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Fragile Infant Forums for Implementation of IFCDC Standards: Key Cornerstone of Interventions for Pain and Stress in the Baby

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Introduction:

The Infant and Family-Centered Developmental Care (IFCDC) Standards, published in 2020 (1) and found at https://nicudesign.nd.edu/nicu-care-standards are embedded in a conceptual model including the key principles of *Infant Mental Health*, *Environmental Protection, Neuroprotection of the Developing Brain*, and *Individualized Care (*see model diagrammed in Figure 1). Also emphasized are the primacy of the parent-baby dyad, the competence of the baby as an interactor, and overall acknowledgment and understanding of the enveloping systems and processes that influence care.

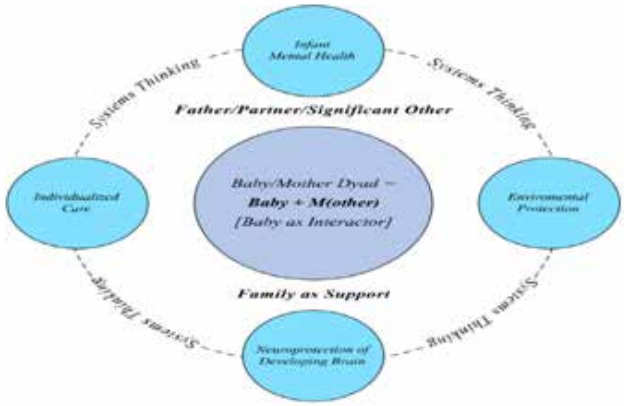

Figure 1: IFCDC Principles – Concept Model

The standards address six domains of evidence-based newborn care. Each standard sets the overall goal and expectation of care, with evidence detailed and referenced on the website. Each standard has a number of competencies that describe components of practice that should be addressed to achieve each standard. The six comprehensive domains include 1) Systems thinking in complex adaptive systems, 2) Positioning and touch for the newborn, 3) Sleep and arousal interventions for the newborn, 4) Skin-to-skin contact with intimate family members, 5) Management of feeding, eating and nutrition delivery, and 6) Reducing and managing pain and stress in newborns and families.

The sixth domain, "Reducing and Managing Stress in Newborns and Families," is broken into two separate standards: the first discusses support of the family, and the second, "Pain and Stress: Babies," The latter focuses on babies' pain and stress will be emphasized in this discussion.

The Standard of Managing Pain and Stress in Families:

A previous Neonatology Today article entitled *Fragile Infant Forums for Implementation of IFCDC Standards: Pain and Stress, Families* discussed the first of these pain and stress standards, focusing on supporting families in intensive care (2). It is important to remember that the delivery of a healthy newborn often presents coping challenges for families; birthing parents and their partners may have major physiologic and hormonal shifts as well as multiple changes in roles and routines, which strain their coping skills and may result in psychological distress. In addition, postpartum mental health issues are known to be more prevalent in populations that are already under stress at the time of childbirth. When parents are faced with the added stress of an infant who may have a prolonged hospitalization or a yet unknown prognosis, the incidence of mental health issues such as anxiety and post-traumatic stress is high and may persist over months (3, 4, 5, 6, 7).

Parental stress is known to decrease responsiveness to the infant and thus may put the infant at risk for poorer developmental outcomes (8). The developmental outcome of children is influenced by the quality of the relationships between the child and caregivers (9). The importance of these relationships is reflected as a core principle of the IFCDC model as *Infant Mental Health* and is embedded implicitly in all the standards and competencies.

Besides their crucial role in overall development, parents are also the best comforters of their infants and can uniquely mitigate the pain and stress experienced during the intensive care stay (10). The family's overall wellbeing is critical to infant wellbeing and is highlighted as the first standard under this domain of *Reducing and managing pain and stress in newborns and families.*

The Standard of Managing Pain and Stress in Newborns:

The standard that deals specifically with the infant's experience of Pain and Stress is worded: ***Standard 2, Pain and Stress, Babies: The interprofessional collaborative team shall develop care practices that prioritize multiple methods to optimize***

baby outcomes by minimizing the impact of stressful and painful stimuli. There are several keywords and phrases in this standard. First, it is an interprofessional and collaborative team that works to manage an infant's pain. Each discipline has relevant expertise to share. While not included in the usual definition of "interprofessional," the competencies in this standard suggest that the infant's family is a key team member and has valuable input when developing a pain management plan. Secondly, the team prioritizes developing multiple strategies to reduce the impact of stress and pain to ensure that options will work in different circumstances and with different infants. Lastly, but most importantly, the goal is to optimize baby outcomes by minimizing stressful and painful stimuli. There is compelling evidence that shows that higher exposure to pain and stress in the neonatal period is associated with adverse outcomes in the development of the brain structure and function as well as long-term physical, social, and emotional outcomes, and thus this is a priority for the team to develop an effective plan (11, 12, 13).

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Practice competencies for addressing the pain and stress in newborns' standards:

Eleven competencies under this standard (Table 1) can be grouped into three categories.

Education (competencies 2.1, 2.2, 2.3):

All staff should have regular educational sessions focused on pain assessment, management, and the long-term consequences of pain in infants. Policies should enforce that untreated pain is a "never" event for infants. Staff caring for infants should be trained and competent in consistently using a validated pain assessment tool that provides a mutual understanding among all caregivers.

The number of validated tools for pain assessment has proliferated in the past decades. In choosing a tool, one should consider:

Table 1

Standard 2, Pain and Stress, Babies: The interprofessional collaborative team shall develop care practices that prioritize multiple methods to optimize baby outcomes by minimizing the impact of stressful and painful stimuli.
Competency 2.1: Standardized education centered on reduction of pain and stress in babies shall be provided to all interprofessional staff including physicians, NNPs and all newly hired professionals on a regular basis no less frequent than annually.
Competency 2.2: Educational offerings shall include the use of standardized pain assessment tools, recognition of the baby's behavioral communication during stressful or potentially painful procedures, the value of skin-to-skin care in reducing stress, and the appropriate use of pharmacologic and non-pharmacologic interventions.
Competency 2.3: Assessment of pain and/or stress using a validated instrument shall be routinely and regularly administered and documented for all babies.
Competency 2.4: Opportunities for positive interactions with the baby's parents and other caregivers, in particular with familiar loved ones should be prioritized.
Competency 2.5: Opportunities for closeness/skin-to-skin care, as appropriate, and family access to their baby at all times, including during procedures, shall be encouraged, documented and routinely evaluated.
Competency 2.6: Use of non-pharmacologic interventions such as positioning, non-nutritive sucking and appropriate swaddling shall be implemented according to the behavioral communication of the baby, documented and evaluated during routine care protocols within the ICU.
Competency 2.7: Pharmacologic interventions, including the use of sucrose and nonopioids, shall be reserved primarily for episodic painful or stressful procedural events, including retinal exams, intubations, post-operative pain management, etc. Their use shall be balanced against potential negative side effects.
Competency 2.8: When pharmacological therapy is utilized, non-pharmacologic interventions shall be used in conjunction with it as a component of a comprehensive pain and stress management strategy.
Competency 2.9: Pain and stress management should be individualized and based on each baby's behavioral and physiological communication and consideration of the parents' expressed preferences.
Competency 2.10: Appropriate information regarding pharmacological and non-pharmacological pain management options for their baby should be provided to parents; Parents shall be included in discussions and encouraged to participate in decisions about pain management for their baby.
Competency 2.11: Families should be included in the development of protocols for assessment and management of neonatal pain/stress, and these protocols shall be readily available to the interprofessional staff.
Table 1: IFCDC Standard and Competencies for Pain and Stress, Babies

Is the tool validated for the appropriate type of pain (procedural/episodic or prolonged/post-surgical pain)? Is the tool validated for the right age population? Is it user-friendly for the bedside staff and easy to become proficient in its use?

These assessment tools are validated for pain and not stress, and it can be difficult to differentiate between them. The staff must develop skills at observing and understanding infant behavior, such as used in the NIDCAP (Newborn Individualized Developmental Care and Assessment Program) observation techniques (15, 16) to recognize subtle changes in the infant's behavior that may indicate early signs of stress. Learning to recognize the infant's unique stress patterns also serves as a common language for staff and parents to communicate the infant's comfort level and focus attention on the overall regulation and comfort of the baby.

Chronic stress adversely affects the central nervous system (17), so caregivers should intervene when the infant shows signs of early to moderate stress. The education of professionals and family members should focus on common non-pharmacologic measures (including skin-to-skin and breastfeeding) to mitigate stress and pain. Observing and understanding the infant's behavioral communication helps the caregivers evaluate if the strategies being used are effective or if they should try alternatives.

Parents as primary comforters (competencies 2.4, 2.5, 2.10, 2.11):

These competencies reflect the principle of parents having unrestricted access to the infant; non-separation of infant and parent throughout the intensive care stay should be promoted. The parent's role in mitigating stress and having pleasurable, enjoyable interactions is integral to the IFCDC Standards' conceptual model. Skin-to-skin care has powerful effects on the infant's physical and developmental outcomes but also reduces the infant's pain and stress behaviors (18). Breastfeeding also appears to reduce pain behaviors in newborns and combines the pain reduction effects of "sweet solutions," such as sucrose, with the effects of pleasurable touch, taste, and smell, truly providing a multisensory approach that may be more effective in pain expression reduction (19). Having the infant skin-to-skin or breastfeeding during minor procedures should be encouraged when feasible. Parents should be prepared and supported to comfort their child during potentially painful or stressful procedures actively.

"Finally, family members should participate as crucial members of the pain management plan by giving input into their baby's pain management, as well as serving as consultants in developing unit-wide pain management protocols and algorithms."

Intensive care staff often are hesitant to do painful procedures on infants with the parents present as active supporters, so they will benefit from education as well as practical preparation to increase their confidence. Intensive care staff should have opportunities to practice those skills in a simulated environment or with guidance from an experienced mentor. Finally, family members should participate as crucial members of the pain management plan by giving input into their baby's pain management, as well as serving as consultants in developing unit-wide pain management protocols and algorithms.

Choosing pain management interventions and evaluating effectiveness through infant observation (competencies 2.6, 2.7, 2.8, 2.9):

These competencies address the importance of contingent caregiving based on what the infant communicates through their behavior. Treatments for pain should be individualized to the infant's signs of pain or stress and responses to intervention. Parents can partner with staff in observing the infants and collaborating to choose effective interventions. Typical non-pharmacologic interventions for preterm infants that have research support, in addition to skin-to-skin care and breastfeeding, include non-nutritive sucking, facilitated tucking and swaddling (20). Other interventions that may be helpful include reducing noxious stimulation by maintaining a quiet, dimly lit environment, providing positive sensory experiences such as drops of breastmilk, use of a cloth that has the mother's scent, and use of the parent's voice, among others.

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These strategies are based on diverse sensory modalities, either by reducing stimulation (light, sound in environment), supporting the infant's own inclinations to self-calm (non-nutritive sucking, swaddling to keep the body tucked, keeping hands to face), or adding pleasurable stimulation (breastfeeding, drops of breastmilk, mother's voice). These are all used to comfort the infant, not just as a pain and stress reduction strategy. The desired result is for the baby to have more restful sleep, stable physiologic functioning, and a calm state that promotes healing, growth, and development. Competency 2.8 states that nonpharmacologic measures should be used in conjunction whenever medication is used to treat pain. In some ways, the term "nonpharmacologic" interventions is a misnomer here as it implies that these strategies are used primarily as a substitute for medication rather than on an ongoing basis to promote the infant's regulation.

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The time to address pain management is not just when a procedure is scheduled. Since there is evidence to suggest that a stressed baby may have a more intense reaction to pain, and because chronic stress harms development, the caregiver should continuously observe the baby's behavior for signs of discomfort and dysregulation. It is then possible to modify the environment and care to reduce stressful components to prevent long-term issues and help the infant better manage the next painful procedure.

There are data to show that an infant who is already stressed when a painful procedure occurs may have a heightened brain reaction compared to infants who are not stressed (21). Of note, the difference in brain activity may not be reflected in the infant's behavior. It may be that a stressed infant experiences a painful procedure more intensely than a calmer baby. This suggests that the caregiver should assess the baby's stress level before a procedure and, if necessary, take the time to calm the baby.

Competency 2.7 states that medication therapy (including sucrose and nonopioid therapeutics) should be used only for episodic painful procedures. Opioids, when used, should be used cautiously, given the possible adverse effects on the infant's outcomes associated with long-term use (22). Competency 2.11 recommends that professionals with input from families develop evidence-based protocols. These can be implemented to provide consistency in approach and thus improve the infant's experience of pain and stress (23).

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Conclusion:

Frequent pain events and chronic stress are often part of an infant's intensive care experience and may have deleterious effects on the infant's development. These experiences are associated with adverse effects on brain structure, function, pain perception, as well as future behavioral and mental health issues. It is of the utmost importance that the intensive care team and the infant's family work together to reduce the pain and stress experienced. The Standards, Competencies, and Best Practices for Infant and Family Developmental Care in the Intensive Care Unit has set two standards to guide care: One focuses on the wellbeing of family members while the other focuses on the wellbeing of the infant. Together, these standards acknowledge that the wellbeing and ultimate development of the infant primarily depend on the wellbeing of the family; an overly stressed parent may not be emotionally available or attuned to their infant to provide adequate comfort. It is important to remember how these standards relate to the IFCDC conceptual model, including the non-separation of baby and parent. The parent provides the most consistent and effective opportunity to keep the baby regulated continuously, and their presence and support are essential.

The competencies in the model for "Managing Pain and Stress: Infant" address 1) the knowledge needed by intensive care professionals and family members to understand the significance of pain exposure, how to assess for pain and stress in the infant appropriately, and know effective strategies to manage infant pain; 2) the role of family members in providing comfort, nonpharmacologic pain relief, and supporting the overall regulation of their baby; and 3) choosing the appropriate pain relief strategies based on understanding the baby's behavioral communication, using guidelines to promote consistency of intervention as well as monitoring the infant's responses to interventions.

Finally, the IFCDC Standards are an evidence-based resource that intensive care professionals can utilize and be assured of their value in enhancing practice. While a unit may wish to focus on one or two of the domains of interest, it is important to understand the conceptual model from which they are generated and ensure that the competencies are implemented considering the key principles. In the context of this standard, Infant Mental Health focuses on building attuned relationships and encouraging parents to support their baby through stressful times and routine care. Environmental Protection refers to modifying the aspects of the environment in response to the infant's tolerances; in this instance, facilitating the baby to be calm, especially before a procedure. Individualized Care focuses on understanding what the baby communicates about their tolerances and modifying the care in timing and intensity to respect that. Neuroprotection of the Developing Brain is a critical principle here, as the evidence of the long-term negative sequelae of chronic exposure to pain and stress is strong. When integrated into practice, these principles can create circumstances where the baby and family undergo their intensive care journey in a calmer, regulated manner, which will optimize their outcomes.

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Figure 1: IFCDC Principles – Concept Model

Taken from: https://nicudesign.nd.edu/nicu-care-standards/ifcdc-principles-concept-model/

Table 1: IFCDC Standard and Competencies for Pain and Stress, Babies

Taken from: https://nicudesign.nd.edu/nicu-care-standards/ifcdc--recommendations-for-best-practice-reducing-managing-pain-stress-in-newborns-families/

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