

## Project Report


### Expanding a primary care nurse practitioner fellowship to support rural and underserved pediatric patients in the US

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#### ETHICS APPROVAL

The Nemours Children's Health Institutional Review Board deemed this exempt as it is not research.

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## Abstract

**Context:** A significant shortage of primary care and mental healthcare providers currently exists in the US and is predicted to worsen, emphasizing the imperative for mental health training and collaboration within primary care settings, especially in rural and underserved areas. WHO (2021) has estimated over 18 million health care workers will be needed in rural areas in the US by 2030. It is challenging for primary care providers to work in rural areas of the US due to limited healthcare resources; limited access to emergency, specialty and mental health services; and requirements for skills to manage patients with complex problems. A lack of healthcare professionals specializing in primary care and pediatric care, coupled with rising demand for mental health services in underserved and rural areas, necessitates innovative and sustainable solutions. Nurse practitioners emerge as a key workforce with the potential to provide these comprehensive services, given their adaptability, scope of practice and potential interest in living and working in rural areas. US experiences indicate that these work environments offer increased independent, comprehensive practice opportunities and competitive salaries leading to greater satisfaction and retention.

**Issue:** Nurse practitioners have historically demonstrated unique strengths in providing primary care services, but traditional education and training in the US do not include additional skills such as telehealth and oversight of patients with complex medical conditions, which are required for successful transition to a position in a rural health area. However, there is evidence that postgraduate fellowships enhance the knowledge, confidence and

capabilities for graduate nurse practitioners and offer comprehensive training to address the needs of rural and underserved populations.

**Lessons learned:** The state of Delaware has a population of 1,052,000 according to the 2024 US Census Bureau, with estimates of more than 80% of the population living in designated rural and underserved regions. A pediatric institution within this state recognizes the demand for both mental health and primary care services in providing a compelling backdrop for development of a postgraduate nurse practitioner fellowship training program. We discuss the program's structure, didactic components, and overarching aims at addressing the needs of local communities. Emphasis is placed on mental health training within pediatric primary care, equipping nurse practitioners with the necessary skills to provide more holistic care.

This article outlines techniques employed to initiate a pediatric primary care fellowship for nurse practitioners interested in a career providing primary care in a rural or underserved region. A discussion related to the challenges of determining the long-term impact of the fellowship program on healthcare outcomes, workforce development, and improved access to pediatric primary care services in underserved areas is included. This approach serves as a potential model for other regions grappling with similar challenges, offering insights into effective strategies for addressing the shortage of pediatric primary care providers with a focus on mental health training.

## Keywords

continuing medical education, mental health services, nurse practitioner, primary care nursing, fellowship, US.

## Context

The US has a shortage of primary care providers, including physicians, nurse practitioners and physician assistants trained in pediatrics and mental health<sup>1</sup>. The literature demonstrates complex issues that contribute to the challenges of providing primary care services, which include growing provider shortages, especially in rural areas and pediatric specialties; limited mental health training; and limited exposure to rural care<sup>2,3</sup>. Nurse practitioners serve as providers and have proven high-quality care, positive patient outcomes, lower medical costs and higher quality of life among patients<sup>4,5</sup>. However, the transition to practice in rural settings is challenging and requires training and support beyond basic nurse practitioner education for many reasons. Most graduate-level nurse practitioner programs exist within universities located in urban areas of the US. Within rural health, finding willing preceptors to train students is difficult based on patient volume, inadequate office support and competition for placements among disciplines. Students may suffer hardship traveling to remote areas, unless they already live there and are interested in pursuing positions close to home<sup>2</sup>. Postgraduate fellowship and residency programs that offer training beyond traditional nurse practitioner programs began in 2007 in the US and offer additional training opportunities, but most pediatric programs exist in acute, critical and subspecialty areas of practice, with extremely limited pediatric-specific primary care programs identified<sup>6,7</sup>.

Considering demand for primary care and mental health providers in rural areas of the US and limited training, data regarding the pediatric population adds to care concerns. Chronic health conditions occur in one out of four children and pediatric mental health diagnoses have increased significantly, especially since the pandemic<sup>8,9</sup>. Between 2016 and 2020, 20–35% more children were diagnosed with anxiety and depression, with pediatric deaths rising<sup>8</sup>. Pediatric nurse practitioners (PNPs) in primary care must provide high-level care, astute identification of patient diagnoses and implementation of evidence-based care for a vulnerable population. Limited but promising reports indicate that nurse practitioners who enter practice through residencies or fellowships have better adjustment to practice, reduced burnout and greater intent to stay in their roles<sup>10</sup>. In 2010, the US National Academy of Medicine identified the necessity for fellowship and residency programs – and, based on provider and patient need, justification for nurse practitioner fellowship programs in primary care and mental health within rural and underserved areas is apparent<sup>11</sup>. These popular positions offer gradual transition to practice with opportunities for specialized training and clinical experience<sup>10,12</sup>.

While there is a dearth of research on educational needs of nurse practitioners working in rural health care, available data indicate barriers including few preceptors, competition for site placement and challenges getting trainees to travel and live in rural areas, contributing to reduced recruitment and retention<sup>2</sup>. However, exposure to clinical care in rural settings, having a supportive

mentor, responsibility for a panel of patients, and a competitive salary and benefits package are factors that support nurse practitioners taking jobs in rural areas<sup>13,14</sup>.

Frameworks and examples to support high-quality pediatric primary care in rural areas are essential to developing programs, but additional data about successful postgraduate nurse practitioner training programs including efficacy and outcomes are needed. The purpose of this article, using a pediatric primary care fellowship example, is to outline the needs of graduate nurse practitioners, describe the rationale for postgraduate training, highlight our program content and structure, and identify ways to collect data for evaluating the quality and efficacy of primary care fellowship programs.

Issue

Nurse practitioner transition to practice

Nurse practitioners are well positioned to provide primary care services for populations of all ages, but undergraduate pediatric nursing content in the US has decreased based on limited opportunities for clinical experiences and the need to focus on technology, patient complexity and additional general nursing content, leaving nurses without these skills or knowledge when entering PNP programs<sup>15,16</sup>. Nurse practitioner graduates are expected to quickly support practice costs and overheads, therefore limiting time to learn the provider role, resulting in frustration, stress and decreased retention<sup>3,4</sup>. Within the rural map, nurse practitioners face challenges including keeping track of rapid changes in care practices and delivery, increasing patient complexity, limited support staff and a lack of time to navigate medical records, document and communicate with patients<sup>10</sup>. A formal fellowship process offers longer and more in-depth orientation, especially in rural areas where providers must take on additional and essential care in mental health and subspecialty services due to lack of local resources<sup>15,17</sup>.

An exemplar of rural and underserved communities

Within the state of Delaware, healthcare access is a concern, with more than two-thirds of the state considered rural and two of the three counties representing medically underserved areas<sup>18</sup>. Approximately 17% of the 230,000 children live in poverty, and this figure is growing<sup>19</sup>. Overall, 13% of children aged 10–17 years have a serious mental health condition and 52% of those aged 12–17 years have diagnosed but untreated depression<sup>20</sup>. The number of children experiencing anxiety and depression increased 33% since 2016, and Delaware is ranked 29 in the least healthy states for maternal and child health<sup>8</sup>. Delaware is ranked 38 among the states with the highest incidence of illicit drug use by children, with 9.9% of adolescents involved and deaths from overdose increasing<sup>20</sup>. Poverty is a social determinant of health driving child health issues contributing to behavioral and mental health problems, preterm birth, low birthweight and high first-year mortality rates. Table 1 displays data regarding maternal–child health issues from the state of Delaware in 2023 as compared to national averages<sup>21</sup>. Poverty, racial and ethnic discrimination and/or adverse childhood events are additional factors contributing to the incidence of pediatric physical and mental health conditions, but often go unnoticed and untreated<sup>19</sup>.

A large pediatric health system serves Delaware in addition to parts of Maryland, Pennsylvania and New Jersey, with 67% of the primary care centers located in US Healthcare Provider Shortage Areas. Families often travel 1–2 hours to access subspecialty care and mental health support, contributing to missed school days and meals, which contributes to food insecurity. The extensive health issues, and awareness of the social determinants of health with limited community resources, contributed to pursuit of PNP as primary care providers and the fellowship as one way to implement sustainable high-quality comprehensive care.

Table 1: Data relating to infant and maternal health status in Delaware and the US

Issue	Delaware <sup>21</sup> (%)	US <sup>21</sup> (%)
Prematurity	11.0	10.5
Low birthweight	9.1	8.5
Infants dying prior to age 1 year	0.51	0.54
Infants born to women who did not receive adequate prenatal care	22	24.4
Uninsured women of childbearing age	6.6	11.6

Initiation of an advanced practice provider primary care fellowship

A lack of PNP educational programs in Delaware, nurse practitioners who are at or close to retirement age, and limited resources for mentoring and precepting, were additional reasons to initiate the PNP primary care fellowship in 2017<sup>22,23</sup>. A targeted review of the literature demonstrated no PNP primary care fellowship programs, and limited content discussing family and pediatric acute care curriculums. Only three articles reported outcome data related to their programs<sup>4,5,24</sup>. As such, our aim was to develop a program to support nurse practitioners in their transition to independent practice with a focus on mental and rural health to meet the needs of our communities.

Due to the lack of outcomes related to fellowship programs, we felt it essential to identify and measure key elements supporting the development and sustainment of similar programs. This led to the creation of our secondary aim: measuring nurse practitioner confidence and competence over time to ensure program success and educational gaps of new-to-practice nurse practitioners are met.

Anxiety and lack of competence are associated with increased burnout and reduced retention, so these were the focus of our primary outcomes. The State Trait Anxiety Inventory assesses anxiety related to confidence<sup>25</sup>, and competence is evaluated using the Primary Care Knowledge Resident Competency Assessment developed by the Veterans Affairs centers for primary care<sup>26</sup>. This tool was modified to reflect the pediatric primary care competencies outlined by the National Organization of Nurse

Practitioner Faculties<sup>27</sup>. Table 2 outlines these competencies. Confidence and competency are assessed at baseline, 1 month, 6 months and 12 months for all fellows in our program.

Additional program elements were modeled after other successful nurse practitioner fellowship programs<sup>10,12</sup> and refined for pediatric patients living in rural populations. Our fellowship program follows a traditional academic year starting and ending in October. Annually, we ask fellows to provide program feedback so content can be modified to better support a robust and effective curriculum.

Characteristics of pediatric patients living in Delaware, geography and limited specialty care access and ongoing need to retain primary care pediatric providers added to the mission. Stakeholder support came from the institution's chief nurse and primary care physician director. Experienced nurse practitioners were recruited as preceptors/mentors and educators. Practice manager support was required for PNP integration into primary care practices, and both patient and provider scheduling<sup>22,28</sup>. Extremely limited previous data documenting outcomes indicated a need for early and ongoing program evaluation.

The PNP primary care fellowship includes education in varied subspecialty clinics for the diagnosis and management of common problems and assists in keeping the child within the purview of the patient-centered medical home, limiting travel and interruptions in care when long appointment wait times occur. The program incorporates didactic content (Table 3) and hands-on treatment of conditions in the state that affect the lives of children, including prematurity, morbidity, vaccination rates, maternal health, postpartum depression screening, and complex and chronic physical and mental health problems. Incorporating behavioral and mental health training resulted in innovative interdisciplinary collaboration.

Between 20 and 30 PNPs apply to the fellowship from graduate primary care programs across the US in response to internet advertisements, targeted conference presentations and program director professional networking. Ideal candidates demonstrate interest caring for underserved pediatric populations, and a strong desire to enhance education and competency – especially in

behavioral and mental health. They complete certification and credentialing requirements, which can take approximately 90 days, and enrollment in the program follows a typical academic cycle. Weekly schedules include 2 days in the primary care setting (termed 'continuity clinic') with a primary mentor (Fig1). One week day is dedicated to didactic learning, reflective and wellbeing practices and/or an evidence-based practice project. Specialty rotations include nurse practitioner mentor-guided learning in school-based health centers, inpatient services such as the well-baby nursery, neonatal intensive care unit, pre-surgery areas and orthopedics, allowing exposure and understanding of patient and family experiences.

The PNP primary care fellowship also has been financially viable with billed income equaling close to 100% of fellow salary, documenting sustainability<sup>22</sup>. Pediatric nurse practitioners are responsible for providing care for a full panel of patients on a graduated scale. Management of the program and time for education offered by providers employed by the hospital are not listed in the program costs.

Between July 2017 and October 2024, 10 graduates completed the PNP primary care fellowship program and eight (80%) remain engaged in clinical care in rural or medically underserved communities. The program originally hired two PNPs per year, but the COVID-19 pandemic resulted in the resignation of one fellow in 2019, a hold on the program for 2020 and 2021 and only one fellow hired in 2022. A federal US Health Resource & Services Administration (HRSA) grant obtained in 2023 allowed the opportunity to host additional fellows from across the country with program expansion.

Fellows provide care in primary care clinics and collaborate in mental health care with licensed psychologists available on site. The HRSA grant supports four PNP primary care graduates annually as well as employing targeted training in our community's highest need areas: pediatric behavioral and mental health care, and rural health. In alignment with funding priorities, we are increasing training for telehealth and utilizing unique methods of education, focused on transition to practice in rural, urban or tribal underserved populations.

**Table 2: Pediatric-specific nurse practitioner competencies for assessment of the pediatric nurse practitioner primary care fellowship program**

Competency	Evaluation <sup>†</sup> examples
Clinical competency in planning and managing care	Differential diagnosis Medications Consults and referrals
Assess, diagnose, treat and manage over time common medical conditions experienced by pediatric patients in primary care	Vaccination schedule Asthma Otitis media Pharyngitis Fever of unknown origin Eczema Attention deficit hyperactivity disorder Depression Anxiety Overweight and obesity
Leadership	Lead case conferences Present patient problems
Interprofessional team collaboration	Safely transition patients between services and providers Maintain open, respectful communication Seek feedback from faculty and team members

Patient-centered care	Communicate with patients between visits using internet-based and telephone communication Elicit patient values, cultures and beliefs Empower patients for self-care Identify, accommodate and customize care based on cognition, language, functional and cultural barriers
Shared decision-making	Active listening skills Engage patients and families as care team member Share accountability with other professions, patients and communities for preventative care
Sustained relationships	Devise, follow, review and adjust longitudinal care plan to meet assigned patient healthcare needs Develop and sustain respectful and trusting relationships with peer trainees, program faculty, clinic staff and other interprofessional colleagues

† Evaluation includes many more parameters. This list is not all-inclusive.

**Table 3: Educational activities included in the first quarter of the pediatric nurse practitioner primary care fellowship program**

Topic	Area of concentration
Icebreaker/team-building exercises Orientation to institutional wellbeing program Gaining trust and giving feedback Nemours wellness program Nemours mansion and garden exploration Walk with 'Ali', Nemours therapy dog Attend hospital-wide orientation DISC® profile and connecting DISC to developing a culture of trust Self-directed wellness activity Interprofessional spiritual care education Communicating across cultures Managing difficult encounters	Wellness, team-building and communication activities
Introduction to antibiotic stewardship Antibiotic stewardship: bugs and drugs Antibiotic stewardship: pediatric dosing pharmacokinetics Asthma care Human trafficking: raising awareness to identifying victims in the clinical settings Weekly pediatric grand rounds Trauma series: pediatric strangulation Addressing vaccine hesitancy Telehealth overview and best practices Introduction to social determinants of health Religious practices and preferences All things respiratory Bronchopulmonary dysplasia: history and current trends	General pediatrics
PNP case study planning Responding to psychologist case studies Program director rounding	Interactive activities
Introduction to evidence-based practice Quality improvement and evidence-based practice methods Research methods and example of research project Role of research nurse Nursing Research Council Collaborative Institutional Training Initiative (CITI online) Nurses' role in recruiting and enrolling patients in research Literature critique, creating an evidence table Group discussion, individual project planning	Evidence based practice and research
Library services, request and search for evidence in the library	Library services
Gender-affirming care in the ambulatory setting Creating an adaptive care environment for vaccinations in children with autism Creating a hyperbilirubinemia pathway in the ED: A QI project example	Examples of previous projects in ambulatory care Quality improvement projects and clinical pathways

PNP, pediatric nurse practitioner. QI, quality improvement.



Week 1 Rotation					
Fellow Name and Primary Care Practice	Monday	Tuesday	Wednesday	Thursday	Friday
Fellow 1	Didactic Day	Primary Care	NICU	Primary Care	NICU
Fellow 2	Didactic Day	Pre-Surgery	Primary Care	Primary Care	Pre-Surgery
Fellow 3	Didactic Day	Primary Care	Primary Care	Adolescent Care	Adolescent Care
Fellow 4	Didactic Day	Primary Care	Pre-Surgery	Pre-Surgery	Primary Care
Week 2 Rotation					
Fellow Name and Primary Care Practice	Monday	Tuesday	Wednesday	Thursday	Friday
Fellow 1	Didactic Day	Primary Care	Adolescent Care	Neurology	Primary Care
Fellow 2	Didactic Day	Adolescent Care	Primary Care	Primary Care	Neurology
Fellow 3	Didactic Day	Developmental Medicine	Primary Care	Adolescent Care	Primary Care
Fellow 4	Didactic Day	Primary Care	Primary Care	Adolescent Care	Developmental Medicine

**Figure 1: Example of the pediatric nurse practitioner primary care fellowship clinical rotation schedule.**

## Supportive structures

### *Community partnerships*

As the hospital is not in a university setting, there are collaborative relationships with local universities to incorporate extensive pediatric behavioral and mental health training and additional education not available in the pediatric hospital setting. Linking with a federally qualified health center located in a Healthcare Provider Shortage Area allows fellows to care for vulnerable and high-risk patients and families.

### *Mental health training*

Behavioral and mental health services training provided by a psychologist partner offers fellows in-depth and extensive didactic including diagnosis, evaluation, screening tools and treatment, along with simulation experiences. A psychiatric mental health nurse practitioner adds education in pharmacological management of behavioral and mental health problems. Continuing education, collaboration and shadow opportunities with psychologists in primary care offices offer experiential education, especially noting that mental health and behavioral health care for providers is not consistent in US academic programs and nurse practitioner students are not always offered this experience clinically. With this education and clinical experience, nurse practitioners can now obtain additional credentials documenting training and competency<sup>29</sup>.

### *Wellbeing*

The partner psychologist offers support in an objective environment, allowing fellows to voice concerns and issues they may be uncomfortable relaying to organizational leaders. However, it is essential that fellows initiate and maintain relationships with preceptors, the program director and other program liaisons. Previous experience as pediatric nurses prepared fellows with established skills to build successful patient and family relationships. In addition to regular meetings with the program psychologist, fellows meet regularly with the program director and develop friendships among their cohort. The fellows benefit from hospital-based wellbeing activities to support resilience and retention<sup>28</sup>.

### *Training in rural health and underserved populations*

Rural health provision requires nurse practitioners to be independent, acknowledge emergent issues and manage challenging situations in primary care. Addressing specialty problems and stabilizing patients while awaiting appointments or transportation to higher levels of care is imperative. Management of behavioral and mental health problems can be accomplished by well-trained PNPs<sup>29</sup>. Education regarding social determinants of health allows nurse practitioners to address issues beyond the health needs of their patients. Nurse practitioners who live and work in their communities understand the challenges patients and their families face on a day-to-day basis<sup>3</sup>.

Additional benefits of working in US underserved and rural areas, to include Healthcare Provider Shortage Areas and a federally qualified health center, include working in a desirable location to live, tuition loan repayment, opportunity to independently manage a panel of patients and to gain specialty and complex patient experiences<sup>3</sup>. The PNP primary care fellowship incorporates clinical training in these sites but also didactic information about the rewards of choosing a career in a rural or underserved area.

## Lessons learned

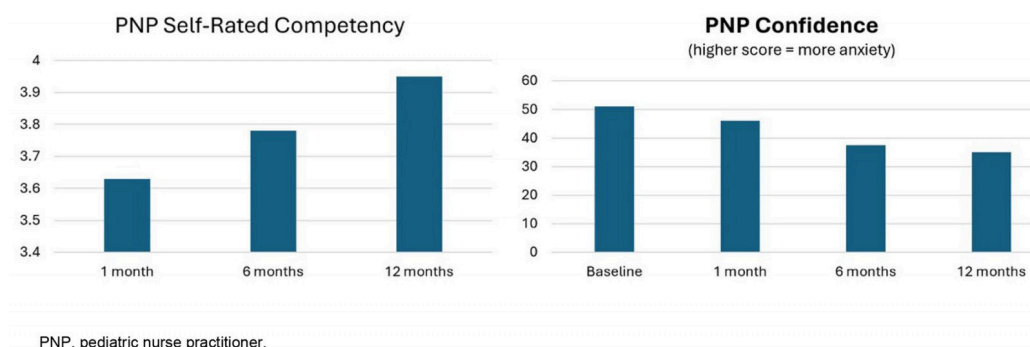
### Program evaluation

Program aims to include documentation of PNP confidence and competence as program outcomes is an important goal, but meaningful analysis of data with small numbers of participants is challenging. Programmatic evaluation for this fellowship began in 2017 and currently occurs with fellows' documentation of self-competency, confidence and employment status. Ten fellows have completed the program, and initial data indicate increased confidence and competency, especially in mental health care. Figure 2 includes data for these measures.

Long-term program evaluation includes tracking fellows who practice primary care in rural communities for 5 years post-training. Between July 2017 and October 2024, of the 10 graduates, eight (80%) remain engaged in clinical care in rural or medically underserved communities. Data are currently being collected through an institutional review board-approved interprofessional research project regarding clinical training with engaged psychologists.

Monitoring provider quality and success in line with patient outcomes and satisfaction, including quantitative information such as number of referrals and/or diagnostic testing with comparisons to providers who did not attend a PNP primary care fellowship, is ongoing. Other potential avenues for assessing training outcomes

could compare compliance with pediatric primary standards of care among PNP primary care fellowship trainees, but any meaningful comparisons will be difficult until adequate numbers of trainees are achieved.



**Figure 2: Initial data supporting the pediatric nurse practitioner primary care fellowship.**

## Organizational commitment

Developing and maintaining a PNP primary care fellowship involves a multitude of support services and institutional financial commitment for program director salary support, time for leaders to create curriculum, and administrative time to manage educational and clinical schedules and collaborative efforts between facilities. When this program launched in 2017, it demonstrated financial stability as fellows generated revenue through patient encounters, and now the HRSA grant allows further curriculum expansion and administrative support. The grant allowed us to create community partnerships with universities to provide simulated mental health trainings and with health systems, allowing for hands-on training for higher risk social needs populations. We have engaged a nurse scientist and evidence-based practice specialist within our organization to consult on data collection for quality improvement and research activities, and support outcome evaluation.

## Challenges

Barriers to program implementation have included competing educational needs from other disciplines (ie residents, students), and lack of space and support staff for fellows within primary care settings. This PNP primary care fellowship advanced practice providers to offer lectures and host fellows in specialty practice; however, the cost of mentors' non-clinical time is not counted but balanced by the opportunity to achieve professional and scholarly goals. Preceptors, office managers and staff are expected to maintain patient volumes, making ongoing engagement with a fellow challenging.

## Growth opportunities

Next steps include ongoing refinement of the program curriculum based on feedback and nurse practitioner learning and community needs. Over time, through use of quantitative metrics, we hope to find statistically significant results in program outcomes, which include confidence and competency. Monitoring the financial sustainability of our program, including administrative support, is essential. Following fellow career paths and evaluating their retention in rural and underserved areas is another goal.

Additionally, PNP primary care fellowship mentors have a unique role, and despite rewards including professional accomplishment, and potential clinical advancement, there is very little data regarding their roles in supporting transition to practice. Developing research around the evaluation and support of mentors associated with PNP primary care fellowship positive outcomes is a must, along with supporting their wellbeing and satisfaction.

## Summary

Nurse practitioner fellowship programs continue to gain momentum in the US, but in pediatrics remain primarily within inpatient services and settings<sup>4</sup>. To provide a successful pipeline for transition to practice within this children's hospital system, a PNP primary care fellowship program was initiated in 2017, training four fellows annually since 2023.

Initial data that informs program content, successful clinical experiences, satisfaction and wellbeing among attendees, and quality measures that document successful pediatric patient outcomes, is encouraging but ongoing. Transition-to-practice programs offer confidence for new nurse practitioners and can be key for those interested in providing comprehensive care for vulnerable populations in rural areas.

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## Conflicts of interest

The authors have no conflicts of interest to disclose.

## References

- 1 Health Resources & Services Administration. *Health workforce projections*. 2024. Available: [web link](#) (Accessed 21 May 2025).
- 2 Kaplan L, Pollack SW, Skillman SM, Patterson DG. Is being there enough? Postgraduate nurse practitioner residencies in rural primary care. *Journal of Rural Health* 2023; **39(3)**: 529-534. DOI link, PMid:36443985
- 3 Spetz J, Skillman SM, Andrilla CHA. Nurse practitioner autonomy and satisfaction in rural settings. *Medical Care Research and Review* 2017; **74(2)**: 227-235. DOI link, PMid:26825943
- 4 Audet L-A, Ghandour A, Sarasua I. Post-graduate integration programs for recently graduated nurse practitioners: a rapid review. *Quality Advancement in Nursing Education (Avancées en formation infirmière)* 2023; **9(3)**: 5. DOI link
- 5 Kleinpell RM, Grabenkort WR, Kapu AN, Constantine R, Sicoutris C. Nurse practitioners and physician assistants in acute and critical care: a concise review of the literature and data 2008-2018. *Critical Care Medicine* 2019; **47(10)**: 1442-1449. DOI link, PMid:31414993
- 6 American Academy of Nurse Practitioners. *What's a Nurse Practitioner (NP)?* 2024. Available: [web link](#) (Accessed 21 May 2025).
- 7 Consortium for Advanced Practice Providers. *APP postgraduate training*. 2024. Available: [web link](#) (Accessed 21 May 2025).
- 8 Annie E Casey Foundation. *2022 Kids Count data book*. 2022. Available: [web link](#) (Accessed 21 May 2025).
- 9 Blackwell CK, Elliott AJ, Ganiban J, Herbstman J, Hunt K, Forrest CB, et al. General health and life satisfaction in children with chronic illness. *Pediatrics* 2019; **143(6)**: e20182988. DOI link, PMid:31061222
- 10 Park J, Covelli AF, Pittman P. Effects of completing a postgraduate residency or fellowship program on primary care nurse practitioners' transition to practice. *Journal of the American Association of Nurse Practitioners* 2021; **34(1)**: 32-41. DOI link, PMid:33625166
- 11 Institute of Medicine (US) Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing, at the Institute of Medicine. *The future of nursing: leading change, advancing health*. Washington (DC): National Academies Press (US). 2011.
- 12 Meissen H. Nurse practitioner residency and fellowship programs: the controversy still exists. *Journal of the American Association of Nurse Practitioners* 2019; **31(7)**: 381-383. DOI link, PMid:31290807
- 13 Kaplan L, Pollack S, Skillman S, Patterson D. Factors that encourage and support advanced practice registered nurses to work in rural and safety-net settings. *Journal of Health Care for the Poor and Underserved* 2020; **31(4S)**: 163-181. DOI link, PMid:35061619
- 14 Owens RA. Transition experiences of new rural nurse practitioners. *The Journal for Nurse Practitioners* 2018; **14(8)**: 605-612. DOI link
- 15 Ljungbeck B, Sjögren Forss K, Finnbogadóttir H, Carlson E. Content in nurse practitioner education – a scoping review. *Nurse Education Today* 2021; **98**: 104650. DOI link, PMid:33203544
- 16 Rice M, Etheridge S, Armstrong A, Coleman E, Corcoran J, Hyde H, et al. Call to action: bolstering the diminishing pediatric nursing workforce. *The Journal of Nursing Education* 2024; **63(12)**: 806-812. DOI link, PMid:39642252
- 17 Morgan P, Sanchez M, Anglin L, Rana R, Butterfield R, Everett CM. Emerging practices in onboarding programs for PAs and NPs. *JAAPA: Official Journal of the American Academy of Physician Assistants* 2020; **33(3)**: 40-46. DOI link, PMid:32097215
- 18 Health Resources & Services Administration. *Health workforce shortage areas*. 2024. Available: [web link](#) (Accessed 21 May 2025).
- 19 Centers for Disease Control and Prevention. *Data and statistics on children's mental health*. Available: [web link](#) (Accessed 21 May 2025).
- 20 Drug Enforcement Administration. *The drug situation in Delaware 2020*. Available: [web link](#) (Accessed 21 May 2025).
- 21 Peristats. *State summary for Delaware*. 2024. Available: [web link](#) (Accessed 21 May 2025).
- 22 Carpenter AE. The development and implementation of a postgraduate pediatric primary care advanced practice nursing fellowship. *Journal of Pediatric Health Care* 2022; **36(5)**: 474-478. DOI link, PMid:35585005
- 23 Delaware Health Care Commission. *Health Workforce Subcommittee*. Available: [web link](#) (Accessed 21 May 2025).
- 24 McDonough KE. Outcomes of postgraduate fellowships and residencies for nurse practitioners: An integrative review. *Journal of Professional Nursing* 2024; **53**: 95-103. DOI link, PMid:38997205
- 25 Spielberger C, Gorsuch R, Lushene R, Vagg P, Jacobs G. *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Spielberger. 1983. DOI link
- 26 Ayvazian J, Muirhead L, Belizaire S, King SS, Campbell J, Klink K. Establishing competency-based measures for Department of Veterans Affairs post-graduate nurse practitioner residencies. *Journal of Professional Nursing* 2021; **37(5)**: 962-970. DOI link, PMid:34742529
- 27 National Organization of Nurse Practitioner Faculties. *Nurse practitioner role core competencies*. Available: [web link](#) (Accessed 21 May 2025).
- 28 Goodwin M, Fingerhood M, Slade E, Davidson P. Development of an innovative curriculum-to-career transition program for nurse practitioners in primary care. *Nursing Outlook* 2021; **69(3)**: 425-434. DOI link, PMid:33526251
- 29 Hallas D, Heuer B, Sesay-Tuffour SA, Foerster LA. Pediatric primary care mental health specialist examination: Job task analysis. *The Journal for Nurse Practitioners* 2023; **19(2)**: 104441. DOI link