White Paper: Critical Shortage of Pediatric Nurse Practitioners Predicted

Kristin Hittle Gigli, PhD, RN, CPNP-AC, CCRN,
Michelle A. Beauchesne, DNSc, RN, CPNP, FAAN, FNAP, FAANP,
Mary S. Dirks, DNP, ARNP, CPNP-PC, FAANP, &
Jessica L. Peck, DNP, APRN, CPNP-PC, CNE, CNL

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Pediatric health care providers play an essential role in the attainment of optimal child health. Ensuring that children have access to qualified pediatric health care providers is as important in improving outcomes as other variables contributing to child health outcomes (Children's Hospital Association, n.d.; Institute for Healthcare Improvement, 2019). Pediatric nurse practitioners (PNPs) are uniquely qualified advanced practice registered nurses (APRNs) with specialized education and focused clinical practice dedicated to the care of all children (American Nurses Association [ANA], 2015). The delivery of high-quality care across the health care continuum allows PNPs working in primary, acute, and specialty care settings to influence child health. PNPs offer clinical expertise and care focusing on children's development, health promotion, disease prevention, and anticipatory guidance, which contribute to child health and family well-being.

The purpose of this white paper is to highlight the roles of PNPs in the care of children, synthesize what is known about the PNP workforce, and elucidate the value of PNPs as members of interdisciplinary care teams. This paper can support PNPs in advocating for their clinical practice and professional development, help health care administrators understand the role of specialized PNPs, promote the wise council of APRN faculty when students are enrolling in graduate nursing education programs, and encourage researchers and policy makers to undertake studies on the state of the pediatric workforce. This scoping review of the current literature identifies gaps in knowledge and makes recommendations for future research on the state of the PNP workforce and roles in care delivery.

Kristin Hittle Gigli, Postdoctoral Research Fellow, CRISMA Center, University of Pittsburgh, Pittsburgh, PA.

Michelle A. Beauchesne, Associate Professor and DNP Director, School of Nursing, Bouvé College of Health Science, Northeastern University, Boston, MA.

Mary S. Dirks, Clinical Professor and Assistant Dean for Graduate Practice Programs, University of Iowa College of Nursing, Iowa City, IA.

Jessica L. Peck, Associate Professor, Texas A&M University Corpus Christi, Corpus Christi, TX.

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Correspondence: Kristin Hittle Gigli, PhD, RN, CPNP-AC, CCRN, 2029 Huntington Lane, Fort Worth, Texas 76110; e-mail: hittlek@gmail.com.

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PEDIATRIC NURSE PRACTITIONERS

There are more than 270,000 nurse practitioners (NPs) currently licensed in the United States, with approximately 5% of those certified to practice in pediatrics (American Association of Nurse Practitioners [AANP], 2019). Of the almost 18,000 PNPs currently holding active certification from the Pediatric Nursing Certification Board (PNCB), 85% are certified to practice in a primary care setting, and only 10% are certified to practice in an acute care setting. An additional 5% hold dual certification in both primary and acute care (PNCB, 2018). Almost an additional 3,000 PNPs are certified in primary care through the American Nurses Credentialing Center (PNCB, 2019a). Nearly half of all newly certified PNPs surveyed reported working in

outpatient general pediatrics, and 26% of PNPs reported working in outpatient specialty care clinics. Although only 8% of PNPs are certified in providing acute care, 22% report practicing in inpatient settings (Freed et al., 2014). These numbers reflect the complexity of role designation and the inconsistencies in employment practices related to certification and licensure.

Primary Care

The PNCB (2018) defines the role of the Certified PNP—Primary Care (CPNP-PC) as a provider of care to children from birth through young adult ages with specialized, extensive knowledge and experience in pediatric health care, including well-child care and prevention, health promotion, and management of acute and chronic pediatric conditions. This care is holistic in nature and seeks to support optimal health outcomes within family, community, and environmental contexts. The current CPNP-PC and Pediatric Primary Care NP—Board Certified (PPCNP-BC) role has progressed to accommodate the rapidly changing and increasingly complex needs of both the pediatric community and health care system (Aruda, Griffin, Schartz, & Geist, 2016). A CPNP-PC/PPCNP-BC may work in settings including, but not limited to, office-based practices, school-based health centers, hospital newborn nurseries, and telehealth practices (ANA, 2015).

Acute Care

A certified Acute Care PNP (CPNP-AC) has specialized education that supports care for patients with acute and critical illnesses who experience episodic illness or exacerbation of chronic illness or who require end-of-life care (Bolick et al., 2013). CPNP-ACs have specialized clinical skills and competencies to assess, diagnose, manage, and evaluate pediatric patients (ANA, 2015), including responsibilities to "stabilize the patient's condition, prevent complications, restore maximum health, and/or provide palliative care" (National Organization for Nurse Practitioner Faculties [NONPF], 2013, p. 39). They work in diverse settings including, but not limited to, hospitals, emergency departments, intensive care units, urgent care centers, and home care with technology-dependent patients. CPNP-ACs work as members of interprofessional teams in which the responsibility of caring for acutely and critically ill patients is distributed among multiple providers: CPNP-ACs, physicians, nurses, and others (Chesluk et al., 2012; Reuter-Rice, Madden, Gutknecht, & Foerster, 2016). As interprofessional team members, CPNP-AC providers are responsible for independent and collaborative decisions when providing patient care and engaging families in the process of care delivery (Stocker, Pilgrim, Burmester, Allen, & Gijselaers, 2016).

Specialty Care

PNPs working in specialty care may often work between the inpatient and outpatient care settings. PNP roles in specialty care are often developed to manage a specific population of patients. As providers in pediatric subspecialties, including but not limited to cardiology, surgery, endocrinology, neurology, nephrology, urology, trauma, pain/sedation, palliative care, and genetics, these PNPs assume a variety of clinical roles. Postgraduate, structured orientations—sometimes referred to as *residency* or *fellowship* programs—can augment the role PNPs play in care delivery in specific specialties and should be competency based (Bolick et al., 2013; Martsolf, Nguyen, Freund, & Poghosyan, 2017; Sorce, Simone, & Madden, 2010). Roles in care can include pre- and postoperative care, management of chronic conditions, high-risk clinics, and hospital consultations (ANA, 2015). Given the spectrum of roles assumed by PNPs working in specialty care and the overlap in the scope of practice between primary and acute care PNPs, the education, certification, and licensure of PNPs in specialty care should match their practice (APRN Consensus Workgroup & National Council of State Boards of Nursing APRN Advisory Committee, 2008).

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Qualifications

Focused competencies for CPNP-PC and CPNP-AC practice differentiate the clinical practice of these providers but retain additional core competencies common to all NPs (NONPF, 2013, 2017). Master's and doctoral degrees and postgraduate certificate education programs support potential certification as a PNP (PNCB, 2019b). The Doctor of Nursing Practice (i.e., DNP) degree is the appropriate credential and a terminal level of education for APRNs, which in some cases is the entry level for nurses as experts in clinical practice (National Association of Pediatric Nurse Practitioners [NAPNAP], 2017). At the completion of a graduate-level PNP educational program, the student qualifies to take the PNP national certification examination that corresponds with his or her educational program, primary and/or acute care (PNCB, 2019b). Upon successful certification, the student becomes a CPNP-PC, PPCNP-BC, or CPNP-AC and can obtain state licensure and authority to practice (APRN Consensus Workgroup & National Council of State Boards of Nursing APRN Advisory Committee, 2008). National efforts are underway in states to ensure uniform regulation of the APRN role in accordance with The Consensus Model for APRN Regulation, Licensure, Accreditation, Certification and Education (National Council of State Boards of Nursing [NCSBN], 2017a). Currently, all states acknowledge the NP role, and a vast majority require NP certification to attain licensure (NCSBN, 2017a). APRNs should align their education, certification, licensure, and patient population with care roles and clinical responsibilities (APRN Consensus Workgroup & National Council of State Boards of Nursing APRN Advisory Committee, 2008). Specializations in practice areas (e.g., oncology, neurology, cardiology, palliative care) result from a

demand for health care delivery. Certifications in these areas are complementary but do not increase the scope of practice, nor are they required for licensure or practice beyond the PNP role and pediatric focus (Kleinpell & Hudspeth, 2013).

Employment as a PNP often requires credentialing and the attainment of privileges to provide care that are unique and vary in different hospitals or health care systems (Gigli, Dietrich, Buerhaus, & Minnick, 2018b; The Joint Commission, n.d.). An orientation program associated with employee onboarding contributes to successful transitions into clinical practice and is encouraged as part of the professional development and mentorship of the PNP (Haut & Madden, 2015). After initial privileges are bestowed, a process of ongoing professional practice evaluation and focused professional practice evaluation with continued national certification are designed to document evidence of maintenance of a level of clinical competence, quality, and proficiency (Wise, 2013).

Full Practice Authority

Full practice authority (FPA) encompasses state regulations and laws allowing APRNs to practice to the full scope of their education and training independent of supervision and under the exclusive authority of state boards of nursing. The rationale for this autonomy includes increased health care access through the Patient Protection and Affordable Care Act, the current U.S. shortage of primary and acute care providers, a credible body of research showing that NPs attain outcomes equivalent to those of physician practice, and the unique position of APRNs to positively effect changes in the health care system (Dillon & Gary, 2017).

The APRN Consensus Model established statutory and regulatory criteria for FPA that includes (a) recognition of all four APRN roles, (b) designation of APRN title, (c) requirement for dual registered nurse/APRN licensure, (d) requirement for a graduate or postgraduate degree from an accredited program, (e) procurement and maintenance of national certification in one or more APRN roles from an accredited certification body, and (f) authority for independent practicing and prescribing (Chesney & Duderstadt, 2017). The Consensus Model recommended FPA for all NPs in all states by 2015, but barriers, including opposition from organized medicine and variations in state legislative body statutes and processes, continue to waylay progress recommended at the national level from being uniformly applied at the state level (Brom, Salsberry, & Graham, 2018). Currently, 22 states plus the District of Columbia and U.S. Territory of Guam are designated as FPA. Sixteen states are designated as *reduced practice*, meaning that state practice and licensure laws reduce the ability of APRNs in at least one area of practice and require a regulated collaborative practice agreement with another health care provider or limit the setting or other practice element. Twelve states are designated as *restricted practice*, meaning that state practice and licensure laws reduce the ability of APRNs in at least one area of practice and that career-long supervision or management by another health care provider is required (AANP, 2018c). In 2017, the U.S. Department of Veterans Affairs granted FPA throughout its network of federal medical centers to three of the four designations of APRNs (NPs, Clinical Nurse Specialists, and Certified Nurse Midwives), allowing them to independently practice to the full scope of their education, training, and certification without unnecessary oversight (Sofer, 2017).

The American Academy of Nursing (AAN) issued a statement in 2017 supporting FPA, recognizing APRNs as a ready workforce to improve access to care, lower health care costs, and help achieve health equity for marginalized populations. In doing so, the AAN joined the NCSBN, the Robert Wood Johnson Foundation, the American Hospital Association, the Federal Trade Commission, and the American Association of Retired People, among others, in supporting greater use of the APRN workforce and subsequent access to quality, accessible, affordable care through FPA (Bosse et al., 2017).

FPA has been associated with more practicing NPs in a state, especially in rural areas and in primary care capacities (Barnes, Richards, McHugh, & Martsolf, 2018; Reagan & Salsberry, 2013). NPs are more likely than their physician counterparts to serve minority, disadvantaged, and vulnerable populations; thus, FPA can maximize the capacity of the NP workforce in underserved areas with the most health disparities and urgent need for care (Xue et al., 2018). From 2008 through 2016, the percentage of NPs as rural providers increased from 17.6% to 25.2%, whereas the percentage of NPs as primary care providers increased from 15.9% to 23.0% in nonrural practices (Barnes et al., 2018). There is a growing consensus that FPA is a viable pathway to provide patients quality, accessible, affordable health care amid the growing complexities of the U.S. health care system. Strategies to achieve FPA in all states include effective stakeholder communication, implementation of innovative care models with documented outcomes, dissemination of effective collaborative models, and showing the effective impact of APRN-delivered care at institutional, state, and national levels (Dillon & Gary, 2017).

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WORKFORCE AND DEMAND FOR PNPS

The NP workforce is growing, and workforce forecasting shows that growth will be strong (Auerbach, 2012; Maier, Barnes, Aiken, & Busse, 2016; Poghosyan & Brooks Carthon, 2017; U.S. Department of Health and Human

Services, 2017). In March 2018, the American Association of Nurse Practitioners (AANP) released the 2017 National Nurse Practitioner Sample Survey results with objectives to (a) update NP compensation data as it relates to education, experience, region, setting, and specialty; (b) identify typical NP benefit packages and employment arrangements, (c) identify associations between practice characteristics and compensation, and (d) identify trends in NP compensation. Data show that 248,000 NPs are currently licensed to practice in the United States, representing a substantial increase from the estimated 120,000 NPs reported in 2007 (AANP, 2018a). The supply of PNPs, however, has not appreciably grown compared with other NP subspecialties (AANP 2018b; Freed et al., 2010a; Schell et al., 2015). This same AANP survey reported that an additional 23,000 new NPs graduated from programs in the 2015/2016 academic year, an increase of 3,000 graduates, or 15.5%, from the 2014/2015 academic year. Although an estimated 85.5% of new graduates were educated as primary care NPs, approximately two out of three new NPs entering the workforce reported graduating from family NP (FNP) programs. (AANP, 2018a)

FNPs are certified to provide care to children, but most report their total pediatric population in practice to be less than 25%. In addition, most FNPs report that their pediatric patient population consists of mostly older children and adolescents (Freed, Dunham, Loveland-Cherry, & Martyn, 2010). Physician assistants (PAs) can practice in pediatric settings, but only 2% of the more than 80,000 currently licensed report working in pediatric settings (National Commission on Certification of Physician Assistants, 2016). As a result, the PNP workforce is increasingly assuming a larger role in the care of pediatric patients across the health spectrum (Coombs, 2015; Freed, Dunham, Moran, & Spera, 2012; Martyn, Martin, Gutknecht, & Faleer, 2013).

Workforce models describe increasing inclusion of the PNP role to meet pediatric health care demands (Basco & Rimsza, 2013; Shugerman et al., 2013). Health care systems are increasingly recognizing the importance of hiring providers with pediatric expertise for the care of children. Providers without pediatric education and certification require longer orientation, resulting in loss of provider productivity and reimbursement for postgraduate pediatric education. Additionally, these providers may realize a lack of confidence in caring for children, whereby an eventual determination of poor fit for the practice ensues, and either termination or resignation takes place (J. Gilliland, personal communication, October 8, 2018). Despite the specific demand for pediatric care, there is a forecasted critical shortage of PNPs over the next decade. Even with significant interventions to enhance the supply pipeline, shortage predictions remain (Schell et al., 2015; Health Resources & Services Administration [HRSA], 2016). Efforts to recruit and retain PNPs are needed to promote future development and engagement of this portion of a pediatric workforce.

Inclusion of self-contained, independent, comprehensive pediatric nursing education curricula and courses expose nurses to the pediatric specialty and can equip them for nursing roles as pediatric registered nurses and APRNs (ANA, 2015). The decision to become a PNP occurs at various points in a provider's career, with 38% deciding before becoming a registered nurse, 32% while in nursing programs, and 40% while working as a registered nurse (Freed et al., 2014). As a result, undergraduate nursing education and early career opportunities in pediatrics can contribute significantly to the decision to pursue a career as a PNP. The availability of pediatric-focused, graduate-level education can also support a nurse's decision to become a PNP. Use of online and hybrid programs can increase the availability of pediatric-focused graduate-level education (Freed et al., 2015). Additionally, promotion of the need for PNPs among students considering APRN education may support increased enrollment in existing programs (Fang, Li, Kennedy, & Trautman, 2017; Freed et al., 2015). Graduate nursing programs have an important role in advising prospective and admitted students toward pursuing PNP education if the care of children is part of their stated career goals.

The American Association of Colleges of Nursing (2017) survey on faculty shortages provides insights into the relationship between the nursing faculty shortage and student enrollment and graduation data, reflecting a complex cycle. Increased vacancies in faculty positions result in limited capacity to enroll qualified students in both master's and doctoral nursing programs. There were 9,757 qualified master's applicants in 2016, with an additional 2,102 doctoral applicants, who had to be turned away from nursing programs because of a combination of faculty shortage and lack of preceptor clinical education opportunities (American Association of Colleges of Nursing, 2017). This issue, in turn, affects the total number of PNP programs, because schools are more likely to incorporate pediatric education into larger, more cost-effective FNP programs to conserve on faculty and placements.

Although primary care NPs are projected to continue to grow in numbers, primary care physicians are not. Thirty-seven states are projected to have a shortage of primary care physicians by 2025, with 12 of these states having a deficit of 1,000 or more full-time equivalent positions. This contrasts with the situation for primary care NPs and PAs, where supply is projected to outpace demand for services nationally (HRSA, 2016). This is consistent with the U.S. Bureau of Labor Statistics (BLS) projection that by 2026, the number of NPs will have increased by 36%, compared with 37% for PAs and 13% for physicians (AANP, 2018a). The shortage is even more evident when pediatrician statistics are reviewed. With just under 50,000 primary care pediatricians in the United States, there are insufficient numbers to care for the increasingly demanding and complex needs of children, and many U.S. counties continue to have a critical provider shortage (AAP, 2013; Bodenheimer & Bauer, 2016; Fraher, Knapton, & Holmes, 2017). The percentage of pediatric residency program graduates choosing to pursue careers in general pediatrics has declined to just over

60%, with more and more physicians choosing specialty care (AAP, 2013; American Board of Pediatrics, 2016).

The HRSA (2016) National Center for Health Workforce Analysis suggested that a significant portion of primary care could be provided by NPs and PAs to potentially offset the projected shortage of physicians in 202,5 but there are fewer data on subspecialty predictions, such as pediatrics. However, they that note all such predictions depend on restructuring health care delivery services and addressing scope-of-practice issues for APRNs and PAs nationally (HRSA, 2016). Finally, growing emphasis on care coordination, preventive services, and chronic disease management encourages expanded roles for all primary care practitioners (HRSA, 2016).

Underserved and rural areas are most detrimentally affected, with current provider shortages leaving millions of children without access to a pediatric primary care provider (HRSA, 2016; Martyn et al., 2013). Nurse practitioners consistently show willingness to practice in underserved areas, as well as to treat Medicaid patients and other vulnerable populations (BLS, 2018; Buerhaus, DesRoches, Dittus, & Donelan, 2015). As the number of APRNs increases, collaborative, team-based, interdisciplinary care will expand patients' access to care while improving health care quality and safety (Buerhaus et al., 2015; Stocker et al., 2016).

In 2018, the *U.S. News and World Report* ranking of best jobs announced that NPs held the #4 spot on the list for the best 100 occupations in the United States. In this same report, it was reported that the NP median salary in 2017 was $98,190, the 25th percentile of NP salaries was $84,860, and the 75th percentile of NP salaries was $117,020. Furthermore, the 0.7% unemployment rate for NPs is significantly below the national average. NPs' "upward mobility—or the ability to advance in terms of responsibility and salary—was categorized as average, stress level was measured as above average, and flexibility ranked below average" (U.S. News & World Report, 2018).

CLINICAL ROLES AND VALUE OF PNPS

The PNP role is essential to the delivery of health care to children in all health care settings where they are principally engaged in direct patient care (Aruda et al., 2016; Reuter-Rice et al., 2016). Pediatricians, hospital administrators, and pediatric subspecialists have indicated intentions to hire more PNPs (BLS, 2018; Freed, Dunham, Loveland-Cherry, Martyn, & Moote 2011; Freed et al., 2012). A national survey of pediatric subspecialists showed an intention to expand the scope of PNP practice in the acute care setting (Freed et al., 2011; Gigli, Dietrich, Buerhaus, & Minnick, 2018a).

The presence of PNPs increases patient access to care, contributes to quality care, and provides patients with provider continuity (Bodenheimer & Bauer, 2016; Kleinpell, Ely, & Grabenkort, 2008). Although there is wide variation in how NP roles in primary, acute, and specialty care are implemented across the country (Kleinpell, Ward, Kelso, Mollenkopf, & Houghton, 2015), the general public views PNPs as qualified providers (Dill, Pankow, Erikson, & Shipman, 2013; Kinder, 2016), and APRNs consistently show high-quality patient care outcomes (Newhouse et al., 2011; Poghosyan & Brooks Carthon, 2017). According to the 2017 AANP survey, NPs may be found in a variety of settings, including private practice, hospital outpatient clinics, inpatient hospital units, community and federally qualified health centers, and emergency departments/urgent care, with a majority of these NPs providing primary care (AANP, 2018a).

Access to care is increased with the addition of PNPs to the pediatric workforce (HRSA, 2016; Institute of Medicine, 2010). To make PNPs' contributions to care assessable and measurable, their care should be visible in electronic health records through independent prescribing and in billing practices (Cameron, Tabor, & Stensland, 2019). PNPs are encouraged to bill with their individual national provider identification number (NAPNAP, 2016). Bundled payments for surgical and critical care services make detection of CPNP-AC care difficult (Stantz & Stantz, 2013). Split/shared billing and billing for completed procedures, however, provide PNPs opportunities to generate revenue as unique providers, allowing the scope of practice of the CPNP-AC to be more fully realized (Haut & Madden, 2015) and enabling PNP care to be measured (NAPNAP, 2016). Participation in quality performance measurement opportunities, leading health care/medical homes, and promoting roles in transitions from pediatric to adult care providers allow PNPs to be recognized for their contributions to care delivery (NAPNAP, 2015; National Quality Forum, 2017).

Indirect Care Roles and Value of PNPs

PNPs' participation in indirect care roles brings value to organizations (Altman & Rosa, 2015). This value, from projects and committee work, can be measured through improvements in patient outcomes related to cost and the quality of care (Altman & Rosa, 2015; Gullick & West, 2015). The time dedicated to indirect care roles including participation in: education, quality, program development, research, administration, advocacy, and policy, can drive innovation and creativity in the health care system (Altman & Rosa, 2015; D'Onfro, 2015; IOM, 2010). Indirect care roles also contribute to the professional development of the individual PNP, which can mitigate the effects of burnout, sustaining this specialized workforce (ANA, 2015; NONPF, 2013). PNPs should have dedicated indirect care time to participate in and contribute to maintenance of skills, engagement in professional activities, and making contributions to the health care system (Oliver, 2016).

SUSTAINABILITY

PNPs offer their patients and their families expertise and skills that are unique among other pediatric health care provider roles. The consequences of turnover have been scrutinized in nursing roles, and high turnover is linked to

decreases in patient satisfaction, safety, and quality of care (Jones, 2008; Waldman, Kelly, Arora, & Smith, 2004). The influence of turnover among APRNs could have similar implications for patient outcomes, and more information is needed (Moss, Good, Gozal, Kleinpell, & Sessler, 2016; Raftery, 2013). Steps to ensure healthy work environments, efforts to address burnout syndrome and compassion fatigue, and opportunities allowing for professional role development can contribute to the sustainability of participation in clinical care by individual PNPs (Moss et al., 2016). Clinical roles for PNPs fostering retention and promoting sustainability contribute to high-quality patient outcomes and will positively contribute to the size of the PNP workforce, given the demand for PNPs.

INTERPROFESSIONAL COLLABORATION

The current political, regulatory, and social climate lends itself to projecting a future requiring intense, collaborative, interdisciplinary efforts to successfully care for the pediatric population. However, receptivity, regulatory, and approach considerations to such collaborations vary widely (Freund et al., 2015). In 2011, Freed et al. found that nearly half of all pediatricians surveyed reported working collaboratively with PAs or NPs and that 38% of those surveyed had increased the number of these collaborations over the last 5 years. The trend toward interprofessional collaborations continues (Johnson, 2013).

The current political, regulatory, and social climate lends itself to projecting a future requiring intense, collaborative, interdisciplinary efforts to successfully care for the pediatric population.

Although the impact of involvement in interprofessional health care teams is a minor part of the discussion toward increasing PNP workforce needs in caring for children across the spectrum of primary, specialty, and acute care, the PNP role does have a significant impact on the way care is delivered to children on these teams and, ultimately, in improving patient care outcomes. The goal of interprofessional health care teams and the Interprofessional Education Collaborative Expert Panel (2011) competencies is to improve patient-centered care with an elimination of redundancy, improve access to care, and improve quality of care overall through a team-based approach. There is a national mandate by the Institute of Medicine (2010) to establish interprofessional team-based care and incentives by the Affordable Care Act to improve patient outcomes and prevention of disease. Pediatric health care is experiencing an increase in complexity of illness and chronicity, which in turn creates a need to advance care coordination and continuity of care between settings such as health care, home, school, and child care. The pediatric health care/medical home and the ability to work interprofessionally with other health care providers is becoming increasingly essential to ensure optimal care for children. PNPs have nursing skills and competencies, in addition to advanced expertise in pediatric growth and development; wellness and illness knowledge; holistic care approach; and understanding of community, state, and national resources, issues, and policies. Furthermore, PNPs have the ability to effectively communicate with needed service providers, which contributes to making them a valuable asset toward ensuring optimal patient outcomes.

RECOMMENDATIONS TO ADDRESS KNOWLEDGE GAPS

Both the Institute of Medicine (2010) and HRSA (2019) support data collection and analysis of the health care workforce to ensure that it is adequate in size and skill to meet the needs of the population. Although there is increasing focus on the role of NPs in health care delivery, the PNP population is often overlooked, missing the unique contributions of these specialty providers. Dedicated research into the PNP role, workforce, and care outcomes will address gaps in our knowledge of the role and support the advancement of the profession.

Although studies have shown variation in how NP roles in primary, acute, and specialty care are implemented across the country (Kleinpell, Ely, & Grabenkort, 2008; Kleinpell et al., 2015), these studies have largely excluded the delivery of pediatric care. Research to evaluate how the clinical and indirect care roles of PNPs are fulfilled is important to understand current roles and potential for changes in the role to maximize PNPs' contributions to care delivery (Freed et al., 2011). As members of interdisciplinary teams, efforts continue to evaluate how interdisciplinary education, models of care, and providers' roles influence outcomes. Describing these practices will elucidate mechanisms to optimize and leverage providers' roles in ways that improve patient outcomes. Additionally, evaluating the effects of FPA on PNP practice and role variation is meaningful for private policy (institutional and payor) and public policy decisions (Buerhaus, 2018; Freed et al., 2010a; Park, Athey, Pericak, Pulcini, & Greene, 2018).

The last published study of the national distribution of PNPs was published nearly a decade ago, and during that time the NP workforce has undergone rapid expansion (Auerbach, Staiger, & Buerhaus, 2018; Freed, Dunham, Lamarand, et al., 2010). It is time to consider evaluating the distribution of the PNP workforce again. Undertaking an effort similar to a census of PNPs can answer questions about provider supply in primary, acute, and specialty care and the national distribution. Furthermore, work addressing the recruitment and retention of PNPs in clinical roles has been unexplored and is meaningful for potential employers of PNPs.

Additionally, when considering possible shortages of PNPs, evaluation of the workforce pipeline and graduate nursing education programs becomes an important factor in

mitigating potential shortages (Freed et al., 2015). Having opportunities to obtain a PNP education are essential to the sustainability of the profession. Nursing schools face obstacles to sustain these programs, because they work to maintain the adequate mix of skills and clinical expertise among the faculty and find adequate clinical placement (Aiken, Dahlerbruch, Todd, & Bai, 2018; NCSBN, 2017b). Policies that support and reward PNPs' decisions to enter academia are needed. Furthermore, models of academic life that allow clinically oriented PNPs to maintain clinical practice while educating future PNPs should be more widely implemented (Fowler, Baker, & Geraghty, 2017).

In many instances, PNPs are not measuring outcomes of the care they provide (Freed et al., 2011). It may be meaningful to survey employers of PNPs to evaluate the perceived value of the PNP role in a variety of practice settings. Individual, institutional, and nationwide efforts to measure PNPs' outcomes are essential to documenting contributions to care in the current quality- and value-based purchasing environment. When possible, PNPs should bill under their unique national provider identification numbers and seek opportunities for shared/split billing in acute care practice. Participation in quality measurement programs as an individual PNP provider is another meaningful way to show the value of the PNP (Kleinpell & Kapu, 2017).

CONCLUSIONS

PNPs are a vital part of the workforce that cares for children. Their specialized education and clinical training make them a unique part of interdisciplinary teams. Attention should be focused on updating and expanding knowledge of the state of the PNP workforce to identify areas in practice and policy where interventions will support maximizing the contributions of these providers to high-quality, accessible, and affordable pediatric health care.

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SUPPLEMENTARY MATERIALS

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