WHITE PAPER

A Milk Safety for Preemies Primer: Keeping Your Most Vulnerable Patients Safe

by Grace Dwyer, MS, MA, RD, IBCLC

NICU clinicians know that **milk is "medicine"** for their littlest patients. For premature babies, human milk is considered not just nourishment, but also an integral part of medical care.[1]

Human milk protects premature infants by lowering the risk for necrotizing enterocolitis (NEC), sepsis, chronic lung disease, retinopathy, and re-hospitalization.[2,3] Human milk also stimulates gastrointestinal cell maturity, helping preemies continue to develop after birth.[2]

Despite the protection human milk offers, feeding NICU patients still involves risk. Every step of the feeding process – from the moment milk is collected to the time it is fed to the patient - presents opportunities for contamination or errors.

The good news? NICUs worldwide are getting savvy with milk management to help feed premature infants safely.

WHY MILK SAFETY MATTERS EVEN MORE FOR PREEMIES

While safety matters when feeding children of any age, for premature infants, the stakes are much higher.

Because preemies have less mature immune systems, they are more vulnerable to getting sick from contaminated milk. Infants who are very low birth weight (<1500 g) or born before 32 weeks gestation are at greatest risk for developing sepsis or NEC from even a relatively small number of microorganisms or microbial toxins in milk.[4]

Misappropriation or "misfeeds" (feeding a patient the wrong recipe or wrong mother's milk) are also particularly problematic for premature infants. Not only does misappropriation put babies at risk for infection, but it can also expose babies to contraindicated fortifiers or deprive babies of receiving the developmentally appropriate milk. We know that for premature infants receiving mother's own milk, timing matters: for example, feeding colostrum in the order in which it was pumped helps maximize its immunological and trophic effects.[3]

CRITICAL SAFETY POINTS IN THE FEEDING PROCESS

Every time milk is handled, an opportunity for contamination or misappropriation arises.[4] In fact, Steele and Bixby estimate there are over 282 failure points in the feeding process where safety can be compromised.[5]

Safety breaches can happen at all of these points:

Collection: For infants receiving their mother's own milk, safety starts with pumping or milk expression. Unclean pump parts and hands can introduce pathogens.

Storage: Human milk must be kept at the appropriate temperature and time limits to both prevent bacterial growth and maintain its nutritional integrity.

Preparation: Preparing milk so that it is ready for the patient can involve thawing, decanting, mixing, and fortifying - all of which subject milk to potential handling and contamination errors.

Administration: To keep patients safe, the right milk must be given to the right patient at the right time. This includes not only milk for feedings, but also for oral care.

HOW TO SAFELY MANAGE MILK

Hospitals can take steps throughout the entire feeding process to keep their premature patients safe. Here is a snapshot of a few impactful, evidence-based shifts:

Parent education is the first step to ensuring milk stays fresh and safe from the start.[6] Teaching parents about hygienic pumping practices (such as how to clean pump parts and how to store milk at home) sets them up for success.

Centralized milk prep is increasingly considered a best practice for reducing contamination and errors.[2,7,8] A "milk room" or "milk lab" that provides dedicated space and refrigerators away from patient care areas promotes milk safety and quality, plus boosts efficiency.[9]

Bar code scanning is another best practice for managing milk.[7,8,10] Bar code scanning is widely used to prevent medication errors, and many hospitals are now harnessing that capability for human milk. Bar codes can help prevent recipe errors, expired feeds, and misfeeds. Labeling milk with bar codes also saves time by eliminating the need for two-nurse verification and handwriting on bottles.[11]

A commitment to quality improvement can transform your unit. Multiple hospitals have significantly reduced feeding errors after taking on QI projects that aimed to make feeding safer.[5,12,13,14] These hospitals took systematic, multidisciplinary approaches to map feeding processes, identify gaps, and move forward with changes.

HOW MILKTRACKER CAN HELP

MilkTracker supports hospital staff through every step of the feeding process to maximize safety for your littlest patients. We at AngelEye appreciate just how much NICU staff have on their plates and are here to empower them to ensure that workflows are as safe as possible.

Bar code scanning and **two-way EHR integration** are principal ways MilkTracker ensures patients are getting the right milk at just the right time. Plus, our MilkTracker team is committed to supporting **quality improvement**. Through an on-site Gap Analysis, we help hospital staff assess current feeding processes and systematically make them safer.

Interested in learning more? Schedule a demo with us to find out how MilkTracker can keep your most vulnerable patients safe.

SOURCES

1. Fugate, K., Hernandez, I., Ashmeade, T., Miladinovic, B., & Spatz, D. L. (2015). Improving Human Milk and Breastfeeding Practices in the NICU. *Journal of Obstetric, Gynecologic, and Neonatal Nursing: JOGNN*, *44*(3), 426–E15. doi: 10.1111/1552-6909.12563.
2. Moro, G. E., Arslanoglu, S., Bertino, E., Corvaglia, L., Montirosso, R., Picaud, J., Polberger, S., Schanler, R. J., Steele, C., van Goudoever, J., & Ziegler, E.E. (2015). XII. Human Milk in Feeding Premature Infants, *Journal of Pediatric Gastroenterology and Nutrition*, 61(1). doi: 10.1097/01.mpg.0000471460.08792.4d.
3. Meier, P. P., Engstrom, J. L., Patel, A. L., Jegier, B. J., & Bruns, N. E. (2010). Improving the use of human milk during and after the NICU stay. *Clinics in Perinatology, 37*(1), 217-45. doi: 10.1016/j.clp.2010.01.013.
4. Cossey, V., Jeurissen, A., Thelissen, M. J., Vanhole, C., & Schuermans, A. (2011). Expressed breast milk on a neonatal unit: a hazard analysis and critical control points approach. *American Journal of Infection Control*, *39*(10), 832-8. doi: 10.1016/j.ajic.2011.01.019.
5. Steele, C., & Bixby, C. (2014). Centralized breastmilk handling and bar code scanning improve safety and reduce breastmilk administration errors. *Breastfeeding Medicine*, 9(9), 426-9. doi: 10.1089/bfm.2014.0077.
6. Nestander, M., Spencer, S., Joseph, K., Hill, J., Thomas, N., Carr, N., & Ager, E. (2019). Pumping Up Prevention of Late Onset GBS Sepsis in the NICU. *Pediatrics*, *144* (2 MeetingAbstract), 269. doi: 10.1542/peds.144.2_MeetingAbstract.269.
7. Matus, B. A., Bridges, K. M., & Logomarsino, J. V. (2019). Evaluation of Key Factors Impacting Feeding Safety in the Neonatal Intensive Care Unit: A Systematic Review. *Advances in neonatal care : official journal of the National Association of Neonatal Nurses*, *19*(1), 11–20. doi: 10.1097/ANC.0000000000000516.
8. Steele, C. (2018). Best Practices for Handling and Administration of Expressed Human Milk and Donor Human Milk for Hospitalized Preterm Infants. *Frontiers in Nutrition*, 3(5), 76. doi: 10.3389/fnut.2018.00076.
9. Gabrielski, L., & Lessen, R. (2011). Centralized Model of Human Milk Preparation and Storage in a State-of-the-Art Human Milk Lab. *ICAN: Infant, Child, & Adolescent Nutrition*, 3(4), 225-232. doi:10.1177/1941406411416978.
10. Fleischman, E. K. (2013). Innovative application of bar-coding technology to breast milk administration. *Journal of Perinatal & Neonatal Nursing*, *27*(2), 145-50. doi:10.1097/JPN.0b013e31828fc4c7.
11. Steele, C., Czerwin, A., & Bixby, C. (2015). Breast milk bar code scanning results in time savings and staff efficiency. *Journal of the Academy of Nutrition & Dietetics*, 115(1), 23-6. doi:10.1016/j.jand.2014.06.360. PMID: 25070921.
12. Oza-Frank, R., Kachoria, R., Dail, J., Green, J., Walls, K., & McClead, R.E. (2017). A Quality Improvement Project to Decrease Human Milk Errors in the NICU. *Pediatrics, 139*(2), e20154451. doi: 10.1542/peds.2015-4451.
13. Drenckpohl, D., Bowers, L., & Cooper, H. (2007). Use of the six-sigma methodology to reduce incidence of breast milk administration errors in the NICU. *Neonatal Network: NN*, *26*(3), 161–166. doi:10.1891/0730-0832.26.3.161.
14. Luton, A., Bondurant, P. G., Campbell, A., Conkin, C., Hernandez, J., & Hurst, N. (2015). Got (the Right) Milk? How a Blended Quality Improvement Approach Catalyzed Change. *Advances in Neonatal Care: Official Journal of the National Association of Neonatal Nurses*, *15*(5), 345–353. doi:10.1097/ANC.0000000000000228.