National Association of Neonatal Nurses

Age-Appropriate Care of the Premature and Critically Ill Hospitalized Infant

Guideline for Practice

National Association of Neonatal Nurses
4700 W. Lake Avenue • Glenview, IL 60025-1485
www.nann.org

Publisher's note. The National Association of Neonatal Nurses (NANN), the author, and the editors neither represent nor guarantee that the content will, if followed, ensure the delivery of safe and effective patient care. NANN assumes no liability or responsibility in connection with the content. The content reflects NANN's judgment regarding the state of general knowledge and practice in this field as of the date of publication and is subject to change on the basis of the availability of new scientific information. The content is not intended to be a substitute for professional medical judgment, diagnosis, or treatment.

The content of *Age-Appropriate Care of the Premature and Critically Ill Hospitalized Infant: Guideline for Practice* is to be used only for individual review and study. For any other use, written permission to use or reprint the content must be obtained. All requests for such use must be made in writing and addressed to the National Association of Neonatal Nurses, 4700 W. Lake Avenue, Glenview, IL 60025.

National Association of Neonatal Nurses

4700 W. Lake Avenue, Glenview, IL 60025-1485
800.451.3795 • 847.375.3660 • Fax 866.927.5321
www.nann.org

Contents

Abstract

The provision of patient-centered care is a universally acknowledged practice expectation in the delivery of high-quality health care. The five primary drivers of an exceptional inpatient experience for patients and families include commitment of leadership, engagement of the hearts and minds of staff, respectful partnerships, reliable care, and evidence-based care.[1] These drivers are embodied in the five core measures for age-appropriate care (also known as developmental care): protected sleep, pain and stress assessment and management, attention to age-appropriate activities of daily living, family-centered care, and the healing environment. Linking age-appropriate care practices with the Joint Commission's standards and elements of performance related to effective communication, cultural competence, and patient-centered care legitimizes and mandates this practice model and provides a framework for the consistent and reliable delivery of age-appropriate care.[2]

Focus

This guideline focuses on the care of all premature and critically ill hospitalized newborns, regardless of their specific disease.

Developers

The developer of this guideline is Mary E. Coughlin, MS APN, of Caring Essentials Collaborative, Inc. The guideline is based on earlier work done in partnership with Sharyn Gibbins, PhD RN, and Steven B. Hoath, MD. None of the contributors has a conflict of interest.

Funding Source or Sponsor

National Association of Neonatal Nurses (NANN)

External Reviewers

Sharyn Gibbins, PhD RN, Credit Valley Hospital, Mississauga, ON, Canada
Steven B. Hoath, MD, Cincinnati Children's Hospital Medical Center, Cincinnati, OH
Sue Ludwig, OTR/L, National Association of Neonatal Therapists, Cincinnati, OH

The editorial board of the *Journal of Advanced Nursing* and its peer review panel provided a rigorous review of the content on age-appropriate care that appeared in a 2009 article by Mary E. Coughlin, Sharyn Gibbins, and Steven B. Hoath, "Core Measures for Developmentally Supportive Care in Neonatal Intensive Care Units: Theory, Precedence, and Practice."[3]

In addition, NANN reviewed and published the work that outlines the core measures for age-appropriate care used in this guideline: "Quality Indicators: Using the Universe of Developmental Care Model as an Exemplar for Change."[4]

Objective

To provide an evidence-based clinical guideline for the consistent provision of age-appropriate care to the premature and critically ill hospitalized infant.

Users and Setting

Intended users of this guideline include all providers of direct and indirect care in the neonatal intensive care unit (NICU) setting.

Target Population

The guideline's recommendations are intended for the population of all patients in the NICU setting, including, but not limited to, inpatients, triage patients, and patients in a rooming-in scenario.

Evidence Collection Methods

A comprehensive electronic search of articles published between 1978 and 2008 was conducted in Medline, Cumulative Index to Nursing and Allied Health Literature (CINAHL), EMBASE, and PsycINFO using the terms *developmental care, developmentally supportive care, caring,* and *infant*. Articles were selected for inclusion if they identified specific interventions within the five core measures that improved short- or long-term morbidity outcomes.

Recommendations and Grading Criteria

The following grading system was employed to rate the quality and strength of the evidence to support the practice recommendations.

Rating System for the Hierarchy of Evidence

Level I: Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials (RCTs) or evidence-based clinical practice guidelines based on systematic reviews of RCTs
Level II: Evidence obtained from at least one well-designed RCT
Level III: Evidence obtained from well-designed controlled trials without randomization
Level IV: Evidence from well-designed case-control and cohort studies
Level V: Evidence from systematic reviews of descriptive and qualitative studies
Level VI: Evidence from a single descriptive or qualitative study
Level VII: Evidence from the opinion of authorities or reports of expert committees

Adapted from *Evidence-Based Practice in Nursing and Healthcare: A Guide to Best Practice* (2nd ed., p. 12), by B. M. Melnyk & E. Fineout-Overholt, 2010, Philadelphia: Lippincott Williams and Wilkins. Copyright 2010 by Lippincott Williams and Wilkins (http://www.lww.com/). Reprinted with permission of Lippincott Williams and Wilkins and the McGraw-Hill Companies.

Method for Synthesizing Evidence

The quality of evidence was evaluated by three independent reviewers using a predetermined structured format. Systematic reviews and RCTs were considered the strongest level of evidence. When these were not available, cohort studies, case-controlled studies, consensus statements, and studies using qualitative methods were considered the strongest level of evidence for a particular phenomenon of interest.

Prerelease Review

Review was provided during presentations of the material in three settings: at the 23rd Symposium on Neonatal Intensive Care in Milan, Italy (2008);[5] the 23rd Annual Gravens Conference on the Physical and Developmental Environment of the High-Risk Infant in Clearwater Beach, FL (2010);[6] and the International Forum on Quality and Safety in Healthcare in Amsterdam, The Netherlands (2011).[7]

Definitions

The *core measures* for the provision of age-appropriate care of the premature and critically ill hospitalized infant are (1) protected sleep, (2) pain and stress assessment and management, (3) attention to age-appropriate activities of daily living, (4) family-centered care, and (5) the healing environment.

Age-appropriate activities of daily living include supportive positioning, infant-oriented feeding interventions, and skin care.

The *healing environment* includes the physical surroundings, the human participants, and the organizational system.

Recommendations and Rationale

The use of age-appropriate care as an organized framework for care delivery in the NICU is founded on the work of Heidelise Als, PhD, and her synactive theory of development.[8] This theoretical construct has recently been advanced by the work of Gibbins and colleagues[9] with the "universe of developmental care" conceptual model and operationalized in two independent projects using the core measures for age-appropriate care.[4,7] On the basis of the results of the pilot work, core measures for age-appropriate care are recommended in this guideline as best-practice standards for the provision of high-quality care in the NICU.

In alignment with the Joint Commission's requirement for healthcare professionals to provide age-specific care across the lifespan,[2] the core measures for developmental care suggest the necessary competencies for those caring for the premature and critically ill hospitalized infant.

Practice Recommendation		Level of Evidence	Reference(s)
1. The infant's sleep is protected. **Rationale**: Sleep plays a critical role in synaptic development, learning, and memory.	The infant's sleep-wake states are assessed and documented and guide all interactions with the infant.	I II III	10 11, 12, 13, 14 15
	Care strategies that support sleep are individualized for each infant and documented.	I III	16, 17, 18, 19 20
	Families are educated on the importance of sleep safety in the hospital and the home; this education is documented.	II III	12 14, 21
2. The infant's stress and pain are assessed and managed. **Rationale**: Investigations into neonatal pain suggest an increased vulnerability to pain and stress in preterm infants, with long-term psychological, behavioral, and physiological sequelae.	Assessments of pain and stress are routinely performed and documented by all direct care providers.	I II	22 23, 24
	Pain and stress are managed before, during, and after all procedures until the infant returns to the baseline state; interventions and infant responses are documented.	I II	22 23, 24
	Family members are informed about and involved in the pain and stress management plan of care for their infant; information sharing and involvement are documented.	III	25
3. Attention is given to ensuring the provision of age-appropriate activities of daily living (positioning, feeding, skin care). **Rationale**: Positioning, handling, feeding, and routine caregiving affect physiological variables, sleep, joint and functional mobility, neurodevelopment, and sensory processing.	Infant positioning ensures comfort, safety, physiologic stability, and support for optimal neuromotor development.	I III	26, 27 28
	Feeding interactions are infant-driven, individualized, nurturing, and developmentally appropriate to ensure safety.	I II	29 30, 31, 32
	The integrity of the infant's skin and mucous membranes is assessed and protected; care findings and strategies are documented.	I II	33 34, 35, 36
4. Family-centered care is provided to the infant's family. **Rationale**: The role of the family in the life of the hospitalized infant is irreplaceable and has an impact on lifelong physiological and psychological events.	The family (as defined by the infant's parents or guardians) has unrestricted 24-hour access to the infant and is provided the opportunity to parent and participate in care; the definition of the infant's family and their participation in care are documented.	II III	37, 38 39
	The level of the family's emotional well-being, parental confidence, and competence is assessed and documented weekly.	I	40, 41, 42
	The family has access to resources and support services that assist in short-term and long-term parenting, decision making, and parental well-being.	II	43, 44
5. A healing environment is provided. **Rationale**: The whole environment, which includes the physical surroundings, the human participants, and the organizational system, influences the quality and consistency of care.	A quiet, softly lit, private environment that promotes safety and sleep is ensured.	II	45, 46
	A collaborative healthcare team that emanates a spirit of teamwork, mindfulness, and caring is in place.	II III	47, 48, 49 50
	Evidence-based policies, procedures, and resources are available to sustain the healing environment over time.	II	51

Patients' Preferences

Because this guideline is grounded on patient-centeredness, patient preference is determined by the responses of individual infants to the care they are given.

Potential Benefits and Harms

The anticipated benefits in the consistent implementation of this guideline across all care providers, as demonstrated in the two pilot projects, include a reduction in key neonatal morbidities (intracranial hemorrhage and gastroesophageal reflux), an increase in patient weight gain over the hospital stay, an enhanced level of professional satisfaction in both nurses and physicians, and an improved efficiency in care delivery.[4,7]

Algorithm

Not applicable

Implementation Considerations

Anticipated barriers to implementation include the absence of an effective process for practice improvement. In order for the full benefits of this guideline to be experienced, these recommended caring interactions must be a standard of practice for all direct and indirect care providers.[52] With the use of the model for improvement and test-of-change methodology, this guideline's evidence-based recommendations can become the standard of practice. Organizational commitment to a culture of safety and high-quality patient care is critical to achieve buy-in and subsequent consistent and reliable provision of the care described in this guideline.

Outcome Review Criteria

Review criteria for measuring change are given in the 2010 work of Gibbins and colleagues.[4]

Update Plan

The core measures for age-appropriate care of the premature and critically ill hospitalized infant are scheduled for review in 2014.

References

1. Balik B, Conway J, Zipperer L, Watson J. Achieving an exceptional patient and family experience of inpatient hospital care. IHI Innovation Series white paper. Cambridge, MA: Institute for Healthcare Improvement; 2011. Available from: www.IHI.org.
2. Joint Commission. The Joint Commission 2009 requirements related to the provision of culturally competent patient-centered care: Critical access hospitals (CAH). 2009 [cited 2011 May 22]. Available from: www.jointcommission.org/assets/1/6/2009_CLASRelatedStandardsCAH.pdf.
3. Coughlin M, Gibbins S, Hoath S. Core measures for developmentally supportive care in neonatal intensive care units: theory, precedence, and practice. J Adv Nurs. 2009 Oct;65(10):2239-48.
4. Gibbins S, Coughlin M, Hoath S. Quality indicators: using the universe of developmental care model as an exemplar for change. In: Kenner C, McGrath J, editors. Developmental care of newborns and infants: a guide for health professionals. 2nd ed. Glenview (IL): National Association of Neonatal Nurses; 2010. p. 43-59.
5. Coughlin M., Gibbins S. Core measures as quality indicators for developmentally supportive care: interventions and outcomes. Paper presented at: 23rd Symposium on Neonatal Intensive Care; 2008 Oct 18-19; Milan, Italy.
6. Maton P, Malcorps A, Marguglio A, Marion W, Langhendries J-P, Jonlet M-H, et al. Developmental care upgrade in a single European institution using a standardized team approach: clinical outcomes at discharge. Poster session presented at: 23rd Annual Gravens Conference on the Physical and Developmental Environment of the High-Risk Infant; 2010 Feb 3-6; Clearwater Beach, FL.
7. Coughlin M, Guyomard F, Gibbins S. Core measures for quality caring in the neonatal intensive care unit. Poster session presented at: International Forum on Quality and Safety in Healthcare; 2011 Apr 5-8; Amsterdam, The Netherlands.
8. Als H. Toward a synactive theory of development: promise for the assessment and support of infant individuality. Infant Ment Health J. 1982 Winter;3(4):229-43.
9. Gibbins S, Hoath S, Coughlin M, Gibbins A, Franck L. The universe of developmental care: a new conceptual model for application in the neonatal intensive care unit. Adv Neonatal Care. 2008 June;8(3):141-7.
10. Grigg-Damberger M, Gozal D, Marcus CL, Quan SF, Rosen CL, Chervin RD, et al. The visual scoring of sleep and arousal in infants and children. J Clin Sleep Med. 2007 March 15;3(2):201-40.
11. Holditch-Davis D, Brandon DH, Schwartz T. Development of behaviors in preterm infants: relation to sleeping and waking. Nurs Res. 2003 Sep-Oct;52(5):307-17.
12. Scher MS. Ontogeny of EEG-sleep from neonatal through infancy periods. Sleep Med. 2008 Aug;9(6):615-36.
13. Schwichtenberg AJM, Poehlmann J. A transactional model of sleep-wake regulation in infants born preterm or low birthweight. J Pediatr Psychol. 2008 Sep;34(8):837-49.
14. Sung M, Adamson TM, Horne RS. Validation of actigraphy for determining sleep and wake in preterm infants. Acta Paediatr. 2009;98(1):52-7.
15. Periano PD, Algarin CR. Sleep in brain development. Biol Res. 2007;40(4):471-8.
16. Feldman R, Weller A, Sirota L, Eidelman AI. Skin-to-skin contact (kangaroo care) promotes self regulation in premature infants: sleep-wake cyclicity, arousal modulation, and sustained exploration. Dev Psychol. 2002 Mar;38(2):194-207.
17. Jarus T, Bart O, Rabinovich G, Sadeh A, Bloch L, Dolfin T, et al. Effects of prone and supine positions on sleep state and stress responses in preterm infants. Infant Behav Dev. 2011;34(2):257-63.
18. Ludington-Hoe SM, Johnson MW, Morgan K, Lewis T, Gutman J, Wilson D, et al. Neurophysiologic assessment of neonatal sleep organization: preliminary results of a randomized, controlled trial of skin contact with preterm infants. Pediatrics. 2006 May;117(5):e909-23.
19. Scher MS, Ludington-Hoe S, Kaffashi F, Johnson MW, Holditch-Davis D, Loparo K. Neurophysiologic assessment of brain maturation after a trial of skin-to-skin contact on preterm infants. Clin Neurophysiol. 2009 Oct;120(10):1812-18.
20. Vignochi CM, Teixeira PP, Nader SS. Effect of aquatic physical therapy on pain and state of sleep and wakefulness among stable preterm newborns in neonatal intensive care units. Rev Bras Fisioter. 2010 June;14(3):214-20.
21. Esposito L, Hegyi T, Ostfeld BM. Educating parents about the risk factors of sudden infant death syndrome: the role of neonatal intensive care unit and well baby nursery nurses. J Perinat Neonatal Nurs. 2007 Apr-Jun;21(2):158-64.
22. Anand KJS, Aranda JV, Berde CB, Buckman S, Capparelli EV, Carlo W, et al. Summary proceedings from the neonatal pain-control group. Pediatrics. 2006 Mar;117(3 Pt 2):S9-22.
23. Sharek PJ, Powers R, Koehn A, Anand KJS. Evaluation and development of potentially better practices to improve pain management in neonates. Pediatrics. 2006 Nov;118 Suppl 2:S78-86.
24. Stevens B, Gibbins S. Clinical utility and clinical significance in the assessment and management of pain in vulnerable infants. Clin Perinatol. 2002 Sep;29(3):459-68.
25. Franck LS, Cox S, Allen A, Winter I. Parental concern and distress about infant pain. Arch Dis Child Fetal Neonatal Ed. 2004 Jan;89(1):F71-5.
26. Monterosso L, Kristianson L, Cole J. Neuromotor development and the physiologic effects of positioning in very low birth weight infants. J Obstet Gynecol Neonatal Nurs. 2002 Mar-Apr;31(2):138-46.
27. Vaivre-Douret L, Ennouri K, Jrad I, Garrec C, Papiernik E. Effect of positioning on the incidence of abnormalities of muscle tone in low-risk, preterm infants. Eur J Paediatr Neurol. 2004;8(1):21-34.
28. Sweeney JK, Gutierrez T. Musculoskeletal implications of infant positioning in the NICU. J Perinat Neonatal Nurs. 2002 Jun;16(1):58-70.
29. Kristoffersen L, Skogvoll E, Hafstrom M. Pain reduction on insertion of a feeding tube in preterm infants: a randomized controlled trial. Pediatrics. 2011 Jun;127(6):e1449-54.
30. Barlow SM. Oral and respiratory control for preterm feeding. Curr Opin Otolaryngol Head Neck Surg. 2009 Jun;17(3):179-86.
31. McCain GC. An evidence-based guideline for introducing oral feedings to healthy preterm infants. Neonatal Netw. 2003 Sep-Oct;22(5):45-50.
32. Thoyre SM, Shaker CS, Pridham KF. The early feeding skills assessment for preterm infants. Neonatal Netw. 2005 May-Jun;24(3):7-16.
33. Visscher M, Odio M, Taylor T, White T, Sargent S, Sluder L, et al. Skin care in the NICU patient: effects of wipes versus cloth and water on stratum corneum integrity. Neonatology. 2009;96(4):226-34. Epub 2009 Apr 29.
34. Afsar FS. Skin care for preterm and term neonates. Clin Exp Dermatol. 2009 Dec;34(8):855-58.

35. Curley MAQ, Rasmus IS, Roberts KE, Wypij D. Predicting pressure ulcer risk in pediatric patients: the Braden Q scale. Nurs Res. 2003 Jan-Feb;52(1):22-33.
36. Lund CH, Osborne JW, Kuller J, Lane AT, Lott JW, Raines DA. Neonatal skin care: clinical outcomes of the AWHONN/NANN evidence-based clinical practice guideline. J Obstet Gynecol Neonatal Nurs. 2001 Jan-Feb;30(1):41-51.
37. Griffin T. Family-centered care in the NICU. J Perinat Neonatal Nurs 2006 Jan-Mar;20(1):98-102.
38. Nibert L, Ondrejka D. Family presence during pediatric resuscitation: an integrative review for evidence-based practice. J Pediatr Nurs. 2005 Apr;20(2):145-47.
39. Malusky SK. A concept analysis of family-centered care in the NICU. Neonatal Netw. 2005 Nov-Dec;24(6):25-32.
40. Correia LL, Linhares MB. Maternal anxiety in the pre- and postnatal period: a literature review. Rev Lat Am Enfermagem. 2007 Jul-Aug;15(4):677-83.
41. Kaaresen PI, Ronning JA, Ulvund SE, Dahl LB. A randomized controlled trial of the effectiveness of an early-intervention program in reducing parenting stress after preterm birth. Pediatrics. 2006 Jul;118(1):e9-19.
42. Lefkowitz DS, Baxt C, Evans JR. Prevalence and correlates of posttraumatic stress and postpartum depression in parents of infants in the neonatal intensive care unit (NICU). J Clin Psychol Med Settings. 2010 Sep;17(3):230-7.
43. Doucette J, Pinelli J. The effects of family resources, coping, and strains on family adjustment 18 to 24 months after the NICU experience. Adv Neonatal Care. 2004 Apr;4(2):92-104.
44. Johnson BH, Abraham MR, Parrish RN. Designing the neonatal intensive care unit for optimal family involvement. Clin Perinatol. 2004 Jun;31(2):353-82.
45. Laudert S, Liu WF, Blackington S, Perkins B, Martin S, Macmillan-York E, et al. Implementing potentially better practices to support the neurodevelopment of infants in the NICU. J Perinatol. 2007 Dec;27 Suppl 2:S75-93.
46. White RD. Recommended standards for the newborn ICU. J Perinatol. 2007 Dec;27 Suppl 2:S4-S19.
47. Ohlinger J, Brown MS, Laudert S, Swanson S, Fofah O. Development of potentially better practices for the neonatal intensive care unit as a culture of collaboration: communication, accountability, respect, and empowerment. Pediatrics. 2003 Apr;111(4 Pt 2):e471-81.
48. Brown MS, Ohlinger J, Rusk C, Delmore P, Ittmann P. Implementing potentially better practices for multidisciplinary team building: creating a neonatal intensive care unit culture of collaboration. Pediatrics. 2003 Apr;111(4 Pt 2):e482-8.
49. Findlay B, Verhoef M. Operationalizing the concept of the optimal healing environment in clinical settings: the importance of "readiness." J Altern Complement Med. 2004;10 Suppl 1:S121-6.
50. Schmidt S. Mindfulness and healing intention: concepts, practice, and research evaluation. J Altern Complement Med. 2004;10 Suppl 1:S7-14.
51. Johnson CE, Handberg E, Dobalian A, Gurol N, Pearson V. Improving perinatal and neonatal safety: the AHRQ patient safety indicators. J Perinat Neonatal Nurs. 2005 Jan-Mar;19(1):15-23.
52. Ludwig S, Waitzman KA. Changing feeding documentation to reflect infant-driven feeding practices. Newborn Infant Nurs Rev. 2007;7:155-60.

National Association of Neonatal Nurses

4700 W. Lake Avenue, Glenview, IL 60025-1485
800.451.3795 • 847.375.3660 • Fax 866.927.5321
www.nann.org