Report of the First Consensus Conference on

Standards, Competencies and Recommended Best Practices for

Infant and Family Centered Developmental Care in the Intensive Care Unit

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INTRODUCTION

An interprofessional committee of neonatal experts has convened for more than 5 years, to study the science, evidence, and best practice of developmental care; and the associated outcomes to the baby and family. The purpose was to establish a document of standardized practice to implement collaborative team management with babies and families through the continuum of hospital to home care. The committee identified gaps in care management/practice to include: a) lack of collaborative function of health care providers and caregivers to perform neurodevelopmental management of the baby, b) failure to consistently include the parents/family as members of the team, c) variation in the application of interventions to satisfy mutual goals for the health and wellbeing of babies, families, and staff, d) inability to recognize the communication of the baby in response to intervention, and e) inadequate education and mentoring to guide effective interaction with the baby. It is vital that care be managed "with" the baby, instead of "to" the baby. **Consequently, based on the mounting evidence of the neuroprotective aspects of infant family centered developmental care (IFCDC)and the importance of supporting infant mental health (IMH), it is critical that the baby's behavioral communication and the nurturing relationship of the parent(s)/family be central to managing and delivering care. Practices that support the message and interaction of the baby and parents can no longer be viewed as "additional" or "optional", but should be integrated as an essential part of medical management, and caregiving for babies and their families.**

APPLICATION OF IFCDC RECOMMENDATIONS

The interprofessional committee of nurses, physicians, physical and occupational therapists, social workers, developmental psychologists, speech/language specialists,

psychologists, and parents, used a process of evidence systematic review and interactive consensus development, to establish recommendations for standards and competencies of best developmental and family centered practice. The standards and competencies of best practice describe the level of competence utilized for interprofessionals and parents to provide individualized, environmentally protective, and nurturing care within an organizational culture that demonstrates the value of integrating the baby and family. The background of developmental and family centered care, and a description of the process used by the committee to draft these recommendations, can be found in the *Executive Summary: Standards, Competencies and Best Practices for Infant and Family Centered Developmental Care in the Intensive Care Unit,* accepted for publication in a supplement of the Journal of Perinatology, February 2020.

In the following sections, six (6) domains of IFCDC are described through standards, and competencies of best practice. The 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. Reducing and managing pain and stress in newborns and families, and 6. Management of feeding, eating and nutrition delivery. (1) Though systems thinking is a separate domain, the system vision, concepts, and process is critical to the organization and implementation of team collaboration, practice, and evaluation, through all of the domains.

"Standard" defines a safe evidence based expectation, or measure, of best practice. "Competencies" are the action, or sequence of actions, that constitute the performance of the standard. The standards and competencies are written as objective measureable performance

experiences to guide the standardization of IFCDC practice in the ICU system by the interprofessional team, including parents and family. Evidence based practice guidelines that are standardized, disseminated, utilized, and monitored among similar care settings can demonstrate opportunities for outcome improvement within the system and among individuals. (2) Each section noted above will outline the standard, competencies and best practices, and the evidence supporting the necessity of implementation.

The committee elected to reference the "baby", rather than "infant", through this document. The term "baby" is more familiar to parents, families, and staff, thus making this content more relevant. "Parents" and "family members" will be used interchangeably, and denote the primary caregiver.

INTENSIVE CARE UNITS FOR NEWBORNS

For the purpose of developing this document, the committee has adopted the definition of newborn *intensive care* used by White and Colleagues (2013) *"care for medically unstable or critically ill newborns requiring constant nursing, complicated surgical procedures, continual respiratory support or other intensive interventions"* (3)(p.S5). Intermediate care refers to less intensive observation/monitoring by professional staff but may include equipment such as oxygen, intravenous therapy (IV), and respiratory supports. Since babies may be managed in sub-specialty intensive care units managed by neonatal, cardiac, neuro, and/or pediatric services where babies are cared for, these recommendations should be applied by interprofessional teams collaborating to provide standardized IFCDC, regardless of the unit location or specialty service.

The consensus of the committee stresses that babies, parents and the family shall be partners in collaborative practice with professionals. This partnership shall influence care and wellbeing through the active exchange of perspective, information, observation, and expectation.

In this document, the consensus committee has chosen to illustrate the integration of the parents, through descriptive statements, that help professionals to "imagine" what it is like to be them, for example:

—"*imagine…having one single event, your child's birth, be the cause for celebrating the best, and the worst, day of your life*."*****

IFCDC- RECOMMENDATIONS FOR BEST PRATICES IN SYSTEMS THINKING

"The biggest challenge is 'medical professionals' treating parents as though they are anxious beings who can't handle information. If doctors, therapists, and nurses actually took the time to hear what parents are saying, then real problems could be identified early…"(4)(p.63)

Standard 1, Systems Thinking: The intensive care unit shall exhibit an infrastructure of leadership, mission, and a governance framework to guide the performance of the collaborative practice of IFCDC.

***Competency* 1.1:** An organizational vision, values, and goals for baby, parent, and family centered care in practice shall be articulated in verbal and written form, and be visibly represented in the unit.

***Competency* 1.2:** With support to/from ICU parents and families, policies, procedures, education programs, interdepartmental relationships, culture, infrastructure, and physical and

environmental design to optimize the baby's physical and psychosocial development shall be identified.

***Competency* 1.3:** Strategic policy(ies) of the governance framework, interprofessional role descriptions, and performance competencies consistent with IFCDC principles shall be developed, implemented and periodically evaluated.

***Competency* 1.4:** ICU leadership will identify the process, indicator(s), evaluation expectation(s), and oversight of operational process and interprofessional IFCDC performance.

***Competency* 1.5:** Appropriate evidence, regulation, education, and incentives to guide stakeholders to/through strategic initiatives will be monitored and regularly evaluated.

***Competency* 1.6:** Leadership will demonstrate accountability to achieve the unit's strategic improvement goals of organization and collaborative practice.

***Evidence-based rationale*:** Health organizations (macro, meso, and micro) are complex and dynamic—continuously changing and adapting. Administering and managing a complex system requires planning to define and develop the organizational vision, values, IFCDC, goals, infrastructure, role descriptions, policies, procedures, and process for the implementation of continuing change. The role of professional leaders is to provide direction and oversight by strategically managing change situation-by-situation amid the activities of daily operations, while simultaneously guiding individuals and teams to the "big picture" vision of a collaborative interprofessional practice that integrates evidence-based developmental family centered standards and principles. (5-17)

Standard 2, Systems Thinking: The intensive care unit shall provide a professionally competent interprofessional collaborative practice team to support the baby, parent, and family's holistic physical, developmental, and psychosocial needs from birth through the transition of hospital discharge-to-home and assure continuity to follow-up care.

***Competency* 2.1:** Teams will demonstrate IFCDC through interaction, practice implementation, and documentation that they are baby, parent, and family centered.

***Competency* 2.2:** Teams will demonstrate interprofessional activities that bridge with community and neonatal population oriented services, such as ICU follow up clinics and community intervention programs.

***Competency* 2.3:** The building of positive relationships among parents, family, and team members shall be demonstrated, and regularly evaluated.

***Competency* 2.4:** Team activities, policies, and implementation of developmental and family centered care will demonstrate processes that support IFCDC.

***Competency* 2.5:** Links to adult learning activities, educational strategies, and behavioral assessments should be identified and readily available to team members.

***Competency* 2.6:** Participation in educational programs and team assignments shall demonstrate continued learning, and foster growth as an interprofessional team member.

***Competency* 2.7:** Team members shall demonstrate systems context sensitivity applicable across practice settings and show respect for individual and collective professional skill sets (transprofessional).

***Competency* 2.8:** Open and ongoing communication among team members including parents and families shall be encouraged.

***Competency* 2.9:** Teams will manage real and potential conflict by using an adopted defined process to negotiate an effective resolution.

***Competency* 2.10:** Interventions, education, and communication will use common and meaningful language across professions, and among professionals, parent(s), and family.

***Competency* 2.11:** Respect for and integration of diversity and ethnic backgrounds shall be prioritized in policy development and practices.

***Competency* 2.12:** All activities, educational programs and policies will be physical and social/emotional health outcome driven.

***Evidence-based rationale*:** Frenk and colleagues (18) state that education for health professionals in the 21st century must promote "interprofessional and transprofessional education that breaks down professional silos while enhancing collaborative and non-hierarchical relationships in effective teams." (p.1951) The health workforce must build a shared foundation of communication, collaboration, and interaction to effectively and efficiently access, plan, implement, and evaluate the provision of care to each baby and the baby's family. The team members, inclusive of parents/family, recognize the role of each member and the significance of their effect on the complex system, as well as the system's effect on the performance of the team engaging with babies and families for a better outcome. (15, 19-33)

Standard 3, Systems Thinking: The practice of IFCDC in the intensive care unit shall be based on evidence that is ethical, safe, timely, quality-driven, efficient, equitable, and cost-effective.

***Competency* 3.1:** The ICU physical space, environment, and culture should be supportive of the health, wellbeing, and development of the baby and family.

***Competency* 3.2:** Efforts to engage and integrate the family and interprofessional team in neonatal health continuing education; and the planning, implementation, and evaluation of improvement initiatives should be demonstrated, documented, and evaluated.

***Competency* 3.3:** Regular assessment and evaluation of the level of competence, satisfaction and wellbeing experienced by both parents and health professionals should be implemented.

***Competency* 3.4:** Ongoing standardized education focused on compassion fatigue, burn-out, and self-care, beginning at orientation to reduce staff stress, anxiety, and secondary post-traumatic stress disorder (PTSD) to maintain high-quality, ongoing support to families with babies in the intensive care unit should be provided.

***Competency* 3.5**: A designated person with the psychological expertise to conduct education programs, as well as individual and group therapeutic consultation, should be identified to assess, plan, and implement a process to reduce staff and family stress, anxiety, and secondary post-traumatic stress disorder (PTSD), and promote self-care.

***Competency* 3.6:** The unit's operational budget expense and revenue, productivity, provider payment, insurance payment, and contractual agreements for improvement opportunities will be

monitored to evaluate the value of IFCDC relative to the unit/organization vision, mission, practice, and outcomes.

***Competency* 3.7:** Workforce scope of practice, competence, caseload, workload equity, worked hours, outcome, and safety occurrences to assess patterns and/or barriers that lead to the identification of improvement opportunities should be monitored.

***Competency* 3.8:** Evidence-based improvement findings and recommendations shall be gathered, analyzed, and disseminated to unit, organization, community partners, and national collaborators through knowledge sharing/transfer and outcome transparency.

***Competency* 3.9:** Health disparities and social determinants within the neonatal population should be recognized, monitored and improved through systematic data collection and education to address disparities and social determinants.

***Evidence-based rationale*:** Complex intensive care delivery systems should determine the relationship(s) between stakeholders, processes, and products, that influence the safe care provided to babies; and quantify the comparative value (including cost) of the influence. Historically, resources tend to be committed to care with insufficient evidence to support the value over time. Further, the non-utilization and/or withdrawal of resources may occur without regard to value, rationale, cost, or wellbeing. Because the wellbeing of staff directly affects the wellbeing of babies and parents, it is important to continuously evaluate performance, and provide education and training for intensive care staff, that adequately equips them with effective communication skills, self-care and coping strategies needed for the inherently high stress work of caring for premature and sick babies and families who are often in crisis. Health team

members, preferably in-house, and families should invest in a culture of awareness and collaborative interaction within the system to provide value-added resources, evidence-based care initiatives, and continuous outcome evaluation. (3, 9, 15, 20, 21, 34-50)

Standard 4, Systems Thinking: The intensive care unit practice and outcomes will provide evidence that demonstrates the continuous monitoring of information relative to IFCDC practice.

***Competency* 4.1:** Improvement initiatives and resulting neonatal health outcomes shall be monitored, evaluated, and communicated.

***Competency* 4.2:** Health outcomes should be monitored using a standardized neonatal database.

***Competency* 4.3:** Unit organizational outcomes should be compared with self, local, state, national, and international outcomes and population health goals, e.g. Healthy People 2020, community and state databases, Centers for Disease Control & Prevention Data and Statistics, March of Dimes Peristats.

***Competency* 4.4:** Neonatal health and social determinants should be assessed and monitored for improvement opportunities.

***Competency* 4.5:** A designated person with the appropriate qualifications to extract, program, manage and report data should be identified and accessed.

***Competency* 4.6:** New knowledge, limitations, and value-added recommendations for implementation to improve IFCDC practice by the team shall be disseminated.

***Evidence-based rationale*:** The care provided to/with babies and their families is complex, and often long-term. The environmental, physical, social, behavioral, and pharmacologic aspects of

care interact in a complex fashion so that it is difficult to determine the direct influence of one event, behavior, and/or therapy on another. Outcomes are likely the result of multiple factors. Consequently, all identifiable elements of the system should be monitored so that the data can be translated into meaningful information about the system. The interaction of data points, and the ensuing patterns that are evident over time, guide the interpretation of data for further study and evidence-based improvement. Potentially better practices can be identified from data interpretation to enhance decision-making and operational practice. Comparing evidence-based practice, process, and data among similar neonatal ICUs, provides a broader base from which to evaluate the value of the practice and the interpretation for meaningful change. (5, 15, 20, 51-59)

Standard 5, Systems Thinking: The interprofessional collaborative practice team shall be transparent regarding the access and use of medical equipment, devices, and products; medications and vaccines, and technologies related to the IFCDC care in in-patient setting, home, and the community.

***Competency* 5.1:** Evidence, short-term and long-term, for effective use with the baby to improve neurodevelopmental outcome shall be evaluated.

***Competency* 5.2:** Professionals and parents shall be educated at the appropriate level of understanding in the use of devices, products, medications, vaccines, and technology, and implication for outcomes.

***Competency* 5.3:** IFCDC practice, and the use of clinical devices and products, shall be standardized so that the team members, including the family, can become expert.

***Competency* 5.4:** Use of equipment and products, activity at the point of service, and safety/recall notices shall be monitored.

***Competency* 5.5:** Methods to evaluate the value of the equipment, device, product, medication and/or vaccine, and technologies for the baby, short- and long- term should be developed, implemented, and discussed among parents and staff.

***Competency* 5.6:** Evidence learned through the implementation and evaluation process of equipment, device, product, medication and/or vaccine, and technologies for the baby, short- and long- term will be disseminated.

***Evidence-based rationale*:** Unit leaders, professionals, parents and families are accountable to be informed about nuances in equipment, devices, products, medications and vaccines, and technologies relative to the continuous care and monitoring of the baby. The evidence-based application to practice and care of each item should be evaluated as to relevance to neonatal outcome. Value should be weighed by comparing current therapy versus the new therapy, the initial cost of the item and the recuperation of expenditure through a patient charge over the period of time that the item is used, and the potential impact to outcome. Accessibility to new technology should be determined. The implementation of new equipment, devices, products, medications and vaccines, and technologies should be reviewed with all involved professionals and applicable service department representatives for a safety assessment, and education/training in the use. A trial may be warranted. Documentation and evaluation of the use of the item should be conducted. Transparency is important to the process of standardization, by

disseminating the evaluation results of use and application, and identifying the implication to practice and outcome. (20, 21, 57-59)

Standard 6, Systems Thinking: The interprofessional collaborative team should provide IFCDC through transition to home and continuing care for the baby and family to support the optimal physiologic and psychosocial health needs of the baby and family.

***Competency* 6.1:** Families should be encouraged to openly communicate and connect with other families who have lived the experience of in-hospital care, transition to home, and integration into the community.

***Competency* 6.2:** Procedures that engage the family in assessing the readiness of themselves and the baby for transition to the home environment should be developed, implemented, and evaluated.

***Competency* 6.3:** Multiple methods and tools, including simulation, to transfer information, education and training to families in order for them to demonstrate their ability to manage the care of the baby in a safe manner both in the hospital and at home, and to identify potential risk, should be utilized.

***Competency* 6.4:** Assessment with the family of their confidence level, for managing the baby in the home and community environment, should be implemented.

***Competency* 6.5:** Identification and assistance in the arrangement of resources post-discharge, including clinics, agencies, community programs, to support the growth and optimal function of the baby in the home and community environment should be available.

***Competency* 6.6:** The IFCDC team will engage the family in arranging continuing follow-up care with health and wellbeing professionals, early intervention, and/or specialty team for post-discharge follow up.

***Competency* 6.7:** Assessment of the practicality of the integrated electronic health information and data across service areas to support timely physical and psychosocial care and wellbeing of the baby and family should be implemented.

***Competency* 6.8:** The IFCDC team and ICU system should identify, monitor and utilize standardized outcome indicators across the continuum of care to enhance long-term health outcomes.

***Competency* 6.9:** Both in-hospital and appropriate follow up services should strategize improvement opportunities for continuity in education, care, system service delivery, policy, fiscal management, supplies, and equipment, across inpatient, outpatient, and community services.

***Competency* 6.10:** Improvement initiatives involving in-patient, out-patient, and agency team members and families who have had infants in the ICU should be implemented and monitored.

***Competency* 6.11:** The transfer of improvement findings and the lived experience of families should be provided in a transparent manner.

***Competency* 6.12:** Efforts to sustain fiscally-sound, value-based, and safe, continuing improvement of care at home should be explored.

***Evidence-based rationale*:** Babies with complex needs, and their families, is a small, expensive, and underserved population whose health outcomes are inadequately monitored and reported

through their lifespan. The current medically-based model does not adequately serve individuals and families with their continuum of growth, cognitive, physical, and psychosocial needs. Hand-offs from medical team to medical team over the lifespan, interrupt health progress, and confuse, sometimes ignore, family members and caregivers. Further, the limited whole-person longitudinal data of the population creates a knowledge deficit for the health professionals managing needs in the home and community during the lifespan. Re-design of the model of continuing care following the transition to home would facilitate a system of interprofessional collaboration, to empower the family, to function independently, communicate openly, disseminate learning, manage change, facilitate collective action, resolve conflict, and make decisions jointly while prioritizing the needs of the family. The interprofessional collaborative team(s), within and outside of the organizational system, is challenged with the responsibility to guide families through the multiple service levels of the health continuum and cultural environment, manage needs, and strengthen the optimum health outcome of the baby and the family. (15, 40, 60-76)

IFCDC- RECOMMENDATIONS FOR BEST PRACTICE FOR POSITIONING AND TOUCH

*"Imagine…holding your daughter's hand, and its entire width fits across the tip of your finger."**

Standard 1, Positioning and Touch: Babies in intensive care settings shall be positioned to support musculoskeletal, physiological, and behavioral stability.

***Competency* 1.0:** Body position shall be individualized and monitored for head, trunk and extremity alignment and movement.

***Competency* 1.1.1:** Supine position should include head and trunk alignment in neutral (not flexed or extended) with semi-flexed extremity posture and use of nested containment with positioning materials.

***Competency* 1.1.2:** Midline head position in supine and side-lying should be considered to minimize potential risk of germinal matrix- intraventricular hemorrhage during the first 3 days after birth in babies born at or less than 32 weeks of gestation.

***Competency* 1.1.3**: Positional support should promote and not restrict spontaneous extremity movement.

***Competency* 1.1.4:** To address and model sleep safety for the home environment, prior to discharge, babies previously positioned therapeutically in varied sleep positions and who are medically stable, should be transitioned to the supine position on a flat, firm bed surface without positioning aids or loose bedding materials.

***Competency* 1.1.5:** Prone position may be used with a vertical positioning roll (from clavicle to pubis) to facilitate extremity flexion. Continuous cardio-respiratory and oxygen saturation monitoring for preterm babies positioned in prone. Mechanically ventilated preterm babies may be judiciously transitioned to prone to improve oxygenation.

***Competency* 1.1.6:** Side-lying position may be used on an individualized basis for spontaneously breathing preterm babies.

***Competency* 1.2.0:** Individualized application of a swaddling blanket may be used to support body alignment and allow lower extremity movement in supine, prone, and side-lying positions.

***Competency* 1.2.1:** Preparation for body alignment with swaddling should include placing hands toward the mouth or face, moving legs into a semi-flexed, abducted position, and keeping neck and trunk alignment neutral without flexion or extension.

***Competency* 1.2.2:** Space for spontaneous kicking shall be created inside the swaddled containment to reduce the risk of hip dysplasia from excessive hip adduction and extension posture.

***Competency* 1.2.3:** Swaddling during weighing, bathing, and heel lance may be used to modulate physiological and behavioral stress during routine care.

***Competency* 1.2.4**: Swaddling may be used as a non-pharmacological comfort strategy for babies with behavioral irritability or neonatal abstinence syndrome.

Standard 2, Positioning and Touch: Collaborative efforts among parents and ICU interprofessionals shall support optimal cranial shaping and prevent torticollis and skull deformity.

***Competency* 2.1:** Positioning for symmetry and neutral alignment shall be implemented, monitored, and documented to promote cranial shaping, and prevent muscular torticollis.

***Competency* 2.2:** Daily variation of head positions (lateral and midline) shall be monitored, and repositioning the crib for head turn variation shall be considered within the assigned bed space.

***Competency* 2.2:** Neonatal therapy for asymmetrical head position preference and skull deformation shall be implemented with pediatric therapy follow up after transition to home.

Standard 3, Positioning and Touch: Body position shall be used as an ICU intervention for infants with gastrointestinal symptoms.

***Competency* 3.1:** Babies with gastroesophageal reflux should be placed in prone (optimal) or left side after feeding.

***Competency* 3.2:** Babies with gastric residuals should be placed in prone or right side after feeding.

***Competency* 3.3:** Bed elevation (30 degrees) with right side-lying position may be used to decrease aspiration of gastric residuals.

***Competency* 3.4:** Bed elevation (14-15 degrees) may be used to reduce tracheal aspiration in ventilated babies.

Evidence-based rationale:

Varied body positions are indicated for postural alignment, extremity movement, and physiological stability with repositioning at 3 to 4 hour intervals. (77) Supine positioning within a containment "nest" formed by blanket roll boundaries, or positioning aids, promotes semi-flexed posture, reduces spine hyperextension, and facilitates midline movement. (77-80) Prone positioning with a vertical positioning roll under the thorax improves hip flexion posture and scapular alignment. (81) Improved oxygenation was found only in the prone position in preterm infants on mechanical ventilation. (82) Long, deep sleep periods associated with the prone position may increase vulnerability to sudden infant death syndrome, indicating the need for physiological monitoring of infants in the prone sleep position in the NICU. (83) Side-lying sleep position was not associated with adverse cardiopulmonary effects (apnea, bradycardia, or oxygen desaturation) in spontaneously breathing preterm infants at <28 weeks postmenstrual age (PMA) and <1000 grams birth weight. (84) Despite limited rigor of evidence analyzed by a Cochrane Neonatal Review Group, Romantsik et al. (85) maintains that midline head position in

supine and side-lying may be prudent for minimizing germinal matrix-intraventricular hemorrhage during the first 3 days of life in babies born at or under 32 weeks of gestation until further research supports or refutes midline head positioning. Transition to the supine sleep position on a flat, firm surface without positioning aids prior to discharge was recommended by the American Academy of Pediatrics (AAP) to model a safe sleep environment to 12 months of age. (86)

Swaddled babies had improved neuromuscular development and motor organization, less physiological distress, longer sleep duration, and improved behavioral self-regulation. (87) Body swaddling within a containment "nest" resulted in recovery of autonomic and motor stability within 5 minutes of weighting and bathing infants at 32 to 35 weeks PMA. (88) Crying and temperature loss decreased during swaddled immersion bathing compared to unswaddled bathing. (89, 90) Increased physiological and behavioral organization occurred during swaddled weighing. (91) Decreased pain response occurred 3 and 7 minutes post-heel stick procedure in swaddled versus containment only position. (92) Swaddling should be considered a non-pharmacological standard in the care of babies with neonatal abstinence syndrome (NAS). (93) Tight swaddling, with restriction of kicking movement, and hip mobility, increases vulnerability for developmental dysplasia of the hip. (94)

Positional skull deformation related to NICU body positioning was detected in preterm infants at 32 to 34 weeks PMA and at term equivalent age. (95, 96) Physical therapy management of positional plagiocephaly was superior to repositioning education and repositioning devices. (97) Timely physical therapy referral and intervention are indicated to manage the clinical pattern of plagiocephaly and asymmetrical motor performance in preterm infants. (98) Severe

deformational plagiocephaly was significantly lower in babies receiving intermittent outpatient physical therapy intervention at 7 weeks to 12 months of age. (99)

Body position influences gastric emptying and reflux. Babies placed in prone and left side-lying positions had decreased reflux. (100) Gastric residual was reduced in the prone and right side-lying position (101) with immediate prone positioning recommended in the first 30 minutes after feeding. (102) To manage combined gastric residual and gastroesophageal reflux, recommendations include positioning babies in prone or right side-lying position with repositioning based on individualized behavioral responses. (102, 103) Bed elevation at 14 to 15 degrees resulted in decreased tracheal pepsin aspirate in ventilated babies. (102-104) Bed elevation of 30 degrees combined with right side-lying position for 6 hours were associated with decreased pepsin aspirate compared to elevated, supine position in ventilated babies. (105)

Standard 4, Positioning and Touch: Babies in ICU settings shall experience human touch by family and caregivers.

***Competency* 4.1:** A parent should be invited to participate with the primary caregiver to provide support to the baby during potentially stressful caregiving and medical procedures. When parents are unavailable, a second caregiver should support the infant.

***Competency* 4.2:** The need for personnel staffing for intermittent procedural assistance in touch and comfort support is essential should be accommodated.

***Competency* 4.3:** Individualized gentle touch (without stroking or passive joint movement) to the head, chest, back, and/or under feet shall be provided when the baby is in an awakened or distressed state and not during quiet sleeping.

***Competency* 4.4:** To avoid overstimulation, individualized frequency and duration of supplemental, gentle touch shall be determined by evaluating the baby's behavioral and physiological parameters before, during, and after the touch interaction.

***Competency* 4.5:** Supplemental gentle touch shall be used judiciously with diligent monitoring for babies with low gestational age and high acuity to insure stability and avoid behavioral agitation, oxygen desaturation, and bradycardia.

***Competency* 4.6:** Stabilizing hand support and slow movement transitions during routine caregiving tasks shall be used for infants with fragile bones, infusion lines and tubes, and ventilator or respiratory equipment.

Evidence-based rationale:

Gentle touch was an effective assist with pain management in the ICU during selected medical procedures. (106-109) Decreased motor stress and increased self-regulatory behaviors during endotracheal suction procedures were found when 4 handed-care was provided by 2 providers. (110) Decreased heart rate and increased REM sleep were calming effects of touch. (111) Rather than using a timed routine for therapeutic application of touch, continuous evaluation and modification of touch should be synchronized with each baby's physiological and behavioral patterns. (112) Fragile babies with high morbidity scores and low gestational age (29.4 weeks) were vulnerable (bradycardia and desaturation) to overstimulation with gentle human touch. (111)

IFCDC-RECOMMENDATIONS FOR BEST PRACTICE TO SUPPORT SLEEP AND AROUSAL

"*Imagine…one day being able to rock my twin sons to sleep without tubes and equipment*."*

Standard 1, Sleep and Arousal: Intensive care units (ICUs) shall promote developmentally appropriate sleep and arousal states and sleep wake cycles.

***Competency* 1.1:** The ICU policies and procedures shall promote periods of time for babies' undisturbed sleep.

***Competency* 1.2:** The ICU policies and procedures shall support stable states of arousal to optimize interaction, assessment and feeding.

***Competency* 1.3:** The ICU shall implement a system for documentation of the individual baby's sleep and arousal states and cycles.

***Competency:* 1.4:** States of arousal and sleep shall be documented as they are an integral part of routine assessment of vital signs and physical condition of the newborn. Assessment shall a) identify behavioral patterns indicative of and duration of periods of arousal and sleep, and b) form a basis for recommendations to enhance behavioral organization and energy conservation.

***Competency* 1.5:** Assessment and documentation of arousal and sleep shall occur: a) at rest, prior to caregiving, b) during care/handling (including holding), c) prior to and during feeding, d) immediately following care, and shall include position of infant and location (e.g., prone-nested in incubator vs. prone, skin-to-skin on mother's chest).

***Competency* 1.6:** Presence and description of participation of family & visitors, sound level and lighting level should be documented to provide a context for state organization.

***Competency* 1.7:** Family members in the ICU shall be provided education regarding the potential benefits of assessment of states of arousal and sleep to inform the baby's plan of care.

***Competency* 1.8:** Regularly scheduled interprofessional education to ensure competence in assessing infant arousal and sleep states shall be developed, implemented and evaluated.

***Competency* 1.9:** Interprofessional education shall include evaluation of the professional's ability to assess infant positioning, arousal, sleep, and readiness for and quality of participation in breast and bottle feeding, and interaction.

Evidence-based rationale: Both quantity and quality of sleep are essential to normal growth and development of preterm and term babies. (113) Following a period of near continuous movement during the early fetal period, cyclical rest-activity patterns begin to develop - after the first trimester. (114, 115) These patterns represent the emergence of organized active and quiet sleep periods that are precursors of Rapid Eye Movement (REM) and non-REM sleep states, respectively; and awake states. (116, 117) The vast majority of late fetal gestation is spent in sleep states relative to wake states. Wake periods gradually lengthen, from brief periods at term age to longer, more organized periods with a circadian rhythmicity emerging over the first 6 post-natal months. (118) These predictable age-related patterns of sleep and arousal can be observed from the preterm to term gestational ages, (119, 120) throughout infancy, (121-125) and into adulthood. (126) These developmental changes reflect maturation and change in the central nervous system (CNS) as well as coordination with the peripheral nervous system. Sleep, in turn, may facilitate CNS plasticity through enhanced production of the structures involved in building neuronal circuitry.(127, 128)

Sleep-state organization is the ability to transition smoothly between states of sleep and wakefulness, and to regulate the transition between states of alertness. These capabilities reflect developmental maturation, including predictable cortical and subcortical brain activation patterns. (118, 129) Sleep state cycling between REM and non-REM (NREM) sleep has been documented by EEG as early as 25 weeks gestational age, (120) with a widely varying cycle length, most commonly ranging from 30 to 100 minutes. Active sleep is predominantly observed at earlier gestations, with increasing durations of quiet sleep with maturation. Regulation of arousal, from sleep to wakeful states, reflects not only neurological maturation, but the integrity of the nervous system. There are characteristic patterns of sleep and arousal that can be specifically associated with medical conditions such as hypoxic-ischemic encephalopathy, congenital heart disease, neonatal abstinence syndrome (NAS), errors of metabolism, and chronic lung disease. (130, 131) Moreover, low arousal at term age is a risk factor for Sudden Infant Death Syndrome (SIDS). (124)

Sleep and arousal states are tied to physiologic functions, such as body temperature, (132) breathing, heart-rate, (133) and digestion, including gastro-esophageal reflux events, which occur more frequently during awake states. (134) Persistence of sleep-disordered breathing has been demonstrated among preterm babies born at <32 weeks, with associated lower IQ, memory and visual-spatial performance at school-age, compared to term-born peers. (135) The characteristics of sleep states may also predict later outcomes. Preterm babies with a REM sleep in which rapid eye movements are minimal were at increased risk of developmental delay at 6 months corrected age. (136)

Regulation of states of arousal has the potential to impact participation in feeding, (137) and social interaction, and has been shown to predict neurobehavioral development later in infancy, at school age, and in adolescence. (138-140) Organized sleep can be considered a clinical marker and facilitator of normal neuro-development. (141, 142) With all of these benefits, sleep should not be unnecessarily externally disrupted.

The importance of sleep for energy conservation, growth and healing of babies in the ICU is widely acknowledged, and support of babies' sleep is typically included in recommendations for developmentally supportive care. Sleep state and level of arousal during routine care may influence baby's responses to care and readiness for feeding. For example, preterm babies desaturated more frequently when handled during active sleep compared to handling in quiet sleep or wake states. (143) Handling techniques and positioning also have a significant influence on sleep and wake states. (89, 144) However, ICU staff do not necessarily come prepared with knowledge of how to assess arousal, sleep, and positioning. (145, 146)

ICU staff need to be specifically educated to the benefits of assessing the baby's sleep and arousal state before, during and after care and handling, and the importance of incorporating interventions that may reduce unnecessary stress. Guidelines for valid criteria for determining states of arousal in preterm and term infants have been established for both direct observation and physiologic methodologies. A combination of observed behaviors (rapid eye movements, facial movements, gross body movements) and physiologic parameters (respiration and/or heart rate variability) provide a structured approach for determining states of sleep and arousal which can be incorporated into routine assessment by ICU staff. (118, 123, 147-152)

Cultural buy-in among ICU staff occurs more readily when training and evaluation experiences incorporate peer participation, and when care practices are included in routine documentation according to a defined standard of care. (145) A contextual approach, incorporating documentation of routine observations of the baby's states of arousal before, during and after care, presence and level of participation of family members in care, and features of the environment has the potential to inform the team regarding the baby's ability to tolerate/ participate in developmentally appropriate activities of daily living such as routine handling during care, feeding, being held and obtaining adequate sleep.

Documentation enhances compliance with a higher standard of care and provides objective data to inform decisions made by the ICU medical team, as well as family members, to optimize the plan of care. This documentation, as part of the electronic medical record, also provides data for quality improvement measures. (153, 154)

Standard 2, Sleep and Arousal: The ICU shall provide modifications to the physical environment and to caregiving routines that are specifically focused on optimization of sleep and arousal of ICU babies.

***Competency* 2.1:** The ICU shall make provisions for space and furnishings that optimize babies' sleep and family participation in sleep protection and interaction during arousal.

***Competency* 2.2:** The ICU shall provide optimal environmental conditions to support sleep, to achieve comfort and behavioral regulation during care and to enhance baby-caregiver interaction through: a) reduction of sound levels, b) provision of natural lighting, c) adjustment of lighting

and diurnal cycling of lighting, d) adjustment of temperature, and e) provision of positioning aids.

***Evidence-based rationale*:** Regulation of sleep and arousal are essential human functions that are easily impacted by ICU environment including caregiver presence at bedside, sound levels, lighting, and temperature. (143, 155-162) Sound level changes as small as 5-10 dB can increase awakenings by a factor of three. (159) Early exposure to cycled light shows a benefit to sleep maturation and weight gain in most studies. (163-165) For babies not receiving hypothermic treatment, warm temperatures that facilitate distal vasodilation, are linked to rapid and organized sleep onset. (132) Conformational positioning may improve sleep in preterm babies, (152, 166) particularly in the flexed, tucked posture. (167)

Private environments have been found to have more prolonged periods of silence, although noise variance can be as high as in the open bay. (168) Care should be taken to provide speech exposure for those babies whose parents cannot be present, to support language and cognitive development. (169, 170) Pod or open bay units may be made quieter by modifications in materials and by staff training. (171)

Standard 3, Sleep and Arousal: The ICU shall encourage family presence at the baby's bedside and family participation in the care of their baby.

***Competency:* 3.1:** Policies and procedures in support of parent participation in routine care and sleep-promoting skin to skin holding shall be developed, implemented, monitored, and routinely evaluated.

***Competency* 3.2:** Uninterrupted and extended time for the baby to sleep during parental skin-to-skin care shall be promoted as early in the baby's hospital stay as possible.

***Competency* 3.3:** Education regarding benefits of sleep during skin-to-skin care will be provided to both parents and professionals.

***Competency* 3.4:** Education for parents shall be provided regarding the importance of facilitating adequate arousal and sleep for energy conservation and optimal feeding, including assessment of arousal states for breastfeeding and/or bottle feeding, and for interaction.

***Evidence-based rationale*:** Parent participation in care, such as face care, mouth care, non-nutritive sucking on a pacifier, diapering, positioning, soothing, facilitated tucking during uncomfortable procedures, and swaddled bathing may positively impact infant regulation of states of arousal. (89, 172, 173) Skin-to-skin holding provides neutral body warmth, muffled body sounds, and rhythmic chest movements, which contribute to improved sleep quality in the preterm baby. Deep sleep and quiet alert/awake states are increased during this intervention, while light sleep, drowsiness and active alertness are decreased. (174-177)

A systems model for intervention that emphasizes: a) the appropriateness of the sensory experience and of its timing, to the developmental stage of the infant, and b) the potential for regulatory and buffering effects of caregiving, holds promise in guiding further interventions aimed at enhancing regulation of states of arousal and sleep, and improving parent-infant interaction and emotional regulation. (139, 175, 178, 179) Parent sensitivity training and parent participation in routine care have a demonstrated impact on reducing parental anxiety, as well as increased infant brain volume and growth by Magnetic Resonance Imaging (MRI), (180)

improved infant-parent interaction at 4 months of age, and infant neurodevelopment and social relatedness at 18 months. (181, 182)

Standard 4, Sleep and Arousal: Interprofessional team members shall review trends in documented arousal and sleep as part of routine data presented on rounds, within the context of feeding and weight gain/energy conservation and parent involvement in care.

***Competency* 4.1:** Consultation by a qualified ICU therapist/developmental specialist should be obtained to assess baby's behavioral/developmental strengths and needs when the baby is considered at risk for developmental sequelae and/or the family would benefit from guidance.

***Competence* 4.2:** Collaboration between professionals and the baby's family to determine appropriate modifications to the care/sleep/feeding routines shall be accommodated, documented, and evaluated.

***Competence* 4.3:** Ongoing anticipatory guidance and support of baby's state and circadian rhythm development and social interaction with m(other) and family members shall be provided both in the ICU and as the family transitions to home services.

***Competence* 4.4:** Consultation among therapists/developmental specialists, nursing and medical staff and parents/family members should be scheduled at a convenient time to optimize collaboration in assessment and planning for sleep protection and social/caregiving interactions.

Evidence-based rationale: Infants and families receiving developmental support through Newborn Individualized Developmental Care Assessment Program (NIDCAP) services within 6 days of admission, had shorter lengths of stay by an average of 25 days, compared with later initiation of developmentally supportive care. (183) These findings suggest that early initiation

of parent-staff collaboration in support of regulation of states of arousal and development, may contribute to discharge at earlier postmenstrual ages.

Preterm infants whose parents provide skin-to-skin holding have longer periods of deep sleep and quiet awake states compared with control infants. (174, 175) Moreover, when parents of preterm infants receive anticipatory guidance in providing developmental support through their ICU stay (e.g., sensitivity to states of arousal and to behavioral communication during routine care and skin-to-skin holding), their infants show improved brain maturation on MRI, compared with controls. (175, 180) Parents participating in developmentally supportive care report that they value these practices, and yet, they report inconsistencies between staff in being "on board" with this approach to care as one of the most significant challenges to performing their parental role. Ongoing practical education and guidance in supporting parental role, without judgment, is essential to a positive outcome. (184)

Standard 5, Sleep and Arousal: Families shall be provided multiple opportunities to observe and interpret their baby's states of arousal and sleep, and to practice safe sleep positioning, to support successful parent-infant participation in care routines during the transition home.

***Competency* 5.1:** Education shall be provided to the family throughout the ICU stay to enhance their recognition of their baby's states of arousal and their confidence and competence in supporting regulation during routine care.

***Competency* 5.2:** Family education shall include the expected developmental trajectory of their baby's sleep and awake states, including the expectation that positioning and strategies for supporting regulation of arousal and sleep will change over time.

***Competency* 5.3:** AAP Safe Sleep Recommendations (185) shall be explained and modeled for families in the ICU for a period prior to discharge.

***Competency* 5.4:** Families shall be educated to the value of daily routines, including regular intervals of awake and sleep time in their baby's day. Education should include soothing strategies and suggestions for promoting positive sleep associations to optimize rest as well as age-appropriate periods of interaction and play.

Evidence-based Rationale: Positioning strategies used during a prolonged ICU stay are not recommended for home-use, according to AAP Safe Sleep Recommendations (185) therefore families need specific guidance in providing a safe sleep environment as they prepare for the transition home. (185-187) Family education regarding the expected trajectory of sleep/wake cycles for developing babies (118, 188, 189) needs to begin early in their ICU stay, to allow for modeling of safe sleep practices prior to discharge, (190-192) and appropriate provision of sleep-wake routines in early infancy. (193, 194)

IFCDC- RECOMMENDATIONS FOR SKIN-TO-SKIN CONTACT WITH INTIMATE FAMILY MEMBERS

"*Imagine....feeling frightened at the thought of holding your baby.... then turning the fear into confidence when your nurse guides you to do skin-to-skin care with your baby. I loved this time with my daughter; she always seemed so peaceful sleeping on me*."*

Standard 1, Skin-to-Skin Contact: Parents shall be encouraged and supported in early, frequent, and prolonged skin-to-skin contact (SSC) with their babies.

***Competency* 1.1:** Verbal and written information about the benefits of SSC shall be provided to parents (including fathers) in their primary language whenever possible and as early as possible before or after intensive care unit (ICU) admission.

***Competency* 1.2:** Information in a variety of appropriate formats and in the parents' language should be provided about the SSC policy and how it applies specifically to them and their baby including: a) inclusion and exclusion criteria; b) indications and techniques for kangaroo care (KC) and hand containment (195); and c) who may be designated by parents to participate in SSC.

***Competency* 1.3:** Images of individuals from diverse populations doing KC and HC should be placed in prominent locations in the hospital and ICU.

***Competency* 1.4:** Parents should be given opportunities to practice SSC transfer with an appropriately-sized manikin if desired before transferring their own baby.

***Competency* 1.5:** Parents should be provided with comfort including: a) safe and comfortable seating or reclining accommodations that are readily available at baby's bedside; b) support pillows; c) secure wraps to support baby; d) a mirror to see baby's face; e) hydration and nutrition for parents as needed; f) privacy, if desired (in private rooms or by privacy screens); and g) a quiet, therapeutic environment for being with their baby.

***Competency* 1.6**: A healing environment that protects the baby's physiologic and behavioral stability shall be maintained during SSC including: a) appropriate room temperature with

absence of drafts; b) consistently low sound levels; c) avoidance of bright lights with individualized light as needed to assess baby; d) prominence of parent's scent (free of strong scents including perfumes and tobacco); e) proximity to mother's breast to support smell and taste (when a mother providing milk is holding her baby); and f) gentle touch and handling to protect baby's immature vestibular system.

***Competency* 1.7:** Parents shall be supported to recognize their baby's behavioral communications of stress and relaxation during SSC.

***Competency* 1.8:** Parents shall be encouraged to support their baby in SSC during painful procedures whenever possible.

***Competency* 1.9:** Parents shall be encouraged to have vocal and singing interactions with their baby during SSC to enhance parental-infant connections, reduce parental anxiety, increase newborn vocal/listening interactions, and improve the baby's autonomic stability.

***Competency* 1.10:** Parents should be allowed to fall asleep during SSC or Kangaroo Care (KC) when safety measures are in place that include: a) parent and baby are in a non-rocking, reclining chair or bed; b) baby is well secured by an appropriate wrap to parent's chest; c) baby is electronically monitored, if indicated; and d) an appropriate healthcare provider is immediately available.

***Evidence-Based Rationale*:** Parents need information to appreciate the therapeutic effects of SSC with their baby in the ICU and deserve information that is clear and understandable, free from medical jargon, and in their native language. (27, 196) A pre-selected teaching DVD on SSC may be useful for parents to watch before doing SSC of very premature or sick babies.

Fathers often need specific encouragement to hold their baby in SSC, and should be included in all educational efforts and SSC opportunities. (197, 198) Parents need to see role models within their own culture and ethnicity doing KC and HC. (199, 200)

Parents should be invited and encouraged to have early, frequent and prolonged SSC with their baby whenever possible. Parents are often intimidated by the ICU environment and by the size and medical condition of their baby and may need reassurance, support, and encouragement to engage with their baby in the ICU. (201, 202) SSC/KC has been shown to reduce maternal anxiety in the NICU. (203) Parents may need instructions on developmentally appropriate HC, and they may wish to practice a simulation of KC with a manikin before doing it with their baby. Supporting parents in how to recognize their baby's behaviors communicating stress and relaxation help to reduce maternal stress. (204) Supporting parents in having SSC with their baby reinforces their role as a parent and as an active member of the caregiving team. (205) Many parents want to be involved in comforting their baby during painful procedures, and should understand how and why SSC can give them an opportunity to do so. (206-208)

Safety and comfort are essential if frequent and prolonged SSC is to be achieved. (209) Comfortable seating or reclining accommodations, including adult beds or reclining chairs whenever possible (non-rocking for intubated babies), should be available to facilitate SSC whenever parents are present. Mothers may need extra support to be comfortable for days/weeks after giving birth. The use of wraps to secure babies in the KC position has been shown to provide comfort, safety, and encourage more SSC. (210) Breastfeeding mothers need hydration and nutrition on a regular basis. Babies who are being electronically monitored should continue

monitoring during KC, and should also be visually monitored by a healthcare provider when the parent is asleep during SSC.

Many m/others (and sometimes fathers) desire privacy during transfer, when their chest is exposed, and during SSC, for enhanced bonding with their baby. Parents often need support in just being a parent, and understanding that their baby's behavioral communications, can help create an emotional connection with their baby in the ICU. (211, 212) Because it is sometimes difficult to see baby's face during KC, a mirror can provide another means for parents to connect with their baby while in SSC. Utilizing Kangaroo Supported Diagonal Flexion (KSDF) positioning provides more opportunities for mother–baby eye-to-eye contact, maternal vocalizations, smiles, and caressing. (213) Parental talking and singing during SSC can reduce anxiety and improve autonomic stability in stable preterm babies. (214) Babies born prematurely, who spend their first weeks and even months of life in the ICU, are often exposed to excessive levels of sound. If separated from mother, they are deprived of the maternal sounds they would otherwise hear in utero. Evidence suggests that the functional development of the auditory system is largely influenced by environmental acoustic inputs early in life, and hearing m/other's voice enhances hearing development and physiological stability. (215, 216)

While thermal synchrony with the parent will usually keep baby warm, (177) some rooms have extreme temperatures that should be noted, and accommodation made. SSC stimulates oxytocin and neuropeptide release promoting localized vasodilation, which increases the skin temperature of the mother's breast tissue, thus promoting newborn thermoregulation. Loud sounds are destabilizing to premature and sick babies, and can interrupt sleep. (217) ICU staff conversations and monitor alarms are the primary sources of loud noise levels in the ICU. In

addition, direct light can interfere with sleep and strong scents can be destabilizing to premature and sick babies. (217) Babies are known to recognize and prefer mother's scent. (218) The early smell and taste of mother's milk provides positive oral and gustatory experiences. It is important to recognize that all handling of the baby should be done slowly so as not to overstimulate the baby's immature vestibular system. (219, 220)

Having a baby in the ICU is mentally, emotionally, and physically exhausting, and parents are usually chronically tired. (221) If safety measures are in place, prolonged SSC in KC is a good intervention for both baby and parent, to promote rest and sleep. In addition to secure positioning and electronic monitoring (if indicated), an appropriately trained healthcare provider must be immediately present whenever a parent is asleep during KC.

Standard 2, Skin-to-Skin Contact: Education and policies in support of skin-to-skin contact between parents and their baby shall be developed, implemented, monitored and evaluated by an interprofessional collaborative team.

***Competency* 2.1:** A written policy and education/training plan for SSC shall be: a) known by all ICU interprofessional staff; b) reviewed by all new employees during employee orientation and annually; and c) evaluated every 1-3 years by ICU leadership for any needed updates.

***Competency* 2.2:** The SSC policy shall include: a) strategies for keeping the baby together with m/other as much as possible; b) clear inclusion and exclusion criteria for SSC; and c) who may be designated by parents to participate in SSC.

***Competency* 2.3:** SSC staff education plan shall include didactic education about: a) the developmental and physiologic expectation of all newborn babies to be in continuous SSC

contact with their mothers after birth and the stress induced by separation; b) the multiple benefits of SSC for babies including decreased mortality, improved physiologic stability, reduced stress and pain, optimal sleep, enhanced neurodevelopment, enhanced gut microbiome maturity, improved feeding tolerance, increased growth, early initiation and longer durations of breastfeeding, decreased rates of sepsis, enhanced parental-infant attachment and bonding; c) the benefits of SSC for parents including reduced stress and anxiety, enhanced parental-infant attachment and bonding, and increased breast milk production for mothers; and d) the need for a healing environment during SSC including protection from loud sounds, bright lights, and strong scents and practical ways to create and maintain such an environment. (3)

***Competency* 2.4:** SSC staff training should include simulation training with appropriately-sized baby manikin/doll on how to safely do standing and sitting transfers of baby (including babies on mechanical ventilation and with lines) to parent's chest.

***Competency* 2.5:** ICU staff who are experienced and comfortable with SSC transfers should be available to mentor less experienced staff until they gain competence and confidence in facilitating SSC transfers.

***Competency* 2.6:** SSC educational content should include ways to individualize SSC according to the baby's medical condition, behavior and state organization and should include: a) descriptions, techniques and indications for KC or gentle supportive HC; and b) techniques and scripts for supporting use of these options to parents.

***Evidence-Based Rationale*:** Formal policies legitimize care practices as standards of care, and help to standardize practice methods. (222) Policies that are fundamental to the culture of the

unit need to be introduced early, during orientation after employment begins. A SSC policy should clearly describe the inclusion and exclusion criteria for SSC/KC, and define who may participate in SSC/KC to avoid ambiguity and confusion. Staff education should explain that maternal proximity is the developmental and physiological expectation of all newborn mammals and the "natural habitat" for all newborn altricial mammals. (223) Education should include evidence in neuroscience and neurobiology that supports the importance of SSC on newborn brain development. (224) Much research (animal and human) documents the universal stress reactions experienced by both mothers and babies when they are separated; (225, 226) therefore, barring extreme medical circumstances, every effort should be made to keep babies with m/other as much as possible for optimal physiologic stability and neurodevelopment.

SSC is one of the most studied interventions in neonatal care. The benefits of SSC documented in numerous studies include: decreased mortality, (227, 228) improved physiologic stability, (229) reduced stress and pain, (206-208) optimal sleep, (174) enhanced neurodevelopment, (175, 224, 230) enhanced gut microbiome maturity, (231) improved feeding tolerance, (232) increased growth, (233, 234) early initiation and longer durations of breastfeeding, (228, 235, 236) decreased rates of sepsis, (227, 235) reduced parental stress and anxiety, (207) and enhanced parental-infant attachment and bonding. (175, 207, 227, 237-239) In addition, SSC increases maternal, paternal and infant oxytocin levels, which support bonding and attachment and increases prolactin levels in mothers, which increases milk production. (207, 240 2018, Sriraman 2017, 241)

Since staff are responsible for creating and maintaining a healing environment in the ICU, they need information about the importance of individualizing light, sounds, and scents in

ways that will protect babies in the ICU from developmentally inappropriate stimulation. In addition to knowledge of the rationale, staff need practical methods of applying this knowledge to support parents and babies during SSC. Staff need more than knowledge and theory to enthusiastically support SSC. Simulation training provides practical, hands-on experience during the learning process to develop competency and confidence in new skills and can be done with appropriately-sized baby/doll manikins to demonstrate how to safely perform standing and sitting transfers of babies (including intubated babies) to parent's chests. (242) Many studies have documented the safety of SSC/KC with ventilated babies (243, 244) and at least one prospective study with 263 VLBW babies has documented the safety of SSC with umbilical lines. (245) A support team for both day and night shifts can provide ongoing assistance, which is often needed during the early stages of practice with a new skill.

All care, including SSC, should be provided in a manner individualized to the baby's developmental stage and adapted to age, medical condition, stability, and state availability. (219, 220) While KC is usually the first choice for SSC, if it is contra-indicated, parents should be encouraged to provide developmentally appropriate HC for their baby. Providing KC or HC for a tiny, fragile baby can be frightening to parents and they may need reassurance and a demonstration of techniques.

Standard 3, Skin-to-Skin Contact: Babies shall be evaluated to: a) determine their readiness for transfer to KC; b) assess stability during transfer from bed to parent's chest; c) assess baby's response to SSC (KC or HC); and d) assess their stability during and after transfer back to the bed.

***Competency* 3.1:** A standardized assessment of the baby's readiness, stability and response to transfer and to SSC should be utilized by ICU staff.

***Competency* 3.2:** Electronic or manual documentation should be created, and staff should be trained in methods of entering data to record parameters, such as: a) if baby was eligible for KC, b) if KC and/or HC was offered to parent; c) if KC or HC was done and how long; d) which parent had SSC with baby; e) baby's response; f) parent's experience; and g) staff experience/motivation.

***Competency* 3.3:** Periodic quality improvement (246) evaluations should be conducted using validated methodology to evaluate SSC implementation and sustainability.

***Evidence-Based Rationale*:** Standardized evaluation and documentation will aid in monitoring safety and therapeutic value in SSC. A variety of valid assessments for SSC are available. (209) Accurate and consistent data collection will make it possible to evaluate progress and identify quality improvement opportunities. Without formal plans for a QI process, it is unlikely to occur. Participation in formal QI processes with other institutions provides comparison of progress and motivation for improvements. (247, 248)

Standard 4, Skin-to -Skin Contact: Parents shall be provided information about the benefits of SSC that continue for babies and parents after discharge.

***Competency* 4.1:** Discharge planning with parents shall include information regarding the continued value of SSC, holding of babies, and encouragement for parents to continue SSC at home.

***Competency* 4.2:** Parents shall be supported in how to safely hold and carry their baby after discharge, including the use of a baby carrier if desired.

***Evidence-Based Rationale*:** The benefits of SSC for babies and parents continues for several months after birth and has been shown to enhance neurodevelopment and social engagement, (237, 249) increase breastfeeding duration, (250) and reduce incidence of postpartum depression. (249) Safety is an ongoing issue that continues after discharge, so should be discussed with parents during discharge planning.

IFCDC-RECOMMENDATIONS FOR BEST PRACTICE IN REDUCING AND MANAGING PAIN AND STRESS IN NEWBORNS AND FAMILIES

"*Imagine…sitting by an isolette and begging and pleading with God for a miracle and mercy, and never really knowing if that is what's best for your baby*."*****

Standard 1, Pain and Stress, Families: The interprofessional team shall document increased parental/caregiver well-being and decreased emotional distress (WB/D) during the intensive care hospital (ICU) stay. Distress levels of baby's siblings and extended family should also be considered.

Competency* 1.1:* Parents shall have unlimited opportunities to be with their baby and be encouraged to engage with their baby, including skin-to-skin interactions.

***Competency* 1.2**: Education shall be provided to all parents on how to (a) recognize their baby's behavioral communications of pain and distress as well as signs of comfort and (b) support parents to use practical ways to safely comfort and soothe their baby.

***Competency* 1.3**: WB/D shall be evaluated within 72 hours of admission and 48 hours before discharge (as well as other times indicated by clinical judgment).

***Competency* 1.4:** Training should be provided for staff in how to screen, assess and document parent/family WB/D in accord with ICU policies.

***Competency* 1.5:** Evaluations of WB/D shall include informal and routine bedside conversations with all parent/caregivers by social workers and psychologists (one per 20 beds), who may utilize appropriate questionnaires and/or inventories to assess for postpartum depression (PPD), Post-Traumatic Stress Disorders (PTSD) or other mental health concerns. This information shall be communicated to relevant members of the interprofessional team in accord with ICU policies.

***Competency* 1.6:** Standardized education programs on reduction of distress and anxiety in families shall be provided for all professionals and include topics: (a) provision of Infant and Family Centered Developmental Care; (b) recognition of symptoms of anxiety, PPD, and PTSD; (c) use of reflective listening skills and non-judgmental feedback; (d) understanding of implicit cultural biases; and (e) utilization of emotional and physical self-care.

***Competency* 1.7:** All parent/caregivers shall be provided with psychoeducational groups emphasizing developmental care as well as the opportunity for peer-to-peer individual support by trained volunteers in the ICU.

***Competency* 1.8:** Selected ICU staff should be appointed to provide targeted levels of support (e.g., listening visits) for parents/caregivers deemed at risk for emotional distress.

***Competency* 1.9:** Appropriate emotional interventions and support shall be provided by social workers, psychologists, and psychiatrists within the ICU to parents/caregivers with debilitating levels of symptoms or acute distress.

***Competency* 1.10:** Referrals of ICU family members for psychotherapy outside the ICU shall be provided using established hospital resources and referral strategies.

***Competency* 1.11:** Discharge planning should include information about parent WB/D and related interventions. This information should be communicated to follow-up providers to promote optimal IFCDC at home.

Evidence-based rationale: In general, prolonged and involved contact with babies, including skin-to-skin care has been shown to reduce parental distress. (178, 251-254) Reports of elevated posttraumatic stress symptoms in ICU parents, with 60% of mothers and 47% of fathers scoring above threshold, came from an NICU that restricted parental presence to 6 hours in the afternoon, one at a time for parental contact, and did not permit skin-to-skin care or breastfeeding. (255) Global studies (256-259) have documented increased risk of ICU mothers and fathers for perinatal mood disorders (PMDs). These studies have uniformly recommended screening for perinatal mood disorders (PMDs) in the NICU for the benefit of parents, the physical and emotional development of the baby, and family functioning. (260) Identification of those parents/caregivers who need intervention is necessary soon after the baby is admitted to the NICU and as the hospitalization progresses. (10, 261) Formal and validated assessments and screeners are available to determine levels and trajectories of emotional distress, (262-264) which may increase or decrease over time. (265) The benefits of universal care (266) for all ICU parents using peer-to-peer support and psychoeducation regarding developmental care principles have been documented. (267-269) Provision of targeted support for mothers has been well-received by NICU nurses and is associated with reduced depression in NICU mothers. (270, 271) A growing number of studies report improved outcomes for mothers who have received

psychotherapy in the NICU. (272-274) Not all ICUs have the resources to provide therapy in the unit by mental health professionals. Professional responsibilities necessitate referral of these parents elsewhere.

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 non-opioids, 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.

Evidence Based Rationale: An abundance of data exists to provide documentation that babies, both term and preterm, experience pain and have both behavioral and physiologic responses to pain. (275-278) Furthermore, studies have also indicated that babies may recall painful stimuli

weeks, months, or years after their occurrence with modified behavioral responses. (279-281) Despite this knowledge, assessments of pain and the use of pharmacologic and non-pharmacologic interventions vary greatly among NICUs. (277, 282) Non-pharmacologic interventions, including skin-to-skin care, have been shown to be effective in reducing both physiologic and behavioral signs of pain and stress. (144, 283-285) Parents are uniquely qualified to participate in these non-pharmacologic interventions. They are especially sensitive to their baby's behavioral communication and therefore most capable of providing positive sensory interactions that will modify the pain response and promote optimal brain development. (178, 180, 286, 287) Yet parents are often excluded from involvement during painful or stressful interventions when their inclusion can provide input that offsets painful or stressful interventions. Utilizing non-pharmacologic interventions as part of routine care will reduce the need for pharmacologic therapy for control of neonatal pain and stress. (206, 285, 288, 289) There is, however, a place for pharmacologic treatment (including sucrose and topical agents) for episodic procedural pain, including intubations and retinal exams and after surgeries. (290-292) Pharmacologic treatment will be more effective when used to complement non-pharmacologic interventions. There is insufficient evidence to recommend routine continuous pharmacologic treatment for mechanically ventilated newborns. (293) Furthermore, there are data to suggest that long term, or continuous use of some pharmacologic therapies, may increase the risk of adverse neurologic events, and lead to longer periods of mechanical ventilation. (294-296)

To provide maximum control of pain and stress in babies, treatments should be tailored to a baby's individual signs and responses to interventions. (180, 297) Here again, parents are integral partners in making these observations and will be more effective partners when made

fully aware of treatment options. Consistency in providing this individualized care will be enhanced by the development of standardized protocols that can be utilized by all caretakers. (180, 212) This will minimize variation in care of both staff members and parents in responding to a baby's signs of pain or stress.

IFCDC- RECOMMENDATIONS FOR BEST PRACTICES FOR FEEDING, EATING AND NUTRITION DELIVERY

"*Imagine…against all odds, and all the setbacks, you are able to hold and breastfeed…your little one grows…and after almost four months in the hospital, that little tiny human who struggled so hard, may get to go home…soon*."*****

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.

***Competency* 1.1:** All staff shall be educated on the physiologic parameters and baby behaviors that are indicative of readiness, engagement, and disengagement. (i.e., the need to alter or stop a feeding)

***Competency* 1.2:** All professional staff who feed babies or support m/others to feed their baby shall be trained in appropriate feeding skills, with verified competency in feeding.

***Competency* 1.3:** Consistency of feeding practices among staff who feed an infant shall be promoted, monitored and verified.

***Competency* 1.4:** Parents and other caregivers (m/others) shall be given information and guidance regarding how to interpret the communication of their newborn including baby behaviors that indicate safe and enjoyable feeding experiences (e.g., physiologic parameters as well as behaviors of feeding engagement and disengagement).

***Competency* 1.5:** Professional caregivers shall support m/others to engage in appropriate responses to their baby's communication during feedings.

***Competency* 1.6:** All oral experiences should be based upon the baby's behaviors and focused on enjoyable non-stressful interactions. Biologically expected experiences (tactile and feeding) shall be the primary focus rather than exercise/therapy driven interventions that are not part of a healthy fetus or newborn's experience. Non-critical care oral experiences that cause distress or instability (e.g., changes in heart rate (HR), respiratory rate (RR), saturations, color changes, crying, hiccupping, yawning, gasping) should be minimized.

***Competency* 1.7:** Baby behavior at the beginning (baseline) of feeding as well as changes during feeding for physiologic, motor, behavioral state, and interaction parameters shall guide the feeder's decision to continue or discontinue the feeding. While some loss of stability is common, the focus shall be on maintaining a minimal level of baseline physiologic stability and behavior throughout the feeding or regaining baseline stability when the baby loses stability during the feeding.

***Competency* 1.8:** When professionals/caregivers determine best delivery of enteral feedings, in addition to nutritional considerations, the baby's physiologic and behavioral responses shall be considered.

***Competency* 1.9:** Baby behavior as well as medical stability shall guide initiation of oral feeding attempts as gestational age does not address normal variability seen in development or with the impact of medical comorbidities.

***Competency* 1.10**: Oral feeding shall be modified or stopped when the baby no longer shows stability or engagement.

***Competency* 1.11:** Oral feeding plans shall be individualized based on the baby's behaviors and performance, as well as overall progress.

***Competency* 1.12:** M/other feeding preferences shall be included and supported whenever possible during the development of feeding management plans.

Evidence-based rationale: Education about the feeding experience is vital, and involves many factors. A primary tenet of infant and family centered developmental care (IFCDC) is the importance of recognizing and responding to the communication of the baby. (15, 298) Specific baby behaviors within the domains of autonomic control, motor, behavioral state, and attention/interaction provide information to the caregiver to guide cares. (15, 298) Caregiving that responds to these behaviors (cue-based) has resulted in improved outcomes of the baby. (183, 195, 299-309) Feeding outcomes have also been improved with programs that focus on attending, interpreting and responding to baby behaviors. (303, 305-308, 310-312)

Infant and family centered developmental care education is the standard for professional caregivers in neonatal intensive care units. (15, 313) Feeding a preterm baby and/or a baby with medical comorbidities requires a skilled feeder – one who observes and responds to the individual needs of the baby. (314-316) These skills shall be taught and competencies verified

for all professional caregivers. (15, 310, 316-318) Staff education focused on the need to monitor baby stability carefully, as well as to respond to signs of instability, to improve the co-regulation of a baby during feedings. (315, 316, 318) Education should include recognizing the physiologic stress signs as well as more obvious motor and behavioral state stress signs, because physiologic stability is challenged during feedings, and can be improved when staff and families are educated and use a collaborative approach with the baby during feedings. (310, 315, 316, 318-321)

Parents generally welcome education regarding behaviors that facilitate oral feedings. (312, 314, 322-324) Most parents need guidance and practice in learning how to feed high-risk babies. (15, 312, 314, 322, 324, 325) Baby behaviors that indicate physiologic instability are not always obvious, and m/others often need support and guidance to understand how to recognize disengagement behaviors during feedings. (314, 315, 320-322, 324) M/others frequently have questions about feedings after discharge from the hospital. (326, 327) Family education and training on infant feeding, both in the NICU and post-discharge, are standard of care and improves feeding outcomes. (15, 232, 310, 312, 314, 328, 329)

Factors that influence the acquisition of feeding skills include progression through enteral feeding stages. Therefore, responses to enteral feedings should be considered. (330-335) Babies demonstrate fewer signs of distress when fed with a slower infusion rate, and may even do best with continuous feedings up through 32 weeks postmenstrual age (PMA). (330-332) Volume tolerance should also be considered with enteral feedings, as volume can affect both comfort and growth. (330-332)

Inputs that cause pain or discomfort and result in irritability or agitation are avoided to minimize noxious effects of the ICU. (see pain and stress-baby, standards). Biologically unexpected inputs (e.g., odors such as perfumes) shall be avoided, to minimize unintended effects, in keeping with principles of developmentally supportive care. (see other care standards). (15, 171) Babies who receive touch protocols that are not based upon biologically expected stimulation may show distress with adverse events (apneic/bradycardic episodes or oxygen desaturations) that stop when the touch protocols are discontinued. (336-339) Sensory-based inputs (e.g., touch, smell, taste) that are provided by the m/other are familiar and can improve stability and outcomes (see skin-to-skin standards).

Feeding experiences challenge the physiologic, motor, and behavioral state stability of babies. (315, 319-321, 340-345) Babies demonstrate behaviors indicative of feeding readiness, and when fed in response to these behaviors, show more physiologic stability and transition more quickly to full oral feedings. (304, 306-308, 310, 315, 319, 346-348) With maturation, babies demonstrate improved stability in physiologic, sensorimotor, behavioral state, and interaction competence. (298, 340, 346, 349, 350) Both stability and maturation influence the development of feeding patterns. (340, 347, 351) Feeding abilities change over time, and therefore eating is considered a neurobehavioral process. (309, 340, 350, 351) Caregivers who are trained to identify and respond appropriately to these indicators can help preterm babies and their parents become co-regulators during a feeding. (314-316, 318, 322, 340, 352) Preterm babies often show more respiratory stability during breast feeding attempts than during bottle feeding. (343, 353-356) Preterm babies often struggle to maintain stability (heart rate, respiratory rate and oxygenation) during bottle feedings. (344, 345, 357) They are able to maintain temperature

when breastfeeding, and some may be able to suck, swallow, and breathe at breast without adverse events as early as 27-28 weeks gestation. (353-356, 358) Mothers are more engaged during feedings where their infant is more physiologically stable, and showing behaviors indicating a readiness to eat. (314, 359)

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

***Competency* 2.1:** Human milk should be available to all babies in the ICU (maternal or donor).

***Competency* 2.2:** Professional staff shall provide information to m/others regarding the importance and benefits of human milk, and the influence of human milk on medical, nutritional, and neurobehavioral outcomes.

***Competency* 2.3:** Maternity and ICU teams shall partner to communicate the importance of and facilitate early hand expression of colostrum and early and frequent mechanical pumping of human milk.

***Competency* 2.4:** Systems shall actively encourage mothers to provide their human milk. Support for feeding challenges both with initiation of pumping and transition to breast feeding shall be anticipated and provided.

***Competency* 2.5:** ICU systems shall support mother/baby dyads to transition to breast feeding (where possible), in additional to providing human milk by other means.

***Competency* 2.6:** ICU systems shall provide lactation support to m/others for the entire hospital stay, from initiation of breast pumping to successful breast feeding.

***Competency* 2.7:** Breast feeding support for transition home shall be identified and communicated to m/others prior to discharge (where appropriate).

***Competency* 2.8:** For babies who are both breast and bottle fed, breast feeding should be initiated first whenever possible. Breast feeding should be offered for every feeding that the mother is available, as tolerated by the baby.

***Competency* 2.9:** Alternatives to bottle feeding shall be used until breastfeeding is well established based upon the desire of the family, in consultation with the ICU staff.

***Evidence-based rationale*:** Human milk imparts many benefits – health as well as psychosocial. Colostrum supports growth of the gut biome, and is full of pre- and probiotics. (360-366) Human milk is protective of infection and other negative health consequences, and is related to improved body composition as well as cognitive abilities. (317, 360, 364-370) Human milk is the optimal nutrition for most babies in the ICU. (364, 366, 371, 372) Mother's own milk is the most suitable nutrition, but donor pasteurized human milk is the second most suitable. (364, 372, 373)

Breast feeding is generally best for babies. Most babies are more physiologically stable and regulated when breast feeding than when bottle feeding. (343, 353, 354, 356) Preterm babies who are breastfeeding are able to create intra-oral vacuum; however, milk intake is related more to time spent actively sucking. (345, 374) Strategies that improve the provision of human milk include putting the baby to breast at an early gestational age, putting babies to breast as a first feeding, and skin-to-skin care. (317, 366, 375-380) Strategies to improve breast feeding outcomes include encouraging maternal involvement, putting babies to breast early and often,

verifying adequate transfer of human milk, and skin-to-skin care. (375-377, 381) Breast shields may be beneficial, but shall be used only if necessary, as they may negatively influence volume consumed at breast. (374, 382) Alternatives to bottle feeding may increase likelihood of babies being exclusively breastfed at the time of discharge. (383-385) Mothers need ongoing support after discharge to breast feed successfully. (356, 375, 382) Mothers in the hospital setting require emotional support to pump for extended periods of time. (375, 377, 386) Mothers struggle emotionally with loss of breastfeeding and have more positive emotions when successfully breastfeeding. (387) Breastfeeding positively influences later feeding behaviors of both the mother and the baby. (381, 388)

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

***Competency* 3.1:** Growth shall be measured, monitored, and optimized both in the ICU and in the early post-discharge period. High-risk infants may require human milk to be fortified for some period of time to meet their full nutritional needs.

***Competency* 3.2:** Staff should be trained to accurately collect weight, length, and head circumference parameters.

Evidence-based rationale: Poor growth in the preterm baby is associated with poorer developmental outcomes. (372, 389) Nutrition in the newborn period shall be optimized to improve developmental and health outcomes. (15, 371) Feeding methodology shall consider loss of nutrients, specifically fat, calcium, and phosphorous. (390) Feedings delivered via a bolus lose a smaller percentage of nutrients than continuous feedings. (390) The comfort of the baby during enteral feedings should be considered as well. (see feeding, standard 1).

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

***Competency* 4.1:** ICU professionals shall actively work with m/others to assist them to feel confident and competent with feeding their babies.

***Competency* 4.2:** Where relevant/necessary, bottle feeding shall be conducted by the m/other when she/he is present rather than by ICU professionals so that m/other is supported to be the expert. M/others or their designees shall be identified as the primary provider(s) of sustenance and nurturing.

***Competency* 4.3:** Professionals shall support the parents' understanding of their baby's communicative behaviors, while guiding and supporting the feeding experience.

***Competency* 4.4:** Emotional support should be available to minimize stress on the family when babies are not eating well, and/or when the family or m/other are having difficulty with their expectations for successful breastfeeding.

***Competency* 4.5:** Extensive support and education shall be offered to m/others who are unable to be the primary feeder during the hospital stay (prior to and after discharge), to ensure confidence and competence in feeding the baby.

***Competency* 4.6:** M/others shall be provided education in a manner that is individualized to the m/other's learning style and ability to understand and retain the information.

***Evidence-based rationale*:** Feeding a preterm infant or an infant with medical comorbidities requires specialized knowledge and skills, and m/others who lack these skills may miss out on the opportunity to co-regulate their infant. (314, 316, 322, 391) Parents evaluate their own competence as a m/other by their ability to feed their baby. (392-394) M/others are motivated to

nurture their babies through feeding, and feedings provide a powerful experience that shapes the parent/child interaction. (392-396) Mothers of preterm babies generally have more clinical symptoms of acute stress and anxiety, and are often more worried about breastfeeding. (381, 387, 397) Lower birthweight (BW), higher neonatal clinical risk, and longer length of stay in the ICU are associated with difficulty breastfeeding. (387) Mothers generally feel a sense of fulfillment, pride, and satisfaction when they are able to successfully feed their baby in the ICU. (381, 398) Significant parenting stress is associated with having babies with more medical risks, as well as with mothers of multiples. (397, 399) Bedside professional caregivers have a critical role in encouraging, supporting, and coaching the m/other to become confident during feedings. (15, 316, 317, 322, 325, 376, 377, 381, 386, 400) (15, 312, 360, 392, 394) M/others often struggle with their role in feeding their high-risk infants, and need emotional support, as well as information and logistical support. (15, 322, 325, 381, 392, 394, 396) Positive maternal interactions during feedings while in the ICU are predictive of later mother-baby interactions after discharge. (396) Outcomes are improved when parents are present and participate in their baby's care. (232, 252, 381, 401)

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

***Competency* 5.1:** Suctioning, respiratory support, and other oral care shall be considered as a potential aversive input to the face and mouth, and be performed only as necessary and with conscious attention to minimizing distress.

Evidence-based rationale: Preterm babies are at high risk of developing sensory aversive responses and feeding disorders. (309, 402-404) Human milk may provide immune benefits when used for mouth and oral care. (361) Babies held skin-to-skin may nuzzle at breast and benefit from the sensory inputs associated with human milk and nuzzling. (317, 378) Providing smells and tastes of human milk may improve the transition to oral feedings. (405) Care shall be taken when mouth care is necessary, to minimize discomfort and aversive experiences as babies show physiologic instability with unfamiliar touch to the face. (15, 336-339)

Standard 6, Feeding: Professional staff shall consider smell and taste experiences that are biologically expected.

***Competency* 6.1:** Odors/tastes of expressed human colostrum and/or milk shall be provided as soon after birth as medically indicated/allowed.

***Competency* 6.2:** Odors/tastes of human milk shall be provided as a way to increase interactions/familiarity with the baby's m/other.

***Competency* 6.3:** Skin-to-skin care shall be facilitated early and often. (see skin-to-skin standards).

Evidence-based rationale: Babies are more stable during skin-to-skin holding. (see skin-to-skin standards). They benefit from smells and tastes of human milk. Providing smells may help with earlier transition to breastfeeding. (15, 317, 361, 378, 405)

Standard 7, Feeding: Support of baby's self-regulation shall be encouraged, especially as it relates to sucking for comfort.

***Competency* 7.1:** Non-nutritive sucking (406) opportunities shall be offered to all babies in the ICU, for comfort, during gavage feeds, and as support during painful procedures.

***Competency* 7.2:** Mothers shall be encouraged to be available for the baby's exploration/comfort at breast.

Evidence-based rationale: Non-nutritive sucking opportunities shall be encouraged, as they are correlated with improved stability in the baby, better transition to oral feedings, and calming effects during painful procedures. No detrimental effects on breast feeding have been shown related to the use of non-nutritive sucking in the ICU. (355, 356, 382-384, 407-411) Early breast exploration supports the transition to full oral feeding, and does not appear to have detrimental effects. (354-356, 366, 375, 376, 382, 412)

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

***Competency* 8.1:** Environments shall be as free of distractions as possible, in order to support both the baby and the feeder to focus on the feeding. Distal environmental influences include ambient noise, lighting, activity around the bed space, availability of a comfortable chair for the feeder, and free from distractions (e.g., phones, conversations). Proximal environmental influences include positioning of the baby in midline with neutral/slight flexion in body/neck as well as postural support for the entire body of the baby.

***Competency* 8.2:** The use of special positioning (e.g., side-lying, upright) shall be individualized based on the baby's needs, documented, and assessed for change as the baby develops feeding competence.

***Competency* 8.3:** Special bottle nipples/bottle systems should be adjusted based upon the infant's ability to maintain physiologic stability and develop/use suction appropriately. Flow rates from bottles should be documented and assessed according to the baby's emerging competence. Bottle/nipple options should be individualized for the baby's abilities and modified as the baby grows, gets stronger, and changes.

Evidence-based rationale: Environments are known to influence baby sleep and behaviors, and should be attended to accordingly. (see sleep and arousal standards). (306) Attuned feeding environments are ones in which both the feeder and the baby are able to focus on the feeding as opposed to the environment. (413) An attuned environment supports the m/other's feeling of belonging as part of the care team. (see pain and stress, families, standard). It also provides privacy and a separation from distractions and other people during the feeding. (413) Feeders who mindfully prepare the environment of the baby's space prior to the feeding, attending to the lighting, seating, noise, and equipment necessary, support improved feeding skills. (15, 315, 316, 318, 414) Babies who are positioned in midline with slight flexion, with postural support, are better able to coordinate sucking/swallowing and breathing. (318, 415) Specialized positions, such as elevated side-lying or upright to achieve horizontal milk flow, may support organization of the suck/swallow breathe sequence, and may be beneficial while the baby is learning to eat. (314, 318, 416-421) However, babies may not require a specialized position, and babies are often successful at transitioning to a more traditional cradle-hold for bottle feeding once they have established a mature sucking pattern. (417) Bottle flow rates influence the way a baby uses suction, and can influence physiologic stability. (319, 342, 344, 345, 357, 422, 423) Caregivers

should be knowledgeable about bottle nipple flow rates as well as infant behaviors that might indicate the need to change the flow rate. (342, 344, 345, 357, 422-427)

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

***Competency* 9.1:** Feeding shall minimize risks for aspiration and/or other adverse cardio-pulmonary consequences.

***Competency* 9.2:** Modifications to support feeding shall be individualized, documented, verbally shared among professionals and parents to facilitate continuity, and used in the development of a comprehensive feeding plan. Communication shall focus on decreasing variability between feedings and on supporting the baby's skill development.

***Competency* 9.3:** Babies shall not be forced to suck or finish a prescribed volume orally if they are losing physiologic stability, are no longer actively sucking, or are asleep.

***Competency* 9.4:** If, despite maximal supports, pleasurable feeding experiences cannot be achieved, babies should be held and be provided smells/tastes and an opportunity to engage in non-nutritive sucking while being given their feeding enterally.

Evidence-based rationale: Feeding efficiency and volume are related to alertness prior to feeding, maturation, and comorbidities. (347, 428) Being held during gavage feedings, and getting smells/tastes during gavage, can improve the baby's eating skills. (405, 407, 408, 412) When babies are offered feedings based upon readiness behaviors, and when the feedings are stopped when baby's show satiation behaviors, they have fewer adverse events (apnea, bradycardia, desaturation) and transition to feedings more quickly, with similar weight gain.

(304-306, 308, 310, 311, 314-316, 319, 320, 335, 346, 359) Feedings should focus initially on establishment of enjoyable experiences where skill attainment is the goal, to avoid aversive experiences. (317, 318, 352, 404, 427) Repeated aversive experiences may place the baby at higher risk for feeding aversions, using a classical conditioning learning paradigm. (429) Repeatedly forcing a baby to finish a feeding or to continue despite losing physiologic stability may lead to aversive experiences and ultimately may increase risk of oral aversions and feeding disorders. (317, 404) These behaviors may also indicate the baby is allowing fluid into the airway. (430) Feeding modifications that are individualized, applied consistently, and support eating skills can improve feeding outcomes. (309, 310, 332, 355, 356, 358, 431, 432) Improved consistency of caregiver actions during feedings improve feeding outcomes and may decrease length of stay. (309, 310, 332, 431, 433, 434)

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

Competency **10.1:** Intensive care policies and time management shall provide opportunities for professional staff and the baby's family to discuss feeding management.

Competency **10.2:** Interprofessional team members shall review the parental involvement in care, and the baby's regulation and stability in the context of feeding and weight/gain/energy conservation, during rounds.

Competency **10.3:** Feeding plans and the progress of the baby's feeding skills should be monitored and documented. Changes to the feeding plan shall be made when an infant is not

stable or not improving, as documented in the feeding plan. Changes should address improving the comfort and safety, as well as ability to eat appropriate volumes.

***Competency* 10.4:** Interprofessional feeding management shall be driven by information gathered, consistently applied, and regularly updated in the application of the baby's individualized feeding plan.

***Competency* 10.5**: Interprofessional feeding management shall be driven by the m/other's expressed desires (to breast feed and/or bottle feed), as well as the baby's stability and behavioral communication during feedings.

Evidence-based rationale: Feeding outcomes are improved when feeding plans are developed by interprofessional teams, consistently followed, and monitored for compliance. (15, 309, 332, 431) The development of feeding plans requires time for team members to meet and discuss options, at a time when the family is present. Parents should be able to attend these discussions, and to play a role in deciding what is best for their baby. (see parenting standards). The behaviors of the baby (before, during and after the feeding) shall be documented and shall guide decisions. (304, 308, 314-318, 352, 359, 414, 433) Plans shall be individualized according to the baby's current needs. (356, 432) The safety and skill of the baby (learning to coordinate sucking/swallowing and breathing) shall be paramount to other considerations. Baby instability during/after feedings shall be considered as relevant information that shall prompt a re-evaluation of the plan. Efficiency, endurance, and volume are all measurable outcomes. (318)

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

***Competency* 11.1:** Feeding shall be seen as a neurodevelopmental progression, with the ICU building a foundation for further learning/development around eating.

***Competency* 11.2:** Professional services shall be made available to families to ensure optimal nutrition after discharge whether breast, bottle, tube feeding, or a combination of those feeding approaches.

***Competency* 11.3:** Post-discharge, feeding outcomes shall be monitored to inform care, document outcomes and assess potential changes in feeding approaches.

Evidence-based rationale: Feeding is influenced by medical factors, maturation, and experience. (309, 332, 350, 351, 428, 431) Medical comorbidities are highly correlated with delayed acquisition of oral feedings, and long-term feeding disorders. (435-438) Feeding skills change over time, and are considered part of a neurodevelopmental process. (340) Preterm babies lag behind their full-term counterparts in skill acquisition. Mothers may struggle with understanding their baby's behaviors and benefit from ongoing support after discharge. (326, 327) Preterm babies lag behind their full-term counterparts in skill acquisition. (303, 394, 439-441) Preterm babies have an increased risk of long-term feeding disorders compared to term babies. (404, 442-445) Late preterm babies have similar feeding problems in the first year as early born preterm babies, and require similar support after discharge. (446) Feeding support while in the ICU, as well as after discharge, is a standard of care in the U.S. and other countries. (15, 432, 447)

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Conflict of Interest

The Consensus Committee members do not have financial, or non-financial, relationships with industry that are relevant to this topic.

Glossary

Systems' Thinking:

Burnout = worn out by excessive use, in the intensive care work setting, a syndrome of emotional exhaustion, depersonalization or disconnection from coworkers, and a reduced sense of personal accomplishment. (448)

Collaborative = to unite in an activity or operation, intellectually process information and action, and execute together, as in working jointly with others of the same or divergent mindset.

Compassion fatigue = *the final result of a progressive and cumulative process that is caused by prolonged, continuous, and intense contact with patients, the use of self, and exposure to stress.* (449) (p.237)

Competency = the defined or expected action, or sequence of actions (process), that constitutes performance.

Development = the act, process, or result of gradually promoting natural growth, differentiation, and evolution, by successive change.

Health disparity(ies) = *a particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion.* (450)

Infant family centered developmental care (IFCDC) = a process blending the natural unified growth of biologic and cognitive system organization and regulation of an infant with the continuous coordinated support of parent(s), family, and interprofessional health team.

Intensive care units for newborns = environment/setting(s) of application – any ICU supporting babies.

Interprofessional = shared by, derived from, or representing, two or more professions/professionals.

Interprofessional collaborative practice = two or more professionals working together toward a common goal through sharing the unique value of each profession.

Lived experience = individuals, such as parents, who have experienced the birth, intensive care, transition to home, and care at home; and have insight into the systemic issues impacting babies, parents, and families with complex needs. (60)

Mental health = relating to the mind, a holistic emotional and intellectual response of an individual to its environment.

Neuroprotection = the state of covering, or shielding, the natural growth of the body's neurologic system from exposure, injury, or destruction.

Post-traumatic stress disorder = an anxiety related mental disorder that can occur after a potentially traumatic event, such as parents' experience of prolonged stays in an ICU with an acute baby, or the continuous exposure of staff to acute/crisis events. Symptoms include re-experiencing the event, avoidance, or feelings of numbness, and hyperarousal.

Practice = to perform systematic action(s) for proficiency within the scope of a professional discipline.

Self-care = any activity, including rest and visual distraction, influencing the individual's positive balance of mental, emotional, and physical health. Self-care can enhance mood, reduce anxiety, and improve relationships.

Social determinants = *...conditions in which people are born, grow, live, work and age. These circumstances are shaped by the distribution of money, power and resources at global, national and local levels. The social determinants of health are mostly responsible for health inequities – the unfair and unavoidable differences in health status seen within and between countries.* (451)

Standard = a measure established by an authority, such as a committee of experts, based on evidence and criteria that may be used as a test, or marker, of quality.

System = the regular interacting of an interdependent group of items, and/or bodies, forming a unified whole.

Systems thinking = intellectual process of identifying the interaction, influence, and relationship of the items, or bodies, that form a whole.

Transprofessional = through a change, or transfer of beliefs and/or knowledge, professionals who demonstrate a shared common goal and/or mission.

Wellbeing = personal state of feeling happy, healthy, and/or prosperous; in the work setting, performance satisfaction, emotional balance, engaging relationships, sense of work-life balance.

Sleep and Arousal:

Active Sleep = One of two main sleep states that make up a sleep period that is typically observed as early as 28 weeks of gestation in utero and by 26 weeks in preterm infants. Active

sleep is defined by coincident behaviors and physiology that includes periods of rapid eye movement (REM) and intermittent twitching type movements of the face and or limbs, which are periodically interrupted by periods of full body movements last a few seconds. Physiological parameters include irregular or non-rhythmic respiration, and higher heart rate variability than when in quiet sleep.

Anticipatory Guidance = Therapeutic interaction with parents/caregivers, wherein the clinician provides psychosocial support, shared observation, assessment and developmentally supportive care planning to enhance performance of the parent/caregiver-infant roles, and enhance caregiver readiness for transition home, and neurodevelopmental outcomes.

Circadian Rhythm = any biological process that displays an endogenous, entrainable oscillation of about 24 hours and are driven by a circadian clock. Although these rhythms are endogenous (generated within the body/brain), they respond to environmental information such as light and social cues. Circadian rhythms likely mature in the human newborn with exposure to light and social cues after delivery, even if the delivery is preterm.

Diurnal Cycling = refers to cyclical biological processes that occur on a day to night cycle, such as sleep and wake.

Emotional Regulation = the ability of an individual to modulate an emotion or set of emotions.

Facilitated Tucking = Otherwise known as “hand-swaddling” or “four-handed care” is a technique utilized by caregivers, often in combination with blanket swaddling and the side-lying position, where an additional caregiver (optimally the parent) provides containment at head and body to achieve flexed posture, and physiologic and behavioral organization of the baby, during routine care, and particularly during potentially noxious procedures.

ICU Therapist/NICU Therapist/Developmental Specialist = A clinician with expertise in neurobehavioral assessment , parent/caregiver support, and provision of anticipatory guidance and modifications to caregiving and environment, to enhance neurobehavioral organization, postural, motor and feeding performance, and physiological developmental processes that affect neurodevelopment.

Non-Nutritive Sucking = Suckling on a teat (e.g., on a pacifier) that does not provide nutrition. Non-nutritive sucking is characterized by a rhythm that is twice that of nutritive sucking. It is postulated to stimulate digestive processes, and to facilitate the pairing of sucking and swallowing that contributes to clearing of oral secretions, as well as the transition to nutritive sucking.

Quiet Sleep = One of two main sleep states that make up a sleep period typically observed as early as 28 weeks of gestation in utero and by 26 weeks in preterm infants. Convergent definitions indicate that QS can be differentiated by eyes closed, regular or rhythmic respiration, low heart rate variability and heart rate, tonic muscle tone, and very low muscle activity, generally limited to startles and rhythmic mouthing.

Sleep Associations = any factor that is frequently used as a means of supporting the transition from wake to sleep and becomes a preferred factor to be present while falling asleep. Sleep associations can be positive or negative. Sleep associations that promote sleep without interfering with the natural processes of sleep and assist with independent return to sleep after naturally occurring brief arousals after initial sleep onset, are considered “positive” sleep associations. Research supported positive sleep associations include having a regular bedtime and a consistent bedtime routine. Negative sleep associations are the factors or actions that

become associated with sleep onset that may later hinder independent return to sleep after waking, including feeding, rocking, and swings.

Social Relatedness = The degree to which a person perceives themselves to be connected to those around them. The degree of social relatedness could also be expressed by behavioral responses and actions in social contexts, such as reading non-verbal cues, social interactions, and emotional reciprocity.

States of Arousal = The range of awake states that vary in terms of alertness and attention, including drowse, quiet awake, active awake, fussing, and crying.

Swaddled Bathing = Immersion of the baby in a tub bath, after first swaddling the unclothed baby in a light blanket. The swaddle is gradually opened to bathe various body areas, and can be replaced, to maintain warmth and to provide containment to optimize comfort and reduce stress.

Ultradian Rhythm: The cyclic alternation of active sleep and quiet sleep within a sleep period.

Skin-to-Skin Contact (SSC):

Hand containment = gentle, sustained touch given with palms of the hands to contain the limbs of a baby for the purpose of providing comfort and support.

Kangaroo Care = ventral contact of a baby wearing only a diaper with the bare chest of the baby's parent or family member.

Kangaroo Mother Care = Three components: 1) early continuous skin-to-skin contact, 2) frequent or exclusive breastfeeding, and 3) early discharge from the hospital.

M(other) = describes the dyad and signifies the baby as an active interactor in the nurturing relationship with the mother (biologic or other), and with the interactive and integrated influence of the father/partner/significant other. Family members reinforce and enhance the supportive relationship.

Skin-to-skin contact = any contact of baby's skin with the skin of another human (including hand containment), but usually referring to ventral contact of a baby wearing only a diaper with the bare chest of the baby's parent or family member (also known as Kangaroo Care).

Pain and Stress:

Perinatal mood disorder (PMD) = although postpartum depression is the most commonly discussed PMD, there is a broader class of conditions encountered by women of reproductive age. The broader spectrum of PMADs' symptomatology and diagnoses includes: (a) depression, (b) anxiety, (c) obsessive-compulsive disorder, (d) posttraumatic stress disorder, (e) bipolar disorders, and (f) psychosis.

Postpartum depression (PPD) = symptoms of depression associated with perinatal experiences. PPD is found in both mothers and fathers.

Wellbeing/distress (WB/D) = personal state of feeling happy, healthy, and/or prosperous; in the work setting, performance satisfaction, emotional balance, engaging relationships, sense of work-life balance; versus pain or suffering affecting the body, body part, and/or the mind,

dissatisfaction, emotional imbalance, disconnected relationships, and the lack of work-life balance.

Feeding:

Nonnutritive Sucking (406) = Sucking for reasons other than nutrition (e.g., pacifiers, toys, fingers or any other object). NNS is typically at a rate pf 2 sucks per second, faster than nutritive sucking (NS). Adequate NNS does not guarantee adequate NS.

Baby-led feeding - Oral feeding opportunities at breast and/or bottle are provided with primary focuses on multiple factors that the baby exhibits as readiness for feeding (including but not limited to awake, alert, calm, rooting, and other signs of hunger) and not based on some predetermined time interval.

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