Educational Gap

Many neonatologists and even some neonatal nurse practitioners (NNPs) are unaware of the history and evolution of the NNP role and its current status. Both should be aware of the past and of the controversial proposed changes and regulations that affect their relationships and practice.

Abstract

The steadily increasing prominence of the neonatal nurse practitioner (NNP) in neonatal intensive care units (NICUs) across the United States has gone largely unnoticed outside the neonatology and nursing literature. Although most NICUs in the United States employ NNPs (now often called neonatal advanced practice registered nurses) and neonatologists widely accept this approach, physicians and nurses in other intensive care settings may be surprised at the extent and sophistication of this new collaborative practice model. This model of expanded interprofessional practice and enhanced contributions by highly specialized nurses to the daily care of critically ill newborns and their families has proven successful. It exemplifies intelligent evolution of care and warrants recognition and emulation across critical care practice. We previously described proposed changes in the educational requirements for NNPs. This article provides historical background of the introduction and addresses the importance of NNPs in NICUs.

Objectives  After completing this article, readers should be able to:

1. Define the various titles and terms describing neonatal nurse practitioner practice.
2. Identify the national organizations with positions and influence on this evolution.
3. Understand the legal status of neonatal nurse practitioner practice, the changes that have been proposed, and the variations by state.
4. Formulate an opinion and action plan regarding these developments.

Evolution of the Neonatal Nurse Practitioner Concept

The nurse practitioner role, first created in Denver, Colorado, in the 1960s by Loretta Ford, EdD, RN, PNP, and Henry Silver, MD, began with pediatric nurse practitioners. The focus was on disease prevention and primary care of children (1) in outpatient settings. Physicians accepted the role, but nurse educators were skeptical. Nonetheless, many nurses took on the nurse practitioner role in pediatric (and adult) office practices during the 1960s and 1970s. These nurse practitioners typically took histories and performed physical examinations; independent diagnosis and treatment decisions followed. The physician was typically nearby for consultation and possible intervention. Training programs and licensure expectations developed variably across different states and regions. As the role became more popular and expansive, the need for more formalized education was recognized, and nurse participants now require a minimum of a master’s degree.

Hospital-based nurse practitioners, especially in intensive care units (ICUs), came more slowly. Nurses in adult ICUs assumed added responsibilities in
arrhythmia diagnosis and rapid contingent antiarrhythmia treatment in the 1970s, but physical examination and other direct patient interaction were limited. NICUs expanded the role of expert neonatal nurses in the late 1970s and early 1980s across the United States.

Neonatal nurse practitioner (NNP) practice evolved independently in Denver, Colorado, St Paul, Minnesota, Indianapolis, Indiana, Salt Lake City, Utah, Phoenix, Arizona, Long Beach, California, New York City and Long Island, New York, Cincinnati, Ohio, and elsewhere. Neonatologists in units without residents or with decreasing or insufficient resident coverage began to delegate responsibilities to specially prepared nurses, usually those with bachelor’s degrees. The educational preparation and procedural training were usually provided by the hospitals or individual neonatologists, sometimes with nursing college certificates of continuing education credit. Such a practice, including its practice protocols, was described in 1980 from the University of Colorado and St Joseph Hospital, Denver. (2)

From the start, this role expansion included complete history taking and physical examination, diagnosis (based on the medical model), and complex manual procedures previously reserved for physicians. At the same time and far more importantly, nurses who attained additional responsibilities brought the holistic, patient- and family-centered ethos of nursing care into the daily medical care of these patients and families.

**Education and Certification**

Formal and more standardized educational requirements developed for content and duration, including required classroom teaching and bedside experience in this new role. Such expectations were initially set by the National Certification Corporation (NCC) (3) (formerly the Nurses Association of the American College of Obstetricians and Gynecologists [NAACOG] Certification Corporation) among others. Courses were initially expected to last 3 months with an additional 9 months of closely supervised bedside experience. Nurses were then able to qualify for examination-based certification in this role. The NCC’s criterion-referenced examination taken to qualify for this certification was carefully developed using National Board of Medical Examiners’ models, and individual questions were and are carefully evaluated.

The NCC still manages this testing, but the educational preparation has changed in the past few years as the National Association of Neonatal Nurses, National League for Nursing, American Nurses Association, and American Association of Colleges of Nursing became more involved and as professional nursing morphed to require all advanced practice nurses to be prepared at the master’s level with a master of science in nursing (MSN) degree. Longer courses, usually taking 2 years, now provide the MSN preparation for nurses seeking to practice in the NNP role. Some courses combine classroom and Internet-based instruction with extensive clinical preceptorship training. State licensure and hospital credentialing vary locally, but MSN credentials are typically the minimum now accepted except for grandfathering of nurses still in practice who were educated in certificate programs before the MSN requirement. Master’s degree programs require candidates to be baccalaureate prepared, thus changing the prerequisites for this sort of training. This change was necessary and positive.

**Current Status**

Although many pediatric and adult ICUs continue to rely exclusively on physician diagnosis and treatment decisions, NICUs across the United States have largely adopted a model in which these specially trained NNPs share responsibility for evaluation and diagnosis and respond to all sorts of neonatal maladies with uniform, protocol-defined treatments. (4)(5)(6)(7)(8)(9)(10) Most procedures required for neonatal critical care are mastered by these nurse practitioners. It is the standard of care in most academic NICUs for nurse practitioners to resuscitate, intubate, and provide protocol-defined medications in the delivery room and the NICU. Other procedures often performed by NNPs, both during interhospital transport and in the inpatient units, include venous and arterial blood sampling, endotracheal intubation, ventilator management, umbilical artery or vein catheterization, percutaneous insertion of central (venous) catheters (“PICC Lines”), lumbar puncture, suprapubic bladder aspiration, and urgent thoracentesis or wire-guided tube thoracostomy for pneumothorax. Advanced practice registered nurses can have prescriptive authority with proper documentation of pharmacy education and a designated supervising physician. This authority and its requirements vary by state law. Decisions regarding medication use, including those used in emergency and urgent resuscitation situations, are directed, at least in part, by discussion with the attending physician and by carefully written protocols. Frequent discussion and formal case review with medical and nursing leaders allow for timely experience-based learning and correction of variances. These developments have been well described in the nursing literature. (11)(12)

This practice has been codified in the United States by the National Association of Neonatal Nurses through its National Association of Neonatal Nurse Practitioners (13) (14)(15) and recognized and endorsed by the American...
Academy of Pediatrics through the policies of its Committee on Fetus and Newborn. (16)(17)

Evidence of Effectiveness and Cost-effectiveness

Measures of knowledge and manual skills have generally revealed NNPs to be better than (18)(19) or comparable to (20)(21)(22) resident physicians or at least not inferior in most spheres. (23) Conclusive studies comparing nurse practitioner patient outcomes with previous approaches are not available. Evaluation methods for the individual’s performance in the role have been offered. (24) Two studies purport to show that the role is cost-effective. (25)(26)

NNPs quickly achieve more experience and more polished procedures and even examination and diagnosis skills than the short-term resident physicians typically assigned to academic NICUs for only 2 to 3 months of their training. NNPs are usually critical thinkers with specialized knowledge who are able to plan and execute care in consultation and collaboration with neonatologists and other health professionals. NNPs have typically joined in a close partnership with the attending neonatologists. The requirements of the residency review committees for pediatric and medicine-pediatric training have reduced NICU training time, (27) thus reducing pediatrician exposure and concurrently increasing demand for NNP involvement.

Hospital Medical Staff Credentialing Issues

Interprofessional tensions have played a role in this evolution of the nurse practitioner role. Physicians are not always willing to delegate aspects of their traditional roles; they can require certain conditions of employment or practice in return for their support. Organized medicine has variably resisted nurse practitioner legislation based on opposition to expanding the scope of practice of nurses. In general, resistance has been muted because NICU NNP practice requires neonatologist supervision and collaboration. Hospital-level privileges have proven difficult in some cases, with non-neonatologists in positions of medical staff authority voicing objections to this sort of expanded nursing practice anywhere in the hospital. This objection has become less frequent as the NNP model has gained medical and legal or regulatory acceptance across the nation. Similar acceptance has been slower in other countries. (28)(29)(30)(31)

The Institute of Medicine’s 2010 report on The Future of Nursing: Leading Change, Advancing Health called for the following:

- Nurses to achieve higher levels of education and training through an improved education system that promotes seamless academic progression.
- Nurses to practice to the full extent of their education and training. The report also advocated for the removal of barriers to practice, including requiring physician supervision. This aspect of the report is a hot button topic for many physicians. Yet for NNPs the practice is almost always interdependent because they function for the most part in intensive care facilities.

Development and Acceptance of the NNP Role

This NNP approach has evolved from a physician-extender model to a more interdependent practice, still in close collaboration with neonatologists. The wholly inpatient nature of NICU care allows for careful daily (or more frequent) neonatologist discussion of each child with consensus development and joint decision-making. The physician typically co-manages more unusual and severe situations, whereas the NNP can take precedence in management of more typical conditions and frequently encountered situations, such as delivery room care and resuscitation, nutritional prescription, parenteral nutrition, ventilator support and response to blood gas measurements, simple hypoglycemia, and standard responses to possible sepsis. This approach varies significantly from one practice to another, depending on the volume, diversity, and acuity of the NICU patient population and the composition of the responsible interdisciplinary team. Developmental care and family-centered care are often enhanced by the sophisticated understanding and experience of NNPs. Although variations in emphasis exist from place to place, this pattern has been widely adopted.

Private practice NICUs (those not managed by full-time university faculty) were for a time somewhat slower to adopt these changes, perhaps influenced by the lesser availability of university-based training for nurse practitioners, by the already limited availability of residents, and by the reduced (or absent) reimbursement for procedures performed by nurses not physicians. Physicians can charge for procedures performed by NNPs only if the physician physically attends the procedure and could step in if needed. This applies equally to procedures performed by residents and continues a long-established pattern of practice in academic units. Independent procedure reimbursement paid directly to NNPs is evolving but varies from place to place. Now both academic health centers and private practices are hiring and training NNPs.

State Regulatory Issues

Many state boards of nursing practice designated NCC certification as a required entry qualification for advanced
practice licensure for the neonatal specialty, even though the NCC protested that its test was designed for an advanced, not entry, level of knowledge and included no direct testing of manual skill or clinical judgment. This situation persists today. States often have specific additional training requirements for prescribing authority, requiring nurses to take separate pharmacology courses (often with no particular neonatal focus) in addition to their NNP training.

Some states did not require national certification to practice as an NNP, but these noncertified NNPs then sometimes found themselves unable to move across state lines if their new state required national certification. If their education occurred before 2005 and their grandfather status had expired, they then had to repeat their NNP course of study to certify and move to the new state.

Variations in Scope of Practice Determined by State Statutes
Political considerations applied by state legislatures place variable limits on the practice of NNPs (and all advanced practice registered nurses). This situation has been decried by the expert panel behind the Institute of Medicine’s Future of Nursing consensus report. They call for a uniform national approach to advanced registered nurse practitioner practice as a way to add to the health workforce (especially in primary care) because we need more primary caregivers under health care reform. (32) We agree with their conclusion that “Elimination of barriers for all professions with a focus on collaborative teamwork will maximize and improve care throughout the health care system.” The NICU experience nationwide validates this assertion.

Alternatives to NNP Practice
As the number of vacant NNP positions increase, alternatives to NNPs are being tried. Physician assistants (PAs) have been employed in some NICUs. (33) The 2-year training programs for PAs provide very little, if any, neonatal content, thus requiring extensive postgraduation preparation for neonatal specialty practice by the employing neonatologist or hospital. PAs are limited to the practice of the particular neonatologist or group practice that employs them and are less likely to have expectations of independence. The earning capacity of PAs is typically less than that of an NNP in a similar extended role, which can lead to short-sighted economic decisions to opt for PAs in the NICU. We remind hospital administrators and neonotologists that “you get what you pay for.”

We regard this approach as greatly inferior to the NNP option. Most new PAs have had only one brief rotation in the NICU and so will need months of additional training. (33) They are trained in diagnostics, assessment, and management throughout the life span of adults but do not generally address the social or developmental determinants of health the way NNPs do.

Some NICUs have turned to hospitalists to bolster their NICU staffing. Hospitalists are typically recently graduated pediatricians with a special interest in NICU care. They have 2 to 3 months of NICU experience and no neonatal fellowship training. Although they provide coverage and on-call service, some recent graduates may, at least initially, fall short of the NNP’s experience and procedural skill in the neonatal subspecialty. Because the emergence of hospitalists in the NICU is a relatively new phenomenon, it is as yet unclear whether many hospitalists will achieve the same decades of longevity in neonatal care that some NNPs do.

Medicolegal Aspects
Anecdotal information suggests that malpractice claims and adverse decisions against NNPs are rare. It is unclear whether this reflects their skill or the typically smaller financial resources of the nurse practitioner. Some lawsuits have named NNPs in actions against the neonatologists working with or employing them, but few data are available. Malpractice insurance premiums for this sort of nursing practice remain quite low by physician standards. Collaborative practice does not appear to have raised neonatologists’ premiums.

Why This Practice Model Is Successful
We believe that this approach to neonatal care is attractive and widespread because it works for all concerned. Infants are getting better, more consistent, more holistic care around the clock. Parents are able to connect more easily and more frequently with knowledgeable nurse practitioners in addition to their neonatologists. Staff nurses and their leaders can get empathetic guidance and sophisticated direction from NNPs, most of whom were staff nurses themselves. NNPs are making a difference in the care and the outcomes of these patients and find themselves in a satisfying and meaningful position in the care of these fragile and rewarding patients. Turnover is quite low. In addition, neonatologists welcome the energy, skill, knowledge, and devotion of NNPs along with their huge contribution to the daily care of the patients. Ultimately, more newborn patients can be cared for with more attentive, high-quality care with the help of these nurse practitioners.

Typically, NNPs have been supported and directed with well-earned trust and confidence by their neonatologist.
colleagues. At the same time, the neonatologist is attentive and available, trusting in the NNP’s judgment, and immediately responsive to calls for help or direction. Close teamwork is essential and, when lacking, threatens the approach and the patients’ well-being. We emphasize the importance of close personal collaboration between the NNP and neonatologist, intensivist, or hospitalist physician. We believe that this is the essential ingredient in the trust and reliance that is required for such practice.

NNPs have proven themselves all over the country—making continuous contributions to the task of caring intensely for these patients. Uniform support for this approach has won over most of the doubters in medical staff offices and regulatory agencies. The trail has been blazed for other inpatient nurse practitioners to follow into pediatric ICUs, adult ICUs, coronary care units, surgical ICUs, labor suites, and hospitalist practice.

**Collaborative Practice With Neonatologists**

Virtually all NNPs practice in close collaboration with the neonatologists providing care in their NICU. Some practice or moonlight in several NICUs. In contrast to nurse practitioners in outpatient (and sometimes remote, rural settings of office-based practice), NNPs have not pressed for complete independence from physicians. They often have nonclinical interests and duties that involve collaboration with physicians. For example, they teach residents and NNP trainees, provide team-structured transport services, and serve as liaison to physicians, staff, and families. Many participate in conducting clinical research trials. Total independence would likely reduce or eliminate these roles.

As NNPs become doctors of nursing practice (DNPs), pressure for completely independent practice may build. We regard this as an unnecessary development that should be resisted by carefully thought-out and balanced collegiality. Recognition of each discipline’s value and role along with collaborative working arrangements may be the key. The common goal of all is improved outcome for the infants and families. Methods for achieving that goal must be artfully crafted so that the NNP and the neonatologist collaborate and complement each other. Specific protocols that define these relationships and responsibilities in advance will ease this relationship. Disagreements between the professions about scope of practice, direct reimbursement, and completely independent practice may yet complicate the challenge of meeting NICU workforce requirements in a high-quality way.

**The Future of the NNP Practice Model**

The outlook for NNP advanced practice looks bright. Hundreds of expert nurses have completed training for this role and are providing sophisticated neonatal care across the land. Many more are in training for this sort of practice. Some developments threaten to complicate or even reverse this trend.

The desire for completely independent practice as mentioned above would likely change the level of support from physicians, especially neonatologists, that is currently enjoyed. More threatening is the expectation of the American Association of Colleges of Nursing that all advanced practice nurses must complete doctoral-level training (doctor of nursing practice degree) before entry into advanced clinical practice. This expectation was approved in 2005 and is supposed to go into effect in 2015. Numerous organizations have dissented, but it remains to be seen whether state nursing boards and colleges of nursing will move exclusively in this direction. We have explored this important issue in a companion paper. (34)

**Summary**

NNPs have earned their prominent role in the care of critically ill newborn patients and their families, enhancing quality and consistency and playing a large and satisfying role in neonatology’s achievements. During the 30-some years of this approach, acceptance has been widespread by professionals and the patients’ families. Training systems have developed and evolved rapidly. Most NICUs across the United States employ NNPs and most plan to hire more. (4) These expert nurses are now essential to the workforce that cares for newborn patients nationwide. Successful NICU experience with collaborative advanced practice nurses can serve as a guide to meeting similar challenges in other acute care settings.

**American Board of Pediatrics Neonatal-Perinatal Content Specification**

- Know the issues in the organization of perinatal care (eg, regionalization, transport quality-control, practice guidelines).

**References**

Nursing Perspectives: Acute Care Nurse Practitioners in the Neonatal Intensive Care Unit: Why This Is a Successful Collaboration
Roger E. Sheldon, Karen Corff, Debra McCann and Carole Kenner
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