

## Improving Tolerance to Human Milk-fortified Feedings in Preterm Infants

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### Expanded Commentary from the Faculty

Human milk fortifiers (HMFs) have been firmly established as essential for rapidly growing preterm infants to provide the additional calories and nutrients they need to thrive and cannot receive from breast milk alone. Fortification research has shown the practice leads to better growth in the short term and improved neurocognitive outcomes in the long term.

Feeding intolerance can be a problem with HMFs, however. Immaturity of the newborn's gastrointestinal tract can lead to delayed gastric emptying and slower intestinal motility, and raise the risk of necrotizing enterocolitis.

Research has found that when used at recommended concentrations, HMFs do not cause feeding intolerance in premature infants.<sup>1,2</sup> It is critical, therefore, that HMF products be administered according to their labeling instructions and handled appropriately to reduce the risk of side effects and complications.

Some strategies:

- Check the newborn's baseline laboratory values before adding an HMF.
- Establish volume tolerance to human milk before adding a fortifier. Fortifier is typically added at 80-100 mL/kg/day of well-tolerated human milk feedings.
- Wait at least 24 hours after the addition of an HMF before advancing the volume.
- Avoid making multiple changes all at once. For example, do not begin vitamin supplements on the same day fortifier is added.
- Do not add formula modifiers to already concentrated fortifiers (eg, carbohydrate, fat, or protein modulars or infant formula).
- Use only human milk plus fortifier when possible. Adding formula feedings can increase the risk of intolerance.
- Avoid bovine-based fortifiers, which are more likely to cause intolerance than HMFs.

By instituting a strict feeding protocol in our institution, including appropriate handling and use of HMFs, we have seen a reduction in feeding intolerance, the need for parenteral nutrition, abdominal distention, and necrotizing enterocolitis in premature infants.

It is not difficult to implement a similar protocol in your NICU setting. The Academy of Nutrition and Dietetics (formerly the American Dietetic Association) has published useful guidelines, entitled *Infant Feedings: Guidelines for Preparation of Human Milk and Formula in Health Care Facilities*, based on the latest research findings on the safe preparation, handling, and storage of human milk and formula (see "Suggested Readings" below).<sup>3</sup> The Centers for Disease Control has also issued recommendations on how to handle breast milk in a hospital environment.<sup>4</sup>

I urge clinicians, led by a pediatric nutrition specialist, to review their current practices to identify gaps and write a protocol for how human milk should be fortified and handled. Although time and effort need to be spent to train staff and implement aseptic techniques, the effort is well worth it to ensure healthier babies.

## Suggested Readings

1. Moody GJ, Schanler RJ, Lau C, Shulman RJ. Feeding tolerance in premature infants fed fortified human milk. *J Pediatr Gastroenterol Nutr.* 2000;30:408-412.
2. Yigit S, Akgoz A, Memisoglu A, et al. Breast milk fortification: effect on gastric emptying. *J Matern Fetal Neonatal Med.* 2008;21:843-846.
3. Pediatric Nutrition Practice Group, Robbins ST, Meyers R. *Infant Feedings: Guidelines for Preparation of Human Milk and Formula in Health Care Facilities*, 2nd ed. Chicago, IL: Academy of Nutrition and Dietetics. 2011. Available at: <http://www.infantformula.org/New-ADA-Guidelines-Now-Available-on-Infant-Feeding-in-Health-Care-Facilities>.
4. Centers for Disease Control and Prevention. Proper handling and storage of human milk. 2010. Available at: [http://www.cdc.gov/breastfeeding/recommendations/handling\\_breastmilk.htm](http://www.cdc.gov/breastfeeding/recommendations/handling_breastmilk.htm).
5. Jones F. *Best Practices for Expressing, Storing and Handling Human Milk in Hospitals, Homes, and Child Care Settings*, 3rd ed. Fort Worth, Tx: Human Milk Banking Association of North American. 2011.
6. Heiman H, Schanler RJ. Benefits of maternal and donor human milk for premature infants. *Early Hum Dev.* 2006;82:781-787.

## Discussion Guide

- What is our hospital protocol for fortifying human milk, including preparation, handling, and storage?
- Discuss strategies for improving our fortification practices, particularly for newborns who are intolerant to feedings.
- Does this information reinforce our current practice?
- If we were to implement or adopt this clinical pearl, what would we do first?
- What other approaches could be used?
- What are the barriers to adopting this clinical pearl in our institution?
- Are there other problems we haven't talked about?