

What We Know

- ▶ Premature birth is associated with a risk of poor clinical outcomes (e.g., intraventricular hemorrhage, chronic lung disease). In addition to this, children born prematurely who spend time in the neonatal intensive care unit (NICU) are at risk for long-term complications (e.g., learning difficulties, behavior problems, neurosensory deficits) that are believed to result from the impact of the NICU environment on their developing nervous system^(1, 4, 5, 6)
 - Infants in the NICU often experience painful procedures and frequent handling in an environment of bright lights and noise. This can negatively impact the immature, developing nervous system of infants, especially those born prematurely, as well as the ability of parents to bond with their infants^(1, 2, 3, 4, 6)
 - Annually, approximately 12.7% of all infants born in the United States are premature^(4, 5, 6)
- ▶ Developmental care (DC) of the newborn involves reading and responding (e.g., holding the infant, gently touching, placing the infant in fetal position) to an infant's behavior in an effort to identify its needs. DC also involves altering the environment (e.g., decreasing lighting, creating a quieter environment) to decrease stimulation and limit exposure to stimuli that are greater than the developmental level that the infant's premature brain can tolerate^(1, 2, 6)
 - DC was implemented between 1980 and 1990 with the goal of decreasing the negative impact of the NICU environment on premature infants and promoting normal development^(1, 2, 3, 6)
 - DC is based on a combination of theoretical constructs originating in developmental neurobiology and clinical nursing⁽¹⁾
 - DC recognizes the infant as a social being who interacts with its environment and engages with caregivers^(1, 6)
 - DC recognizes the family as an important part of the care team^(1, 2, 6)
 - The behavior of the infant in response to the care provided is viewed as a form of communication⁽¹⁾
 - ▶ The infant's response is identified and classified (for details, see discussion below), and this information is used to create an individualized care plan that guides the provision of care⁽¹⁾
 - Caregivers provide individualized interventions (e.g., supportive touch and positioning) to which the infant responds according to its individual developmental level^(1, 2)
 - Short-term benefits of DC include a decrease in the number of days that ventilator support is required, improved weight gain, and a decrease in overall length of stay for infants in the NICU⁽¹⁾
 - Limited information is available regarding the long-term benefits of DC⁽¹⁾
- ▶ The neonatal individualized developmental care and assessment program (NIDCAP) is a program based on DC that was developed to provide premature infants with sensorial stimulation based on their individualized level of neurologic maturity^(3, 6)
 - NIDCAP was developed in Boston at Children's Hospital Boston⁽³⁾
 - Currently there are 16 NIDCAP centers in 7 different countries: the United States, Sweden, France, The Netherlands, Argentina, England, and Belgium⁽³⁾
 - NIDCAP requires caregivers to transition from viewing the NICU as a place to provide crisis-oriented and protocol-driven care to an environment that is calm and family-centered^(3, 5)
 - NIDCAP is based on a synactive theory that suggests that there is an order in which neurologic subsystems (e.g., autonomic, motor, organizational, attentional) develop and that while developing they impact and interact with each other^(4, 5, 6)
 - The infant is required to self-regulate and maintain a balance between these subsystems⁽⁶⁾
 - ▶ Observed behaviors (e.g., motor response, autonomic response) in response to stimuli are interpreted and classified as adequate and self-regulated (i.e., good coping response; e.g., stable respirations, looking attentively at the caregiver, resting hands upon the chest) or inadequate and an exhibition of

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October 28, 2011

stress behavior (i.e., poor coping response; e.g., grimacing, extending extremities away from the body, a change in color to pale)^(3, 6)

– Based on an infant’s response to stimuli, care recommendations are developed^(4, 6)

– Care plan recommendations focus on altering room surroundings (e.g., sounds, lighting, windows), incubator or crib environment (e.g., use of incubator cover), and assisting with self-regulation (e.g., positioning the infant to a comfortable or preferred position [e.g., fetal position]). Recommendations for the timing of care (e.g., bathing, feeding, diaper changes) and scheduling of daily routines may also be included in the care plan^(4, 6)

▶ For example, if an infant is unable to self-regulate (as evidenced by extending the extremities away from the body and grimacing) when repositioned facing a light or a window, the care plan may recommend pulling the shades in the room and covering the newborn’s eyes when he/she is repositioned facing a light source

– The plan of care is communicated to all caregivers (e.g., parents, nurses) and is revised following reassessment of the infant every 7–10 days⁽⁶⁾

• There is a significant cost associated with implementing and maintaining NIDCAP⁽⁶⁾

– It is recommended that NIDCAP be implemented incrementally over a period of 5 years^(3, 6)

– NIDCAP requires education and training of NICU staff prior to implementation as well as regular follow-up education offerings^(3, 6)

• While the evidence supporting NIDCAP is limited, studies have shown that NIDCAP⁽⁶⁾

– results in a decreased need for infant respiratory support, reducing the risk of lung complications⁽⁶⁾

– results in an increased ability of premature infants to interact with their parents, enhancing parent and child bonding⁽⁶⁾

– results in improved neurodevelopmental outcomes in infants at 9 months of age compared to age-matched infants who did not experience NIDCAP⁽³⁾

– has been linked to positive cognitive and psychomotor development during infancy and normal development and behavior at 5.5 years of age⁽⁶⁾

▶ It is estimated that 64% of NICUs in the U.S. practice a form of DC and approximately 24% are planning to implement DC in the near future⁽²⁾

• Despite the benefits of DC, some institutions have yet to adopt the model⁽¹⁾

• Utilization of DC has varied among institutions that have adopted it, in both the implementation process and the overall interpretation of the DC model⁽¹⁾

What We Can Do

▶ Become knowledgeable about DC of the newborn and the impact of the NICU environment on the neurologic and neurobehavioral development of infants so you can accurately assess your patients’ personal characteristics and health education needs; share this information with your colleagues⁽⁵⁾

▶ Participate in initial training and ongoing educational offerings related to DC if available at your facility⁽³⁾

▶ Provide DC based on current evidence and individualized care plans to infants in the NICU⁽¹⁾

• Recognize each infant in the NICU as a unique individual requiring individualized care⁽⁵⁾

• Promote family participation in the care of infants in the NICU and assist families in nurturing infants according to their individual level of neurologic development^(1, 3)

• Create an environment that is appropriate for each infant’s level of development that supports parental involvement in care⁽³⁾

▶ Participate in multidisciplinary care rounds and provide care recommendations to support each infant’s identified developmental level⁽³⁾

Note

Recent review of the literature has found no updated research evidence on this topic since previous publication on December 17, 2010.

Coding Matrix

References are rated in order of strength:

- M** Published meta-analysis
- SR** Published systematic or integrative literature review
- RCT** Published research (randomized controlled trial)
 - R** Published research (**not** randomized controlled trial)
 - C** Case histories, case studies
 - G** Published guidelines
- RV** Published review of the literature
- RU** Published research utilization report
- QI** Published quality improvement report
 - L** Legislation
- PGR** Published government report
- PFR** Published funded report
- PP** Policies, procedures, protocols
 - X** Practice exemplars, stories, opinions
- GI** General or background information/texts/reports
- U** Unpublished research, reviews, poster presentations or other such materials
- CP** Conference proceedings, abstracts, presentations

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