Lactation Milestones
Neonatal Intensive Care Unit

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Center for Clinical Excellence

Inclusion Criteria:
Infants admitted to NICU< 7 days of life or receiving human milk
* = If the parental goal is to direct breast/ chestfeed

- Begin Family-Centered Developmental Care Bundle (FCDC)
- Share Track My Milk (TMM) Program with parents
- Document Lactating Parent Goal
  - If parental goal changes at any point, Lactation Team will develop weaning plan, continue FCDC Bundle as appropriate

Is the goal to provide Human Milk (HM)?

- **No** → Continue FCDC Bundle
- **Yes** →
  - Lactating Parent to start **pumping or Direct Breast/Chestfeeding (DBF)** if medically appropriate
  - Staff encourages pumping/DBF every 3 hours
  - Bedside nurse to provide pumping supplies
  - Lactation team to complete pumping education

- **Provide Human Milk Oral Care if fresh milk available**
  - Sterile water oral care if fresh human milk is not available
- Dry pacifier when mouthing
- Upright/ventral holding with gavage feeds (**Skin-to-Skin (STS)** preferred)
- Continue FCDC Bundle as appropriate

<28 weeks PMA?

- **Yes** → back to Provide Human Milk Oral Care
- **No** → **NPO?**

NPO?

- **Yes** →
  - Continue FCDC Bundle
  - Dipped pacifier when showing pre-feeding readiness

  Expressed Human Milk (EHM) preferable to formula when available
- **No** → **Intubated?**

Intubated?

- **No** →
  - Promote Oral Stimulation:
    - **Dipped pacifier** when showing pre-feeding readiness, using Expressed Human Milk (EHM) preferable to formula when available
    - **Promote Non-Nutritive Breastfeeding*(NNBF)** if parameters are met
    - Initiate 1st NNBF session with trained staff
    - Run gavage feed during **NNBF**
  - Provide **STS** or hold baby during feeds when possible
  - Continue FCDC Bundle as appropriate

≥ 32 weeks PMA?

- **No** → back to Promote Oral Stimulation
- **Yes** →

Medical team decides patient is stable for oral feeding?

- **No** → back to Promote Oral Stimulation
- **Yes** →
  - Start oral readiness scores
  - Advocate for **1st PO feed at breast/chest***
  - **Discuss benefits of prioritized DBF practice experience with parent.**
  - Develop initial feeding plan and enter into Nutrition Communication section into EHR
  - Continue FCDC Bundle as appropriate

Readiness Scores = 2 for ≥ 50% of cares in 24 hrs?

- **No** → back to Promote Oral Stimulation
- **Yes** →
  - Notify Lactating Parent that infant is ready to start oral feeds
  - Encourage Lactating Parent to provide **1st oral feed** (support up to 24 hours for Parent to come for first feed)
  - **If parent desires to do Prioritized DBF & is able to be present 2+ feeds/day, enter Prioritized DBF order**
  - Reserve oral feedings as direct breast/chest feeds only for up to 72 hours
  - After 72 hours, progress to cue-based bottle and DBF (at least one DBF/day encouraged per infant cues)
  - **If parent desires to start with both DBF and bottles enter DBF & Cue-Based Feeding (CBF) orders**
  - Contact Lactation Team within 24 hours of oral feeding initiation to assist with individualized lactation plan)

Patient ready for Discharge home
If transferred to another hospital, lactation care to be assigned by receiving facility

- Referral for outpatient lactation follow-up
- Home going feeding plan (by Lactation and Medical team)
- Prioritize feeding human milk through the day of discharge

FAMILY-CENTERED DEVELOPMENT CARE BUNDLE

Consider for ALL ages as often as appropriate:

Assent for Donor Human Milk when eligible per policy
Family involvement in cares
Hand containment with cares and feeds
Skin to skin care (STS): focus on frequency, duration and synchronize with feeds
Discuss parental care strategies

Parameters for STS:

Please refer to the **NICU STS** policy for the most updated criteria.
All infants are eligible for STS except:
on ECMO
Silo
Fresh Tracheostomy/ Critical airway (until cleared by ENT)
Therapeutic Hypothermia

Requires an Order for STS:
Tracheo-Esophageal Fistula/Esophageal Atresia (Intubated)
Chest tube
Oscillator

Parameters for Non-Nutritive Breast/Chestfeeding (NNBF)*:

≥ 28 weeks PMA
Extubated
Physiologically stable on respiratory support
Showing pre-feeding readiness
Surgical patients must be discussed with Surgery Team prior to placing order
Discuss with medical team if arterial/umbilical line, chest tube, or aqua/PD catheter is present

Parameters for Prioritized Breast/Chestfeeding Practice (Prioritized DBF) when indicated:

Infant is ≥32 weeks PMA
Lactating parent is willing to participate for 2 or more feedings each day for a period of up to 3 days
Infant showing consistent readiness cues to begin Prioritized DBF per CBF protocol (scores “2” at 50% or more care times within a 24-hour period)
See individualized Lactation suggestions for gavage supplementation post DBF during Prioritized DBF
Even if infant shows readiness when lactating parent is not present, caregiver will hold infant and offer Non-Nutritive Sucking (NNS) with gavage feed when able to do so
Progress to cue-based breast/chest feeding including bottle feeding per family/medical team plan of care.
At least one DBF opportunity/day preferred post Prioritized DBF period

Track My Milk Program and Application:

The Track My Milk pumping log helps parents keep track of how much they pump (It’s a feature in MyChart, as part of the Track My Health)
By keeping track of milk production, the care team can help families reach their feeding goals

Legend:

PMA= Post Menstrual Age
*= If the lactating parent goal is to direct breast/chestfeed
Bolded= *Lactation Milestones*
TMM = Track My Milk Program
EHM = Expressed Human Milk
CBF = Cue Based Feeding
DHM = Donor Human Milk
DBF = Direct Breast/Chestfeed
Prioritized DBF = Prioritized Direct Breast/Chestfeed
NNBF = Non-Nutritive Breast/Chestfeed
NNS = Non-Nutritive Sucking (pacifier)
HM = Human Milk
STS = Skin to Skin care
Oral Care = immunotherapy, infection control strategy
Oral Stimulation = supports oral feeding success through NNBF or dipped pacifier

Lactation Algorithm

Inclusion and Exclusion Criteria

Inclusion criteria:

- Any infant admitted to NICU less than 7 days of life or receiving human milk

Exclusion criteria:

- Parent does not intend to provide human milk

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Assessment/Policies

- Human Milk Inpatient: Drugs of Abuse, Opioids and Other Harmful Substances Policy
- Human Milk Storage, Handling and Exposures Policy
- Storage and Utilization of Donor Human Milk (DHM) in the NICU
- Breast/Chestfeeding and Lactation in Neonatal Services Policy
- Use of Expressed Breast Milk for Oral Care
- Kangaroo Care (Skin-to-Skin Care)

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Recommended Treatments

- Direct breast/chestfeed (DBF) or pump within first 6 hours of delivery
- Introduce parents to Track My Milk Program and Application
- DBF (as able) or pump 8 times per day
- Encourage DBF **as first feeds and** as often as possible per lactating parent availability and medical stability
- Donor Human Milk (DHM) if parental milk is not available
- Follow medical team recommendations to support growth

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Treatments Not Recommended

- Routine use of formula feeds
- Restricting NNBF or DBF opportunities at breast/chest in medically stable patients

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Discharge Criteria & Planning

- Prioritize feeding human milk through the day of discharge
- Home going feeding plan provided by dietitians
- Follow Up with Outpatient Lactation

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Patient & Caregiver Education

- **Education on (In Appendix):**
- Providing the Safest Milk for Your Baby
- Caring for Your Baby Book
- Prioritized Direct Breast/Chestfeeding handout
- **Helping Hands Links:**
- Providing Human Milk for Your Hospitalized Baby
- Breast/Chestfeeding Helping Hand
- Breast Care and Expressing Milk Helping Hand
- Human milk for Your Hospitalized Infant: Electric Breast Pump Helping Hand
- Kangaroo Care for Your Infant Helping Hand
- Oral stimulation
- Pasteurized Donor Milk

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Risk Awareness & Zero Hero

- Human Milk Errors
  - Wrong milk to wrong patient
  - Incorrect fortification
  - Expiration of milk prior to use
- Human Milk Inpatient: Drugs of Abuse, Opioids and Other Harmful Substances Policy

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Key References

Skin-to-Skin Contact:

- Li L, Wang L, Niu C, et al. Early skin contact combined with mother's breastfeeding to shorten the process of premature infants ≤ 30 weeks of gestation to achieve full oral feeding: the study protocol of a randomized controlled trial. Trials. 2021;22(1).
- Niela-Vilén H, Melender HL, Axelin A, Löyttyniemi E, Salanterä S. Predictors of Breastfeeding Initiation and Frequency for Preterm Infants in the NICU. Journal of Obstetric, Gynecologic & Neonatal Nursing. 2016;45(3):346-358.

Hand Containment with cares/feeds:

- Pados, B. F., & Fuller, K. (2020). Establishing a Foundation for Optimal Feeding Outcomes in the NICU. *Nursing for Women's Health*, *24*(3), 202–209.
- Griffiths, N., Spence, K., Loughran-Fowlds, A., & Westrup, B. (2019). Individualised developmental care for babies and parents in the NICU: Evidence-based best practice guideline recommendations. *Early Human Development*, 104840.

Developmental care with parent involvement:

- Guillaume S, Michelin N, Amrani E, et al. Parents' expectations of staff in the early bonding process with their premature babies in the intensive care setting: a qualitative multicenter study with 60 parents. BMC Pediatrics. 2013;13(1). doi:10.1186/1471-2431-13-18

Human Milk Oral Care:

- Snyder R, Herdt A, Cepeda NM, et al. Early provision of oropharyngeal colostrum leads to sustained breast milk feedings in preterm infants. Pediatr Neonatol 2017;58:534–540.
- Sharma D, Kaur A, Farahbakhsh N, et al. Role of oropharyngeal administration of colostrum in very low birth weight infants for reducing necrotizing enterocolitis: A randomized controlled trial. Am J Perinatol 2020;37:716–721.
- Glass KM, Greecher CP, Doheny KK. Oropharyngeal administration of colostrum increases salivary secretory IgA levels in very low-birth-weight infants. Am J Perinatol2017;34:1389–1395

Dry and Dipped Pacifier:

- Bache, M., Pizon, E., Jacobs, J., Vaillant, M., & Lecomte, A. (2014). Effects of pre-feeding oral stimulation on oral feeding in preterm infants: a randomized clinical trial. *Early human development*, *90*(3), 125-129.
- Kaya, V., & Aytekin, A. (2017). Effects of pacifier use on transition to full breastfeeding and sucking skills in preterm infants: a randomised controlled trial. *Journal of Clinical Nursing*, *26*(13-14), 2055-2063.
- Davidson, J., Ruthazer, R., & Maron, J. L. (2019). Optimal timing to utilize olfactory stimulation with maternal breast milk to improve oral feeding skills in the premature newborn. *Breastfeeding Medicine*, *14*(4), 230-235.

Non-Nutritive Breast/chestfeeding:

- Fucile, Sandra, Emily Wener, and Kimberly Dow. "Enhancing breastfeeding establishment in preterm infants: A randomized clinical trial of two non-nutritive sucking approaches." Early Human Development 156 (2021): 105347.
- Narayanan I, Mehta R, Choudhury DK, Jain BK. Sucking on the "emptied" breast: non-nutritive sucking with a difference. Arch Dis Child. 1991;66:241–244.
- John, Hima B., et al. "Nonnutritive sucking at the mother's breast facilitates oral feeding skills in premature infants: a pilot study." *Advances in Neonatal Care* 19.2 (2019): 110-117.
- Khodagholi, Zahra, et al. "The effect of non-nutritive sucking and maternal milk odor on the independent oral feeding in preterm infants." *Iranian journal of child neurology* 12.4 (2018): 55.

First PO Feed at Breast/Chest:

- Casavant, S. G. , McGrath, J. M. , Burke, G. & Briere, C. (2015). Caregiving Factors Affecting Breastfeeding Duration Within a Neonatal Intensive Care Unit. Advances in Neonatal Care, 15 (6), 421-428.
- Briere C, Lucas R, McGrath JM, Lussier M, Brownell E. Establishing Breastfeeding with the Late Preterm Infant in the NICU. Journal of Obstetric, Gynecologic & Neonatal Nursing. 2015;44(1):E1-E2.

Prioritized Breast/chestfeeding Practice (also known as Protected Breastfeeding Practice):

- Phillips R, VanNatta D, Chu J, Best A, Ruiz P, Oswalt T, Wooldridge D, Fayard E. Breastfeeding Practice Before Bottle-Feeding: An Initiative to Increase the Rate of Breastfeeding for Preterm Infants at the Time of Neonatal Intensive Care Unit Discharge. Crit Care Nurs Clin North Am. 2024 Jun;36(2):251-260.
- Hilditch C, Rumbold AR, Keir A, Middleton P, Gomersall J. Effect of Neonatal Unit Interventions Designed to Increase Breastfeeding in Preterm Infants: An Overview of Systematic Reviews. Neonatology. 2024;121(4):411-420.

Direct Breast/Chestfeeding:

- Pineda R. Direct breast-feeding in the neonatal intensive care unit: is it important? Journal of Perinatology. 2011;31(8):540-545.
- Briere CE, McGrath JM, Cong X, Brownell E, Cusson R. Direct-Breastfeeding Premature Infants in the Neonatal Intensive Care Unit. Journal of Human Lactation. 2015;31(3):386-392.
- KH, Sjoden O, Ewald U. The development of preterm infants' breastfeeding behavior. Early Hum Dev. 1999;55:247–264.
- Lucas, Ruth F., Rebecca L. Smith, and Sheila Gephart. "When is it safe to initiate breastfeeding for preterm infants?." *Advances in neonatal care* 15.2 (2015): 134-141.
- Maastrup, Ragnhild, et al. "Breastfeeding progression in preterm infants is influenced by factors in infants, mothers and clinical practice: the results of a national cohort study with high breastfeeding initiation rates." *PloS one* 9.9 (2014): e108208.

Development of a Feeding/Supplementation Plan:

- Noble, Lawrence M., et al. "ABM Clinical Protocol# 12: Transitioning the breastfeeding preterm infant from the neonatal intensive care unit to home, revised 2018." *Breastfeeding Medicine* 13.4 (2018): 230-236.
- Davanzo, Riccardo, et al. "From tube to breast: the bridging role of semi-demand breastfeeding." *Journal of human lactation* 30.4 (2014): 405-409.
- White, Ali, and Katy Parnell. "The transition from tube to full oral feeding (breast or bottle)–A cue-based developmental approach." *Journal of Neonatal Nursing* 19.4 (2013): 189-197.

Quality Measures

- GOAL: Successful Lactation across a continuum that starts with early initiation of breast stimulation (either pumping or DBF) followed by multiple milestones as emphasized in this pathway eventually leading to successful long-term provision of HM.
- Our goal in this pathway is to enhance compliance with each milestone when clinically applicable to eventually lead to successful long-term provision of HM.
- Rate of HM@ Discharge: Increase percentage of infants (admitted less than 7 days of age and discharged before 120 days) receiving human milk HM [#] at discharge from NICU by a target of 10% from baseline.
- Rate of Human Milk[#] at Discharge stratified by race; sex; insurance; ethnicity
- Oral care: Rate of infants <28 weeks PMA receiving HM[#] receiving daily oral care.
- DBF: Rate of any direct breastfeeding during hospitalization completed in infants (admitted less than 7 days of age and discharged before 120 days of age) receiving human milk (HM) [#]?
- Balancing Measure: HM Errors: The number of human milk administration errors in infants in the NICU

[#]*to include lactating parent's milk, and exclude donor milk unless from a gestational surrogate*

Lactation Algorithm

Potential Areas for Research

- Factors that decrease disparities among human milk feedings at discharge
- Assess for disparities and barriers to provision of donor human milk

Lactation Algorithm

Pathway Team & Process

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Advisory Committee Date: *December, 2022*

Origination Date: *December, 2022*

Revision Date: *July 2025*

Next Revision Date: *July 2028*

Clinical Pathway Development

This clinical pathway was developed using the process described in the NCH Clinical Pathway Development Manual Version 6, 2022. Clinical Pathways at Nationwide Children's Hospital (NCH) are standards which provide general guidance to clinicians. Patient choice, clinician judgment, and other relevant factors in diagnosing and treating patients remain central to the selection of diagnostic tests and therapy. The ordering provider assumes all risks associates with care decisions. NCH assumes no responsibility for any adverse consequences, errors, or omissions that may arise from the use or reliance on these guidelines. NCH's clinical pathways are reviewed periodically for consistency with new evidence; however, new developments may not be represented, and NCH makes no guarantees, representations, or warranties with respect to the information provided in this clinical pathway.

For more information about our pathways and program please contact:
ClinicalPathways@NationwideChildrens.org

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Appendix

Clinical Nutrition Lactation

Providing the Safest Milk for Your Baby

Your baby deserves the best start and every drop counts! We know that your milk is the very best nutrition for your baby. We encourage you to eat a well-balanced, healthy diet when you are providing breast milk. Do not be afraid to start breastfeeding or pumping because of the medicines you are taking.

Over the Counter Medicines:

- Some over the counter medicines and herbs can cause side effects in your baby.
- Some over the counter medicines and herbs can decrease your milk supply.
- Medicines that dry up your nose may also dry up your milk supply. You should not take medicines that contain "pseudoephedrine" (i.e. Sudafed, Claritin D) because they can dry up your milk supply.
- Check the ingredients in all over the counter medicines before you take them.
- To learn more about medicines and breastfeeding:
  - Visit the http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?LACT – this is the "Drugs and Lactation Database."
  - You can search "Lactmed" on your computer's search engine.
  - "Lactmed" is also a free app you can download on your smartphone!

Recreational Drugs:

- Only take medicines as prescribed when providing breast milk.
- Alcohol can pass through breast milk to your baby. Talk to your baby's doctor or a lactation consultant if you plan on drinking alcohol.
- Smoking can decrease your milk supply. Ask your doctor if you want help quitting.
- If you use recreational drugs, you must agree to stop using them while you are providing breast milk. Please only bring SAFE MILK to the hospital for your baby (milk that you pumped while not using drugs).
- If you use only medicines (such as Methadone, Subutex® or Suboxone®) prescribed by your doctor, your milk will be fed to your baby and you can breastfeed when your baby is ready.

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Prescription Medicines:

- Most medicines that your doctor tells you to take during pregnancy are safe to take while breastfeeding.
- It is safe to start breastfeeding and pumping while we help you get information about your specific medicines.
- Be sure to tell the baby's doctor all of the medicines you are taking and the current dose. Tell the doctor if there are any changes to your medicines.
- Your baby's doctor will closely monitor your baby for side effects of the medicines and will make recommendations as needed.
- Radiology Tests (CT or cat scans, MRI, x-rays, etc.)
  - Some dyes can enter breast milk and require a temporary hold on breastfeeding.
  - If you need a medical test and will be exposed to a dye, do not pump and dump. Save the milk and label it. Talk to the Lactation Team or your baby's doctor before that milk is given to your baby.

Milk Sharing:

- Give YOUR baby the benefit of YOUR breast milk. We only accept Moms' OWN milk.
- Sharing breast milk is not safe.
- Studies show that breast milk shared on the internet can have high levels of bacteria in it even if they say it is "safe".
- Most people do not know how to properly ship milk to make sure it stays cold and does not leak.
- If donor milk is needed, talk to your baby's doctor. We use the OhioHealth Mother's Milk Bank. They are a nationally recognized organization and will pasteurize the donated milk.

Contact your lactation team if you have any questions or concerns.
(614) 722-5228

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