothers:

"My provider made assumptions about my background and needs"

"I felt judged and discriminated against because of my color"

"There was no continuity of care- I had to keep repeating my story"

"Please just get to know me and my culture – what are our beliefs?"

"Please don't rely on my husband or my family to interpret correctly"

"I felt powerless and coerced into making decisions"

Practice Recommendations

COMMUNICATION- Provided various interpreter modalities to increase interpreter use

CONNECTION- Sit at bedside, provide culturally sensitive care and SMILE more!

TRUST- Build relationships and provide continuity of care

SUPPORT- Advocate for patient and provide community resources

EDUCATION- Provided cultural competence training

Results

Press Ganey Top Box Scores:
Communication w/ nurses (all ethnicities)

11.1.2022-10.31.2023	84.29
11.1.2023-2.14.2024	93.14

8.9% improvement with practice changes.

Acknowledgements

Team members: Michele Brown, BSN, RNC-MNN; Nicole L. Carbaugh, RN; Lacey A. Crowl, BSN, RNC-MNN, CLC; Jennifer L. Hamberger, BSN, RNC-MNN; Amy L. Harris MSN, RNC-MNN; Sherry A. Luckenbaugh, RNC-MNN; Alysse A. Smith, BSN, RN

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Cristina M. Brooks, MSN, RN, CPAN, CAPA

SCAN ME

Implementing an infant massage program for micro-premature babies in the Neonatal Intensive Care Unit (NICU) at Sunnybrook Health Sciences Centre: Exploring the Experience of Parents

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[1]Sunnybrook Health Sciences Centre, Neonatal Intensive Care Unit, DAN Women and Babies Program
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[3]Lawrence Bloomberg Faculty of Nursing, University of Toronto

BACKGROUND

Parents of micro-premature babies in the NICU may experience depression, feelings of hopelessness, grief and loss. This stressful environment may have a negative effect on parental attachment and bonding.

Neonatal massage has many benefits for both the baby and the parents. Evidence in the literature supports teaching massage to parents in the NICU since it may decrease anxiety, depression, promote attachment, increase parent satisfaction, and improve the parent/infant dyad. Previous studies include parents of babies greater than 27 weeks gestation.

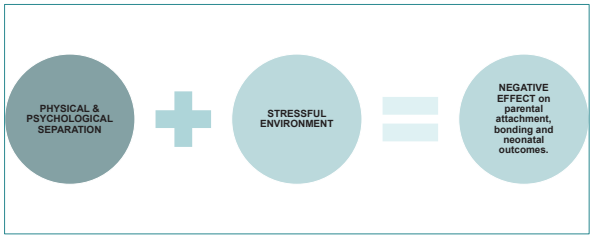
Sunnybrook NICU in Toronto Canada, has a unique opportunity to evaluate the effect of training parents of babies less than 25 weeks gestation. An evidenced based, gestational age-appropriate massage program was developed to teach parents to massage their babies after 34 weeks gestation.

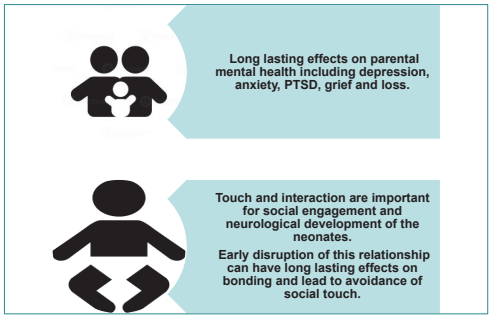
AIM

The aim of this study is to explore the impact of integrating infant massage as part of the care that parents can provide their babies.

CLINICAL SIGNIFICANCE

Micro-premature babies less than or equal to 25 weeks have complex medical course requiring prolonged hospitalization in the NICU.





GOALS

✓**Explore the experiences of parents**

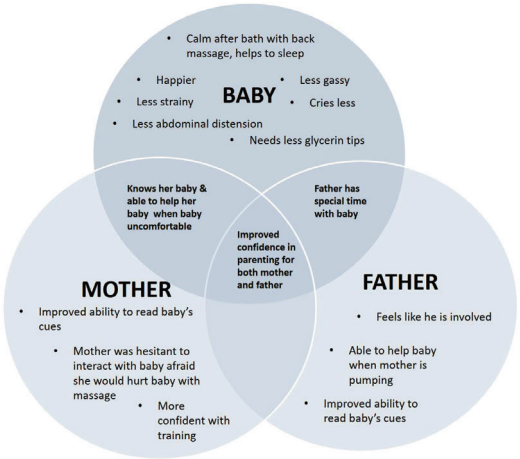
✓**Understand acceptability, facilitators and barriers to their involvement in the massage program**

✓**Improve and adapt the program for broader implementation to optimize the parents experience and neonatal outcomes.**

METHODS

- ✓ N=34
- ✓ 20 families consented (20 mothers & 14 fathers)
- ✓ Semi structured interviews were conducted
- ✓ Three members of the research team collaborated to develop coding themes
- ✓ Coding guide was developed
- ✓ Content analysis was conducted and focused on description and interpretation of data
- ✓ Themes were identified

RESULTS



I definitely would recommend it, especially to new parents. And it just helps, especially being a NICU parent, it helps give you that bond with your baby that you're not really getting because they're either in an incubator or in a crib and packaged in the machines. So doing that massage program helps me interact with the baby. It made me feel like I had purpose as a parent there because you're not really doing much. The [trainer]s and doctors are doing majority and it's something that you're able to take home and have a part of your routine like I do. So I benefited from it and I think overall it's a good practice to have.

I think that's why it was clear to me that, like the maintaining the face to face, going through the steps, each step with the baby, taking that time to just, you know, enter yourself and breathe in 5 deep breaths in and out and realize like this is supposed to be something that's you and the baby, and like nothing else should really be entering your mind. So, yeah, I thought it was a bit like that in terms of like a holistic and …supposed to be something mutually beneficial.

FACILITATORS	• Hands-on opportunity • Easily understandable • Visual resources • Supportive, experienced & trainers expertise
BARRIERS	• Limited access to trainers in the beginning • Parent's work schedules • One parent being more confident than the other • Other activities in the NICU taking priority e.g. breastfeeding • Medical conditions of the baby required modified massage
OUTCOMES	• Abdominal massage improved GI motility, facilitated gas/bowel movements, decreased suppository use • Increased feeding and sleep time attribute to relief and relaxation post massage. • Massage positively influenced most parents • Parents reported feeling less stressed and anxious, more confidence in their skills and empowered

DISCUSSION

- Parents acknowledge the difficulty of a prolonged NICU admission and how learning massage helped to decrease their stress .
- Babies in NICU experience many painful procedures. Parents are now able to provide support, relieve abdominal discomfort, calm their baby and provide positive touch. They like the idea that they have a tool to help their babies.
- Fathers acknowledge that sometimes they get left out of their babies care and they worry about their wife and their baby. Fathers find a purpose in massage as a way to get closer and bond with their babies
- Mothers enjoy watching their partners learning massage and they find joy in their partner wanting to learn as well.
- Previous research on the positive effects of massage on the baby, decreasing parental anxiety, improving confidence of parents became evident as we conducted our interviews.

CONCLUSION & NEXT STEPS

- Empowerment, confidence and ongoing support were all echoed by the participants.
- Parents who had experienced a stressful NICU course gravitated to joining the massage program.
- This was not only a massage course to help the baby, it also served to decrease anxiety in families. They were heard laughing and enjoying their baby.
- Parents are looking for hope and normalcy. They wanted to learn massage after hearing about the research benefits for their baby; they wanted to do everything to optimize the outcomes of their infant.
- Next steps include:
  - Continue to increase number of trained massage staff (40-->71)
  - Make a video of the particular massage steps to help parents learn techniques and have a reference post discharge (QR code)
  - We serve a multicultural, multilingual population, plan to translate material into other languages

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CLABSI PREVENTION

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North Shore University Hospital, Northwell Health

INTRODUCTION

Central line-associated bloodstream infections (CLABSI) in the neonatal period are serious infections typically causing a prolonged hospital stay, increased cost and significant impact on morbidity and mortality. Studies show a strong association between neonatal infection, impaired long term neurodevelopmental outcomes, and poor growth in preterm infants. CLABSI can be prevented through implementation of evidence-based preventive interventions.

BACKGROUND

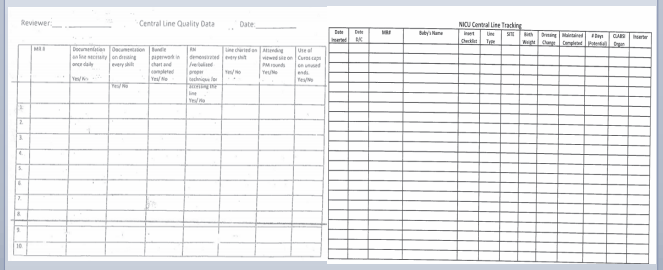
- North Shore University Hospital (NSUH) Neonatal Intensive Care Unit (NICU) used standard universal precautions to assemble central lines, no standardized insertion techniques or kits were used and insertion techniques were not closely monitored.
- In 2008, based on best practice guidelines from the NYS initiative, NSUH NICU created a multidisciplinary central line committee to develop a standardized procedure to assist in the reduction of CLABSI rates.
- We changed our practice by implementing evidence-based strategies during the insertion and maintenance of the central line.

PURPOSE

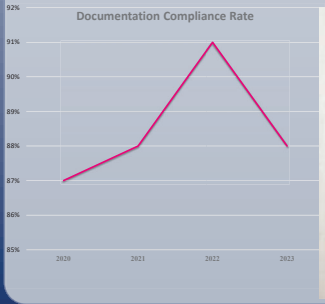
- To decrease CLABSI rates in NICU and improve patient outcomes.
- To reduce length of stay and healthcare costs.
- To increase knowledge to articulate evidence-based strategies for reducing CLABSI in the NICU setting.

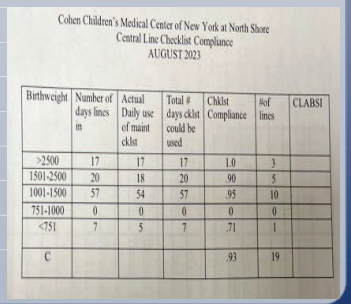
METHOD

- In 2008 a new standardized process for central lines was implemented.
- Central Line Champions were identified on both shifts and a committee was formed.



- Weekly and monthly audits were performed on both shifts using the above tools.
- Champion RNs monitored the compliance with this initiative and helped to achieve positive outcomes.
- The Champions checked to ensure proper documentation on our new processes.
- Central line necessity, intact dressings, completion of bundle paperwork, and adherence to sterile processes were checked daily by the Champions.
- Documentation, paperwork, and sterile process audit compliance was 87% (2020), 88% (2021), 91% (2022), and 88% (2023).





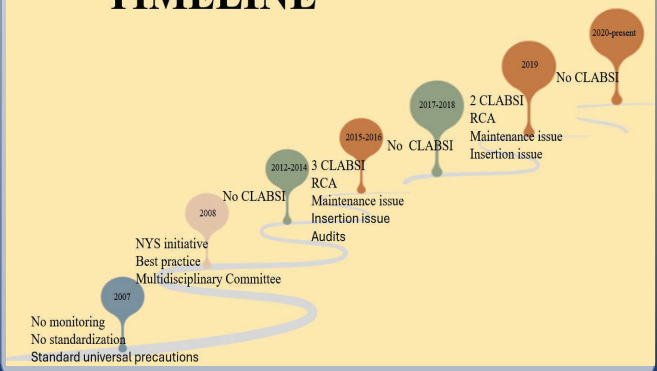
Cohen Children's Medical Center of New York at North Shore
Central Line Checklist Compliance
AUGUST 2023

Birthweight	Number of days lines in	Actual Daily use of maint cklst	Total # days cklst could be used	Chklst Compliance	#of lines	CLABSI
>2500	17	17	17	1.0	3	
1501-2500	20	18	20	.90	5	
1001-1500	57	54	57	.95	10	
751-1000	0	0	0	0	0	
<751	7	5	7	.71	1	
C				.93	19	

IMPLEMENTATION

- In 2015 and 2016, when a CLABSI was identified, we conducted a root cause analyses (RCA) as a part our quality improvement process.
- We determined the infection was caused by maintenance issue in 2015 and an insertion issue in 2016.
- Staff were re-educated on best practices and medical providers were re-educated on proper insertion techniques.

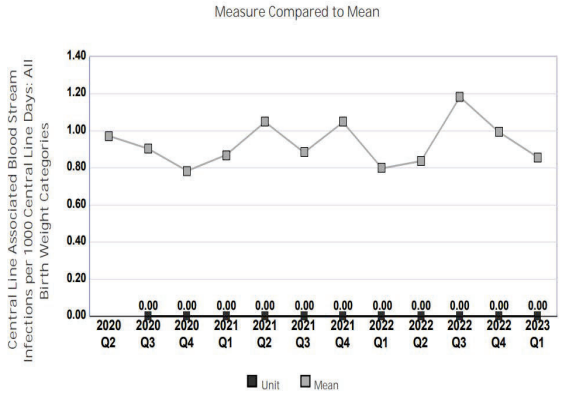
TIMELINE



RESULTS

Unit: NICU

Measure: Central Line Associated Blood Stream Infections per 1000 Central Line Days: All Birth Weight Categories



- Since implementation of NYS best practice guidelines in 2008 our CLABSI rates have decreased, and we have had no central line infections for 1351 days.
- This was achieved by standardizing our practice, developing bundles, educating multidisciplinary team members through champion model, and conducting weekly and monthly audits.

CONCLUSION

- Implementation of evidence-based practices and quality improvement methodologies demonstrated 1351 days of zero CLABSI in our NICU, highlighting the importance of comprehensive and a systematic approach to infection prevention.
- The efforts of the multidisciplinary team have helped to maintain our zero central line infection rate.

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COOK COUNTY HEALTH

The Golden Hour: A quality improvement project for preterm neonates in the neonatal intensive care unit

Lata Thomas MSN-Ed, RNC-NIC

Background

- "Golden Hour" in preterm neonates is defined as the first hour of postnatal life which includes the time during resuscitation in the delivery room, transport, and admission to the neonatal intensive care unit (Sheng et al.,2024)
- The International Liaison Committee on Resuscitation (ILCOR) has recommended the adoption of evidence-based interventions during the first 60 minutes of postnatal life, to better support the fetal-to-neonatal transition. The research concludes that early interventions can reduce hypothermia, hypoglycemia, and efficiency in establishing intravenous access. Long-term outcomes include decreased risk of bronchopulmonary dysplasia, intraventricular hemorrhage, and retinopathy of prematurity (Lamary et al., 2023).

Objectives

S - To standardize care procedures for preterm infants during the first hour of life to improve neonatal outcomes

M - To attain thermoregulation, early IV access, delivery of IV fluids and antibiotics, and glucose management within the first hour of life.

A - Improve the quality and consistency of care based on evidence, structuring multidisciplinary teamwork and effective communication.

R - Effective stabilization of high-risk infants through standardization of care and addressing specific risk factors or medical conditions that may affect neonatal health during the first hour of life.

T - The quality initiative was started in 2017 and is now part of the quality assurance project which is maintained by conducting regular audits to evaluate compliance with golden hour best practices and identify areas for improvement every month.

Methods

A data collection sheet was developed using (Illinois Perinatal Quality Collaborative) ILPQC tool kit to provide guidelines for the care of very low birth infants during the first hour of life. The data collected included temperature, initial glucose level, initiation of IV fluids, and IV antibiotics infusion within one hour of admission to the Neonatal Intensive Care Unit (NICU).

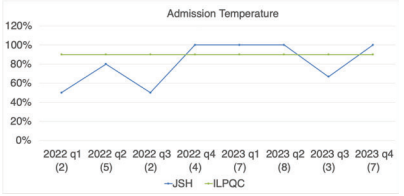
FIRST HOUR QI Data Sheet: For VLBW infants

Name:____ MRN:_____
DOB:_____ TOB:_____ BW:_____
Mode of Delivery: _____ GA:_____

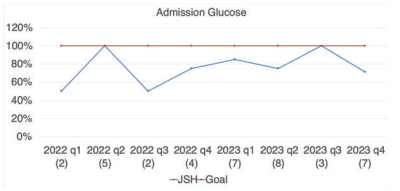
DELIVERY ROOM

Any Family Member Present in DR–Y/N: by MD							
Pre-Briefing Y/N							
Laryngoscope	Correct ETT	Suction Catheter	AMBU bag	Neopuff	Mask	Meds	UVC
Cord: Milking or DCC- by MD							
Initial Fio2 in Delivery Room- by MD							
Fio2at 5 mins of life- By MD							
Pulse oximeter by 2 mins of age				Yes		No	
Intubation Y/N and what time							
Surfactant used Y/N and what time							
Warmer bed Preheated				Yes		No	
Temperature Probe by 5 mins				Yes		No	
Delivery Room temp >23-25 degree C				Yes		No	
Chemical Mattress Used				Yes		No	
Plastic Wrap used				Yes		No	
Cap place on Infant's head				Yes		No	
Was transport Incubator Preheated				Yes		No	
Time baby arrived to NICU							
NICU initial Axillary Temperature (*C and time)							
Initial NICU Fio2							
Initial Oxygen saturation in NICU							
Early HAL started- Y/N							
IV antibiotics started- What time							
Initial Glucose Level							
IVF started- what time?							
Team debriefing done after the resuscitation				Yes		No	
Equipment Problems, please specify							
Please tell us what went really well?							
What can we improve?							

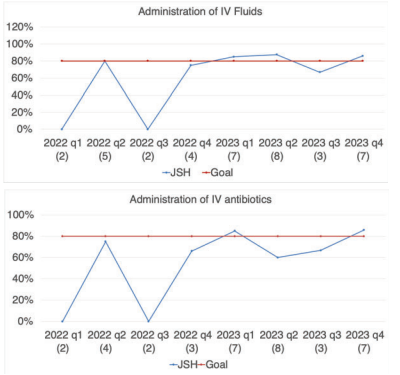
Results (2022- 2023)



Graph 1: Indicate a consistent improvement in temperature management across both years, with a higher proportion of quarters meeting or exceeding ILPQC goal of 90%.



Graph 2: Glucose metrics showed some variability between 2022 and 2023, with overall improvement from 2022-2023 .(ILPQC goal – 100%)



Graph 3 and 4: Few quarters fell short of the target for administering IV antibiotics and IV fluids within the first hour of life. Nonetheless, there is a discernible enhancement in performance across these parameters from 2022-2023, with more consistent achievement of the goal in 2023 (ILPQC goal- 80%)

Conclusion

- By implementing best practices, we were able to standardize care and provide early interventions to the preterm newborns during the first hour of life.
- Continuing education process involving the multidisciplinary team collaboration to ensure coordination between providers in the delivery room and NICU is critical to the success of the quality assurance project.

Limitations

Ongoing continuing education efforts are needed for both NICU and delivery room healthcare teams on applying best practices to ensure timely interventions during the first hour of postnatal life of a preterm newborn.

Nursing Implications

- Nursing implications during the "Golden Hour" period focuses on rapid assessment, stabilization, and timely transportation and admission to the NICU.
- Staff education on routine and standardized care of preterm neonates is required to increase adherence to golden hour practices and documentation.

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Controversies in the Management of Patent Ductus Arteriosus for Preterm Infants

THE OHIO STATE UNIVERSITY
COLLEGE OF NURSING

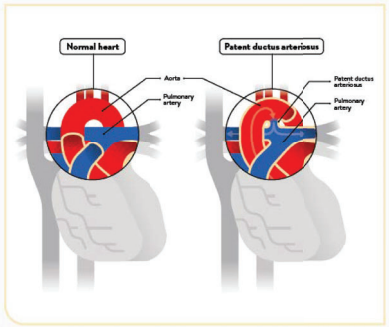
Jodi A. Ulloa, DNP, APRN-CNP, NNP-BC; Stephanie R. Sykes, DNP, APRN-CNP, NNP-BC

Background and Significance

- Patent ductus arteriosus (PDA) is a common cardiovascular diagnosis for premature infants. In full-term, healthy newborns, the PDA usually closes within 72 hours of life. The persistence of the ductus arteriosus beyond 72 hours is common in premature infants.[1]
- The incidence of a PDA diagnosis is estimated to be >30-50% for those <31 weeks gestation, with a higher incidence inversely related to gestational age.[2]
- Other risk factors associated with ductal patency, especially during the first few days of life, include respiratory distress, excessive fluid intake, and use of furosemide.[3]
- The presence of a PDA presents many clinical management challenges for neonatal providers because of pulmonary over-circulation and systemic hypoperfusion.[4]

Purpose

- Diagnosis and management of a PDA is one of the most controversial topics debated in neonatal medicine.[5,6]
- The resulting issues include how best to diagnose a PDA, define a hemodynamically significant PDA (hsPDA), develop a consensus for optimal management, and intervene at the appropriate time.

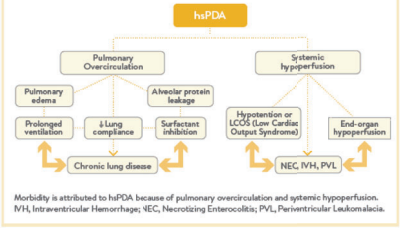


Hemodynamic Significance

TABLE 1. Clinical Findings Associated with a hsPDA[4,20,21]

CLINICAL FINDING	CHARACTERISTICS	CONTRIBUTING PHYSIOLOGY
Heart Murmur	• Systolic, coarse • Heard along the left sternal border • Radiates across precordium and back • Left-to-right shunt may be large enough not to create turbulence and audible murmur	Increasing flow velocity and turbulence through a patent ductus due to increasing systemic vascular resistance and decreasing pulmonary vascular resistance
Hyperactive Precordium	Increased precordial impulse	As a result of increasing left ventricular stroke volume
Bounding Pulses	• Prominent • May be palpable where not normally (i.e., palms)	Diastolic runoff from systemic circulation into pulmonary circulation from the descending aorta due to lower pulmonary vascular resistance
Wide Pulse Pressure	In most immature infants, both systolic and diastolic pressure may be low without a widening pulse pressure	Diastolic runoff from systemic circulation into pulmonary circulation from the descending aorta due to lower pulmonary vascular resistance
Increasing Respiratory Requirements	• Tachypnea • Decreased oxygen saturation • Increasing oxygen requirement • Changes in respiratory support i.e., increasing positive pressure needs	Increasing pulmonary blood flow as systemic vascular resistance decreases and pulmonary vascular resistance decreases resulting in increased blood flow across the patent ductus

FIGURE 2. Consequences of Pulmonary Over-Circulation and/or Systemic Hypoperfusion[4]



Morbidity is attributed to hsPDA because of pulmonary overcirculation and systemic hypoperfusion. IVH, Intraventricular Hemorrhage; NEC, Necrotizing Enterocolitis; PVL, Periventricular Leukomalacia.

Pharmacologic Treatment

NSAIDs (Indomethacin; Ibuprofen)

- Advantages:
  - \+ Both are equally effective in closing the PDA
  - \+ Can be used prophylactically or for treatment with failure of conservative management
- Disadvantages
  - \- Transient or permanent acute kidney injury (AKI)
  - \- Necrotizing Enterocolitis (NEC)
  - \- Thrombocytopenia
  - \- Gastrointestinal (GI) bleeding or perforation

❖ Comparatively, Ibuprofen has decreased risk for side effects on kidneys and GI tract

Non-opioid analgesics (Acetaminophen)

- Advantages
  - \+ Appears to be a safer alternative versus NSAIDs with descreased risk of AKI, NEC, and GI bleeding
- Disadvantages
  - \- Unknown long term neurodevelopmental effects

Invasive Interventions

Surgical Ligation

- Decreasing frequency in past decade
- Reserved for more acutely ill patients who then experience greater complications post-op

Cardiac Cath Lab Procedures

- Increasing frequency of Transcatheter PDA closure (TCPC)
- Complications can include device mal-positioning/migration, thrombosis, and vessel injury

Discussion

- Managing a hsPDA in the NICU remains challenging for NICU providers.
- Assumptions that the PDA is uniformly pathologic have been challenged as one of the fundamental flaws in clinical trials.

Implications for Practice

- Evidence-based recommendations are needed to define a hsPDA as well as to guide the diagnosis, evaluation, and selection of treatment options to support the closure of a hsPDA while minimizing co-morbidities.
- Future randomized controlled trials will assist NICU providers in determining if conservative management, pharmacologic, surgical, or percutaneous closure will optimize patient outcomes.

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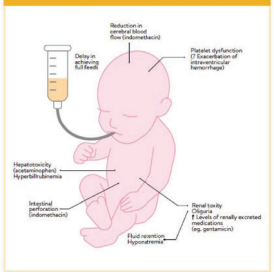
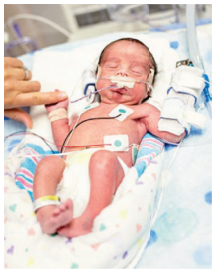
FIGURE 3. Pharmacologic Management: Potential Side Effects[26]





Bereavement Debrief in the NICU

Joanne Pasinski, DNP, Jessica Villarreal, MSN, RN, CCRN: Karyl Reid, APN, Mary Zetelski, LCSW, ACHP-SW

[1] Joseph M. Sanzari Children's Hospital @Hackensack Meridian Health

NICU Joseph M. Sanzari Children's Hospital @Hackensack Meridian Health

BACKGROUND

- **Background:** Neonatal loss has been referred to as a catastrophic loss to families and staff alike. Grief is a natural experience brought on from providing care in a high stress environment that can lead to burnout, fatigue and psychological distress.There are great opportunities to to explore best practices during these challenging situations.
- World Health Organization states 13.4 million babies were born preterm in 2020 (before 37 weeks)
- The US in 2021 estimates 14.8% of live births died.
- Preterm complications leading cause of death on children under 5
  Rate of preterm deaths were approximately 900,000 in 2019.
- **What is the knowledge/action gap?** New staff with limited experience and minimal experience in bereavement are left to find their own sources of comfort and grief.

METHODS

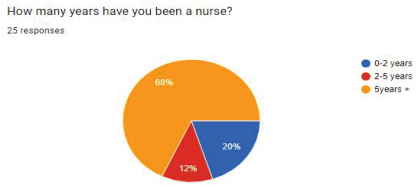
- Interdisciplinary led open forum including, RNs, MDs, Social Workers, RT's, palliative care representatives unit clerks and milk technicians.
- Open forum to discuss feelings
- Social worker encouraged open communication

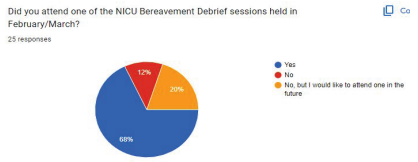
RESULTS

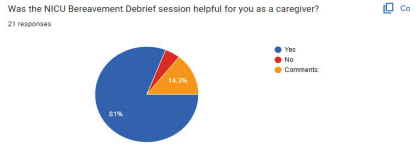
Table 1 Neonatal Intensive Care Unit bereavement debriefing session	
Welcome and Introductions	Purpose of BD reviewed Invite participants to introduce self and Describe role with family
Basic Facts	Review events at the time of death
Case Review	What was it like caring for the patient? What was the most distressing aspect of this case? What was the most satisfying aspect of this case?
Emotional Components of the case	What will you remember most about the patient and or family?
Grief Responses	Please describe what you have been Feeling, thinking and doing since the death
Wellness strategies for navigating grief	How are you taking care of yourself so you can continue to provide care for other patients and families? Review healthy grieving strategies Review available resources
Reflection	What lessons did we learn from caring for this patient?
Conclusion	Acknowledge and validate care provided to this patient and family

Table

Questions to Facilitate Interaction
What brought you to this field in nursing?
Did you expect there to be this amount of illness, trauma and/or death?
What do you do with your emotions, (especially while witnessing a family) when a child dies?
What do you do with your emotions afterward?
Have you experienced death before working here?
What do you believe happens after a body expires?
How do you manage when you have no control, there is nothing to do but allow for a (peaceful) death. (death is imminent)
How do you transition from work to home after a normal day/ or after a death?
Do you have self care rituals to calm your mind and body after a stressful day/or after a death?
Do you have self care rituals to calm your mind and body after a stressful day/or after a death?
Do you have self care rituals to calm your mind and body after a stressful day/or after a death?
Where do you find people to support you/to witness and share your grief?
Do you have a spiritual tradition or practice?







LIMITATIONS

- Small sample size
- Infrequent event
- Timing of death to first debrief.
- Time set aside to debrief for ALL staff members

CONCLUSIONS

- Being present as a team helps with the healing inside each of us.
- Interdisciplinary views allow all to acknowledge

NEXT STEPS

- Allow volunteer dogs to come into the lobby for staff (RN/Medical/Ancillary)
- Install televisions in each section with calming music and nature pictures, for example.YOUTube, (relaxing music) or WeCare
- EAP counseling referrals as needed
- Schedule staff support quarterly.

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REVAMPING NEONATAL NURSE TRANSPORT TRAINING FOR THE NEXT GENERATION

Sarah Viray, BSN, RNC-NIC; Lindsey Young, MSN, RNC-NIC;
Jessica Bothie, BSN, RN; Agne Worthen, BSN, RN

Loyola University Medical Center, Maywood, IL

INTRODUCTION

The transport of neonates from one hospital to another is a high risk situation in which nurses have increased responsibility with limited resources or support. Our Neonatal Intensive Care Unit (NICU) trains the majority of its clinical staff to participate in these transports via ambulance and helicopter, rather than utilizing a dedicated transport team or outside party. Due to a recent surge of new hires, the increased demands of training the next generation of nurses for this specialized task necessitated a change in our education process. By streamlining information, reorganizing materials, and utilizing mock transport simulations, we were able to successfully implement new training guidelines.

BACKGROUND

Loyola's level III NICU is one of ten perinatal centers in the state of Illinois and was designed to be a regional transport center for critically ill infants in the Chicagoland area. However, the frequency and consistency of these transports have declined in recent years due to the increased number of NICUs, limiting field training opportunities. There has also been a rise in staff turnover rates throughout the medical field. This has caused a change in the demographics on our unit as the ratio of inexperienced to experienced nurses has multiplied.

Our standard process of training new nurses for transport proved to be unsustainable and time-consuming. As a result, each shift had fewer trained nurses available for transport, which made staffing the unit difficult at times.

These guidelines were formed years ago when our team would be dispatched to a local hospital and often had to fully stabilize critical patients prior to transport. More experience was needed before sending our nurses into those situations. However, perinatal training of staff at these outlying facilities has resulted in most of the infants having already been stabilized, requiring far less intervention on our part as we prepare the infant for travel.

A committee was formed to review our training process and design a new program to maximize field training opportunities.

REVIEW COMMITTEE

- NICU Nurse Manager
- NICU Clinical Nurse Leader
- NICU Nurses
- NICU Medical Director

TRANSPORT PROTOCOL

TRANSPORT REQUIREMENTS

- One year experience in a NICU; at least 6 month's in Loyola NICU; ≥ 0.5FTE
- Attendance at an in-person S.T.A.B.L.E. Course

PREVIOUS TRAINING PROTOCOL

- Four hours of didactic transport class taught by Clinical Nurse Leader
- Two ambulance transports with a nurse preceptor

PROPOSED CHANGES

- Two hours of didactic transport class
- Two hours of mock transport simulations
- One ambulance transport with a nurse preceptor

PLAN OF ACTION

- Streamline education using technology
- Recruit staff nurses who regularly go on transport to teach classes
- Assign newer nurses more admissions, critical patients, and high-risk deliveries to increase their experience and confidence
- Utilize mock transports to simulate the experience, including documentation
- Send nurses on a supervised transport as soon as possible after class
- Preceptor will serve as a resource while nurse trainee completes all tasks

TRANSPORT TEAM RESPONSIBILITIES

- NICU Registered Nurse (RN)
  - Receive report upon arrival at outside hospital
  - Assess infant, secure tubes/lines, draw labs and provide medications
  - Secure infant in transport incubator
  - Vital signs at least every 15 minutes
  - Documentation
- NICU Physician
  - Accept transport and communicate with outside hospital
  - Review plan of care and obtain consents from parents
  - Perform any necessary procedures to stabilize infant
- NICU Respiratory Care Provider (RCP)
  - Assess infant and stabilize airway
  - Program and monitor ventilator/oxygen on transport incubator
  - Assists with patient care, as qualified

TRAINING PROCESS

CLASSROOM EDUCATION

- Review the transport process including:
  - Legal aspects, including policies
  - Team member responsibilities
  - Equipment and supply review
  - Infant stabilization
  - Medication quiz
  - Documentation
- Review of various procedures and special situations
  - Umbilical lines, pneumothorax, needle aspiration, chest tubes
  - Extremely low birthweight infants
  - Hypoxic ischemic encephalopathy and whole body cooling
  - Congenital cardiac and genetic anomalies
  - Abdominal wall and spinal defects
- Transport Test completed with at least 85%

MOCK TRANSPORT SIMULATIONS

- Mimic environment at outside hospital
- Various scenarios are utilized to practice skills and procedures
- Trainee obtains report from course instructor
- Trainee performs the following interventions:
  - Nursing assessment
  - Obtain supplies from transport bag/medication box
  - Stabilization of infant for transport (i.e. secure lines/tubes)
  - Perform skills (i.e. IV access, blood work, secure airway)
  - Secure infant in transport incubator and sets monitors
  - Documentation

OUTCOMES

After implementing the training process, we were able to efficiently train nurses in less time.

STAFF FEEDBACK

- Realistic scenarios in a less stressed environment
- Hands-on approach to build muscle memory
- Documentation experience to help eliminate confusion
- Improved turnaround time with supervised experience(s) after transport class
- Increased confidence in skills
- Decreased burden on senior staff

ACKNOWLEDGEMENTS

We would like to thank our Leadership Team for acknowledging the need for change in training. Many thanks to our seasoned transport nurses for their patience and feedback while the new guidelines were established. Finally, thank you to the next generation of Loyola NICU nurses who rose to the challenge as the strong nurses we are training them to be, successfully completing transport training in record time.

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Reducing Unplanned Extubations in the Neonatal Intensive Care Unit (NICU)

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ECU HEALTH Maynard Children's Hospital

BACKGROUND

The endotracheal (ET) tube provides a stable airway for critically ill neonates on mechanical ventilation. Unplanned extubation (UE) is the unintended removal or dislodgement of the ET tube. UEs are common, with incidences reported from **0.14 to 6.6 per 100 ventilator days**. NICU has a higher rate than other critical care units due to anatomical differences in very small infants. A target of **≤1.0 UEs per 100 ventilator days** is a reasonable goal for institutions working to improve their UE rates.

PROJECT AIM

Aim is to decrease the unplanned extubation rate from 2.11 to 1.5 per 100 endotracheal tube device days within 6 months.

PROJECT DESIGN/STRATEGY

Multidisciplinary UE committee was created in March 2023 to identify the best practice interventions.

↓

With a key driver diagram, multiple PDSA (plan-do-study-act) cycles were planned to address key drivers.

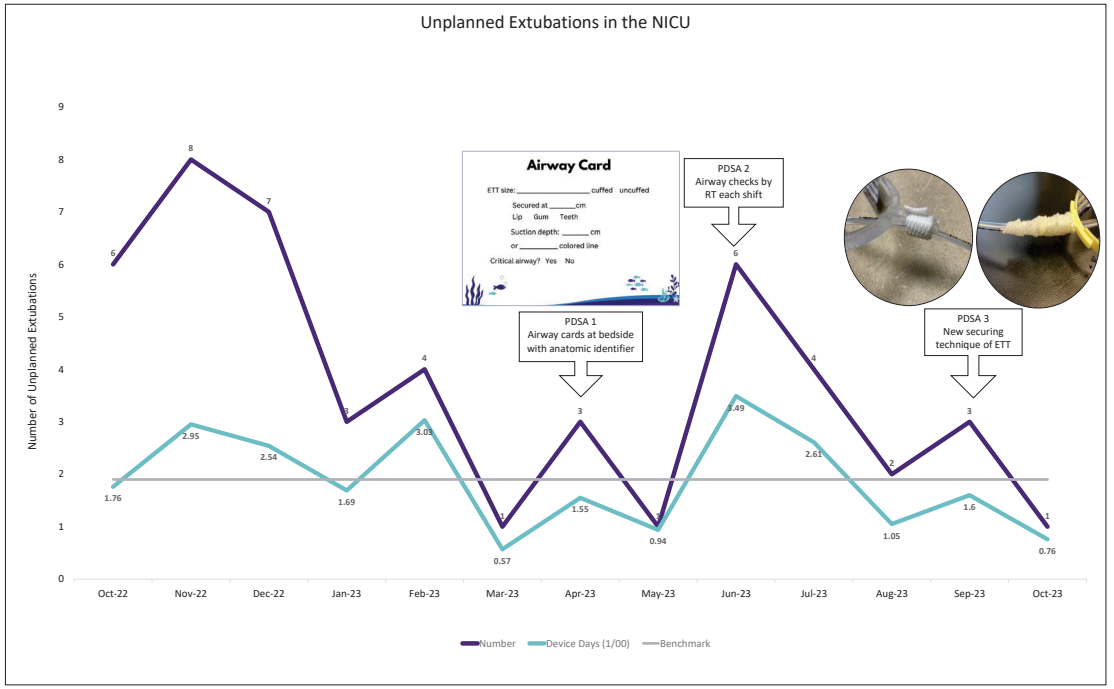
↓

Data from the safety event reporting system is the source of all unplanned extubation events.

↓

Implementation of a standardized drill-down form to be completed by the RT & RN during the unplanned extubation.

CHANGES MADE (PDSA CYCLE)



RESULTS/OUTCOMES

- The number of unplanned extubation events has decreased from 29 to 19 in the last six months after implementation.
- The unplanned extubation rate has decreased from **2.11** to **1.89** in the last six months.
- The Outcome measure was the number of UE rate per 100 intubated days.
- Process measures included immediate root cause analyses for UE events, adding the airway card for intubated infants, two staff members for hands-on care or procedures, and using the endotracheal tube new securement technique.
- Balancing measures included ET securement technique revisions during intubation.

LESSONS LEARNED

- Encourage all team members to submit safety intelligence reports for unplanned extubation
- Perform a Multidisciplinary Team Review of All Events:
  Conducting thorough root cause analysis for each unplanned extubation event to identify contributing factors and receive individual stakeholders' perspectives.
- Prolonged duration of intubation, shorter trachea, uncuffed ET tube, and possibly less sedation increase the risk of UE for infants under 28 weeks of gestational age. Specific interventions are needed to mitigate this risk in this age group.

NEXT STEPS

- Timely extubation is one of the most effective ways to prevent UE; the plan is to merge the two initiatives.
- Fostering a safety culture within the NICU, all staff members feel empowered to speak up about safety concerns, report incidents or near misses without fear of reprisal, and actively participate in QI initiatives to reduce UE events.
- Continue standardizing interventions, considering factors such as gestational age, respiratory status, ventilation modality, and developmental stage to minimize the risk of UE while optimizing overall outcomes.

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Novel biomarkers for early and accurate detection of necrotizing enterocolitis in infants born prematurely

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Abstract

Necrotizing enterocolitis (NEC) is an inflammatory disease affecting the intestinal tract of infants born prematurely. It is one of the most common complications of prematurity, resulting in increased morbidity and mortality due to unchecked pathogenic bacterial growth. The median time between death and x-ray diagnosis is 1 day and, currently, there are no reliable molecular methods to predict the onset of NEC. This study aimed to determine the potential of intestinal alkaline phosphatase (iAP) as a predictive biomarker for NEC. Fecal samples were obtained prospectively from infants born prematurely in neonatal intensive care units at four hospitals. More than 100 clarified stool samples from case patients were compared to 200+ age-matched controls. Biospecimens were analyzed for iAP abundance, iAP enzyme activity, and total fecal protein concentration. Analyses of age-matched NEC and control samples showed increased iAP abundance and decreased enzymatic activity directly correlate with NEC diagnosis 3 days before x-ray and hazard ratio of 6. Association of iAP with moderate and severe forms of the disease suggested that iAP can be a diagnostic tool accurate and specific for NEC detection in asymptomatic infants. If confirmed with a larger study, iAP biomarkers could assist nurses with identifying at-risk infants earlier.

We prospectively enrolled 259 premature infants at four hospitals from 2015-2021

Table 1. Clinical characteristics of NEC cohorts. Data are median *(IQR)* or n. Using appropriate method (ANOVA, Kruskal-Wallis test, Fisher's exact test, or Student's t-test) to compare difference among three groups and an α value of 0.05, *p*-values ≤ α support that there are statistically significant differences between the three infant populations. Statistically meaningful *p*-values are shown in bold.

Clinical measure	advanced NEC	early NEC	non-NEC controls	*p*-value
Birthweight (g)	855 *(700-1380)*	940 *(790-1190)*	1100 *(845-1380)*	0.28
Gestational age (wk)	27.6 *(24.7-31.1)*	28.0 *(26.0-29.4)*	28.7 *(26.4-31.6)*	0.48
Sex				0.39
male	13 *(52%)*	12 *(63%)*	42 *(46%)*	
female	12 *(48%)*	17 *(37%)*	49 *(54%)*	
Race/ethnicity				0.08
African American	10 *(40%)*	14 *(74%)*	63 *(69%)*	
Caucasian	13 *(52%)*	5 *(26%)*	24 *(26%)*	
Hispanic	2 *(8%)*	0 *(0%)*	2 *(2%)*	
Other	0 *(0%)*	0 *(0%)*	2 *(2%)*	
Age of first NEC episode				
PCA (wk)	33.9 *(31-35.7)*	29.4 *(28.4-30.9)*	N/A	**0.02**
weight (g)	1620 *(1110-2050)*	1015 *(860-1377)*	N/A	**0.0006**
# sepsis co-morbidity	9 *(35%)*	4 *(21%)*	13 *(14%)*	0.24
Total # blood transfusions	5 *(2-11)*	5 *(1-6)*	0 *(0-3)*	**<0.0001**
Exposure to human milk				0.31
0%	4 *(16%)*	3 *(16%)*	8 *(9%)*	
<10%	4 *(16%)*	0 *(0%)*	10 *(11%)*	
10-50%	4 *(16%)*	2 *(10%)*	19 *(21%)*	
≥51%	13 *(52%)*	14 *(74%)*	54 *(59%)*	

- Thirty-eight infants were diagnosed with advanced NEC (Bell stage II/III), 28 with early NEC (stage I), and 193 were non-NEC infants. Twenty-six infants had sepsis and 15 had non-GI infection.
- There were no statistically significant correlations with birthweight, gestational age, race, Apgar score, or human milk exposure between development of NEC with *pneumatosis intestinalis*, suspicion of NEC, and control patients.
- The only meaningful clinical association with NEC was post conceptual age, supporting the model that the disease develops after birth.
- Over 2,500 stool specimens were obtained, and 4,200 assays were completed on 600 of them. We compiled 5,400 demographic and general disease course characteristics. Lastly, we collated 163,200 entries regarding their hospital stay.

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Introduction

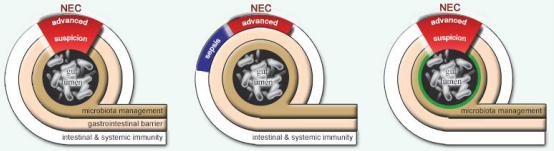


Figure 1. The identity of key players in gut lumen homeostasis that give rise to NEC age-dependence is unknown[1]. ***(A)*** NEC is correlated with several physiological and structural processes in the gut (top panel) and is most prevalent between 26-35 wks postconceptual age (bottom panel). ***(B)*** Current research effort to develop a NEC biomarker has focused on proteins in immunity cascades, which invariably are not specific for NEC, and in dysbiosis of the microbiome. ***(C)*** Our approach focused on host proteins involved in microbiota management. ***Reproduced from Heath et al. JAMA Open XXXX***

- Neonatal necrotizing enterocolitis (NEC) is a gastro-developmental disorder[1].
- Currently, diagnostic tools are limited. X-ray determination of pneumatosis intestinalis and/or portal air is used for diagnosis of advanced disease and lacks sensitivity (as low as 44%)[2].
- Proteins involved in intestinal and systemic inflammation are not specific markers for NEC; detection of inflammation biomarkers signal late stages of disease process and inflammatory damage[3,4].
- Although structural features of the gastrointestinal tract are largely in place at birth, candidate links to NEC are proteins in the microvilli that are responsible for functional maturation and adaptation to mutualistic microorganisms, when the infant in the extra-uterine environment[5].
- Our hypothesis is that **intestinal alkaline phosphatase (iAP)**, involved in microbiota management, can be used to detect NEC earlier and allow for disease reversibility.

iAP measures identified advanced disease and early disease not observable by x-ray

- Cross-sectional analysis showed that high iAP content shed in gut lumen is always associated with NEC and has no correlation with sepsis or other non-GI infections.
- The absolute level of iAP activity was always lower for all infants diagnosed or suspected of NEC.

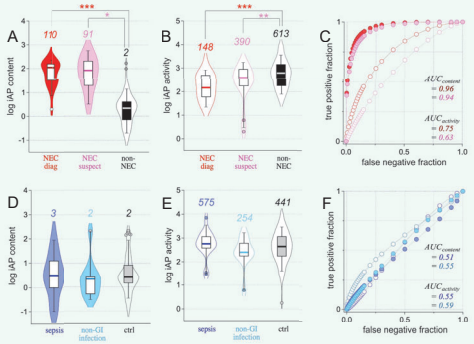


Figure 2. High iAP content and low iAP activity are linked with advanced stages of NEC and NEC suspicion[1]. Medians of relative iAP content ***(A)*** and for iAP activity ***(B)*** are shown for samples collected in the clinical window of NEC diagnosis (red horizontal line) and of NEC suspicion (pink horizontal line). Samples from non-NEC patients (black), at the average post-conceptual age for NEC diagnosis and suspicion, are also shown. Turkey IQR (boxes) were used to define outliers (circles) as hinge ± 1.5xIQR; there were no far outliers. Whiskers on the box plots are marked the 9th and 91st percentiles. Box plot is superimposed on a violin plot (solid color), which uses a kernel density estimate, and shows that the data distribution is continuous and not bimodal. Number of asterisks denote ten-fold differences in *p*-value, which was determined by 2-sided t-test and with unequal variance. In *(A)*, *p*-value for *** and for * is 0.0003 and 0.0124, respectively; in *(B)*, *p*-value for *** for ** is 0.0002 and 0.0064, respectively. ***(C)*** Receiver operator curves of the iAP content in samples collected during NEC diagnosis (filled red circles) and NEC suspicion (filled pink circles). Also shown are ROC curves for iAP activity in samples collected while infant was diagnosed with NEC (open red circles) or was suspected of having NEC (open pink circles). Medians of relative iAP content ***(D)*** and for iAP activity ***(E)*** are shown for samples collected during sepsis (dark blue) or other non-GI infection (light blue). Samples from control patients (black), at the average post-conceptual age for sepsis and non-GI infections, are also shown. ***(F)*** ROC curves of the iAP content (filled symbols) and iAP activity (open symbols) in samples collected in the clinical window of sepsis (dark blue) and other non-GI infections (light blue). Also shown are ROC curves N=14-91.

Multiplexed measures increased hazard ratio and earlier disease detection in asymptomatic infants

- Increased levels of iAP in stool occurs on average 3.3 days earlier than x-ray diagnosis of NEC.
- If iAP abundance and iAP activity are multiplexed, it increases the average number of days that a patient with NEC can be diagnosed in advance of x-ray to 4.9 days.
- An asymptomatic patient with elevated iAP abundance has a 6-fold higher likelihood of developing NEC while a patient with an elevated multiplex score is 19 times more likely to develop NEC.

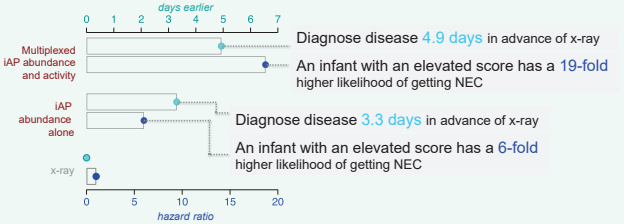


Figure 3. Samples collected longitudinally from 91 patients were analyzed to determine the likelihood a patient would develop NEC prior to x-ray diagnosis. iAP abundance alone and iAP abundance combined with iAP activity were assayed. The average number of days prior to x-ray diagnosis that a patient's stool had elevated amounts iAP compared to controls was determined. The number of days prior to x-ray diagnosis that a patient had an elevated abundance of iAP with significantly reduced iAP activity was also compared to controls. A hazard ratio was calculated to determine the fold likelihood that iAP abundance alone or multiplexed iAP abundance and activity could be used to indicate the likelihood of disease.

Conclusions

- Both iAP abundance alone and a multiplexed iAP score are promising candidates for early diagnoses of preterm necrotizing enterocolitis
- Several different types of opportunities would become available for clinical end users if a simple method for early and more accurate NEC diagnosis was available.

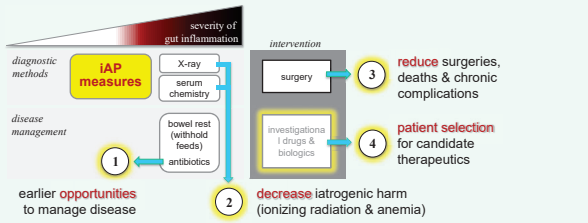


Figure 4. Potential patient benefits and clinical opportunities from earlier and more accurate diagnosis of NEC. Preemie standard of care requires new methods to monitor NEC disease. The gold standard for diagnosis is x-ray and identifies only 44% of advanced NEC cases. Disease management choices in mid-to-advanced NEC are shown. Numbered circles, highlighted with yellow, mark potential changes in clinical workflow and outcomes from use of our proposed biomarker. Dark and light blue arrows show immediate benefits and clinical advances for patients, respectively.

Acknowledgements

This work is dedicated to the patients and families who participated in this study. The staff and nurses at Children's Hospital of New Orleans, Touro Infirmary, and Washington University are recognized for their valuable research assistance and commitment to the infants in the neonatal intensive care units. SK is founder of a spin-out company, Chosen Diagnostics Inc, whose business interests are related to this project; the company has license from LSU Health for the diagnostic applications. This work was supported by the National Institutes of Health (R01GM097350 to SK; K08DK101608, R03DK111473 and R01DK118568 to MG), National Science Foundation (IIP-1713220 and IIP-1547932 to RB and SK); March of Dimes (5-FY17-79 to MG), Louisiana Board of Regents (LEQSF-RD-D-07 to SK), LSU LIFT2 (HSCNO-2017-LIFT-006 to SK), Children's Discovery Institute of Washington University and St. Louis Children's Hospital (MG), Department of Pediatrics at Washington University School of Medicine, St. Louis (MG), LSU School of Medicine (BB, SK, and MH), and LSU Health Foundation (MH, ZG, and SK).

Retinal Camera Use Within ROP Programs

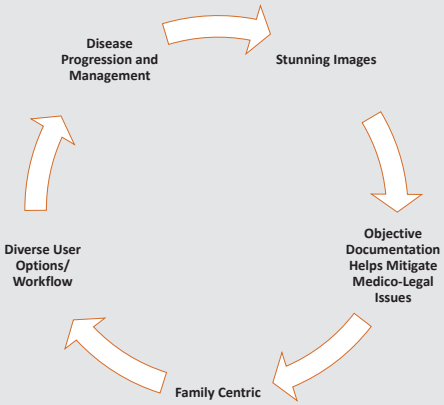
Amy Law BSN, RNC-NIC

September 2024

Introduction

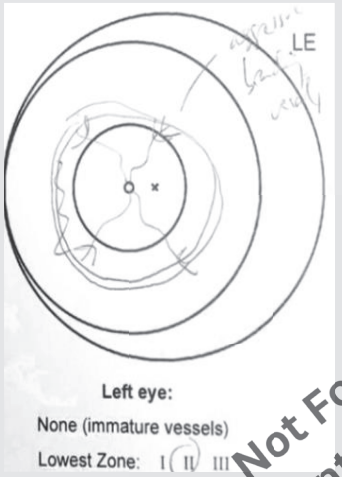
- Recent technological advancements have resulted in increased use of retinal cameras in NICUs.
- This use is evolving quickly and becoming widespread as a standard of care.
- A camera can optimize your ROP program and is often used in conjunction with current practices.
- It helps by improving and aiding in overall disease diagnosis/progression, providing education for both clinicians and (importantly) families, and assisting with a valuable nursing workflow.
- These advances have also brought about the critical advantage of objective documentation which has proven paramount and highly sought after in healthcare climates.

Advantages and Benefits

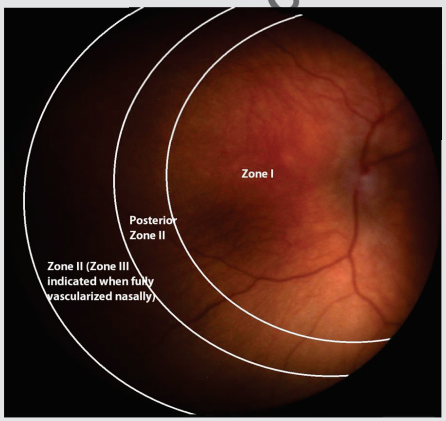


ROP Zones Annotation Comparison

Hand Drawn ROP Zones



ROP Zones from a Fundus Image



Results

Descriptive characteristics of premature newborns screened for ROP by binocular indirect ophthalmoscopy versus wide-field fundus camera [1]

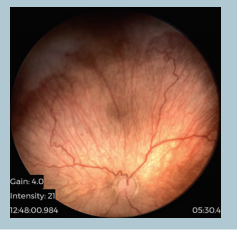
	Binocular indirect ophthalmoscopy (Year 2014) n=159	Wide field fundus camera (Year 2019) n=138	P-value
Demographic data			
Term (PMA) (weeks), Mean (SD)	27.9 (2.1)	26.5 (2.1)	<0.0001
Term 23-27+6 PMA, No. (%)	64 (41)	101 (73)	0.0035
Term 28-32+6 PMA, No. (%)	95 (59)	37 (27)	0.0004
Male gender, No. (%)	78 (48.7)	67 (48.2)	>0.99
Hospitalization duration (days), Mean (SD)	73.52 (31.5)	76.38 (30.4)	0.43
Multiple births, No. (%)	56 (35.0)	31 (22.3)	0.02
Nutritional status			
Birth weight (g), Mean (SD)	1061 (345.8)*	908.6 (263.3)	<0.0001
Weight gain to day 28 (g) / Birth weight (Kg), Mean (SD)	437.7 (142.6)#	404.6 (148.6)*	0.05
Human milk feeding, No. (%)	151 (96.2)*	132 (95.0)	0.78
Respiratory status			
Hyaline membrane disease, No. (%)	116 (73.0)	98 (71.0)	0.80
Oxygen therapy duration (days), Mean (SD)	50.64 (35.4)	57.82 (32.3)	0.07
Mechanical ventilation, No. (%)	115 (71.9)	96 (69.1)	0.62
Mechanical ventilation duration (days) , Mean (SD)	6.25 (9.0)†	8.3 (10.4)‡	0.07
Treatments			
Caffeine treatment, No. (%)	150 (93.7)	136 (97.8)	0.09
Postnatal corticosteroid therapy, No. (%)	6 (3.7)	7 (5.0)	0.78
Prolonged inotropic therapy, No. (%)	8 (5)	13 (9.4)	0.17
Other comorbidities			
Late onset sepsis, No. (%)	45 (28.1)	41 (29.5)	0.80
Necrotizing enterocolitis, No. (%)	13 (8.1)	20 (14.4)	0.09
Intraventricular hemorrhage (any grade), No. (%)	44 (27.5)	27 (19.4)	0.10
Grade 3 and 4, No. (%)	3 (1.9)	12 (8.7)	0.01
Hematological status			
Thrombocytopenia, No. (%)	84 (52.5)	74 (53.2)	0.91
Anemia, No. (%)	127 (79.4)	119 (85.6)	0.17
RBC transfusions, No. (%)	88 (55.0)	94 (67.6)	0.03
Number of RBC transfusions from birth to Day 28, Mean (SD)	1.182 (1.4)	1.489 (1.5)‡	0.08
Erythropoietin treatment from birth to Day 28, No. (%)	138 (86.2)	115 (83.3)	0.52
Biological status			
Maximal glycemia from birth to Day 28 (mMol/L), Mean (SD)	9.263 (4.1)#	10.48 (4.0)‡	0.01
Insulin therapy, No. (%)	59 (37.1)	68 (48.9)	0.05
ROP status			
Number of fundus examinations, Mean (SD)	2.688 (1.8)*	2.449 (1.8)	0.26
Patients with ROP diagnosis (any grade), No. (%)	11 (6.9)	46 (33.1)	<0.0001
Patients with referral warranted ROP, No. (%)	0 (0)	5 (10.9)	0.57

SD= standard deviation, PMA= post menstrual age, RBC= red blood cells, ROP= retinopathy of prematurity. *=Data missing for 2 patients, # =Data missing for 4patients, †=,Data missing for 1 patients, ‡=Data missing for 3 patients

Summary

Wide-field Digital Eye Imaging vs. Binocular Indirect Ophthalmoscopy

- Objective Wide Field Image vs Narrow Hand Drawing
- Effectively Monitors Disease Progression Over Time
- Provides a Superior Platform to Obtain Second Opinions
- Empowers NICU to Control the Screening Process
- Reduce Revenue Loss From Needless Transfers
- Improves Education for Parents to Increase Compliance
- Objective Documentation Mitigates Risk of Medico-legal Action



In summary, Wide-field Digital Eye Imaging significantly enhances the capabilities of eye screening and monitoring, offering a more efficient and reliable method compared to traditional techniques. This advancement supports better healthcare outcomes and operational efficiencies in medical settings

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Targeted Fortification with Mother's Own Freeze-Dried Breastmilk for Improved Tolerance and Growth Maintenance

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[1]Milkify, Inc. Houston, TX [2]Pediatrix Medical Group, [3]Rev Bioscience, LLC, Boise, ID

Introduction

- Late preterm infants requiring fortified breastmilk to meet growth requirements are typically provided a cow's milk-based fortifier.
- As not all infants tolerate cow's milk-based nutrition, creating a need for better-tolerated and maternally-derived fortification options.
- The novel use of autologous freeze-dried breast milk (AFDBM), defined as human milk derived from the lactating parent offers the potential of an exclusive breastmilk diet via targeted caloric fortification.
- This is accomplished by adding AFDBM to freshly expressed milk to precisely increase caloric content under medical supervision.
- The use of the MIRIS Human Milk Analyzer evaluates the macronutrient content of maternal frozen and freeze-dried breastmilk, allowing for a customized and personalized fortification strategy for each baby.

Case Description and Intervention

S. M is a late preterm infant with history of oxygen requirement, atrial septal defect, cow's milk protein allergy, bloody stool, severe reflux and failure to thrive.

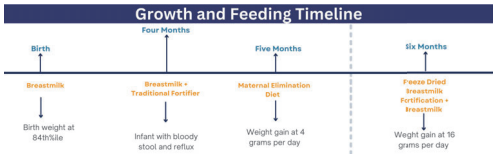
- Infant failed several formula fortification trials as demonstrated by recurrence of bloody stool and oral formula avoidance with subsequent weight loss.
- Maternal breast milk analyzed via the Miris Human Milk analyzer to determine macronutrient content of 24-hour pooled milk sample.
- With pediatrician and medical team support, family utilized AFDBM as fortification method.
- Breast milk powder combined with expressed maternal milk provided approximately 28 calories per ounce
- Freeze-dried breastmilk powder was also added to pureed table food for continued caloric enhancement
- Infant monitored closely for growth, feeding tolerance, bloody stool, and urine/stool output

Clinical Summary

Former 36 week infant girl with history of clinically significant reflux, bloody stool and cow's milk protein allergy provided autologous freeze-dried breast milk via contact free processing, which was subsequently used for caloric fortification.

Mother's breastmilk fortified with AFDBM to provide an additional 4 calories per ounce. Infant without recurrence of bloody stool, decreased episodes and volume of reflux, and attainment of expected weight gain after novel fortification method.

Growth and Feeding Timeline



Bioactive Factors and Nutrient Retention in Freeze-Dried Breastmilk

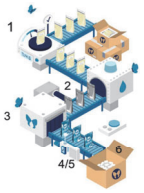
Nutrient	Measured Value Freeze-dried (g/100mL) (n=590 samples)	Mature Breast Milk Reference Value* (g/100mL)
Fat	3.9 +/- 0.8	3.2 +/- 1.0
Carbohydrates	7.9 +/- 0.6	7.8 +/- 0.9
True Protein	1.0 +/- 0.2	1.0 +/- 0.1
	Measured value kcal/100mL (n=590 samples)	**Mature Breast Milk Reference Value* (kcal/100mL)**
Calories	73 +/- 6.2	65 +/- 9.0

Average +/- SD. N=590 samples of powdered breast milk rehydrated according to package instructions (87% water). Samples were analyzed at Milkify using a Miris Human Milk Analyzer.
*Reference values are reported as average +/- SD from mature milk samples from term infants (Gidrewicz et. al. 2014)

Breast milk component	Biological significance	Effect of lyophilization
Human milk oligosaccharides (HMOs) and HMO profiles	Prebiotics, stimulate infant immune system, block pathogen binding/entry	No significant change
Vitamin C	Antioxidant	Mild reduction (~31%)
Catalase	Antioxidant	No significant change
Leptin, Adiponectin	Hormones involved in appetite and metabolic regulation	No significant change
Hepatocyte Growth Factor	Growth factor involved in intestinal development	No significant change
Lipase	Enzyme involved in fat metabolism	No significant change
Glycoproteins	Involved in immune function; block pathogen binding/entry	No significant change
Antibodies: IgA, IgG and IgM	Involved in immune function, IgA blocks pathogen binding and entry	Slight reduction (25% IgA, and 20% IgG and IgM)
Lysozyme	Enzyme with bactericidal properties	No significant change

Breastmilk Freeze-Drying Process

Step 1: Intake of frozen milk
Step 2: Preparation for freeze-drying
Step 3: Contact Less Freeze-drying
Step 4: Packaging and QC testing
Step 5: Nutritional analysis
Step 6: Milk returned to client



The Milkify facility is located in Houston, TX.
It is cGMP certified and FDA-registered:

FDA food facility registration: #16969346312
SGS cGMP certification: #US23/00000165

Use of Nutritional Data to Create Custom Fortification Recipe

- Frozen (non-freeze-dried) breast milk is tested from milk collected and pooled over a 24-hour period to establish a "baseline" composition.
- Breast milk powder is tested after freeze-drying.
- Macronutrient composition is analyzed using the FDA-approved MIRIS Human Milk Analyzer
  - Calories
  - Fat
  - Protein
  - Carbohydrates

Breast milk powder samples prepared for analysis on MIRIS

Breast milk powder measured out in the home setting

Nutrient	Value (per gram powder)	Value (per tbsp powder)
Fat	0.22 grams	1.48 grams
Carbohydrates	0.62 grams	4.16 grams
Protein	0.12 grams	0.80 grams

Targeted Fortification

Fortification Processing Timeline

- Client inquires about fortification with company and is referred to APN
- Client consults with APN regarding fortification needs
- Client places order for processing directly with company
- Frozen breast milk is shipped to processing facility using medical-grade shipping coolers provided by the company
- Milk is processed on an expedited schedule and returned to client
- Nutritional analysis is performed and sent to APN
- Fortification recipe is generated by APN based on Miris results and caloric target
- Recipe is sent to client and healthcare provider

* Entire process takes 1-2 weeks

This caloric fortification process has been used in >70 infants with no reported adverse effects or safety concerns.

Safety and Quality Checklist for Medical Providers

- ✓ Facility uses a Contact Less Method to ensure that breastmilk never touches utensils or equipment
- ✓ Facility is registered with the FDA as a Food Processing Facility
- ✓ Facility is cGMP Certified-ensuring that the processed product meets quality standards based on the intended use.
- ✓ Facility uses professional freeze-drying system for precision temperature control and water activity analysis to ensure safety and accurate shelf life
- ✓ Facility processes and packages ONLY breastmilk-no other food products
- ✓ Milk powder is handled within laminar flow hoods and no powder dispensers are used for packaging
- ✓ Facility meets or exceeds HMBANA Guidelines for milk holding, ensuring the milk is never thawed during processing
- ✓ Milk is processed one client at a time and milk is individually tracked with ID barcoding system
- ✓ Breastmilk is not bought or sold

Conclusion

Human milk from the lactating parent may be freeze-dried and used as an alternative caloric fortification strategy in select cases where cow-milk based formula or fortifiers are not tolerated or not preferred. Freeze-drying should be performed in a controlled environment using food-grade equipment and sanitation practices and fortification should be supervised by a medical professional. This caloric fortification process has been used in >70 infants with no reported adverse effects or safety concerns.

Next Steps and Ongoing Research Potential

Understand the mechanisms through which autologous fortification with FDHM have led to improvements in feeding tolerance. The impacts of FDHM on HMOs, the infant gut microbiome, and health outcomes may be further investigated to establish appropriate treatment regiments for specific classes of medically complex infants.

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