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Infant and Family-Centered Care Standards, Competencies, and Best Practices: Feeding, Eating, and Nutrition Delivery

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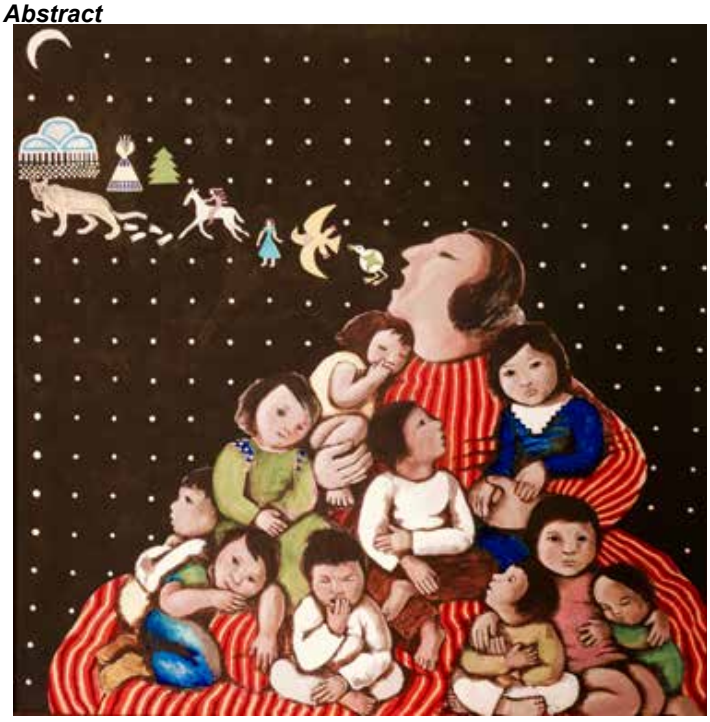
Abstract



All infants depend on others to meet their nutrition and hydration needs to grow and thrive. The dependence on others is regardless of being born term, preterm, with or without major underlying genetic/medical/surgical etiologies. The uniqueness of each infant must be respected and nurtured by primary caregivers and all concerned with their care, particularly in a Neonatal Intensive Care Unit (NICU). For high-risk babies to attain full oral feeding, whether by breast, bottle, or combination, there is no "cookbook" as a guide. In order to achieve optimal feeding and growth, it is vitally important to avoid stress, discomfort, and the possibility of feeding aversion that often occurs in infants in intensive care. Recommended Standards, Competencies, and Best Practices for Infant and Family-Centered Developmental Care (IFCDC) focus on providing systems thinking within intensive care settings that exemplify best practices and include feeding, eating, and nutrition delivery (FEND) recommendations. These best practices provide the practitioner with an ever-expanding evidence base for supporting successful feeding in high-risk babies.

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"Despite medical advances in the last two decades, the average age for infants to achieve full oral feedings has not changed."

Introduction

Typical requirements for safe discharge from a neonatal intensive care unit (NICU) to home include oral feeding skills at breast and/or bottle sufficient to meet weight gain and growth. [1] Oral feeding is often the last required skill achieved by an infant who spends their early days, weeks, or months in the NICU. [2] Many professionals continue to think that slow advances in oral feeding are primary factors in holding infants back and extending the length of stay (LOS). [3] Interestingly, and in a sense contradictory, the course for infants to achieve full oral feedings is directly influenced by gestational age at birth and the medical course during the first weeks of life, in addition to underlying genetic or surgical diagnoses. [2, 4] For instance, gestational age at first and full enteral feedings correlate with the attainment of full oral feeding and length of hospital stay. [12] When one considers the multi-factorial influences on successful feeding in the NICU, oral feeding logically should be the final milestone to be achieved. [5-7].

Infants need to make global neurological developmental gains to eat safely and efficiently. These include stability in breathing, heart rate, oxygenation, digestion, and motor and neurobehavioral skills. [5-7, 10, 11] Oral feeding relies on the ability of the infant to breathe via the nose without signs of stress to coordinate the sucking, swallowing, and breathing sequencing. [8, 9] the infant must also maintain pulmonary stability while feeding orally at the breast or via bottle/nipple, along with appropriate digestion. [9] These basic neurological mechanisms for safe eating should develop before an infant is expected to meet the requirements for oral feeding.

"The Infant and Family Centered Developmental Care (IFCDC) Recommended Standards, Competencies, and Best Practices for Infant and Family-Centered Developmental Care focus attention on the provision of care within intensive care settings that exemplify best practices, and includes recommendations for feeding, eating and nutrition delivery."

Although there has been a great deal of emphasis on "getting infants to eat earlier so they can go home sooner", length of stay is influenced by factors other than oral feeding skill development. [2, 12] Despite medical advances in the last two decades, the average age for infants to achieve full oral feedings has not changed. [13] Healthy preterm infants typically achieve full oral feedings at 36 ½ weeks, plus or minus two weeks. [2, 13] This finding appears persistent despite multiple clinical approaches and research studies to get infants to eat earlier. Infants with medical comorbidities or are extremely premature at birth often achieve oral skills well after 36 weeks and may not achieve full oral feedings before discharge. [2, 12, 13] Despite attempts to get infants to eat earlier, a small percentage of healthy preterm infants require supplemental tube feedings at discharge. [12]

FEEDING, EATING, AND NUTRITION DELIVERY (FEND) STANDARDS

Standard 1, Feeding: Feeding experiences in the intensive care unit (ICU) shall be behavior-based and baby-led. Baby-led principles are similar whether applied to enteral, breast, or bottle feeding experience.

Standard 2, Feeding: Every mother shall be encouraged and supported to breastfeed and/or provide human milk for her baby.

Standard 3, Feeding: Nutrition shall be optimized during the ICU period.

Standard 4, Feeding: Mothers shall be supported to be the primary feeders of their baby.

Standard 5, Feeding: Caregiving activities shall consider the baby's response to input, especially around the face/mouth, and aversive non-critical care oral experiences shall be minimized.

Standard 6, Feeding: Professional staff shall consider smell and taste experiences that are biologically expected. Standard 7, Feeding: Support of baby's self-regulation shall be encouraged, especially as it relates to sucking for comfort.

Standard 8, Feeding: Environments shall support an attuned feeding for both the feeder and the baby.

Standard 9, Feeding: Feeding management shall focus on establishing safe oral feedings that are comfortable and enjoyable.

Standard 10, Feeding: ICUs shall include interprofessional perspectives to provide the best feeding management.

Standard 11, Feeding: Feeding management shall consider short and long-term growth and feeding outcomes.

Perhaps it is past time to recognize that, like other developmental skills, there is a lower age limit that we can expect for an infant to achieve full oral feeding. Given the preponderance of the evidence, that limit appears to be 36 ½ weeks, plus or minus two weeks. Disregarding the developmental aspect of the achievement of infant eating skills contributes to feeding difficulties that even late preterm infants experience. [14] Within and among infants, variability is often the most prominent characteristic. It is worth remembering that "each infant writes her/his book," which continues throughout infancy, early childhood, and beyond.

Feeding eating and nutrition delivery standards to guide practice

"Rather than asking questions such as "What gestational age shall we use to start oral feedings with an infant?", the focus should shift to identifying behaviors of the infant that indicate a readiness to begin oral experiences."

The Infant and Family Centered Developmental Care (IFCDC) Recommended Standards, Competencies, and Best Practices for Infant and Family-Centered Developmental Care focus attention on the provision of care within intensive care settings that exemplify best practices, and includes recommendations for feeding, eating and nutrition delivery (FEND https://nicudesign.nd.edu/nicu-care-standards/ifcdc--recommendations-for-best-practices-for-feeding-eating-and-nutrition-delivery/). Currently there are eleven standards in this area (Table 1).

Table 1: Feeding, Eating, and Nutrition Delivery (FEND) Standards

Below are highlighted several of the Standards that emphasize the need for understanding how to support the development of feeding skills in high-risk newborns.

"Several FEND standards focus attention on the need to provide oral experiences that are biologically expected and that consider the infant's response to input."

Standard 1 for FEND highlights that all feeding experiences shall be provided with the infant's behaviors guiding the experience.

Standardization of practice within the framework of individualized care for infants and families begins with recognizing that the lived experiences of both the infant and the family influence feeding experiences and eating skill development. Rather than asking questions such as "What gestational age shall we use to start oral feedings with an infant?", the focus should shift to identifying behaviors of the infant that indicate a readiness to begin oral experiences. "Cue-based" or infant-led feedings have been associated with a faster transition to oral feedings and with more physiologic stability of the infant during feedings. [15-18]

Standards two and four focus on encouraging and supporting mothers to breastfeed, provide human milk, and support families to be their babies' primary feeders.

Several FEND standards focus attention on the need to provide oral experiences that are biologically expected and that consider the infant's response to input. Human milk is the best nutrition for infants, especially preterm infants. [23-27] Sensory environments contribute to successful feeding, and parents' bodies provide the best sensory environment for infants. Skin-to-skin hold-

ing has been associated with improved outcomes, including a 40% decrease in mortality in reports from developing countries. [19-22]

In recent years, evidence has increased our understanding of what mothers need to breastfeed successfully. There is mounting evidence that breastfeeding does not increase the length of stay when the mother is in an intensive care setting that provides appropriate environmental and family-integrated support. [28-30] [29] In areas where breastfeeding is expected and supported, infants, on average, achieve exclusive direct breastfeeding at similar ages

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without increased length of stay. For instance, a publication from Denmark in 2014 found that 99% of 1221 mothers of infants born between 24 and 36 weeks gestation initiated breastfeeding, and 68% of the infants were discharged with exclusive breastfeeding. [31] In contrast, a study from 2019 of 76,855 infants admitted to a NICU in the United States reported that breastfeeding was not even initiated in 39.4% of them. [32] Another study of breastfeeding in Greece reported that only 58.1% of infants were exclusively fed human milk during their first month. [33]

Every neonatal intensive care unit has opportunities to help infants and their families get off to the best start possible with attention to the standards, competencies, and best practices for breastfeeding provided within the framework for FEND. There is no question that human milk is the best nutrition for infants and direct breastfeeding is the best option for most infants.

Standards five, six, and seven highlight the importance of

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minimizing and protecting against aversive experiences while promoting positive associations with oral-facial touch.

Many of the caregiving activities within NICUs are painful but necessary. The best we can do for those potentially aversive activities is to provide positive oral and facial experiences to counteract the negative ones. Within this conceptual framework, the most biologically expected and nonaversive experience of feeding is at the breast and in the context of a primary caregiver, typically the mother.

Eating requires safely breathing, sucking, and swallowing in coordinated, efficient ways. Research shows that the ability to do so is not achieved simultaneously for every infant. For example, in a report on the development of pharyngeal structures and function, "pressures were more consistent at 35-36 weeks PMA" than those found at earlier ages. [34, 35] Bottle-fed infants are more likely to struggle to coordinate sucking, swallowing, and breathing than breastfeeding infants. Infants have fewer desaturation episodes and more stable heart- and respiratory rates at the breast. [36-38] Each potential physiologically dysregulating experience could contribute to the infant perceiving feeding as an aversive experience. This finding highlights the importance of the more biologically expected feeding mode – breastfeeding. [36]

The focus of standard nine is that feeding management shall focus on establishing safe oral feedings that are comfortable and enjoyable.

"When NICU staff and families work together to follow the infant's lead, focusing on direct breastfeeding as the best way to achieve feeding experiences, these infants are more likely to be comfortable and safe.

No matter how badly all persons involved with infant care want every infant to be a successful total oral feeder before discharge home, they must pay close attention to the infant's cues. Behaviors indicate a readiness or lack of readiness to engage in the challenge of eating. Maintaining homeostasis while engaged in the feeding process is fundamental to both the safety and enjoyment of eating. Behaviors that indicate a loss of homeostasis are considered disengagement behaviors. "Quality" feedings will lead to improved quantity unless underlying factors impede the infant's development.

Infants must be adequately nourished without stress to infants or caregivers. Otherwise, the infant is likely to become aversive to oral feeding, whether breast or bottle (and often a combination in the early months of life). As time passes, those aversions may lead to undernutrition and "picky eating" with resistance to the ad-

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vance of diet in the second half of the first year of life. [50] It is essential to point out that infants begin eating with primitive motor responses while they learn to eat with every feeding experience. [9, 48] What are they learning if the feeding experiences are negative? When pairing negative experiences with food, perhaps they are learning that eating is not pleasurable and sets the stage for food aversion. [48]

When NICU staff and families work together to follow the infant's lead, focusing on direct breastfeeding as the best way to achieve feeding experiences, these infants are more likely to be comfortable and safe.

Standard 11 addresses feeding management considering short- and long-term growth and feeding outcomes.

Following signs of infant behavioral readiness and organization for successful feeding will enhance short-term outcomes and fa-

cilitate discharge from NICU to home. Aversion to eating does not often present while the infant is in the NICU. Instead, it presents at the time of transition to volitional eating, which occurs between two and four months of corrected age, or with the transition to complementary foods, which, according to the American Academy of Pediatrics, is when appropriate skill levels are reached at approximately six months of age. [27, 49-52] A recent review article revealed that 40% of infants struggle with feeding and growth after discharge from the NICU. [53] A similar prevalence rate (40%) applies even to infants who did not show evidence of struggles with eating while in the NICU.

"Some care practices lack evidence or have low-quality and potentially high-biased evidence. Many studies that have been initiated have resulted in varied approaches and outcomes."

These feeding problems frequently do not just disappear. In a study of preterm children at the age of two years, 23% (18/80) had definite feeding difficulties as measured by a standardized assessment. Another 26% (21/80) were at high risk of developing feeding problems. [54] A more recent systematic review and meta-analysis showed that 43% of infants and 25% of children born preterm demonstrated oromotor eating problems. [55] Families report challenging feeding behaviors with both infants and children into school ages. [50, 55] [56] It follows that feeding approaches within the NICU may contribute to aversive learning about eating and later feeding difficulties.

"The meta-analysis concluded that the benefit of oral stimulation programs is uncertain for reducing time to transition to total oral feeding, duration of hospitalization or intensive care stay, or exposure to parenteral nutrition."

Considerations and caution regarding feeding practices in intensive care

The complexities of feeding physiology, behavior, and development are clear, prompting various clinical and research approaches and supports to enhance short and long-term outcomes. Some care practices lack evidence or have low-quality and potentially high-biased evidence. Many studies that have been initiated have resulted in varied approaches and outcomes.

Documentation of safe feeding practices

A recent review of feeding an infant requiring continuous nasal positive airway pressure (nCPAP) and/or high flow nasal cannula (HFNC) examined the variability in practices within NICUs and Pediatric ICUs in New Zealand and Australia. [39, 40] Only one of these studies used instrumental swallowing assessments, and these authors highlighted the lack of safety data. Research has previously shown that 80-90% of infants who are aspirating do so silently rather than demonstrating signs of unsafe swallowing (e.g., no cough or gag.) [41-43]

Initiation of earlier feeding to reduce the length of hospital stay

A recent quality improvement study advocated beginning oral feedings with all infants at gestational ages younger than 33 weeks. [44] When changing to a cue-based oral feeding program AND beginning infants at <33 weeks PMA, the mean age for acquiring full oral feedings decreased from 37.4 to 36.5 weeks PMA, the commonly reported accepted mean age for reaching this milestone, and is clinically insignificant. [44] The study did not report any direct evaluation of the safety of swallowing with the earlier introduction of oral feeds.

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Oral stimulation to encourage earlier feeding success

Many NICU professionals use oral stimulation programs to "speed up the learning." A recent Cochrane meta-analysis highlighted the methodological flaws and high potential for bias in most oral stimulation reports [45]. One flaw is that oral stimulation is not uniformly administered. Some would consider sucking on a pacifier/soother/dummy or an emptied breast as oral stimulation. Others would say oral stimulation is a systematic approach to touching and moving oral structures to teach motor movements. The meta-analysis concluded that the benefit of oral stimulation programs is uncertain for reducing time to transition to total oral feeding, duration of hospitalization or intensive care stay, or exposure to parenteral nutrition. [45] In another series of studies, an oral stimulation program did not improve suction while in the hospital, nor did it improve breastfeeding rates after discharge. [46, 47]

Until large studies of feeding incorporate neurophysiologically and methodologically sound, clinically relevant, and family-inclusive strategies, research studies should be critically reviewed for their relevance and scientific rigor before acceptance into practice.

"As DW Winnicott stated, "Feeding is a putting into practice a love relationship between two human beings." [59]

Changing the culture of feeding practices.

Feeding practices are varied and may constitute a "feeding culture" in any particular intensive care unit. Changing the culture around feeding practices in intensive care is challenging and complex. To support feeding, NICU teams and families must work together. A study was designed to change the feeding culture in the NICU and work towards improving feedings in-hospital and post-discharge. Implementation of the program resulted in fewer infants needing feeding therapy services in the 3-5 month corrected age follow-up period. [18] The study provides hope for address-

ing feeding approaches that will ameliorate feeding aversion and later feeding challenges. Successful approaches such as this one provide evidence that it is time to change intensive care feeding culture, optimize feeding experiences, and shift focus to avoiding short- and long-term adverse outcomes.

"IFCDC standards and competencies for FEND focus on pleasurable non-stressful enteral, breast, and bottle-feeding experiences that support the regulation of the infant and the development of the parent-infant relationship. "

Recommendations to optimize short and long-term feeding outcomes

- When considering feeding the preterm or ill newborn within the NICU setting, the primary focus must be on feeding as the baby's experience, not accomplishing the act of feeding.
- Feedings should be based on the availability and stability of the infant, thus "infant-led." Studies of the change to infant-led feedings have shown a decrease in the gestational age at which infants reach full oral feedings (although the length of stay has not changed). [18, 57]
- Feeding plans should be individualized for each infant to offer and alter feeding opportunities based on the behavioral and physiological responses of the infant. Since each infant's medical course is different, the path to eating is different. [58] These differences mean that feeding supports need to be individualized to the family's goals and the infant's needs.
- Feeding experiences should be designed to provide a foundation for building parent-infant relationships in the most meaningful ways critical for carrying over into childhood.
- Approaches to change the feeding culture towards a more evidence-based, infant-led, and with parents as primary feeder model should be initiated.
- Rather than "do to," feedings should be a time to "enjoy with." As DW Winnicott stated, "Feeding is a putting into practice a love relationship between two human beings." [59]

Summary and Conclusions:

In summary, infant feeding is incredibly complex. The challenges change as each infant changes in multiple ways over time. Feeding cannot be considered in isolation but as one piece of a complex puzzle involving all aspects of medical comorbidities and neurodevelopment that are beyond the scope of this article. Caregivers spend a great deal of time feeding their infant, so the enrichment of all interactions between infant and caregiver is fundamental to the physical and mental health of the dyad. While nutrition and hydration needs must never be jeopardized, infant-led feeding experiences provide opportunities to develop a lifelong love of eating and a family mealtime interaction around trust. Team members from multiple disciplines with primary caregivers must work together to use integral collaborative processes with the infant "leading the charge."

Every neonatal intensive care unit has opportunities to help infants and their families get off to the best start possible with attention to the standards, competencies, and best practices within the FEND framework. IFCDC standards and competencies for FEND focus on pleasurable non-stressful enteral, breast, and bottle-feeding experiences that support the regulation of the infant and the development of the parent-infant relationship. The focus is not solely on the quantity and volume of breast milk and/or formula consumed per feeding or every 24-hour period. Instead, safe, comfortable, enjoyable, and predictable feedings support trust in the world, which leads to improved infant and family mental health.

"The model used to develop the IFCDC standards makes it clear that infants are seen as competent communicators. Thus, feedings are infant-led. Also within the IFCDC model are the concepts of environmental protection to provide neuroprotection of the developing brain, with infants and families at the center. Infants expect to be with their families."

The model used to develop the IFCDC standards makes it clear that infants are seen as competent communicators. Thus, feedings are infant-led. Also within the IFCDC model are the concepts of environmental protection to provide neuroprotection of the developing brain, with infants and families at the center. Infants expect to be with their families. Families expect to be the primary caregivers of their infants. The standards are being updated and revised to include the most recent published evidence. Although limitations are expected with a wide range of levels of evidence in the subject selection, research procedures, data collection, and interpretation of the findings, evidence-based practice is emphasized as the necessary standard.

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