Scope of Neonatal Nursing Practice

DEFINITION AND OVERVIEW OF PROFESSIONAL NEONATAL NURSING

Neonatal nursing is the specialized practice of caring for the neonate, infant, and family from birth and initial hospitalization through discharge and early follow-up care. This highly specialized nursing practice includes caring for infants who are born prematurely and those born at term or beyond who are experiencing illness or complications such as birth defects, infection, cardiac malformations, and surgical problems. Although the neonatal period is defined as the first month of life, these newborns are often hospitalized for months. Therefore, neonatal nursing encompasses care of infants who may experience long-term complications related to their prematurity or complications and illness [National Association of Neonatal Nursing (NANN), n.d.]. Neonatal nursing practice may also include care of the well newborn.

Medical and technological breakthroughs have expanded the ability to save extremely small and premature infants as well as profoundly ill infants, which has increased the survival rates to 10 times better than they were 15 years ago (NANN, n.d.). With these innovations and practice changes, the nursing care needs of this population have grown. As a result, nurses who specialize in neonatal nursing may take care of infants up to 2 years of age (NANN, n.d.).

The population served by the neonatal registered nurse is diverse and increasing in numbers. According to the Centers for Disease Control and Prevention (CDC), preterm birth rates have increased for the past 3 years with 1 in 10 infants being born prematurely. Additionally, 8.3% of infants are born with low birth weight in the United States (Martin, Hamilton, Osterman, Driscoll, & Drake, 2018). The U.S. Department of Health and Human Services reported that in 2018, 4% of all births required assisted

ventilation immediately after birth, and of those, 34% required assisted ventilation for more than 6 h after delivery.

The most current data from 2017 reported that infant mortality was 5.8 infants per 1,000 live births, and the leading cause of death was congenital malformations, which accounted for 20.5% of all deaths. The second leading cause of death was disorders related to prematurity and low birth weight, which accounted for an additional 17% of all patient deaths (Murphy, Xu, Kochanek, & Arias, 2018).

Neonatal care in the developed world tends to focus on highly technological solutions to reduce infant mortality. In the developing world, infant mortality is an enormous problem. In 2017, 4.1 million infants died before the age of 1 year, which accounts for 75% of all deaths in children under 5 years of age (World Health Organization, 2019a). The direct causes of death and disability vary considerably throughout the world, as do the causes of low birth weight and prematurity. The challenge in taking care of the newborn lies in the allocation of resources available in these countries (World Health Organization, 2019a). Neonatal nurses practicing in these areas face the challenge of providing lifesaving care with limited resources in the context of difficult social and governmental structures.

The numbers of critically ill infants surviving to discharge have increased, while the age of viability has decreased. As a result, the specialty has evolved to encompass the care of convalescing or fragile infants up to 2 years of age. The neonatal registered nurse recognizes and respects each infant as a unique, individual human being. The nurse assists the family's adaptation to a new, highly technical environment while encouraging attachment to, and bonding with, the newborn. The neonatal registered nurse recognizes the family's attachment as crucial for the infant's physical, psychological, and emotional well-being (Carter, Gratny, & Carter, 2016). The neonatal registered nurse strives to empower the family through education, practice, and competence in caring for the newborn. This is achieved through promoting family-focused care; assisting parents with adapting to, and gaining meaning from, the neonatal experience; and fostering their independence in assuming care of the neonate or infant. This process begins at the time of birth when the parents are

taught developmentally and physiologically appropriate handling. As the infant's physiologic status improves and the infant matures, the family is encouraged to continually participate in the infant's care until they reach the competence level to provide care upon discharge.

This document is intended to identify some of the issues and trends that have an impact on the practice of professional neonatal nursing. It is not intended to restrict role development and nursing practice, but rather to frame and clarify the scope and foundation of the work of professional neonatal nurses at all levels of neonatal practice. It is intended to be used in conjunction with the *Code of Ethics for Nurses with Interpretive Statements* [American Nurses Association (ANA), 2015a], *Nursing's Social Policy Statement: The Essence of the Profession* (ANA, 2010), and *Nursing: Scope and Standards of Practice, Third Edition* (ANA, 2015b).

The scope of neonatal nursing practice describes the "who," "what," "where," "why," "when," and "how" of nursing practice within this specialty area. These descriptors create a complete picture of the dynamic and complex practice of neonatal nursing. The total scope of neonatal nursing practice that an individual nurse engages in is influenced by education, experience, role, and population served (ANA, 2015b).

HISTORY OF NEONATAL NURSING

The roots of neonatal nursing are in the care of mothers and babies throughout history. Midwives and experienced female elders have cared for women through pregnancy, delivery, and shortly after delivery for centuries. However, the focus of their care was clearly on the woman, and infant mortality was very high. Modern neonatal nursing as a subspecialty began with the invention of the incubator in 1878 by the French obstetrician Étienne Tarnier. In 1884, Tarnier also invented a small tube for the administration of gavage feedings (Raju, 2019). These two interventions revolutionized the care of sick and preterm infants. Two decades later, "premature baby shows" began in Europe and the United States. These shows were quite successful and eventually led to the establishment of a Premature Infant Station at Michael Reese Medical Center in Chicago in 1914. This unit was run by Julian Hess, a pediatrician, and Evelyn Lundeen, the Head Nurse. They

achieved unparalleled survival rates, in part because of rigorous attention to details related to environmental control, asepsis, and feeding (Raju, 2019). These facets of care—thermoregulation, infection control, and nutrition—underpin the care neonatal nurses provide today.

As the 20th century unfolded, the options available for care of newborns expanded. Blood transfusions, intravenous fluids, and ventilators all became commonplace. In 1950, the first federal grant funding the Premature Institute program was allocated to train hospitals in caring for this group of infants. Despite this, in 1963, President John Kennedy's newborn son, who was born at 4 lbs 10 oz and 34 weeks gestation, died of respiratory distress syndrome. He was 39 hours old ("The presidency," 1963). This family tragedy was widely reported and illustrated to the public that tremendous work in the field remained to be done. This event led to the first American neonatal intensive care unit (NICU) opening at Yale in 1965 and nurses actually being trained to care for premature and ill neonates.

In the ensuing years, basic research into the physiology of the premature infant has led to an explosion of drugs, devices, and therapies for the tiniest and most premature of infants. As these treatment options became prevalent and survival of smaller and sicker infants became common, neonatal nurses developed innovative methods of improving infant outcomes. Developmental care and skin-to-skin care have become essential components of the nursing care provided to these infants. Nurses have been instrumental in developing methods to assess and treat pain in the infant. The modern NICU employs evidence-based nursing and medical care in a collaborative manner.

UNDERLYING ASSUMPTIONS OF NEONATAL NURSING

The following assumptions were made in the development of *Neonatal Nursing: Scope and Standards of Practice:*

- The standards focus primarily on the process of providing nursing care to newborns or infants and their families.
- The nurse recognizes that the family is the integral unit for care.

- Nursing care is individualized to meet the unique needs of each newborn or infant and family.
- The nurse considers and respects the family's goals and preferences when developing and implementing a plan of care.

The nurse adheres to the American Nurses Association *Code of Ethics for Nurses With Interpretive Statements* (ANA, 2015a):

- The nurse respects culture and diversity in all aspects of newborn or infant and family care and administers nursing care accordingly.
- The nurse respects the privacy rights of the newborn or infant and family and manages all information accordingly.
- The nurse provides information to the family so informed decisions can be made regarding the care of the newborn or infant and family.
- The nurse functions within the Nurse Practice Act of the state and the established policies and procedures as described by the healthcare institution in which the nurse is practicing.
- The nurse works in coordination and collaboration with other healthcare providers to render care to the newborn or infant and family.
- The nurse strives to provide the highest quality of care while utilizing available resources.
- The nurse strives to promote optimal outcomes within the confines of current practice standards.
- The nurse strives to ensure use of evidence-based care when possible and advocates for research in areas lacking evidence to support practice.

PRACTICE CHARACTERISTICS OF NEONATAL NURSING

The unique physiology of the neonate and the care of their family are the foundation upon which neonatal nursing is based. Neonatal registered

nurses understand the complex conditions and disease processes affecting a patient population that includes those born at a range of gestational ages. The transition to extrauterine life is a unique period of rapid physiologic change, found only in this age group. The newborn infant's ability to accomplish the complicated task of transition to extrauterine life is influenced by gestational age, presence of physical defects, perinatal risks such as chronic maternal illness or drug exposure, infection, and other factors. Infants who have required intensive neonatal support for early illness or prematurity are at additional risk for long-term complications such as chronic lung disease, impaired growth, and poor neurodevelopmental outcomes. The interplay between the infant's relative immaturity, genetic background, and the complications associated with lifesaving treatment modalities can produce physiologic changes that are unique to this population.

Neonatal nurses are aware of the potential effects of maternal health on the developing human and evaluate the infant for subtle signs of these complications in an attempt to ameliorate these problems. Maternal health and disease can have profound effects on the developing fetus. Placental function influences growth and development both in utero and after birth. Placental dysfunction can produce a myriad of effects in the infant, which can, in turn, produce significant complications, both short term and long term. A growing body of evidence shows that adult diseases can have their origins in fetal pathology (Devaskar & Calkins, 2020).

These neonatal and maternal factors require a skill set that is highly specialized and includes a high level of vigilance with attention to detail. In caring for newborn infants, the neonatal registered nurse recognizes the importance of holistic care and supports the family's adaptive coping skills in this setting. The following framework provides details related to the specific characteristics that reflect the unique skill set of neonatal nursing.

CONTINUOUS ASSESSMENT

The critical care skills of continuous assessment and response to findings are employed from the time of birth throughout the infant's

convalescence. Vigilance for the infant, as reflected by continuous assessment and monitoring, is a vital skill of the neonatal registered nurse. Detection of subtle changes in the infant's physiologic status and communication of these changes to the appropriate interprofessional team members, including physicians; advanced practice registered nurses; case managers; laboratory technicians; occupational, physical, and respiratory therapists; nutritionists; social workers; and child-life specialists, is an essential role of the neonatal registered nurse. For instance, early identification of the subtle symptoms of hypothermia or of increased apnea, bradycardia, and lethargy in a previously stable infant can lead to the early identification of sepsis in this population. This continuous assessment is vital for the well term neonate who is transitioning to extrauterine life as it is for the preterm or ill neonate and infant.

The goal is to provide safe, timely, and comprehensive intervention and care for the fragile newborn and family, within the context of larger systems and environments. The neonatal registered nurse utilizes a variety of both pharmacologic and nonpharmacologic measures for the treatment of pain (Walden & Spruill, 2020). The neonatal registered nurse is a leader in the continuous assessment of pain and the development of individualized care plans to prevent suffering through the management of the infant's discomfort.

DEVELOPMENTAL CARE

The neonatal registered nurse provides care for medically fragile infants who are physiologically and developmentally premature. Infants in neonatal care units face the dual challenge of meeting appropriate developmental milestones and enduring a period of critical illness. The neonatal registered nurse provides a therapeutic environment that utilizes evidence-based practices favoring optimal developmental outcomes and supporting physiologic stability.

Ultimately, the goal is to maximize outcomes while supporting the infant's development, thereby enhancing the infant's growth and neurodevelopmental potential (Silva, Linares, & Gaspardo, 2018). Understanding and allowing for wake–sleep cycles, circadian rhythms, and

appropriate sensory experiences also foster homeostasis (Gardner, Goldson, & Hernandez, 2016). Sleep plays a critical role in the development of synapses, in learning, and in memory. The protection of sleep is fundamental to the care provided (Gardner, Goldson, & Hernandez, 2018). The neonatal registered nurse utilizes knowledge of the dynamic relationship between innate behaviors and the environment to shape the care that is provided. Assessment of both physiologic and behavioral cues from the infant drives the creation of developmentally supportive care, which decreases the stress experienced by the infant (Silva, Linhares, & Gaspardo, 2018).

HEALTH PROMOTION

In planning and providing care, the neonatal registered nurse considers all aspects of the infant's health, including preventive health care, growth, and anticipatory guidance. The neonatal registered nurse closely assesses the infant's physiologic status, develops a specialized plan of care, and evaluates the infant's response. Activities of daily living are provided in a developmentally appropriate manner so that positioning, handling, feeding, and routine care affect the infant's physiologic status positively (Altimier & Holditch-Davis, 2020). The neonatal registered nurse devises, coordinates, and executes an individualized plan of care for the newborn, both during the period of acute illness and during convalescence, revising plans as needed and continually evaluating responses from the infant and the family (Beauman & Bowels, 2019). The neonatal registered nurse provides parents and caregivers with appropriate education and anticipatory guidance to ensure optimal care of the infant after hospital discharge (Hamline et al., 2018). Teaching families care of the high-risk or medically fragile infant is of primary importance.

ENVIRONMENT

The neonatal registered nurse recognizes the significant role that the environment plays in the health and development of the newborn. Some environmental effects, such as thermoregulation, begin within the first "golden hour" of life; others are seen throughout the infant's

hospitalization as the infant's clinical condition and environmental requirements change; and some effects may not be apparent until later in infancy and childhood. The neonatal registered nurse strives to create a healing environment for the infant that supports both physiological and neurological development and incorporates many aspects of developmental care. These may include (but are not limited to) maintaining a neutral thermal environment; providing uninterrupted sleep periods; reducing stressful and painful experiences; providing positive auditory, tactile, and other sensory experiences; and minimizing the risk of infection (Altimer & Phillips, 2019; Gardner, Goldson, & Hernandez, 2016). The neonatal registered nurse partners with families to promote positive family–infant interaction; provides opportunities for touch, holding, and skin-to-skin care; optimizes breast or bottle feeding; and encourages active participation in the infant's daily care needs. This is particularly important for families of infants who remain in the NICU for extended periods of time.

FAMILY-CENTERED CARE

Neonatal registered nurses recognize the family as an integral part of effective care delivery, and they honor and promote the partnership between families and the neonatal team. A fundamental component to family-centered care is dignity and respect for family beliefs and culture, along with the need for accurate, complete, and timely information sharing. Psychosocial support of the family is an important aspect of family-centered care. The neonatal registered nurse must be prepared to assess for and support the healthy transition into parenthood (Hall, Phillips, & Hynan, 2016). The neonatal registered nurse encourages parental presence and direct involvement in caregiving to maximize physiologic stability and developmental outcomes and prepare for discharge. Relationships between partners may deteriorate secondary to the stress of having an infant in the NICU, and the neonatal registered nurse recognizes the need for and implementation of family-centered care (Manning, 2012).

Throughout the infant's hospitalization, the family members are encouraged to increase their participation in hands-on care as appropriate

to the infant's physiologic status. The neonatal registered nurse recognizes that this evolution in parental care improves the ability of the family to confidently care for the infant as he or she transitions to home. Families are encouraged to collaborate in both individualized care of the newborn and programmatic development benefiting all neonates (Banerjee, Aloysius, Platonas, & Deierl, 2018; Maree & Downes, 2016; McGrath & Vittner, 2020). Support for families with infants in the NICU for extended periods of time should include members of the medical team such as social workers, case managers, and behavioral health professionals. Families who are separated from their neonates because of transport from outlying areas, illness, or other reasons require innovative ways to connect with their neonates. Including parents in rounds via video technology, providing virtual visitation or interaction, and frequent phone calls are ways to include parents in caring for their infant from a distance (McGrath & Vittner, 2020).

On occasion, newborns experience life-limiting conditions. Neonatal registered nurses play an essential role in the coordination of the individualized needs of the infant and family while maintaining dignity and inclusion of culturally sensitive care. The neonatal registered nurse is sensitive to optimizing opportunities for infant–family experiences in the time remaining, including, but not limited to, holding the infant, introducing the infant to the extended family, or taking the infant home with perinatal hospice support (NANN, 2015).

CULTURALLY SENSITIVE CARE

Cultural competence is the process of using effective psychomotor and cognitive skills to bridge the gaps that occur when diverse individuals interact (Heitzler, 2017). The neonatal registered nurse provides culturally sensitive care to the infant and family by acknowledging the family's unique cultural needs while caring for that infant. Culturally competent care in an increasingly diverse and multicultural society is an ongoing developmental process. Understanding the family's core cultural dynamics, the meaning of the illness, and the social context assists the neonatal registered nurse in delivering the care that the infant requires (Siegel, Voos, & Hills, 2016).

Typical healthy transitions in the family are complicated by NICU hospitalizations. Social circumstances, such as social disadvantage and multiple births, require the neonatal registered nurse to provide culturally sensitive and family-based NICU interventions (Lean, Rogers, Paul, & Gerstein, 2018). Family-focused, culturally appropriate care can eliminate potential barriers to health care for the family and is essential for the infant's well-being. Whenever feasible, the cultural practices and beliefs of the infant's family are respected and accommodated by the neonatal registered nurse and the multidisciplinary team. Examples include assisting the family to arrange for the baptism of their infant, bathing, and rituals unique to their culture (McGrath & Vittner, 2020). The neonatal nurse ensures that medical translations are available and used whenever necessary.

SPIRITUAL CARE

The neonatal registered nurse recognizes the importance of considering and supporting spiritual care to help decrease the stress experienced by families (Aldemar, Ozdemir, & Tukekci, 2017). The nurse recognizes and helps families acknowledge, address, and cope with the variety of emotions that coexist, including hope and joy, grief and loss, anger and disappointment, and helplessness and isolation. This is achieved through supporting, educating, and providing time for the neonatal registered nurse to develop meaningful relationships with families (Turner, Chur-Hansen, & Winefield, 2014).

The neonatal registered nurse understands that grieving is an individual process and occurs in stages. The neonatal registered nurse recognizes and respects religious and spiritual family practices, while conveying acceptance, openness, and availability. Hospitalization of the sick newborn is recognized as a family crisis, involving all members of the family (Aldemar, Ozdemir, & Tukekci, 2017). Protracted neonatal illness will extend the period of family stress. The neonatal registered nurse provides interventions and support for all families and pays close attention to those at risk secondary to severe disability (Dickinson, Whittingham, Sheffield, Wotherspoon, & Boyd, 2020).

Spiritual support is necessary regardless of the infant's outcome. The neonatal registered nurse assists the family and the infant at the end of life in whatever ways possible (NANN, 2015). In some instances, families may experience complicated situations in which decisions about the care of their infant are necessary. The decisions may be difficult for them to make or difficult for care providers to understand. Bereaved parents and NICU care providers benefit from structured strategies of support (Levick, Fannon, Bodemann, Munch, & Ahern, 2017).

THE CODE OF ETHICS FOR NURSES

The *Code of Ethics for Nurses With Interpretive Statements* ("The Code": ANA, 2015a) serves as the ethical framework for neonatal nurses and provides guidance for the future. The nine provisions explicate key ethical concepts and actions as well as provide a description of the professional nurse.

Provision 1. The nurse practices with compassion and respect for inherent dignity, worth, and unique attributes of every person.

> The neonatal registered nurse is an essential contributor to ethical discussions with physicians, advanced practice registered nurses, other healthcare team members, and family members. All members of the team, including the parents, work to provide care that has been determined to be in the best interests of the child and family. A shared decision-making model of communication and care for ill newborns is the model of care for ethical issues. In this model, caregivers seek to help families discern their own values and ethical commitments as they face situations that are new, unanticipated, and life altering for both themselves and their infant (Lantos, 2018).

Provision 2. The nurse's primary commitment is to the patient, whether an individual, family group, community, or population.

> The neonatal registered nurse acknowledges the parents' role as surrogate decision-maker for the infant. The neonatal registered

nurse provides the family with detailed information to enable informed decision-making and consent. Acting as an infant advocate, the neonatal registered nurse identifies potential ethical conflicts when they occur and coordinates interdisciplinary forums for discussion and resolution of these conflicts (NANN, 2016).

Provision 3. The nurse promotes, advocates for, and protects the rights, health, and safety of the patient.

Neonatal registered nurses are uniquely positioned to support families and advocate for infants when faced with ethical challenges. For example, technological advances, such as those seen in the field of Genomics, result in faster diagnoses in addition to a broad delineation of the genetic makeup of the individual tested. This may pose significant advantage to the affected individual and family but may also reveal unintended identification of other genetic problems. There may also be unintended consequences for parent–infant bonding (Gyngell et al., 2019). The neonatal registered nurse uses evidence to advocate for the infant and the family while also employing collaborative practices to ensure the rights and safety of the infant and family remain the priority.

Provision 4. The nurse has authority, accountability, and responsibility for nursing practice; makes decisions; and takes action consistent with the obligation to promote health and to provide optimal care.

The neonatal registered nurse possesses the skills to make decisions, lead interprofessional collaborations, and ensure accountability to the infants and families in their care. For example:

- *Baby Liam was born at 23 $^{2}/_{7}$ weeks gestation and has been admitted to the neonatal intensive care unit. On day of life 3, it was noted that Liam had suffered bilateral grade four intraventricular hemorrhages. He has required vasopressor*

support since the time of admission and continues to need significant ventilatory support. The neonatal registered nurse notes that Liam's parents have not been at Liam's bedside and are not able to discuss the possibility of a poor neurodevelopmental outcome for Liam. The next time Liam's parents are at the bedside, the neonatal registered nurse provides the parents time and space to be with their infant and encourages communication through active listening. Upon hearing the parents describe a deep worry about how to proceed with care for their son, the neonatal registered nurse offers to organize and attend a collaborative meeting involving other healthcare services, such as palliative and spiritual care to support the creation of a plan of care that accounts for the needs and Liam and his parents.

Provision 5. The nurse owes the same duties to self as to others, including the responsibility to promote health and safety, preserve wholeness of character and integrity, maintain competence, and continue personal and professional growth.

The neonatal nurse may be challenged with ethical issues that arise from past actions or proposed actions. Where ethical issues exist, the solution may result in moral distress for the care providers involved. The individual nurse should respond to moral distress by using available strategies to assist in approaching these situations. These same strategies can be used to assist other healthcare providers and the families who find themselves in difficult circumstances (Prentice et al., 2018).

Provision 6. The nurse, through individual and collective effort, establishes, maintains, and improves the ethical environment of the work settings and conditions of employment that are conducive to safe, quality health care.

The neonatal registered nurse works toward creating conditions that focus on safe, quality care for all infants, families, and coworkers. This includes incorporating communication standards that enable all providers and families to speak to issues of

safety or quality that are observed during their time in the NICU. The neonatal advanced practice registered nurse acts as a leader in initiating, coordinating, and implementing outcomes that come from diverse interprofessional teams addressing ethical concerns (NANN, 2017).

Provision 7. The nurse, in all roles and settings, advances the profession through research and scholarly inquiry, professional standards development, and the generation of both nursing and health policy.

The neonatal registered nurse strives for accuracy in the reporting and interpretation of scholarly inquiry and seeks publication in professional literature. Professional standards and policies are developed through open collaboration with key stakeholders, including the families, to ensure systems of shared decision-making.

Provision 8. The nurse collaborates with other health professionals and the public to protect human rights, promote health diplomacy, and reduce health disparities.

Neonatal registered nurses first acknowledge the impacts of inadequate access to prenatal care and other primary care services, as well as systems that promote and allow for structural racial discrimination on adverse birth outcomes (Yonder, Walden, & Verklan, 2010; Alhusen, Bower, Epstein, & Sharps, 2016). With this framework, neonatal registered nurses are able to apply principles of social justice to professional activities. These activities include, but are not limited to, promotion of family-centered care (Marcellus & MacKinnon, 2016), development of just perinatal toxicology screening protocols (Koshman, 2016), and creation of structural and process care delivery measurements and practices addressing racial and ethnic disparities (Sigurdson et al., 2019).

Provision 9. The profession of nursing, collectively through its professional organizations, must articulate nursing values, maintain the

integrity of the profession, and integrate principles of social justice into nursing and health policy.

A detailed description of The National Association of Neonatal Nurses' Code of Ethics is available at http://nann.org/about/code-of-ethics.

DISCHARGE PLANNING

The neonatal registered nurse plays a central role in partnering with the family and caregivers to coordinate the discharge of sick, medically fragile, or recovering full-term or preterm infants and assisting the family with the transition from the NICU to the home. Identification of the medical home should occur early in the process of discharge planning. This should begin at the time of birth or as soon after birth as is reasonable for the needs of that infant and family. The neonatal registered nurse must be knowledgeable about current evidence-based discharge practices. Discharge planning processes are standardized, and assessment of readiness for discharge is an important part of the process (Smith et al., 2013).

Quality improvement processes have been used to delineate a thorough, comprehensive process that has improved both parental and nursing staff assessment of discharge readiness (Gupta, Pursley, & Smith, 2019). The discharge process should be multidisciplinary, and utilize available community resources to ease the transition of the infant and family into the home environment and community. A comprehensive plan for discharge builds upon the partnership formed between the family and the healthcare team, making arrangements to assist the parents or caregivers in developing the ability to independently meet the infant's needs (Carter, Gratny, & Carter, 2016). In some circumstances, the family cannot meet the needs of the infant independently. When this situation arises, identification of available resources to meet the infant's care needs is part of the discharge process. This may require significant education not only for the family but also for the community partners that will assume post-discharge care of the infant.

ADVOCACY

Advocacy is an integral part of the neonatal registered nurse role. The neonatal registered nurse is uniquely positioned to assist individual families by advocating for both the family and the infant. Advocacy is a skill that relies upon the individual nurse's critical thinking and negotiation skills. The neonatal registered nurse is empowered to advocate at personal, professional, community, state, and national levels. This advocacy can take the form of advocating for an individual infant or a group of infants with similar characteristics. Additionally, advocacy may take the form of involvement in a professional organization to improve the care of infants across the country or even the world.

QUALITY ASSURANCE AND EVIDENCE-BASED PRACTICE

The neonatal registered nurse utilizes evidence-based nursing practice to provide high-quality nursing care to the infant. The neonatal registered nurse is cognizant of current practice trends and works to improve outcomes based upon accumulated research and evidence. The nurse participates in identifying potential avenues for research and quality improvement to benefit the infant and neonatal nursing care practice. The neonatal registered nurse uses nursing sensitive quality indicators (NSQI) to measure the impact their care has on patient outcomes (Mangold & Pearson, 2017).

The neonatal registered nurse synthesizes and organizes available evidence to improve care via practice bundles and clinical practice guidelines. For example, catheter-related infection, ventilator-acquired pneumonia, and intraventricular hemorrhage-reducing bundles are widespread across NICUs. The neonatal medical and nursing communities have worked collaboratively for years to ensure improved safety and outcomes. One example of this is the Vermont Oxford Network, a not-for-profit organization, formed in the late 1980s with the goal of improving the quality and safety of care for neonatal patients around the world (Edwards et al., 2019). Patient centeredness is necessary when undergoing quality assurance and evidence-based practice (Melnyk & Fineout-Overholt, 2019).

Neonatal registered nurses should seek to include families in the creation, execution, and evaluation of quality assurance and evidence-based practice.

PATIENT SAFETY

The neonatal registered nurse recognizes situations in which potential harm may befall the individual infant and acts to prevent harm or injury. The neonatal registered nurse works to identify potential and actual causes of error and to create appropriate changes in individual practice, unit culture, and larger systems of health care (Samra, McGrath, & Rollins, 2011).

Medical errors affect 1 in 10 patients worldwide (WHO, 2019b). The reports of the Institute of Medicine (IOM) on patient safety, quality, and errors have shaped nursing and medical care in the neonatal arena, just as they have throughout the rest of the healthcare community. The IOM emphasizes a patient-focused approach to care delivery as a solution to the "quality chasm" (IOM, 2001). The neonatal registered nurse is aware of the complexity of both the NICU environment and neonatal disease (Raju, Suresh, & Higgins, 2011). These complexities and potential for greater consequences from errors in the neonatal population require the neonatal registered nurse to function with attention to detail and partner with other healthcare professionals in the development of policies and procedures (Krzyzaniak & Bajorek, 2016).

The development of policies and procedures is considerably more evidence based than in the past, with the varying strengths of evidence being critically evaluated and ranked and with evidence from systematic reviews and randomized controlled clinical trials holding more weight than less well-controlled studies or expert opinion (Beauman & Bowels, 2019). In addition, systems to medication administration and prescription have become more common. These include electronic medication administration systems, physician order entry systems, manual double checking of medications prior to administration, and standardization of dosage concentrations. Specific challenges associated with neonatal medication administration have been delineated and recommendations

published by the Institute for Safe Medication Practices (Dabliz & Levine, 2012). The neonatal nurse is aware of, and employs strategies for, ensuring safe medication administration.

RESEARCH

The neonatal registered nurse recognizes the necessity of research to guide practice. The neonatal registered nurse identifies existing evidence and uses it to shape practice. The neonatal registered nurse identifies gaps in knowledge and, when possible, collaborates with nurse researchers to fill those gaps. The neonatal registered nurse critically reads and evaluates research in the literature.

Multiple roles in research for the neonatal registered nurse exist. These include consumer, participant, facilitator, and investigator (Pressler and Toly, 2020). Neonatal nursing research topics include, but are not limited to, skincare, assessment and management of pain, developmental care, skin-to-skin care, effects of the environment, and management of breastfeeding. The neonatal registered nurse identifies opportunities and barriers for the translation of research into practice.

PRACTICE ENVIRONMENTS AND LEVELS OF CARE IN NEONATAL NURSING

The neonatal registered nurse provides health care to the infant in a variety of settings, which may include the delivery room, newborn nursery, subacute care, acute care, chronic care, interhospital transport, home care, and infant follow-up clinics. In the hospital setting, neonatal units provide care at specific infant-acuity levels. These unit designations reflect the availability of personnel, physical space, equipment, technology, and organizational resources to provide care that is required for specific neonatal populations and acuity. The definitions for level designation include minimal capabilities, functional criteria, and provider type required. Determinations and definitions of level of NICU care in this document are based on the American Academy of Pediatrics (AAP) policy statement "Levels of Neonatal Care" (2012).

- Level I—In Level I care, the neonatal registered nurse directly observes the neonate during the stabilization period after birth. The nurse monitors the low-risk newborn infant's adaptation to extrauterine life and assists in the transition of the newborn to rooming-in with the mother. The nurse also cares for healthy newborns in the mother–baby unit including physiologically stable preterm infants born at 35–37 weeks gestation. The nurse in this level of care is also prepared to stabilize infants born at less than 35 weeks gestation or who are ill after delivery until transfer to a higher level of care is provided. This level of care is an essential part of mother–infant care. Neonatal advanced practice registered nurses may also play a significant role in the assessment and management of the healthy newborn, including parental teaching and discharge planning.
- Level II—In the Level II setting, often referred to as special care or transitional care, the neonatal registered nurse takes on greater responsibility for monitoring the premature newborn or the newborn who is having difficulty in adapting to extrauterine life. The neonatal registered nurse at this level cares for premature infants who are born at gestation of 32 weeks or more or who weigh 1,500 grams or more at birth with problems that are expected to resolve promptly. Full-term infants who are moderately ill or have had complications at birth are also included in the care of the neonatal registered nurse. Infants in Level II units are not expected to need urgent subspecialty care. The infants in this unit may require respiratory support (including continuous positive pressure or assisted ventilation on an interim basis until the infant's condition improves or the infant is transferred), supplemental oxygen, intravenous therapy, specialized feeding, or time to mature prior to discharge. These units must have equipment and personnel continuously available to provide ongoing care and to address emergencies. The neonatal registered nurse provides the family with discharge instruction and arranges for follow-up support when the infant is discharged to home.

- Level III—In the Level III NICU, the neonatal registered nurse cares for the acutely ill newborn during a critical period. Expert care and knowledge are required in this highly technical and challenging environment. The neonatal registered nurse provides direct care for the premature or full-term infant who requires complex care. This critical period for the infant may require intensive life-support techniques, such as mechanical ventilation, nitric oxide therapy, and high-frequency ventilation. These units have continuously available personnel and equipment to provide life support for as long as is necessary. They also have access to subspecialists either on site or via prearranged telemedicine technology or telephone consultation.
- Level IV—In addition to all the capabilities of the Level III NICU, Level IV NICUs have the added capability to care for the most complex and critically ill infant requiring surgical repair of complex conditions, including complex congenital cardiac defects. The neonatal registered nurse in these units also cares for the chronically technology-dependent infant. The nurse teaches the family how to care for the child in the home setting or aids in the transition to a rehabilitation center. Many of these Level IV NICUs are also regional perinatal centers and have the capability to provide extracorporeal membrane oxygenation (ECMO). The neonatal nurse in this setting may also be involved in facilitation and education within their referral centers.
- Delivery Room—The neonatal registered nurse is responsible for attending the birth of neonates deemed to be at high risk or at the request of the obstetrician. Education of neonatal resuscitation as outlined by the Neonatal Resuscitation Program (NRP) is essential. Every delivery should be attended by at least one individual whose sole responsibility is the care of the newborn, and this person should be skilled at initiating resuscitation. That individual or someone who is readily available should have the skills to provide a complete resuscitation, including endotracheal intubation (Wyckoff et al., 2015). Good communication between the maternal care providers and the neonatal team is essential for

determining risk factors, supporting families, and planning ongoing care.

- Transport—Access to tertiary care and both the technological support and staff expertise in these centers is made available through the efforts of transport teams composed of nursing, medical, and other health professionals who are trained in the care of neonates. The neonatal registered nurse may be responsible for transporting an infant via ground or air. For those infants born acutely ill in a location without the necessary resources, the neonatal registered nurse assists with stabilization in preparation for transport and may be a part of the transport to another care center. The neonatal transport nurse is responsible for assessment, stabilization, and continuous high-level care during the transfer to another care center. The neonatal registered nurse may also be responsible for transporting the stable newborn to the community-level hospital for convalescent care [Section on Transport Medicine American Academy of Pediatrics (AAP), Insoft, Schwartz, Romito, & Alexander, 2015].

The care of the neonatal patient is guided by the neonatal nursing standards of practice. At all care levels, the neonatal registered nurse recognizes and demonstrates the importance of their role as an infant and family advocate. All neonatal nurses require training to assess minute changes in the infant's health and to observe unspoken cues and physiologic changes that define this nursing practice. The neonatal registered nurse evaluates outcomes of the infant's care and revises the plan as necessary to promote wellness. Sick newborn infants require the attention of specialized, expert neonatal registered nurses at all care levels.

EDUCATION, CERTIFICATION, AND ROLES IN NEONATAL NURSING

Graduation from an accredited nursing program and registered nursing licensure are required for entry into the field of neonatal nursing. An individualized education and orientation program supports the registered nurse in initial practice and provides the opportunity for both

novice nurses and those who are new to the facility to work with an experienced preceptor. The professional neonatal registered nurse meets her or his ongoing learning needs through reading journals and books and completing professional development experiences, such as continuing education opportunities, attendance at conferences related to neonatal care, and involvement in a professional nursing organization pertinent to practice.

Neonatal registered nurses demonstrate accountability for maintaining excellence in practice through self-motivated learning activities as well as collaborative efforts with other nursing colleagues, organizations, and professional associations. Maintaining core competencies within an individual's role is an expectation and can be achieved through ongoing documentation of critical thinking and psychomotor skills and within role-specific domains [National Association of Neonatal Nurse Practitioners (NANNP), 2015].

Professional associations and organizations provide the opportunity to advocate for professional nursing, patients, and families at both the local and national levels. Participation in the specialty's certification process further demonstrates the nurse's commitment to expertise in neonatal nursing. Nurses who have developed expertise in neonatal nursing may test their proficiency through certification or specialization designation in several areas of neonatal nursing, including low-risk neonatal care, neonatal intensive care, and neonatal transport [American Association of Critical-Care Nurses (AACN), 2020; National Certification Corporation (NCC), 2020].

Neonatal registered nurses may seek to advance their formal education through a number of pathways, including master's, Doctor of Nursing Practice (DNP), or Doctor of Philosophy (PhD) preparation. The advanced practice neonatal nursing role requires additional formal education in neonatal care at a minimum of master's-level preparation (NANNP, 2019). The Consensus Model for APRN Regulation clearly states that to be defined as an advanced practice registered nurse (APRN), the nurse must have passed an examination that "measures APRN, role and population-focused competencies and [must maintain] continued competence as

evidenced by recertification in the role and population through the national certification program" [National Council of State Boards of Nursing (NCSBN), 2008, p. 6]. In the neonatal setting, the APRN is an expert nurse practitioner or clinical nurse specialist who collaborates with a multidisciplinary team, including neonatologists, pediatricians, nursing staff, ancillary services, and the infant's family (NANNP, 2017).

The neonatal nurse practitioner (NNP) applies nursing theory and advanced knowledge and clinical training to the management of a caseload of infants, in collaboration with the neonatologist. The NNP typically is responsible for medical and nursing management of acutely ill and convalescent infants, but may also have roles in staff development, research, and the development of standards of care. Certification as an NNP is available through the National Certification Corporation (NANNP, 2019).

The neonatal clinical nurse specialist (NCNS) provides diagnosis, treatment, and ongoing management of patients. The NCNS provides expertise and support to nurses caring for patients at the bedside, drives clinical practice changes throughout organizations, and ensures the use of best practices and evidence-based care. The NCNS has the skills and expertise to identify gaps in healthcare delivery and works to design and implement interventions to improve healthcare delivery (NACNS, 2020).

Doctorally prepared neonatal nurses may have either a PhD or a DNP. These terminal degrees allow the neonatal nurse to either focus on research utilization (DNP) or design and conduct research with a focus on the neonatal population (PhD). Both types of doctorally prepared neonatal nurses play an integral role in the advancement of neonatal nursing practice.

FUTURE CONSIDERATIONS

Advances in both prenatal and perinatal treatment (e.g., infertility assistance or fetal treatment) have altered the context of neonatal care practice. Low birthweight and premature infants account for more than 8% and 10% of births, respectively (CDC, 2018). Increased numbers of multigestation pregnancies, late-preterm infants, and medically fragile infants

have increased the demand for expert care providers well versed in the care of these patients. The increasing incidence of admissions to the NICU for management of neonatal abstinence syndrome (NAS), a group of problems that occur in a newborn who was exposed to opioid drugs for a length of time while in the mother's womb, requires evidence-based, family-centered, and cost beneficial care (MacMillan, Rendon, Verma, Riblet, Washer, & Holmes, 2018).

Extremely premature and other compromised infants are surviving to discharge with increased levels of complex needs, and thus continue to reinforce the need for neonatal registered nurses who can also provide care for the newborn in the home. Technology-dependent infants are now being discharged to receive care in the home setting. Multidisciplinary teams are required during and after hospitalization to ensure safety and quality of care for these infants and their families (Bowels, Jnah, Newberry, Hubbard, & Roberston, 2016).

Collaborative projects involving interdisciplinary teams, as well as networks to evaluate outcomes, will offer opportunities to improve care. Quality improvement activity is becoming the norm in NICUs around the country. Simulation creates opportunities to increase safety and quality through practice of technical and behavioral skills (Kenner, 2020).

Neonatology is a rapidly evolving field, and each year brings forth substantial research and recommendations for practice changes. The neonatal registered nurse has the opportunity to enact change through conducting and appraising research, which will enable the specialty to grow and establish professional credibility (Pressler & Toly, 2020). Genetic testing and research related to genetic therapy will increasingly influence neonatal care (National Human Genome Research Institute, 2020). Direct fetal treatment procedures, which merge the roles of delivery room nurse, surgical nurse, and neonatal nurse, have the potential for creating new neonatal patient populations. These populations will have new needs, some of which can be anticipated and some of which will not be expected.

The neonatal registered nurse can impact the future of patient care with their increased involvement in clinical inquiry. Increased use of

electronic health records will increase the ability to "mine" data and make it possible to more efficiently assess areas for improving care. Electronic health records and automation of devices to allow the synchronization of data to the medical record allow for changes in care delivery and workflow.

The neonatal registered nurse plays an important role in education of families, parents, care providers, and communities. Outreach opportunities for teaching in community hospitals are an example of community education. Neonatal registered nurses may also be called upon to provide education regarding newborn care, risk factors, immunizations, and newborn safety in community settings, daycare centers, parenting groups, and other arenas.

The neonatal registered nurse's role continues to change as new technologies and treatments are developed. Improvements in care outcomes must be evaluated in light of cost, equitability, and feasibility. Ethical decision-making will continue to be an important part of the neonatal registered nurse's daily work and will likely become more complex. As NICU cases escalate in acuity and complexity, the stress that all healthcare providers experience may increase. It is important that neonatal registered nurses be appropriately supported in this stressful environment. Recruitment and retention of nursing staff and support of new graduates entering the profession are crucial for the advancement and survival of the profession and neonatal nursing specialty.