Association of Women's Health,
Obstetric and Neonatal Nurses

THE USE OF HUMAN MILK DURING PARENT–NEWBORN SEPARATION

EVIDENCE-BASED CLINICAL PRACTICE GUIDELINE

AWHONN

PROMOTING THE HEALTH OF
WOMEN AND NEWBORNS

About AWHONN

Headquartered in Washington, D.C., the Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) is a leader among the nation's nursing associations, serving more than 23,000 health care professionals in the United States, Canada, and abroad and representing more than 350,000 nurses in our specialty.

AWHONN advances the nursing profession by providing nurses with critical information and support to help them deliver the highest-quality care for women and newborns. Through its many evidence-based education and practice resources, legislative programs, research, and coalition work with other organizations and associations, AWHONN has firmly established itself as the leading association for women's health, obstetric, and neonatal nurses.

AWHONN members strive to deliver superior health care to women and newborns in hospital, home health, and ambulatory care settings. The rich diversity of members' skills and experience make AWHONN *the* voice for women's health and neonatal nursing. It is through their dedication, knowledge, skill, and expertise that we create resources aimed at achieving our mission to promote the health of women and newborns.

Sponsorship of this educational resource was provided by Prolacta.

ISBN: 978-1-938299-81-0

This Evidence-Based Clinical Practice Guideline was developed for AWHONN as an informational resource for nursing practice. The Guideline does not define a standard of care, nor is it intended to dictate an exclusive course of management. It presents general methods and techniques of practice that AWHONN believes to be currently and widely viewed as acceptable, based on current research and recognized authorities.

Proper care of individual patients may depend on many individual factors to be considered in clinical practice, as well as professional judgment in the techniques described herein. Variations and innovations that are consistent with law and that demonstrably improve the quality of patient care should be encouraged. AWHONN believes the drug classifications and product selection set forth in this text are in accordance with current recommendations and practice at the time of publication. However, in view of ongoing research, changes in government regulations, and the constant flow of information relating to drug therapy and drug reactions, the reader is urged to check information available in other published sources for each drug for potential changes in indications, dosages, warnings, and precautions. This is particularly important when a recommended agent is a new product or drug or an infrequently employed drug. In addition, appropriate medication use may depend on unique factors such as individuals' health status, other medication use, and other factors that the professional must consider in clinical practice.

The information presented here is not designed to define standards of practice for employment, licensure, discipline, legal, or other purposes.

ACKNOWLEDGMENTS

The Use of Human Milk During Parent–Newborn Separation Evidence-Based Clinical Practice Guideline was developed by the Evidence-Based Clinical Practice Guideline Science Team, which is made up of AWHONN member experts who are recognized for their significant contributions in perinatal nursing. The team members were selected for their expertise as scientists and clinicians dedicated to improving the health and well-being of women and newborns in their specialty areas. All team members work in the obstetric clinical area and care for or oversee the care of women and newborns.

The process for Guideline development described herein was the result of the combined efforts of AWHONN's Practice, Research, and Education Committee undertaken in 1998 using the framework presented in the American Nurses Association's *Manual to Develop Guidelines* (Marek, 1995). AWHONN gratefully acknowledges the work of the individuals who have contributed their time and expertise to promoting evidence-based practice in nursing and who have been instrumental in disseminating a growing body of knowledge about lactation and breastfeeding.

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 doi: 10.1016/j.jogn.2021.06.003

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 doi: 10.1016/j.jogn.2021.06.003

The Use of Human Milk During Parent–Newborn Separation

PURPOSE STATEMENT

The purpose of this Guideline is to provide evidence-based clinical practice recommendations to support lactation for those parents who choose to provide human milk to their newborns and who are separated during the initial birth hospitalization. The goals of the proposed recommendations are to (1) ensure all parents have the ability to make informed feeding decisions, (2) enable parents to effectively initiate and sustain milk supply for their newborn through discharge, and (3) help parents reach their personal breastfeeding goals beyond the immediate hospitalization period.

This Guideline provides evidence-based approaches to accomplish the following:

- Promote human milk as the primary source of nutrition for all newborns during parent–newborn separation.
- Recognize diversity in the parent–newborn dyad.
- Implement the Spatz 10-step system as the national model for providing human milk to vulnerable newborns.
- Define human milk as a medical intervention to support the nutritional and immunologic needs of vulnerable newborns.

PATIENT POPULATION

This Guideline is directed toward any childbearing family in which the lactating parent and newborn are separated during the initial birth hospitalization. Newborns may be full-term or preterm, and separation may be for either a parental or neonatal condition. Elements of this guideline may be pertinent to healthy as well as high-risk newborns and for infants after discharge. Elements of this Guideline may also be pertinent to parent–newborn separation after the birth hospitalization.

SETTINGS

This Guideline is applicable in all settings that care for childbearing families experiencing parent–newborn separation. The Guideline may also be applicable to settings outside of birthing or neonatal units, including children's hospitals, critical care units, psychiatric units, and outpatient settings (e.g., lactation services, home visiting services). At times, and in particular settings, it may not be feasible to adhere to the Guideline fully.

PROVIDERS

The Guideline is directed toward registered nurses (RNs), advanced practice registered nurses, lactation consultants, and providers responsible for managing care of parents and newborns in the postpartum period through discharge of the newborn. Other licensed or unlicensed personnel, including those accountable to the RN or advanced practice registered nurse, may use the Guideline as appropriate for care within the scope of clinical practice defined by licensing boards or accrediting bodies. Selected elements of the Guideline may be appropriate for use by parents and other identified caregivers.

EVIDENCE-BASED GUIDELINE DEVELOPMENT PROCESS

Nursing specialty organizations are in a unique position to facilitate the use of research findings in clinical practice through the guideline development process. AWHONN, as a leader in women's health, obstetric, and neonatal nursing, elected to participate in the international movement to develop guidelines for evidence-based decision making in accordance with its mission to improve the health of women and newborns. The AWHONN template for guideline development is based on the framework delineated in the American Nurses Association's (ANA's) *Manual to Develop Guidelines* (Marek, 1995). The ANA *Manual* models its process on that of the Agency for Healthcare Research and Quality, formerly the Agency for Health Care Policy and Research (Woolf, 1990).

Science Team Member Selection

Development of this Guideline included a national call to convene a team of AWHONN expert members to serve as the Evidence-Based Clinical Practice Guideline Development Science Team. After a review of curricula vitae, summary statements of expertise, and phone interviews, a team of seven members was chosen. This team included members with various levels of education practicing in geographically diverse obstetric settings. Team member roles included clinical nurses, clinical nurse educators, nurse managers, lactation consultants, and

nurse scientists. The science team leader was selected for her clinical expertise and scholarly research in human milk feeding. In addition, one AWHONN nurse leader worked as a science team member and in an advisory role for the Guideline development process.

Evolution of the Guideline

All team members participated in monthly video teleconferences to identify the purpose, population, settings, and providers. In addition, the team identified search terms that provided the background for an extensive literature review. Several topic-specific electronic database searches and manual searches were conducted by the AWHONN librarian to identify relevant literature. Specifically, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, Scopus, and the Cochrane Library were searched for journal articles published in English between 2015 and 2020 that focused primarily on developed countries. Literature published before 2015 that was cited in the previous Guideline: *Breastfeeding Support: Preconception Care Through the First Year, 3rd edition*, was also available to the science team.

Search Terms

The primary search terms were as follows:

- Colostrum and immune therapy
- Cue-based feeding
- Donor milk
- Infant-driven feeding
- Lactogenesis
- Maternal separation
- Pumping and initiation
- Measurement of milk transfer
- Milk volume
- Milk expression
- Non-nutritive sucking

These additional primary search terms were combined with *human milk* or *breastfeeding*:

- Alternative feeding
- Discharge
- Enteral
- Ethics
- Fortification
- Fractionation
- Informed decision
- Kangaroo care
- Latch
- Management
- Medical intervention
- Oral-pharyngeal administration
- Postdischarge follow-up
- Preparation
- Skin-to-skin
- Storage
- Transition

Relevant professional organization guidelines (from the Academy of Breastfeeding Medicine, American College of Obstetricians and Gynecologists [ACOG], and AWHONN) were also searched for information about breastfeeding and human milk.

Article Selection and Guideline Development

In sections divided by search terms, 3,510 abstracts were reviewed and considered by at least two science team members. Additional articles, including selected literature published before 2015 and some published after the original literature search was completed, were retrieved and scored based on knowledge of seminal works and as new topics or gaps in the literature were identified. A total of 778 articles were read and scored. Consensus on the rating of evidence was obtained by at least two science team members before an article could be included as

 doi: 10.1016/j.jogn.2021.06.003

supporting rationale for the clinical practice recommendations in the Guideline. Quantitative literature was scored using the quality-of-evidence rating tool. Qualitative literature was scored using the qualitative evaluation and scoring tool. Draft sections of key topics of focus, including pertinent clinical practice recommendations accompanied by referenced rationale statements, were created and reviewed by two team members. Individual and group video conference meetings were held to further review, refine, and obtain consensus for all clinical practice recommendations and supportive rationale statements. In addition, all science team members participated in the review process.

Guideline Review

The draft Guideline was sent to five additional members with expertise in breastfeeding and the use of human milk or with expertise in evidence-based practice to provide an extensive review and critique of the original work of the team. The science team leader and the AWHONN nurse leader reviewed the comments and reached consensus on incorporating them.

LITERATURE EVALUATION AND SCORING

Quantitative Literature: Quality-of-Evidence Rating Tool

The quality of quantitative evidence supporting clinical practice recommendations was determined by team consensus using a revised scale that included a combination of the U.S. Preventive Services Task Force *Guide to Clinical Preventive Services* (1996) quality-of-evidence rating scale and additional scoring schemas to further delineate meta-analysis and systematic review studies:

- MA: (Meta-analysis): Evidence obtained by a statistical analysis that combines the results of multiple scientific studies. The combined information leads to a higher statistical power and more robust point estimate than is possible from the measure derived from any individual study.
- SR: (Systematic review): A literature review that collects and critically analyzes multiple research studies, using methods that are selected before one or more research questions are formulated and then finding and analyzing those questions in a structured methodology.
- I: Evidence obtained from at least one properly designed randomized controlled trial (RCT).
- II-1: Evidence obtained from well-designed controlled trials without randomization.
- II-2: Evidence obtained from well-designed cohort or case–control analytic studies, preferably from more than one center or research group.
- II-3: Evidence from multiple time series with or without the intervention. Dramatic results in uncontrolled experiments (such as the results of the introduction of penicillin treatment in the 1940s) could also be regarded as this type of evidence.
- III: Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.

Qualitative Literature: Evaluation and Scoring Tool

Because several of the studies reviewed were qualitative in nature, different criteria were required to evaluate these studies and rate the quality of evidence. Consequently, the team used a scoring tool generated by AWHONN and based on evaluative criteria of qualitative research discussed by Gray et al. (2017). Each qualitative study reviewed was evaluated according to the following categories:

- Descriptive vividness
- Methodological congruence
- Analytical preciseness
- Theoretical connectedness
- Heuristic relevance

Quality-of-Evidence Rating

- QI: 75%–100% of the total criteria were met.
- QII: 50%–74% of the total criteria were met.
- QIII: Less than 50% of the total criteria were met.

A detailed description of the qualitative criteria used for the analysis was published in the *Journal of Obstetric, Gynecologic, & Neonatal Nursing* (Cesario et al., 2002). Each clinical practice recommendation presented in the Guideline is supported by a referenced rationale and an accompanying quality-of-evidence rating for each quantitative or qualitative reference cited.

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 doi: 10.1016/j.jogn.2021.06.003

The Use of Human Milk During Parent–Newborn Separation

INTRODUCTION

While most professional organizations (American Academy of Pediatrics [AAP], American College of Nurse Midwives [ACNM], ACOG, World Health Organization [WHO]), including AWHONN, have position statements about breastfeeding, few outline the specific lactation needs during parent–newborn separation. Much of the global attention has been on the Baby-Friendly Hospital Initiative, which primarily focuses on the healthy couplet, early immediate breastfeeding, and skin-to-skin contact. Despite the fact that the Baby-Friendly Hospital Initiative has been in existence for 25 years, globally, only 43% of infants are breastfed within 1 hour of birth, and only 41% of infants receive exclusive human milk for the first 6 months (WHO, 2018). The AAP recommends exclusive breastfeeding for the first 6 months of life (AAP, 2012). There are significant benefits to human milk diets, and newborns may not receive exclusive human milk diets during parent–newborn separation.

Human milk and breastfeeding should be viewed as a lifesaving medical intervention (Spatz, 2020c), specifically for vulnerable newborns. When parent–newborn separation occurs, the lactating dyad can be at risk for suboptimal breastfeeding, which may compromise short-term and long-term outcomes for the newborn. It is important to note that the impact of human milk as a medical intervention is not limited to preterm newborns; human milk should be recognized as a necessary intervention for all vulnerable newborns who may be separated from their parent(s) after birth. Over half of admissions to neonatal intensive care units (NICUs) are not preterm newborns, but rather term newborns with other medical–surgical needs (Harrison & Goodman, 2015), and the provision of human milk for these newborns is critical for optimal health and developmental outcomes.

Exclusive Human Milk Diets

The term "breastfeeding" includes feeding a newborn directly at the breast but also refers to any method of providing direct or expressed human milk for newborns. The WHO defines "exclusive breastfeeding" as a diet of 100% breast milk, either direct or expressed, and does not specify mode of delivery (e.g., directly from the breast or via tube or bottle; WHO, 2019). Differences exist between providing expressed milk and directly feeding at the breast, specifically in the milk microbiota (Moossavi et al., 2019). However, direct breastfeeding may not be feasible for all newborns, and it may not be the preference for all lactating parents. Implementing evidence-based lactation interventions will help all parents achieve their breastfeeding goals. An optimal goal is to provide 100% of a parent's own milk during the entire hospitalization, if feasible. Ideally, newborns would continue to receive human milk beyond discharge to meet the WHO recommendations of exclusive human milk for the first 6 months and continued breastfeeding for 2 or more years (WHO, 2019).

Pasteurized Donor Human Milk (PDHM)

In recent years, there has been a growing interest in the use of PDHM. While PDHM has many benefits, most notably in the reduction of necrotizing enterocolitis (NEC) in preterm newborns, it is not as effective as parent's own milk, especially related to weight gain (Cacho et al., 2017), as the macronutrients (particularly protein) in PDHM are significantly different from parent's own milk (Perrin et al., 2020). Therefore, PDHM should not be viewed as a replacement to parent's own milk but as a bridge to full nutrition with parent's own milk. PDHM should be considered if the use of parent's own milk is contraindicated, such as in the case of HIV-positive status or active illicit drug use (AAP, 2012).

Ideally, all newborns should have access to parent's own milk or PDHM; however, the use of PDHM is not consistent in hospitals across the United States (Perrin, 2018). Data from the Centers for Disease Control and Prevention national survey of Maternity Practices in Infant Nutrition and Care showed that in 2015, 28.3% of facilities reported using PDHM (Perrin, 2018), and use was higher in Level III and Level IV hospitals (65.7% and 73.3%, respectively). The use of PDHM is highest at hospitals that also had the highest rates of mother's own milk feedings ($p < .001$). Furthermore, hospitals that were designated as Baby-Friendly and those that were in states with milk banks were more likely to use PDHM (Perrin, 2018).

Informal Milk Sharing

Interest has been growing in the use of informally shared milk. While this practice is not entirely risk-free because the milk is not pasteurized or screened, there are ways in which informal milk sharing can be practiced more safely. In order to prevent bacterial contamination or transmission of viruses, parents choosing informal milk sharing should screen those who are donating milk (Sriraman et al., 2018). Parents should be allowed to make informed feeding decisions, including the use of informally shared milk if that is their desire, especially if the hospital does not have PDHM available. Whenever possible, hospitals should consider having a waiver for the use of informally shared milk and should encourage open and honest conversations with families and health care providers about the risks and benefits (Martino & Spatz, 2014; Spatz, 2016). It is important to note that in some communities,

informal milk sharing is a cultural preference (Bressler et al., 2020).

Optimization of Human Milk

A Cochrane systematic review describes a lack of high-quality evidence for routine fortification of human milk, yet fortification remains the standard of care in many NICUs (Thanigainathan & Abiramalatha, 2020). In other countries, targeted fortification is used, which requires the use of a human milk analyzer (HMA). Before 2019, no HMAs were approved by the U.S. Food and Drug Administration (FDA), and as of the writing of this Guideline, only one company offers an FDA-approved device. All staff using HMAs should have an understanding of the science of human milk to make use of the device practical and effective. Ideally, the future of human milk feeding will include the customization of milk to meet the individual needs of the newborn. If fortification is warranted, providers should favor human milk fortifiers over bovine-based fortifiers. Such decisions may take into account the cost of human-milk–based fortification and the fact that bovine fortifiers do not meet the requirements for exclusive human milk diets.

Breastfeeding Disparities

Significant health disparities exist in the use of parent's own milk and PDHM (Spatz, 2020a). Although national breastfeeding initiation and continuation rates continue to increase, persistent disparities in initiation, exclusivity, and duration are found to be related to racial and ethnic background and income levels. Non-Hispanic Black infants continue to have lower breastfeeding rates than White infants (Li et al., 2019). These disparities are equally concerning for newborns admitted to NICUs who are at higher risk for mortality. Hospitals located in postal codes with a higher percentage of Black residents have lower rates of use of mother's own milk and PDHM (Boundy et al., 2017). The disparities may be influenced by a lack of resources, including health care provider support, hospital practices and policies, parents' knowledge and exposure to breastfeeding, and community-level support for breastfeeding (Boundy et al., 2017). It is important to acknowledge that historical antecedents have negatively influenced breastfeeding among African American women (Louis-Jacques et al., 2020). Black women are more likely than others to die in childbirth, deliver low-birth-weight infants, and have chronic health conditions (Boundy et al., 2017; Petersen et al., 2019).

Informed Feeding Choices

All parents should be afforded the opportunity to make an informed feeding choice regarding human milk for their newborn. Nurses and other health care professionals should educate parents and families to support an informed decision (ACNM, 2016; ACOG, 2021). This Guideline is based on the Spatz 10-step model to promote and protect human milk access for vulnerable newborns (Spatz, 2004). Published data on the use of this model demonstrate high pumping initiation rates, increased first feed rates of human milk, and increased use of human milk through discharge and beyond (Fugate et al., 2015; Kositamongkol et al., 2019; Martino et al., 2015; Takako et al., 2020). One NICU in the United States implemented a quality improvement project using the Spatz 10-step model and showed statistically significant improvements in outcomes, including a shorter time to first milk expression, an increase in newborns receiving human milk as the first feed, a threefold increase in the use of human milk at discharge, and higher patient satisfaction scores (Fugate et al., 2015). Therefore, the Spatz 10 steps for human milk and breastfeeding for vulnerable infants frame the Guideline recommendations.

Although this Guideline was developed to ensure newborns who were separated from their parents receive human milk, it is also important to recognize that some parents who wish to provide human milk to their newborns may not be able to establish a complete milk supply. Women feeling pressure to provide human milk may experience an increase in psychological distress, especially for those who choose not to or are not able to provide full human milk diets (Penniston et al., 2021: II-2). Clinicians should target the development of informational resources that support nonbreastfeeding parents.

Gender-Neutral Terminology

The science team had extensive discussions regarding terminology and recommends that health care clinicians consider using gender-neutral language (Spatz, 2020b). Always ask the parent which terms they are most comfortable using. Instead of "mother" or "woman," the term "parent," may be more applicable. Additionally, it is important to acknowledge that much of the breastfeeding research literature is reported from the heteronormative perspective. The rationale statements in this Guideline may reflect the terminology used in the published research. While many health care providers see female/male sets of parents in much of their practice, it is critically important to recognize that other families, such as same-sex mothers, may have different lactation care needs (Juntereal & Spatz, 2019, 2020). Using the terminology "breastfeeding" or "chestfeeding" also includes parents from more diverse backgrounds (Spatz, 2020b). To provide appropriate, respectful, and sensitive care, the health care provider should always ask individuals what words they use to describe themselves, their bodies, and their health care practices.

APPLICATION OF THE GUIDELINE

This Guideline presents general guidance based on literature and best practice. However, optimal outcomes require RNs and other health professionals to exercise clinical judgment based on a variety of factors, including the specific health status of the newborn or parent, history, and cultural variations. The Guideline can be used to support the use of human milk and breastfeeding for parents who are separated from their newborns during the initial birth hospitalization. This includes newborns who may be transferred to a

 doi: 10.1016/j.jogn.2021.06.003

higher level of care and those who remain hospitalized after the lactating parent is discharged. Given the varied populations served in many health care settings, it may not be feasible for the nurse to be knowledgeable about the customs, values, and beliefs of all groups. Nevertheless, to the extent that information is known or communication about such issues is practical, RNs should seek to be sensitive to the choices and expectations of each parent and family.

Role of the RN

Nurses help to promote and protect the use of human milk and breastfeeding (Spatz, 2010) and should be prepared to address the barriers to breastfeeding, whenever needed (ACOG, 2021). This includes providing education, evidence-based interventions, and support for all breastfeeding dyads. In all care settings, and during all interactions in the care of childbearing families, nurses play an optimal role in ensuring that families make informed feeding decisions about the use of human milk and breastfeeding while assisting families with reaching their personal breastfeeding goals. In addition, RNs should recognize the disparities in outcomes related to variations in care practices and work toward health equity in human milk practices. RNs, advanced practice nurses, and other health care professionals have the unique ability to improve the use of human milk for vulnerable newborns.

RESEARCH PRIORITIES

After a review of the literature, the science team identified the following priorities for research:

- Provision of parent's own milk
- Eliminating disparities in human milk use
- Support for human milk beyond discharge
- Optimization of human milk
- Strategies for optimization
- PDHM as a bridge to parent's own milk
- Volumes and timing of colostrum oral immune therapy

GLOSSARY OF TERMS

Chestfeeding is a term used by many transmasculine and nonbinary parents to describe how they feed and nurture their children from their bodies.

Coming to volume refers to the period between the onset of lactogenesis II and the achievement of a threshold volume of 500 to 600 mL/day, typically between 4 and 7 days after birth in a healthy population of mothers and newborns who breastfeed exclusively.

Direct breastfeeding refers to feeding a newborn at the breast or chest, as opposed to feeding the lactating parent's own milk via another device, such as a bottle.

Human milk is a parent's own milk or the milk expressed from the lactating person.

Human milk analyzers (HMAs) are medical devices that measure the macronutrient content in human milk, which allows for targeted fortification for each individual newborn.

Informal milk sharing refers to milk provided by another lactating parent but not processed through formalized mechanisms, such as a milk bank.

Lactation biomarkers are values measured to determine whether the lactating parent has come to volume. Colostrum is high in sodium, which drops markedly when one comes to volume, and lactose rapidly increases at this time.

Lactogenesis I is the period from 16 weeks of pregnancy through days 3 to 4 after birth, also known as secretory differentiation.

Lactogenesis II is the development of copious milk supply, also known as secretory activation.

Mother's own milk refers to human milk expressed from the breast of the birth mother.

Oral care involves using the parent's own milk (colostrum or transitional or mature milk) to coat the inside of the newborn's mouth. When using colostrum, the process may be referred to as colostrum oral immune therapy.

Parent's own milk refers to human milk expressed from the breast or chest of any lactating parent, which may or may not be the birth parent.

Pasteurized donor human milk (PDHM) is milk that has been donated by other parents, screened, and heat-treated.

Skin-to-skin refers to placing the naked newborn (with a diaper and with or without a hat) in a vertical position with its chest on the mother or caregiver's bare chest.

Targeted fortification is a process used to tailor human milk for the individual newborn's nutritional needs by analyzing milk macronutrients and then fortifying the milk as needed.

Vulnerable newborn refers to any newborn, full-term or preterm, who has a medically related issue that may impact the ability to feed or tolerate human milk, including a complication experienced by the parent that leads to early separation after birth.

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Recommendations and Rationale Statements

STEP 1—INFORMED DECISION

Recommendation ID-1: Assess parental knowledge about the benefits of human milk for their newborn's health and developmental outcomes.

- **Assist families in making an informed decision about human milk and breastfeeding before birth, whenever possible.**

Rationale: The AAP recommends all preterm infants receive human milk (AAP, 2012: III). Newborn nutrition should be a shared decision-making process and include ethical principles. Mother's own milk should be communicated as the preferred nutritional source, and support persons should be included in feeding decisions (McGlothen-Bell et al., 2019: III). Prenatal lactation consultations that use informed decision-making strategies lead to increased pumping initiation rates (Edwards & Spatz, 2010: III; Froh et al., 2020: III). Counseling mothers of very-low-birth-weight infants increases lactation initiation and feeding of human milk without increasing maternal stress and anxiety (Sisk et al., 2006: II-2). Prenatal newborn feeding information should include information about exclusive pumping and the dose-response benefit of human milk. A mixed-methods study of 84 past and current exclusive pumpers revealed that although the majority (71%) had not heard of exclusive pumping until after birth, they described feeling more knowledgeable and less frustrated, insecure, depressed, rejected, embarrassed, envious, burdened, guilty, or disappointed when exclusively pumping (Jardine, 2019: II-2).

Recommendation ID-2: Educate parents about the health benefits of human milk for both the newborn and the lactating parent.

Rationale: Not all families have a history of or exposure to breastfeeding, nor do all families recognize that human milk is a lifesaving medical intervention (Spatz, 2020: III), specifically for sick and vulnerable newborns. Knowledge of the benefits of human milk will help parents make an informed choice. The use of human milk for newborn nutrition improves short-term and long-term health and developmental outcomes and reduces newborn and childhood morbidity and mortality. Vulnerable newborns who receive human milk and human milk fortifiers showed improved feeding tolerance, a faster advancement of human milk volumes, and an overall decrease in total number of parenteral nutrition days compared with newborns who received a combination of human milk, formula, and bovine fortifiers (Ghandehari et al., 2012: I). In preterm newborns, retinopathy of prematurity, bronchopulmonary disease, and sepsis are all significantly reduced with an exclusive human milk diet (Hair et al., 2016: I).

Human milk and breastfeeding also improve outcomes beyond the hospital stay, with decreases in the incidence and severity of ear, gastrointestinal, respiratory, and urinary infections throughout infancy (AAP, 2012: III). Breastfeeding is associated with significantly lower rates of sudden infant death syndrome, and lower rates of childhood cancers are seen in children who are exclusively breastfed for the first 6 months (AAP, 2012: III). Although there are benefits of both expressed human milk and feeding at the breast, direct breastfeeding is associated with higher body mass index and weight gain (Azad et al., 2018: II-2). However, this association is dose-dependent; it decreased with bottle feeding and further decreased with formula supplementation after the neonatal period (Azad et al., 2018: II-2). Human milk feeding has also been shown to influence the neurodevelopment of low-birth-weight newborns (Martins-Celini et al., 2018: II-2; O'Connor et al., 2012: I).

In addition, there are positive maternal outcomes associated with breastfeeding, including improved pregnancy spacing and faster return to prepregnancy weight (ACOG, 2021: III). Mothers who breastfeed have lower rates of hypertension, hyperlipidemia, Type 2 diabetes mellitus, and cardiovascular disease (ACOG, 2021: III). Women who breastfeed have a dose-dependent decrease in breast and ovarian cancer (ACOG, 2021: III). Long-term exclusive breastfeeding is associated with decreased rates of postpartum depression. Conversely, women with postpartum depression are less likely to have positive breastfeeding experiences, which could lead to early weaning (Webber & Benedict, 2019: III).

Recommendation ID-3: Provide parent's own milk for all newborns (full-term and preterm) who are separated from the parent.

- **If parent's own milk is not available, provide PDHM prior to formula.**

Rationale: Whenever possible, human milk provided to the neonate should be expressed milk from the newborn's own parent. PDHM should not displace mother's own milk or parent's own milk diets, unless there is a lack of sufficient supply or contraindications to using that milk. Newborns receiving parent's own milk have increased gut microbial diversity, better feeding tolerance, and superior growth when compared with those receiving PDHM (Ford et al., 2019: II-2). The incidence of NEC and other gastrointestinal morbidity is lower among very-low-birth-weight newborns who receive an exclusively human milk diet (Ford et al., 2019: II-2).

Although both mother's own milk and donor milk can reduce the incidence of NEC (AAP, 2017: III; Ford et al., 2019: II-2), donor

milk does not provide the same benefit for vulnerable newborns (Ford et al., 2019: II-2). Very-low-birth-weight infants fed mother's own milk had more diverse gut microbiota, improved feeding intolerance, and better overall weight gain than those fed donor milk (Ford et al., 2019: II-2). Most PDHM is donated by mothers who have delivered healthy term infants; therefore, PDHM does not have the same protein levels that preterm infants require for healthy weight gain. Not only can pasteurization destroy the bioactive components naturally found in human milk, but the process of making PDHM involves multiple transfers of the milk, which leads to significant fat loss. PDHM cannot be customized to the unique needs of the newborn (Akinbi et al., 2010: II-3). New research shows it may be possible to inoculate PDHM with parent's own milk to improve the microbiota (Cacho et al., 2017: II-2).

Recommendation ID-4: Ensure consent has been obtained for the use of PDHM as a bridge to parent's own milk, if indicated.

- **Ideally, consent for PDHM should be obtained separately from a general consent form.**

Rationale: To better support the nutritional needs of the newborn, parents should receive prenatal counseling regarding the physiology of milk production and the critical window to effectively come to volume. Parents should be aware of the benefits of exclusive human milk diets and the dose-response benefit of human milk (AAP, 2012: III). Ideally, newborns separated from their parents should be provided with PDHM diets instead of formula-based diets when parent's own milk is not available. If the parent's own milk is unavailable or not available in sufficient amounts, the use of donor human milk should be the standard for early feedings of vulnerable newborns, both preterm and full-term. Parent's own milk, when provided by the birthing person, meets the nutritional requirements for the gestational age of the newborn. For example, human milk expressed after the birth of a preterm newborn has more of the protein and nutrients needed by preterm infants (McGlothen-Bell et al., 2019: III). Early discussions, before birth if possible, should include the benefits of parent's own milk and then donor milk as the best options for newborn nutrition. Parents need sufficient time to understand why PDHM is a better option for their newborn than formula.

STEP 2—INITIATION AND MAINTENANCE OF MILK SUPPLY

Recommendation IM-1: Promote an organizational culture that supports human milk diets for all newborns, especially during parent–newborn separation.

Rationale: Human milk feeding at discharge from the NICU is a measure of neonatal health care quality. Hospitals should develop a culture that values breastfeeding and the use of human milk as a way improve maternal and infant health (Hallowell et al., 2016: II-2; Spatz, 2014: III). Staff education that is specific to the needs of parents who are separated from their newborns can help promote human milk diets. Hospitals should have adequate resources that support milk expression and storage, such as hospital-grade breast pumps; appropriate refrigerators and freezers; and International Board-Certified Lactation Consultants or educated, trained nurses who can provide evidence-based lactation interventions and care (Spatz, 2014: III). Staff education is important in increasing rates of pumping within the first hour after delivery (Gams & Flynn, 2015: III). The provision of full-time dedicated NICU lactation support is associated with an increase in breastfeeding outcome measures for high-risk preterm infants (Gharib et al., 2017: II-2) and facilitates the provision of human milk through discharge.

Mothers who are separated from their newborns need targeted interventions and additional support to achieve the needed pumping frequency for adequate milk volumes for their newborns (Yu et al., 2019: II-2). Pumping is the ideal way for mothers to maintain an adequate milk supply after separation from their newborn (Froh et al., 2015: III; L. A. Parker et al., 2015: I; Spatz et al., 2015: III). While the overall prevalence of newborns receiving human milk at discharge has increased over the past decade, persistent disparities exist across geographic regions in the United States, as well as racial and ethnic disparities that have not diminished over time (M. G. Parker, Gupta, et al., 2019: II-2). Organizations should work to identify and help eradicate disparities that limit the promotion of breastfeeding and the provision of human milk diets for all newborns, especially for those separated from their parents.

Recommendation IM-2: Encourage the parent to start milk expression with a hospital-grade pump, manually, or with a combination of both, ideally within 1 hour of birth.

Rationale: Nurses and other health care professionals should help the lactating parent effectively initiate and maintain milk supply. National data indicate that few newborns who have been separated from their parent receive human milk through discharge (Hallowell et al., 2014: II-2; Hallowell et al., 2016: II-2). Research demonstrates that the first 3 to 5 days after birth are critical for milk production. The timing of milk expression, number of pumping sessions, and total volume expressed during this time are predictive of normal lactation biomarkers (Hoban et al., 2018: II-2; Hoban et al., 2021: II-2; M. G. Parker, Melvin, et al., 2019: II-2). Delayed lactogenesis II, often caused by delayed milk expression postpartum, was associated with lower milk volume in the early postpartum period (Hoban et al., 2021: II-2).

Mothers who pump within 1 hour of birth produce significantly more milk at 3 weeks after birth and achieve lactogenesis II earlier than those who begin pumping at 6 hours after birth (L. A. Parker et al., 2015: I; Spatz et al., 2015: III). Establishment of an adequate milk supply is time-dependent. Colostrum should be expressed as soon as possible after birth, 8 to 12 times per day, to ensure an adequate milk supply with target milk volumes of 500 to 1,000 mL per 24-hour period (L. A. Parker et al., 2015: I; Spatz, 2018: III). Milk volume and pumping frequency on Day 4 after birth are significant predictors of milk supply at 6 weeks after birth. To provide adequate milk volumes to support exclusive human milk diets for those newborns still hospitalized at 10 to 14 days of age, expressed milk volumes should be a minimum of 750 mL in each 24-hour period (Hill & Aldag, 2005: II-2). Milk supply at 2 weeks is

 doi: 10.1016/j.jogn.2021.06.003

predictive of whether newborns are discharged home on mother's own milk (Hoban et al., 2021: II-2).

There are strategies to identify factors that may impact coming to volume. An RCT of 62 mothers of preterm newborns born at less than 34 weeks of gestation evaluated significant predictors of milk volume using maternal diaries. The authors found that mothers using double pumping produced twice as much milk, with volumes on average of 500 mL per day in the first 10 days, when compared with mothers using single pumping. In addition, those mothers who gave a higher score for "comfort" of a breast pump also had higher milk production (Fewtrell et al., 2016: I). In addition, measuring human milk biomarkers may also aid in early detection of delayed or impaired lactogenesis (Hoban et al., 2021: II-2).

Recommendation IM-3: Educate the lactating parent on the importance of using a hospital-grade electric breast pump that has the ability to pump both breasts simultaneously, if available.

- **Manual expression of milk may be considered or combined with pumping, especially in the first few days after birth.**

Rationale: Breast pumps that mimic the unique sucking patterns used by healthy, full-term, breastfeeding newborns during the initiation and maintenance of lactation are more effective, efficient, convenient, and comfortable. These pumps help lactating parents produce greater daily and cumulative milk output and greater milk output per minute spent pumping (Meier et al., 2012: II-2). Manual expression of milk should also be considered as an option, especially in the first few days after birth. Parents combining manual techniques with pumping express high levels of fat-rich, calorie-dense milk. One RCT comparing human milk content obtained in the first 48 to 72 hours after birth for 21 healthy couplets found that both the fat content and the energy content in manually expressed milk was significantly higher ($p = .024$ and $p = .04$, respectively) than that of milk expressed by pumping (Mangel et al., 2015: I). However, expressed volumes may be lower when using hand expression alone. An RCT of 26 mothers of very-low-birth-weight newborns found that those mothers using hand expression alone had significantly lower daily volumes in the first 7 days after birth when compared with mothers using pumps (electric expression; Lussier et al., 2015: I).

Recommendation IM-4: Educate parent(s) about principles of milk expression, including but not limited to the following:

a. Pumping or expressing a minimum of 8 to 12 times per day with a hospital-grade double pump, whenever possible
b. Continuing to pump for at least 2 minutes after milk droplets stop flowing
c. Pumping at least once during the night and up to every 3 hours at night if needed to increase milk supply
d. Tracking the volume and frequency of human milk expressed
e. Maintaining frequent contact with lactation specialists, NICU nurses, and lactation-based peer counselors.

Rationale: Early initiation of pumping, staff and family education, and hospital-grade pumping equipment are instrumental in supporting human milk supply and availability of human milk for newborn nutritional requirements (Froh et al., 2015: III; Gams & Flynn, 2015: III; Spatz et al., 2015: III), especially during parent–newborn separation. Minimum volumes needed for providing exclusive human milk feedings are at least 750 mL per 24-hour period. Coming to volume typically occurs between 4 and 7 days if there is adequate milk expression (Meier et al., 2016: III). Achieving pumped volume of 500 mL or more per day by postpartum Day 14 was the biggest predictor of continued provision of parent's own milk at NICU discharge (Hoban et al., 2018: II-1). Lactation support services should target the early critical period for milk expression (Hoban et al., 2018: II-1). The introduction of a breast pumping diary was associated with a significant increase in the intake of expressed human milk among hospitalized preterm newborns (Wu et al., 2015: III). The strongest predictors of adequate milk production include double pumping, early establishment of milk production, and perceived comfort level of the pump (Fewtrell et al., 2016: I).

Recommendation IM-5: Encourage the parent to pump frequently when visiting the newborn.

- **Encourage the use of relaxation techniques and offer privacy.**

Rationale: Expressing milk in proximity to the newborn, particularly during and immediately following skin-to-skin care, is associated with higher milk volumes (Acuña-Muga et al., 2014: II-2). Parents should be encouraged to spend as much time as possible at the newborn's bedside. Ideally, parents should express first, hold their newborn skin-to-skin for 1 hour or more, and express again immediately following the skin-to-skin session. (See "Step 5—Skin-to-Skin Contact.")

STEP 3—HUMAN MILK MANAGEMENT

Recommendation HMM-1: Ensure adequate pumping, storage, and labeling supplies are available at home and in the hospital setting, whenever possible, and include the following:

- **Hospital-grade electric pump and associated equipment**
- **Food-grade plastic or glass containers for storing expressed milk**
- **Labels**

Rationale: Human milk management is recognized as a critical factor in the well-being of both healthy and vulnerable breastfeeding newborns (Ward et al., 2020: II-2). Many vulnerable newborns are often dependent on enteral or supplemental and fortified feedings to maintain adequate nutrition. A hospital-grade electric pump is essential for the initiation and maintenance of milk supply for mothers of hospitalized or vulnerable newborns. Mothers are more likely to express when a pump is available at the bedside, and data support that milk supply significantly increases with double pumping (Porta et al., 2020: II-2). Earlier expression of milk significantly increases human milk volume at discharge (Ward et al., 2020: II-2).

Health care facilities should have human milk management systems that ensure contamination is prevented during procurement, storage, thawing, and administration of human milk diets (Steele, 2018: III). Additionally, labeling and fortification should be performed following specific protocols and procedures to minimize errors and prevent mislabeling and improper administration (Steele,

2018: III). Similar protocols and procedures should also be instituted to prevent contamination and errors when using human donor milk.

Recommendation HMM-2: Educate parents who are separated from their newborns on how to express, label, and store milk safely.

- **Label with the parent's and the newborn's information and the date and time expressed or pumped and store according to facility protocol.**

Rationale: Education on human milk expression and the importance of human milk diets empowers parents of vulnerable newborns to initiate and maintain a milk supply. Ideally, parents will have access to food-grade containers for expressed and stored milk. Glass is superior to plastic in protecting human milk against bacterial growth and has a higher rate of preservation of immunoglobulins (Eglash et al., 2017: III; Takci et al., 2013: II-2). Parents should be counseled to avoid the use of plastic bottles that contain bisphenol A and S because of possible milk contamination. If a parent brings milk in a container other than plastic or glass, the milk may still be used if proper home storage procedures were followed. Providing information on the use of appropriate containers may facilitate better storage and maintain milk quality. If plastic milk storage bags are used by the mother, she should be counseled to store these bags in the freezer in an area that will minimize the risk of damage or puncture (Eglash et al., 2017: III; Human Milk Banking Association of North America, 2019: III).

Recommendation HMM-3: Provide staff education to support facility-based protocols for storing and administering fresh and frozen milk, including the following:

a. **Fresh milk should be prioritized over frozen thawed milk, whenever possible.**
b. **Colostrum should be used in the chronological order it was expressed.**
c. **Colostrum should be stored and labeled specifically as colostrum.**
   - **If the newborn will be offered enteral nutrition within 3 to 4 days (72–96 hours), store colostrum in the refrigerator.**
   - **If the newborn is not expected to receive enteral nutrition within 3 to 4 days, colostrum should be frozen according to the facility protocol.**
   - **When enteral feedings are initiated, the earliest dated human milk should be provided to promote the use of colostrum for first feeds.**

Rationale: Staff education will help ensure that human milk is available to the newborn when feedings are initiated. Compared with frozen milk, fresh milk has higher antioxidant levels, which is important for vulnerable newborns (Aksu et al., 2015: II-3). The immunomodulatory proteins are reduced in frozen milk, resulting in decreased antibacterial capability of the milk (Akinbi et al., 2010: II-2); therefore, the use of fresh expressed milk or refrigerated milk should always be prioritized. Colostrum is important for reducing the risk of infection, use of parenteral fluids, and duration of hospitalization, as well as for improving bonding for parents of newborns in the NICU setting (Gephart & Weller, 2014: SR). Feeding colostrum in the order that it was produced mimics what would happen naturally if maternal–infant separation did not occur (Spatz, 2006: III).

Recommendation HMM-4: Ensure human milk management systems are supported by national guidelines. One suggested protocol is as follows:

a. **Use a centralized human milk handling location with double-checks at key points of processing.**
b. **Use individual, patient-labeled bins for easy identification of milk.**
c. **Consider bar-code scanning for milk fortification, administration, and expiration notification.**
d. **Ensure refrigerators and freezers used for storing human milk are connected to commercial-grade power circuits and labeled appropriately for storing human milk.**
e. **Maintain storage temperatures as follows and according to facility guidelines:**
   - **Refrigerator temperatures should be at or below 4 °C (39.2 °F).**
   - **Deep freezers should be at less than −17 C to −20 C (1.4 F to −4 F).**

Rationale: Ideally, facilities will have a centralized human milk process. Centralization of human milk handling and storage for hospitalized newborns allows for greater infection control measures (Steele & Bixby, 2014: III). Using dedicated human milk refrigerators and freezers, with adequate storage space for each newborn's milk supply, is important to ensure proper temperature maintenance and airflow (Steele, 2018: III) and help preserve human milk quality (Steele, 2018: III). Bar-code

TABLE 1 STORAGE AND USE RECOMMENDATIONS FOR HUMAN MILK

Storage Location	Time
Room temperature	Hang time for continuous feedings: 4 hours maximum
Refrigerator	
Fresh human milk	48 hours maximum
Thawed unpasteurized human milk	24 hours maximum
Thawed pasteurized donor human milk	48 hours maximum
Fortified human milk	24 hours maximum
Freezer	
Human milk	6-12 months maximum *or* beyond 12 months in deep freeze with lower temperatures

doi: 10.1016/j.jogn.2021.06.003

scanning before the administration of human milk improves safety at each step of human milk administration and reduces the risk that a newborn receives wrong or expired milk (Steele & Bixby, 2014: III). If the hospital does not have a bar-coding system, a standardized system for labeling human milk should be employed (Spatz, 2004: III). In addition to scanning and labeling, a centralized human milk system helps maintain human milk safety during storage. Table 1 describes storage and use recommendations for human milk (Steele, 2018: III; Steele & Bixby, 2014: III).

STEP 4—ORAL CARE AND FEEDING OF HUMAN MILK

Recommendation OCF-1: Anticipate and prepare for oral care to provide oral immune therapy during parent–newborn separation.

Rationale: It is important for parents to understand the impact of using colostrum and human milk for oral immune therapy, especially in newborns who weigh less than 1,250 grams. Using human milk for oropharyngeal mouth care, early trophic feedings, and eternal nutritive feedings has been shown to improve clinical outcomes (Brown et al., 2019: MA; Lussier et al., 2015: I; Rayyan et al., 2015: III). Conveying the importance of human milk for newborns, especially vulnerable newborns, empowers parents to begin and maintain a regimen to supply human milk to their newborn (Gephart & Weller, 2014: SR).

Both amniotic fluid and mother's own milk are ways to expose newborns to immunoprotective body fluids. Both amniotic fluid and mother's own milk contact the oropharynx of the newborn. Because preterm newborns are exposed to amniotic fluid for a shorter time, mother's own milk used as oral care may continue to provide immunoprotection to the oropharynx (Garofalo & Caplan, 2019: III). Human milk contains many protective biofactors that are antimicrobial and anti-inflammatory and can enhance intestinal microbiota and improve newborn intestinal maturation (Rodriguez et al., 2015: I), especially in newborns born prematurely. Colostrum is the perfect first immune stimulator in newborns, as it contains much higher concentrations of immunoprotective agents than more mature human milk (Underwood, 2013: III). An RCT of 48 preterm newborns born at less than 28 weeks of gestation received oral care every 3 hours with either colostrum or sterile water. Newborns in the colostrum group had a statistically significant reduction in clinical sepsis (Lee et al., 2015: I).

Recommendation OCF-2: Ensure that oral care is included as an integral part of routine care if the newborn is unable to orally feed (see Appendix).

- **Ideally, oral care with human milk should be performed each time the parent expresses milk.**

Rationale: The use of expressed human milk should be prioritized for oral care in those newborns receiving full parenteral nutrition and should continue until the enteral feedings are initiated (Edwards & Spatz, 2010: III). A systematic review found that data are lacking to support the full benefits of oral care (Gephart & Weller, 2014: SR). However, oral care using human milk has been demonstrated to be safe for preterm and ill newborns, including those who are intubated (Gephart & Weller, 2014: SR; Lee et al., 2015: I; Moreno-Fernandez et al., 2019: II-1). Although exact protocols may vary by facility, nurses should ensure that fresh milk is used to provide oral care whenever possible (Akinbi et al., 2010: II-2; Spatz, 2006: III). There is no evidence to support the use of PDHM for human milk oral care, because many of the bioactive components of human milk are destroyed or significantly reduced during pasteurization (Garofalo & Caplan, 2019: III).

Recommendation OCF-3: Initiate enteral feeds using parent's own milk according to the provider's orders and whenever possible.

a. Begin enteral feeds with colostrum.

b. If parent's milk is not available, consider using PDHM.

Rationale: The use of parent's own milk supports the unique growth needs of their newborn. Colostrum expressed from mothers of preterm infants has higher levels of protein, fatty acids, immune factors, and anti-inflammatory properties than colostrum expressed from mothers of term newborns (Gephart & Weller, 2014: SR). Human milk feeding protects against the development of late-onset sepsis. In addition, rapid advancement of enteral feeds using human milk may proportionally reduce the number of days the infant needs total parenteral nutrition, consequently decreasing length of stay (el Manuouni el Hassani et al., 2019: II-2).

Evidence indicates that preterm newborns who are fed human milk have decreased gastrointestinal and respiratory diseases, NEC, urinary tract infections, otitis media, and late-onset sepsis (Becker et al., 2016: MA; Brown et al., 2019: MA; Quigley et al., 2018: MA). Long-term health benefits for those who receive human milk include decreased rates of asthma, diabetes, obesity, and cardiovascular disease and improved cognitive development. Regardless of social determinants of health that may positively or negatively affect newborns, receiving human milk may help decrease infant mortality (Becker et al., 2016: MA).

Recommendation OCF-4: Consider the use of fortifiers for additional nutritional needs on an individual basis.

Rationale: Although fortification of human milk is common practice for hospitalized preterm newborns, the evidence remains inconclusive for recommending this as routine practice (Thanigainathan & Abiramalatha, 2020: MA). Cochrane reviews evaluating the short-term and long-term effects of carbohydrate supplementation (Amissah et al., 2020a: MA), protein supplementation (Amissah et al. 2020c: MA), and fat supplementation (Amissah et al., 2020b: MA) in human milk to increase growth for preterm newborns found very-low-quality evidence to support routine fortification. It is important to note that these reviews are limited by small sample sizes, low precision, and very-low-quality evidence regarding duration of hospital stay, feeding intolerance, and NEC (Amissah et al., 2020c: MA). Additional research on routine fortification is warranted to make individualized decisions for vulnerable newborns.

Providers choosing to use fortification to enhance nutrition in human milk should decide on the best fortifiers. Interest is growing in the use of

fortifiers derived from human milk compared with bovine milk. The use of human milk fortifiers supports exclusive human milk diets in vulnerable newborns. The incidence of NEC and other gastrointestinal morbidity is lower among very-low-birth-weight newborns who are provided an exclusively human milk diet, including those who receive fortifiers that are derived from human milk (Ford et al., 2019: II-2). A metanalysis found many of the individual studies using human milk fortifiers showed promise in reducing NEC, length of stay, and number of days on total parenteral nutrition (Premkumar et al., 2019: MA). However, this analysis determined that evidence remains inconclusive as to the overall reduction in NEC, mortality, or feed intolerance or improvement in growth when comparing human milk fortifiers to bovine fortifiers (Premkumar et al., 2019: MA). An additional meta-analysis found no difference in rates of late-onset sepsis or surgical NEC between the use of human milk fortifiers and bovine fortifiers (Ananthan et al., 2020: MA).

Recommendation OCF-5: Use human milk nutrient analysis, when available, to facilitate targeted milk fortification, if needed.

Rationale: The macronutrient and energy content of human milk can be highly variable and unpredictable. Protein intake and protein-to-energy ratio are major determinants of weight gain in very-low-birth-weight infants (de Halleux et al., 2019: II-2). The protein and energy content of donor milk may be significantly lower than that of mother's own milk (de Halleux et al., 2019: II-2). Preterm newborns have higher protein and energy requirements; therefore, fortification of mother's own milk is recommended for very-low-birth-weight infants (de Halleux et al., 2019: II-2). PDHM often has lower protein content than parent's own milk and therefore requires fortification to compensate. Fortification of PDHM with specific nutrients such as vitamin D, proteins, and calcium has been associated with increased weight gain in premature infants (Adhisivam et al., 2019: I). Adjustable fortification is recommended for effectiveness and practicality in reaching adequate protein intake and growth for preterm infants (Adhisivam et al., 2019: I).

Recommendation OCF-6: Consider providing skimmed human milk for newborns with chylothorax.

Rationale: Some conditions, such as chylothorax, an anomaly that results from an intrauterine obstruction of the thoracic duct, require newborns to receive fat-free milk. Using fat-free human milk for infants with chylothorax may be beneficial because of the immunologic qualities that are not present in formulas using cow's milk (Chan & Lechtenberg, 2007: III). A centrifuge can be used to skim the human milk, allowing the infant to receive the immunobiologic and nutritional benefits of human milk (Spatz et al., 2014: III). It is important for mothers to have a good milk supply because the volume of usable milk after the skimming process is lower (Spatz et al., 2014: III).

STEP 5—SKIN-TO-SKIN CONTACT

Recommendation STS-1: Educate parents during newborn separation about the benefits of skin-to-skin care (also referred to as kangaroo care or kangaroo mother care [KMC]), including the following:

- **Decreased risk of infection and hypothermia and lower overall length of stay**
- **Improved growth and breastfeeding duration**
- **Enhanced parent–newborn attachment and bonding**

Rationale: Skin-to-skin care is a cost-effective intervention that has many benefits for the newborn, especially for those who are separated from their parents. Skin-to-skin contact at birth improves the infant's ability to suckle at the breast, have an organized rooting and prefeeding behavior, and easily recognize the mother's milk scent (Cleveland et al., 2017: SR). Infants who receive skin-to-skin contact during the postpartum period breastfeed more readily than those who receive standard care (Cleveland et al., 2017: SR). For infants in the NICU, skin-to-skin care significantly increases the rate of exclusive breastfeeding (Cunningham et al., 2018: SR). An RCT of 160 preterm newborns weighing between 1,000 and 1,800 grams compared early KMC (within the first 4 days) to late KMC (after stabilization and no longer using respiratory support). The authors found those newborns receiving early KMC had significantly higher exclusive human milk feedings and direct breast feedings, significantly fewer apneic episodes, and less need for reinitiating ventilation or respiratory support (Jayaraman et al., 2017: I).

A systematic review and meta-analysis of 30 studies found that skin-to-skin contact has a significant positive impact on initiation of breastfeeding and breastfeeding success (Ghojazadeh et al., 2019: MA). Maternal stimulation during KMC for the low-birth-weight newborn in the NICU setting resulted in decreased variations in heart rate and respiratory rate (Jayaraman et al., 2017: I). The initiation of skin-to-skin contact immediately after birth in healthy full-term newborns is directly linked to cardiopulmonary stabilization by decreasing cortisol levels within minutes of being placed in skin-to-skin contact (Cleveland et al., 2017: SR). An additional systematic review noted that skin-to-skin contact improves short-term cardiorespiratory outcomes compared with routine incubator care and that there is strong evidence that skin-to-skin care reduces cortisol and increases oxytocin levels in preterm infants (Pados & Hess, 2020: SR). Neonates born to mothers with gestational diabetes are likely to have fewer episodes of hypoglycemia and a significant increase in the frequency of breastfeeding when placed skin-to-skin in the early postpartum period (Dalsgaard et al., 2019: II-1). A systematic review and meta-analysis of 17 RCTs reporting weight in relation to KMC found that those preterm neonates who routinely had KMC had increased weight gain, earlier breastfeeding rates, more success at the breast, and higher rates of exclusive breastfeeding at 6 weeks of age (Cunningham et al., 2018: MA). Some authors propose that a quiet sleep state during KMC promotes better physiologic outcomes in both full-term and preterm newborns (Cunningham et al., 2018: MA; Samra et al., 2013: II-1).

Skin-to-skin care also benefits the parents. Skin-to-skin contact by either parent can positively improve parent–infant interactions (Cleveland et al., 2017: SR). Skin-to-skin care strengthens parent–newborn interactions, including the feelings of bonding, a sense of naturalness with the experience, and overall satisfaction. Studies

 doi: 10.1016/j.jogn.2021.06.003

have concluded that caregivers other than the mother can facilitate the development of the late preterm infant's early feeding cues by providing skin-to-skin contact (Nyqvist et al., 2017: II-2).

Recommendation STS-2: Encourage skin-to-skin care as early and frequently as possible.

a. **Ideally, skin-to-skin sessions should last at least 30 minutes with at least 2 hours of cumulative time per day.**
b. **Encourage parents to express milk and empty the breast completely prior to skin-to-skin contact and then immediately afterward.**

Note: Newborns can tolerate skin-to-skin contact while intubated.

Rationale: Accomplishing early skin-to-skin contact, within the first 2 to 3 hours after birth, showed a significant increase in rates of exclusive breastfeeding at discharge (Moore et al., 2016: MA; Vila-Candel et al., 2018: II-2). During the first hour after birth, infants begin to coordinate autonomic, sensory, motor, and behavioral state systems, which makes the first hour after birth an ideal time to initiate skin-to-skin contact (Lau et al., 2018: II-2). The longer skin-to-skin contact is provided, the more positive the newborn–parent outcomes are. Newborns are eight times more likely to breastfeed spontaneously if they spend more than 50 minutes in skin-to-skin contact with their mothers immediately after birth (Moore et al., 2016: MA). A systematic review noted a statistically significant weight gain when skin-to-skin intervention lasted for 20 hours per day, and minimal to no differences when the skin-to-skin intervention was less than 2 hours cumulative per day (Cunningham et al., 2018: MA). If the parent is going to combine skin-to-skin with non-nutritive sucking, it is recommended that the parent express milk first with a hospital-grade pump to fully empty the breast by pumping until there are no more jets of milk and then continue to pump for an additional 2 minutes. (Fugate et al., 2015: III; Spatz, 2004: III).

STEP 6—NON-NUTRITIVE SUCKING

Recommendation NNS-1: Educate parents about the importance of non-nutritive sucking.

Rationale: Effective newborn sucking is an important skill needed to achieve adequate nutrition and weight gain and facilitate timely discharge. Coordination of respiration, sucking, and swallowing can be difficult if not impossible for preterm newborns, as the sucking reflex is not well coordinated until the fetus reaches approximately 34 weeks of gestation (Calik & Esenay, 2019: I; Khodagholi et al., 2018: I). Providing various stimuli, such as non-nutritive sucking, assists in the development of sucking skills (Calik & Esenay, 2019: I; Khodagholi et al., 2018: I; Thomas & Mathew, 2019: II-2). Non-nutritive sucking may also lead to the ease of transition to oral feedings and decrease overall length of stay (Bala et al., 2016: I; Calik & Esenay, 2019: I; Foster et al., 2016: MA; Khodagholi et al., 2018: I). An RCT of 28 preterm newborns in the NICU setting found that those offered non-nutritive sucking (via pacifier) during oral gavage feedings transitioned to total oral feedings 11 days earlier, gained weight faster, and were able to be discharged 7 days earlier than those preterm newborns not offered non-nutritive sucking options (Calik & Esenay, 2019: I). The study is limited by a small sample size, and the authors recommend further research.

Recommendation NNS-2: Provide frequent opportunities for non-nutritive sucking during parent–newborn separation, including via pacifiers, gloved fingers, or parent's breast.

- **If the parent is available and the newborn is able, encourage the parent to place the newborn at the breast following milk expression or during bolus tube feedings.**

Rationale: Various methods for providing non-nutritive sucking exist, including pacifiers, a gloved finger, or the parent's nipple or breast, all of which are equally effective. Tube-fed newborns often transition to oral feedings more quickly when the newborn has experienced stimuli that will support sucking experiences (Calik & Esenay, 2019: I; Kaya & Aytekin, 2017: I). A pacifier can improve non-nutritive sucking by increasing oral stimulation. Non-nutritive sucking of the breast can increase the sucking and swallowing reflexes (Thomas & Mathew, 2019: II-2). Stimulation with parent's milk odor improves the newborn's non-nutritive sucking skills and increases the transition from tube to oral feedings (Khodagholi et al., 2018: I). The combined stimulation of maternal milk odor and non-nutritive sucking can increase the maturation in preterm newborns and enable earlier feeding skills, including increased mouth movements and better breast acceptance, and contributes to a calmer newborn, which may lead to increased feedings and earlier discharge (Khodagholi et al., 2018: I).

Oromotor stimulation can be applied to newborns with or without non-nutritive sucking and can improve sucking abilities while reducing the transition time from gavage feedings to oral feedings (Bala et al., 2016: I). An RCT of 31 preterm infants born at less than 34 weeks of gestation found that those who received a structured 15-minute oral sensorimotor intervention per day for 10 consecutive days had faster advancement to full feedings at the breast and enhanced direct breastfeeding rates at discharge when compared with newborns who had a sham intervention (Fucile et al., 2018: I).

Recommendation NNS-3: Assist the parent(s) and other support people to identify newborn behaviors during non-nutritive sucking, including the following signs of organized and disorganized sucking:

- **Organization: Coordination of sucking, swallowing, and breathing; smooth, regular respirations; and good posture**
- **Disorganization: Difficulty breathing, color change, coughing and choking, tachypnea, spitting up, hypertonicity or flaccidity, irritability, and gaze aversion**

Rationale: The smooth integration of sucking, swallowing, and breathing during nutritive and non-nutritive feeding is important for the newborn to develop feeding skills and to avoid development of aversions around feeding (Foster et al., 2016: MA). The development of feeding behaviors is thought to reflect neurobehavioral maturation, as the development of oral feeding

requires complex anatomic and physiologic coordination (Foster et al., 2016: MA). A retrospective chart review of videofluoroscopic swallowing studies on 310 infants admitted to the NICU setting found that 79 had silent aspiration (Bowman et al., 2020: II-2). The authors explained that aspiration is influenced by factors impacting the individual and the environment. Occupational and speech language pathologists should be integrated into the health care team as partners to identify infants at risk for disorganization or poor feeding outcomes (Bowman et al., 2020: II-2). It is also important to note that infants who exhibit uncoordinated sucking patterns are at higher risk of abnormal developmental outcomes; therefore, periodic follow-up and early intervention may be warranted (Yi et al., 2019: II-3).

Recommendation NNS-4: Monitor the newborn for readiness to feed at the breast, including tolerance of bolus feedings, sucking at the breast, and feeding cues, such as hand-to-mouth activity and rooting or sucking around the gavage tube.

Rationale: The incidence and duration of breastfeeding for preterm newborns and those who are separated from their parents are typically less than that of full-term newborns (Fucile et al., 2018: I). Decreased breastfeeding rates are attributed to the many challenges of attaining direct breastfeeding among this vulnerable group. Anatomic and physiologic coordination, including hand-to-mouth activity, rooting and sucking, and sucking at the breast, reflect neurobehavioral maturation and potential readiness for advancing to oral feedings, which may include direct feeding at the breast (Foster et al., 2016: MA). Long bursts of sucking are associated with the newborn's readiness to transition to a more mature feeding and sucking pattern (Khodagholi et al., 2018: I). Early intervention and transition to direct breastfeeding, when the newborn is ready, may enhance breastfeeding rates (Fucile et al., 2018: I).

STEP 7—TRANSITION TO THE BREAST

Recommendation TB-1: Initiate direct breastfeeding when newborns demonstrate readiness to begin oral feeds.

Rationale: When newborns show readiness to feed, they should be transitioned to breastfeeding for parents who choose direct breastfeeding. Both preterm and full-term newborns should be able to maintain their body temperature outside the incubator or when in skin-to-skin care. The newborn is ready for the initiation of oral feeds when demonstrating a quiet alert, relaxed state and a bright, healthy look. The newborn should also show cues for engagement, such as making a mouthing "ooh" configuration, making eye contact, and moving hands to mouth. Preterm newborns should be able to demonstrate sufficient mouthing, rooting, and sucking reflexes and hunger cues; wake up for feedings; and focus on the food source (Lubbe, 2018: III).

Recommendation TB-2: Prioritize that the first oral feeding session is at the breast, for parents who choose direct breastfeeding.

Rationale: Transitioning from gavage feeding to direct breastfeeding may present challenges for vulnerable newborns. Ineffective recognition and management of these challenges by parents and the health care team may lead to both short-term and long-term deficits in premature newborns (Ziadi et al., 2016: SR). To promote successful feedings at the breast, newborns should be offered non-nutritive sucking and oral stimulation during gavage feedings. Sucking at the nipple during gavage feedings while increasing time at the breast, cue-based feeding, and exposure to human milk odor all lead to direct breastfeeding (Ziadi et al., 2016: SR).

When transitioning from gavage to direct breastfeeding, the amount of milk that is actually transferred during breastfeeding can be a concern. It is imperative that vulnerable and premature newborns receive adequate nutrition for continued growth and development. Early, frequent feeds at the breast are associated with breastfeeding longevity, because direct breastfeeding uses the newborn's ability to sustain milk production. Direct breastfeeding stimulates oxytocin release through skin-to-skin contact and in response to the newborn's direct sucking, which in turn helps to relieve maternal stress and increase milk volume. Stress is a well-known antagonist of human milk production, and successful feedings at the breast encourage ongoing breastfeeding by the parents. Direct breastfeeding also provides a means to actively participate in the newborn's care, imparting confidence and reinforcing the parent's disposition to breastfeed (Casey et al., 2018: II-2).

A retrospective cohort study of 255 low-birth-weight preterm newborns sought to determine the impact of a feeding imprint on overall feedings and outcomes. Those preterm newborns who were offered direct breastfeeding before the first bottle feeding showed a shorter transition to the establishment of full oral feedings, were fed at the breast more frequently throughout the hospital stay, and had earlier discharge dates when compared with those newborns who were offered bottles first (Suberi et al., 2018: II-2). Furthermore, the microbiota is different when infants are fed expressed human milk versus feeding directly from the breast (Moossavi et al., 2019: II-2).

Recommendation TB-3: Monitor the newborn for physiologic stability during early oral feedings regardless of the feeding method.

- **Ideally, oxygen saturation should be maintained at 90%; however, minimum oxygen saturation levels may be individualized based on the medical condition of the newborn.**

Rationale: During feeding attempts, underdeveloped physiologic adaptive mechanisms place the preterm or vulnerable newborn at risk for changes in vital signs, reflexes, activity state, and oxygen saturation. Feeding may trigger compensatory mechanisms, such as moving into a sleep state, limited tongue extrusion, and a change in sucking, which may increase the risk of aspiration (Shaker, 2013: III). Traditional volume-based feedings may increase these risks and lead to the development of feeding aversions in the NICU setting and after the newborn is discharged home (Shaker, 2013: III). Educating parents about newborn feeding cues and cue-based or newborn-guided feeding may help develop positive feeding interactions and lead to earlier full feedings, even in the most ill or premature newborns (Shaker, 2013: III).

doi: 10.1016/j.jogn.2021.06.003

Recommendation TB-4: If available, provide opportunities for the parent to stay close to their newborn.

- **Ideally, the parent(s) should stay with the newborn as much as possible to allow for direct breastfeeding anytime, day or night.**

Rationale: Allowing parents to stay in the facility will allow them to be available for all feedings, which may assist the newborn with the transition to on-demand feedings more quickly. Promoting continued direct breastfeeding for prolonged periods of time or consecutive days helps to demonstrate the newborn's effectiveness at the breast. One study found that preterm newborns weighing less than 1,250 grams staying in a single-family room consumed greater volumes of human milk, had shorter lengths of stay, and had better cognitive and developmental outcomes at 18 and 24 months of age (as assessed by the Baylor III scores), when compared to similar gestational age newborns staying in open-bay NICU settings. These differences may be the result of higher human milk volumes (Vohr et al., 2017: II-2). An additional study of infants born at 32 weeks of gestation and weighing 1,800 grams or less found those newborns receiving human milk at discharge had a higher percentage of human milk feedings, fewer ventilator days, and more direct breastfeeding opportunities while hospitalized (Lussier et al., 2019: III).

Whenever possible, health care providers should offer safe options for parents to spend prolonged times with their hospitalized newborns. When families are integrated into the care of their newborns, there is improved newborn weight gain, decreased parent stress and anxiety, and higher rates of human milk feeding at discharge, according to an RCT (O'Brien et al., 2018: I). In this RCT, parents were present in the NICU for at least 6 hours per day, attended educational sessions, and actively cared for their newborns (O'Brien et al., 2018: I).

STEP 8—MEASURING MILK TRANSFER

Recommendation MMT-1: Weigh the newborn before and after breastfeeding to document milk transfer according to facility guidelines. A suggested protocol is as follows:

- **Weigh the clothed newborn before feeding and document the weight in grams.**
- **Weigh the newborn after feeding with the same clothing and document the weight in grams (1 gram equals 1 milliliter of human milk).**
- **Subtract the postfeeding weight from the prefeeding weight.**

Rationale: While clinical cues may be sufficient in supporting the healthy parent–newborn dyad for breastfeeding, it is important to ensure during separation that the newborn is not overfed or underfed. Test weights are an accurate objective measurement to assess milk transfer during direct breastfeeding (Haase et al., 2009: II-2). Electronic scales may be used to assess milk transfer in preterm and vulnerable newborns (Perrella et al., 2020: II-3). Weights before and after breastfeeding are a reliable way to verify volume of feedings, even in smaller volumes (Rankin et al., 2016: II-2). Using test weights is one way to ensure that infants are not overfed or underfed during breastfeeding and allows clinicians to provide accurate guidance for supplementation, if needed (Haase et al., 2009: II-2).

STEP 9—PREPARATION FOR DISCHARGE

Recommendation PD-1: Provide breastfeeding support for parents who are separated from their newborns throughout newborn hospitalization to improve the provision of human milk/direct breastfeeding after discharge.

Rationale: Parents should receive adequate support in the immediate postpartum. Researchers demonstrated that an increased breastfeeding self-efficacy increases breastfeeding duration and success (Briere et al., 2014: SR; Heidarzadeh et al., 2013: II-1; Porta et al., 2019: II-2). Increased breastfeeding and support for expressing human milk during hospitalization has been found to improve breastfeeding rates at discharge (Bentley et al., 2017: II-2). Determining breastfeeding self-efficacy early in the postpartum period can provide important information to assist clinicians in identifying parents who may require additional breastfeeding support after discharge (Laliberté et al., 2016: I). All clinicians should offer hospital-based interventions that focus on enhancing breastfeeding self-efficacy and supporting the mother's own milk production for all newborns before discharge to home (Porta et al., 2019: II-2).

Recommendation PD-2: Identify social determinants of health that may impact overall duration of breastfeeding.

- **Ensure breastfeeding and lactation strategies are individualized to each couplet and family.**

Rationale: Clinicians should be aware of conditions that impact duration of breastfeeding. A systematic review of six manuscripts evaluating factors that impact post-NICU breastfeeding found that mothers with lower socioeconomic status, lower education, and those who smoke are more likely to have shorter breastfeeding durations after discharge (Briere et al., 2014: SR). Researchers found social factors such as maternal age, ethnicity, marital status, education level, and eligibility for federal food supplements significantly correlated with human milk feeding at discharge (Briere et al., 2014: SR; Fleurant et al., 2017: II-2; Riley et al., 2016: II-2). Maternal breastfeeding goals, intergenerational relationships, and the social support networks may positively affect human milk feeding after discharge from the NICU (Fleurant et al., 2017: II-2). Neighborhood structural factors such as economic deprivation have been shown to have an inconsistent association with human milk feeding after discharge from the NICU for the very-low-birth-weight newborn (Riley et al., 2016: II-2).

Receiving NICU-specific lactation support and access to peer counselors and related breastfeeding resources improve breastfeeding outcomes in the very-low-birth-weight neonate born to low-income and geographically or socially isolated women (Francis et al., 2018: I; Riley et al., 2016: II-2). Parents of preterm newborns may discontinue breastfeeding or supplying human milk earlier than

parents of full-term newborns, which may be associated with sociodemographic and health-care-service–related factors (Francis et al., 2018: I; Porta et al., 2019: II-2). Providing at-risk parents with a realistic understanding of the importance of breastfeeding, challenges associated with breastfeeding, and the availability of community support that meet the specific needs of the family can positively impact the duration of breastfeeding after discharge.

Recommendation PD-3: Ensure the newborn meets discharge criteria for feedings and weight gain.

a. **Allow newborns to directly feed at the breast for all feedings before discharge.**
b. **Discontinue fortification according to the health care provider's orders before hospital discharge, if indicated.**
c. **Monitor for newborn weight gain with full feedings at the breast.**

Rationale: Discharge home should be addressed from the standpoint of both the parent and the newborn. When parents are separated from their newborn, unique feeding challenges may persist. Sometimes parents have to adjust to caring for a fragile newborn at home, without the direct support of nursing and lactation staff. Higher prevalence of breastfeeding at discharge has been associated with a higher frequency of daily breastfeeding and more hours spent in skin-to-skin contact during the first few days after birth (Casey et al., 2018: II-2; Nilsson et al., 2017: I). Ideally, parents should be encouraged to continue skin-to-skin contact and direct breastfeeding or provision of human milk after discharge. Fortifiers should be discontinued, as most parents do not have access to fortifiers after discharge. Studies regarding postdischarge nutrient fortification of human breast milk are inconsistent, and the approach warrants further investigation (Liu et al., 2019: II-2; Young et al., 2013: MA). Newborns should demonstrate a sustained pattern of weight gain on full human milk feedings (AAP & ACOG, 2017: III).

STEP 10—APPROPRIATE FOLLOW-UP CARE

Recommendation FU-1: Provide referrals and appointments for appropriate breastfeeding and lactation support upon discharge from the hospital.

- **Follow-up care with a health care provider should be scheduled within 48 to 72 hours of discharge.**
- **Health care providers should communicate directly with those in the community setting to reinforce the direct breastfeeding or provision of human milk plans.**

Rationale: Specific needs for follow-up care should be determined, and appropriate guidance should be provided to the parents, including information on breastfeeding support and availability of lactation specialists in the outpatient or home setting (Ridgway et al., 2016: II-2). Preterm newborns who receive health care services on a regular basis after discharge are 4.6 times more likely to achieve catch-up growth (Liu et al., 2019: II-2). Communication between providers is key to the successful transition to home. Inadequate communication between providers has been identified as a frequent source of frustration for parents and may lead to a negative impact on the newborn's well-being (Lutz, 2012: QIII).

Providing breastfeeding and lactation support via home visits and follow-up telephone calls has been associated with higher breastfeeding prevalence rates at 6 months (Nilsson et al., 2017: I). An RCT of mothers receiving care in a community-based breastfeeding clinic ($n = 315$) in Canada reported a higher level of empowerment, emotional well-being, and longer breastfeeding duration when compared with those mothers receiving standard care ($n = 157$; Laliberté et al., 2016: I). Support from health care providers at an outpatient breastfeeding clinic improves self-efficacy and satisfaction for new mothers (Laliberté et al., 2016: I). However, home nurse visitation is an effective alternative to office-based care (Paul, 2012: I).

Recommendation FU-2: Refer the family to additional community resources when transitioning to the home setting.

Rationale: Providing a telephone support intervention after discharge from the NICU promotes mothers' self-efficacy, builds trust in the effectiveness of breastfeeding, improves attachment, and improves breastfeeding rates for the preterm newborn (Ericson et al., 2017: I). Web-based support for breastfeeding parents can provide continuous monitoring after discharge with steady communication between lactating parents and lactation specialists. Monitoring and communicating after discharge was shown to increase breastfeeding duration, exclusivity, and intensity (Ahmed et al., 2016: I; Zachariassen, 2013: I). An RCT of 106 mother–newborn dyads found that those who received interactive breastfeeding Web-based support ($n = 49$) had greater exclusive breastfeeding rates at 1, 2, and 3 months after discharge when compared with those dyads that had standard care ($n = 51$; Ahmed et al., 2016: I). In addition, integration of support, such as dedicated family support, peer counselors, targeted education support, or parent support groups, plays a significant role in managing postpartum coping and breastfeeding for those who were separated from their newborns (Briere et al., 2014: SR; Tan et al., 2012: I).

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APPENDIX

TABLE 1. Recommended Colostrum as Oral Immune Therapy Protocol

Procedure	Key Points
1. Obtain fresh or refrigerated colostrum from mother	1. Give mother small breast milk collection containers and teach mothers hand expression to increase volumes of colostrum
2. Verify the colostrum identifier matches infant's identifier	2. Label colostrum in the order it was pumped
3. Wash hands and don gloves	3. Use fresh colostrum whenever possible
4. Saturate a sterile cotton swab with colostrum (approximately 0.2 mL)	4. HMBANA recommends to refrigerate only for 48–96 h for hospitalized infants[31p45]
5. Gently paint the tongue, gums, and inner cheek with colostrum	5. If < 0.2 mL colostrum is available, can mix with small amount of sterile water
6. Repeat every 3-4 h even when enteral feeding is begun via gavage tube[21-23,25]	6. Document colostrum as oral immune therapy when administered
	7. Recommend that parents do this when possible

Abbreviation: HMBANA, Human Milk Banking Association of North America.

Synthesized from recommendations of Meier et al, 2010[11] and Spatz and Edwards, 2009.[28]

From Gephart, S. M., & Weller, M. (2014). Colostrum as oral immune therapy to promote neonatal health. *Advances in Neonatal Care*, *14*(1), 44–51. https://doi.org/10.1097/ANC.0000000000000052. Used with permission.

STRENGTH OF CLINICAL PRACTICE RECOMMENDATIONS

These recommendations reflect a summative interpretation of the evidence presented herein, along with the clinical judgment and expertise of perinatal nurses. Each clinical practice recommendation is assigned a strength of recommendation (SOR) upon which the certainty of impact for implementing that recommendation is based. Additionally, the clinical practice recommendation is also assigned a level of evidence score (LES) that is determined based on the various levels of evidence cited in the rationale statements in that particular section of Guideline.

Research, however, is not the sole determinant for integrating evidence into practice. In order to identify the clinical relevance and applicability of these recommendations, the Evidence-Based Clinical Practice Guideline Revision Team came to consensus. All selected research was critically analyzed to assess the strength and generalizability while considering the risks and benefits to the woman and newborn. Incorporating clinical expertise into this process ensures the applicability of these recommendations into clinical practice.

STRENGTH OF RECOMMENDATION (SOR)

A	Strong Recommendation	There is high certainty that the recommendation will provide strong benefit to the woman and/or newborn.
B	Moderate Recommendation	There is high certainty that the recommendation will provide moderate benefit to the woman and/or newborn.
C	Weak Recommendation	There is insufficient or low-level evidence to support universal adoption of the intervention. However, it may be offered based on professional judgment or the woman's preference.
NR	Not Recommended	There is strong to moderate evidence to support that the intervention be excluded.
IE	Insufficient Evidence	There are insufficient data to make a universal recommendation for this intervention as it may have limited or unknown effectiveness.

LEVEL OF EVIDENCE SCORE (LES)

High	The evidence to support this recommendation is of high quality, including mostly Level I studies, systematic reviews, or meta-analyses of high-level studies.
Medium	The evidence to support this recommendation is of moderate quality, including mostly Level II, II-1, II-2, or II-3 studies. May also include areas where there is limited high-quality evidence.
Low	The evidence to support this recommendation is weak or of low quality, including mostly Level III studies, professional opinion, or case studies. The evidence may also be lacking.

Strength of Clinical Practice Recommendations
The Use of Human Milk During Parent–Newborn Separation
Evidence-Based Clinical Practice Guideline

Topic	Guideline Recommendation	Strength of Recommendation (SOR)	Level of Evidence (LES)
Step 1			
Informed Decision (ID)	ID-1: Assess parental knowledge about the benefits of human milk for their newborn's health and developmental outcomes.	A	Medium
	ID-2: Educate parents about the health benefits of human milk for both the newborn and the lactating parent.	A	High
	ID-3: Provide parent's own milk for all newborns (full-term and preterm) who are separated from the parent. If parent's own milk is not available, provide PDHM prior to formula.	A	Medium
	ID-4: Ensure consent has been obtained for the use of PDHM as a bridge to parent's own milk, if indicated.	B	Low
Step 2			
Initiation and Maintenance of Milk Supply (IM)	IM-1: Promote an organizational culture that supports human milk diets for all newborns, especially during parent–newborn separation.	A	Medium
	IM-2: Encourage the parent to start milk expression with a hospital-grade pump, manually, or with a combination of both, ideally within 1 hour of birth.	A	Medium
	IM-3: Educate the lactating parent on the importance of using a hospital-grade electric breast pump that has the ability to pump both breasts simultaneously, if available.	A	High
	IM-4: Educate parent(s) about principles of milk expression.	A	Medium
	IM-5: Encourage the parent to pump frequently when visiting the newborn.	A	Medium
Step 3			
Human Milk Management (HMM)	HMM-1: Ensure adequate pumping, storage, and labeling supplies are available at home and in the hospital setting, whenever possible.	A	Medium
	HMM-2: Educate parents who are separated from their newborns on how to express, label, and store milk safely.	A	Low
	HMM-3: Provide staff education to support facility-based protocols for storing and administering fresh and frozen milk.	A	High
	HMM-4: Ensure human milk management systems are supported by national guidelines.	B	Low

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 doi: 10.1016/j.jogn.2021.06.003

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Strength of Clinical Practice Recommendations
The Use of Human Milk During Parent–Newborn Separation
Evidence-Based Clinical Practice Guideline

Topic	Guideline Recommendation	Strength of Recommendation (SOR)	Level of Evidence (LES)
Step 4			
Oral Care and Feeding of Human Milk (OCF)	OCF-1: Anticipate and prepare for oral care to provide oral immune therapy during parent–newborn separation.	A	High
	OCF-2: Ensure that oral care is included as an integral part of routine care if the newborn is unable to orally feed.	A	High
	OCF-3: Initiate enteral feeds using parent's own milk according to the provider's orders and whenever possible.	A	High
	OCF-4: Consider the use of fortifiers for additional nutritional needs on an individual basis.	B	High
	OCF-5: Use human milk nutrient analysis, when available, to facilitate targeted milk fortification, if needed.	B	High
	OCF-6: Consider providing skimmed human milk for newborns with chylothorax.	B	Low
Step 5			
Skin to Skin Contact (STS)	STS-1: Educate parents during newborn separation about the benefits of skin-to-skin care (also referred to as kangaroo care or kangaroo mother care [KMC]).	A	High
	STS-2: Encourage skin-to-skin care as early and frequently as possible. Ideally, skin-to-skin sessions should last at least 30 minutes with at least 2 hours of cumulative time per day.	A	High
Step 6			
Non-Nutritive Sucking (NNS)	NNS-1: Educate parents about the importance of non-nutritive sucking.	A	High
	NNS-2: Provide frequent opportunities for non-nutritive sucking during parent–newborn separation, including via pacifiers, gloved fingers, or parent's breast.	A	High
	NNS-3: Assist the parent(s) and other support people to identify newborn behaviors during non-nutritive sucking, including the following signs of organized and disorganized sucking.	A	High
	NNS-4: Monitor the newborn for readiness to feed at the breast, including tolerance of bolus feedings, sucking at the breast, and feeding cues, such as hand-to-mouth activity and rooting or sucking around the gavage tube.	A	High

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Strength of Clinical Practice Recommendations
The Use of Human Milk During Parent–Newborn Separation
Evidence-Based Clinical Practice Guideline

Topic	Guideline Recommendation	Strength of Recommendation (SOR)	Level of Evidence (LES)
Step 7			
Transition to the Breast (TB)	TB-1: Initiate direct breastfeeding when newborns demonstrate readiness to begin oral feeds.	A	Low
	TB-2: Prioritize that the first oral feeding session is at the breast, for parents who choose direct breastfeeding.	A	High
	TB-3: Monitor the newborn for physiologic stability during early oral feedings regardless of the feeding method.	A	Low
	TB-4: If available, provide opportunities for the parent to stay close to their newborn.	B	Medium
Step 8			
Measuring Milk Transfer (MMT)	MMT-1: Weigh the newborn before and after breastfeeding to document milk transfer according to facility guidelines.	A	Medium
Step 9			
Preparation for Discharge (PD)	PD-1: Provide breastfeeding support for parents who are separated from their newborns throughout newborn hospitalization to improve the provision of human milk/direct breastfeeding after discharge.	A	High
	PD-2: Identify social determinants of health that may impact overall duration of breastfeeding. Ensure breastfeeding and lactation strategies are individualized to each couplet and family.	A	High
	PC-3: Ensure the newborn meets discharge criteria for feedings and weight gain.	A	Medium
Step 10			
Appropriate Follow-Up Care (FU)	FU-1: Provide referrals and appointments for appropriate breastfeeding and lactation support upon discharge from the hospital.	A	High
	FU-2: Refer the family to additional community resources when transitioning to the home setting.	A	High

doi: 10.1016/j.jogn.2021.06.003