

# Comparative Evaluation of Nurse Practitioners and Physician Assistants: Education, Policy, and Patient Outcomes

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## Abstract

Nurse Practitioners (NPs) and Physician Assistants (PAs) play a crucial role in addressing healthcare workforce shortages and providing cost-effective, high-quality care. This review examines current literature on their educational models, compensation patterns, policy development, clinical outcomes, and progression of their role in healthcare. Findings show that both professions achieve comparable patient satisfaction and outcomes to physicians despite differing in regulatory and educational frameworks among other differences.

## Keywords

Nurse Practitioners (NPs), Physician Assistants (PAs), Healthcare Policy, Clinical Outcomes, Education and Training

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## 1. Introduction

Nurse Practitioners (NPs) and Physician Assistants (PAs) are now an integral component of today's healthcare workforce, and their contribution is essential in addressing the growing demand for accessible and cost-effective medical care. At a time when healthcare facilities the world over are facing provider shortages, particularly in primary healthcare, NPs and PAs are now viable solutions in augmenting and supporting physicians' skill sets in numerous categories and settings of clinical practice. For many, there is a question of which role would be better suited to them. Both of these professions are taught to assess, diagnose, and treat patients, yet they differ in education, compensation, and regulation. However, they appear to differ little amongst each other or their physician counterparts in arguably the most important metric: patient outcomes. Both of these occupations re-

sult in positive patient care responses with most findings in specific settings showing evidence that PAs and NPs show no difference compared to medical doctors. Understanding the differences and similarities between NPs and PAs is essential in evaluating their impact on healthcare delivery and policy [1].

This paper examines the current literature, including guidelines, statistics, and studies pertaining to PAs and NPs with regard to educational background, patient care differences, patient outcomes, compensation, and policies.

## **2. Educational Background/Patient Care Differences**

NP education is focused on two general areas: developing the professional NP role and independent practice preparation. This advanced professional position is based on a foundation of in-depth knowledge in nursing theory and research, leadership and collaboration skills, as well as thorough understanding of the relevant organizational, political, economic, and regulatory issues to better influence healthcare systems and policies. At the same time, a strong foundation in health promotion and disease prevention must be integrated via the clinically oriented subjects of anatomy, physiology, pathophysiology, pharmacology, and advanced clinical assessment in order to ensure NPs are ready for the necessary decision-making required for independent practice. Together, these ensure that NPs are not only capable of providing high-quality, patient-centered care, but are also ready to lead, innovate, and guide the provision of healthcare while maintaining the unique emphasis on nursing that the role provides. The advancement of NP education has been central to expanding the role and authority of advanced practice nurses within modern healthcare systems. Unlike registered nurses, NPs are trained to exercise broader medical responsibility, involving functions that were traditionally exclusive to physicians. Their expanded clinical scope has allowed NPs to fill critical gaps in primary and specialty care, particularly in regions facing physician shortages, and to function as independent providers of medical care.

Despite the growing significance of nurse practitioners (NPs) in health care, certain barriers continue to limit the full realization of the role. A major concern is whether NP education adequately prepares graduates for advanced clinical practice. Among 159 recently graduated NPs, more than half reported feeling not fully prepared for their responsibilities, and over 60% noted a gap between their theoretical knowledge and clinical skills. New NPs expressed the greatest uncertainty in the following areas: independent decision-making, time management, complex care, prescribing, billing and coding, and interdisciplinary communication. These findings emphasize the need for structured residency or transition programs to strengthen early-career readiness [2].

Regarding their PA counterparts: PA education has similarly changed to address the ever-evolving healthcare and societal demands since the first such program was offered in 1965. Initially created to train military corpsmen to aid physicians, PA programs soon changed to address multiple community and educational needs. Modeled after medical school, PA education introduced many in-

structional innovations that have since become commonplace—such as simulated patient encounters, early clinical exposure, and problem-based learning. Additional programs followed in due course. As of the early 2000s, there were 132 accredited programs, most offering a 26-month program that consisted of didactic and clinical education, and almost half granting a master's degree. Program development caused shifts in the number of applicants, with enrollment and graduation rates increasing consistently during the 2000s. Education for PAs has also expanded to reach nontraditional students through online and interdisciplinary education, demonstrating broader trends in higher education. Support agencies have strengthened faculty development, research, and accreditation processes to make PA education a leading force in U.S. medical training. PA instruction is generally based on the biomedical model but is known for its novel, flexible, and patient-oriented approach to generating competent clinicians [3] [4].

The education PAs receive has played an important role in shaping the way patients view and respond to their treatment. Initial PA programs, such as Medical Extension (MEDEX), were created to train capable medical professionals quickly to meet physician shortages, and these programs established trust by proving that PAs could deliver adequate and safe care. Over the years, PA schooling has simultaneously become more uniform and standardized, while also becoming more robust, ensuring graduates have similar skill sets to physicians. This consistency in training reassured patients that they were under high-quality medical care whether the provider was a PA or a physician. According to numerous studies, patient satisfaction with treatment provided by PAs is consistently high, typically ranging from 94% to 100%. This indicates that the education PAs currently receive equips them with the required competency in both the technical and interpersonal skills required for patient care. Most importantly, as PA education expanded worldwide, patients uniformly reported equal levels of satisfaction across geographical locations—showcasing that this model of training is effective even between healthcare systems. In essence, strong PA education has been the foundation for their professional acceptance, and patient satisfaction was nearly indistinguishable from that of medical doctors [5].

However, just like NPs, PAs still do have some challenges with regard to preparedness. According to a 2023 National Commission on Certification of Physician Assistants (NCCPA) survey, only 39.5% of new PAs described themselves as “very prepared” for practice, while 55.4% described themselves merely as “somewhat prepared”, and with roughly 5% not considering themselves prepared (3.2% “neither prepared nor unprepared”, 1.5% as “somewhat unprepared”, and 0.3% as “very unprepared”). These figures suggest that PAs would also benefit from some post-graduate support to bridge the gap between training and clinical autonomy [6].

Taken together, the data from both NPs and PAs shows a commonality: new graduates in these advanced practice roles frequently perceive gaps between education and clinical demands, especially when it comes to complex decision-mak-

ing and administrative competencies. Both professions may benefit from structured transition frameworks such as residencies, internships, or mentorship programs to strengthen their readiness and develop long-term professional confidence.

Despite their similarities, there are differences in educational and regulatory structure between NPs and PAs. NP education is grounded in the nursing model, typically requiring prior RN licensure and emphasizing holistic, patient-centered care at the master's or doctoral level. In contrast, PA training follows a medical model inspired by physician education [4]. The nursing model centers on holistic, person-focused care—viewing the patient within the context of family, community, and wellness promotion—whereas the medical model is disease-oriented, emphasizing diagnosis, pathology, and treatment of specific conditions. While NPs are licensed through nursing boards and regulated under the Consensus Model for APRN Regulation, PAs are certified by the NCCPA and licensed under medical boards, often requiring supervisory or collaborative practice agreements. NPs who change specialties must generally complete additional coursework or certification, whereas PAs are permitted greater flexibility to move between specialties without additional licensing requirements. These structural and regulatory differences continue to shape their scopes of practice and levels of clinical autonomy [7] [8]. Most emergency-department NPs pursue Family NP (FNP) certification, emphasizing outpatient training, while Adult/Gerontology Acute Care NPs gain more inpatient experience but treat only ages 12 and up. Some institutions now offer EM-specific NP pathways with 168 - 500 additional hours of focused rotations. Meanwhile, PA applicants often present diverse prior experiences (paramedic, EMT, military medic), and PA curricula guarantee rotations across internal medicine, surgery, pediatrics, and EM, ensuring versatile exposure. Such variability in NP entry (especially direct-entry programs without bedside nursing) and PA pre-admission experience produces wide differences in clinical readiness [4].

Physician assistants typically earn a master's degree over approximately 27 months, completing about 2000 clinical hours during training, with admitted applicants averaging around 3500 hours of prior healthcare experience. Nurse practitioners generally complete 500 to 600 clinical hours for a master's degree or 1000 for a doctorate, often after accumulating 2000 to 4000 hours of registered nursing experience. Thus, while PA training is modeled on medicine and emphasizes broad, supervised clinical exposure, NP education builds upon prior nursing practice and integrates theory, leadership, and patient-centered care. Both programs lack the extensive specialty residencies physicians undertake but are evolving toward emergency medicine-specific or residency-style options to close readiness gaps [4].

Although all three—physicians, PAs, and NPs—treat patients, their pre-degree paths and post-graduate training differ sharply. Physicians complete medical school followed by three to four years of emergency medicine residency, amount-

ing to roughly 13,500 hours of clinical contact before independent practice. Although many NP and PA applicants enter training with thousands of hours of prior clinical experience—often as registered nurses, EMTs, or military medics—these experiences differ qualitatively from the structured, supervised clinical education completed during formal graduate training and physician residencies. The former provides valuable patient exposure, procedural familiarity, and situational awareness, but is typically task-oriented and role-specific rather than designed for competency-based progression or independent clinical decision-making. Meanwhile, the latter emphasizes progressive responsibility, standardized competency evaluation, and direct oversight by attending clinicians [2] [4] [7].

### 3. Compensation

NPs in the United States earned a mean hourly wage of \$59.94 in 2022—about \$124,680 annually—with an estimated 258,230 NPs employed nationwide. Compensation rose steadily through the 2010s and early 2020s, outpacing inflation and reflecting sustained demand for NP services. Because NPs were only first reported as a separate occupation in the Bureau of Labor Statistics (BLS) in 2012, we compare over the timeframe of 2012 to 2022. During that period, NP mean annual wages increased from \$91,450 in 2012 to \$124,680 in 2022, a rise of approximately 36.3% [9] [10]. Over this same 2012-2022 period, cumulative inflation (as measured by the Consumer Price Index) increased by roughly 27% [11]. Thus, real wage growth for NPs was about 9.3 percentage points above inflation. This growth reflects persistent national demand and the expanding autonomy of the NP workforce. As discussed later, increases in demand and favorable policy (e.g., expanded practice authority) have continued to support a strong NP labor market with further-increasing pay into the mid-2020s, showcasing the role's economic stability.

There is drastic variance in compensation among states and industries: context-specific averages for Advanced Practice Registered Nurses (APRNs), which includes NPs, varied widely across the country. Based on 2022 data, amongst the industries with the highest concentration of NP employment, NPs working in home health care services earning the highest mean annual wage (\$148,960), followed by outpatient care centers (\$134,030), then general medical and surgical hospitals (\$129,330). Those working in the offices of physicians earned even less (\$121,880), and the absolute lowest mean wage occurred with those NPs that worked in the office of other (non-physician) health care practitioners with a mean of \$112,660. Regionally, California had one of the highest state averages, with a mean annual wage of \$158,130. Amongst the states that had the highest employment level of NP jobs with reported annual mean wages, Tennessee and Florida ranked the lowest at \$99,330 and \$110,310, respectively [10].

Very similar figures and patterns are found with PAs. In the United States, they earned a mean hourly income of \$60.23 (about \$125,270 annually) in 2022, with approximately 140,910 employed nationwide [12]. From the same 2012 to 2022 period, PA mean annual wages increased from \$92,460 to \$125,270, a rise of ap-

proximately 35.5% [4] [12]. Compared with the same roughly 27% inflation increase, PAs experienced an estimated 8.5 percentage points of real wage growth above inflation—roughly the same as what was seen among NPs. The overall mean salaries were also comparable, with PAs only making approximately \$500 more than NPs on average, an incredibly small percentage difference.

Just as with NPs, salaries varied by both setting and geography: outpatient care centers offered the highest mean annual earnings (\$137,040), followed by employment services (\$133,750) and scientific research and development services (\$130,400). Regionally, Connecticut and Rhode Island ranked among the top states in terms of PA compensation (mean annual wages estimated at \$137,060 and \$136,760, respectively), while Kentucky and Mississippi were among the lowest (\$97,270 and \$98,000) [12].

Projections through 2025 suggest PA salaries will continue to rise at a rate above inflation, furthering the career's stability [3].

#### 4. Policies

The development of the NP role was closely tied to healthcare policy and educational reform during the mid-1900s. Federal initiatives such as the establishment of Medicare and Medicaid in 1965 increased the demand for cost-effective primary care, initiating new models of advanced nursing practice [13]. That same year, Loretta Ford and Henry Silver launched the first NP program at the University of Colorado, laying the foundation for a graduate nursing degree [14]. Later legislative efforts emphasized reimbursement and independence. Eventually, state laws evolved toward full practice authority, allowing NPs to diagnose, prescribe, and manage treatment independently in an increasing number of jurisdictions. These milestones show how policy and regulation have shaped the modern landscape of the NP profession, making it a key avenue for patient care in the modern world [13].

By a very similar token, the PA profession emerged from federal policies and legislation that aimed at expanding access to medical care due to the increased physician shortages that were occurring in the 1960s. At that time, workforce analysis revealed strong disparities and inadequacies in primary health care coverage, most notably in rural and other underserved communities, causing the federal government to begin investing in the training of additional modes of healthcare providers. The Allied Health Professions Personnel Act of 1966 and the Health Manpower Act of 1968 helped provide federal funding which supported the establishment of PA programs, especially in these rural and underserved regions. This monetary support helped build out the necessary educational infrastructure for such programs [15].

Subsequently, the Rural Health Clinic Services Act of 1977 also helped improve access to healthcare in rural and other medically underserved areas by creating the Rural Health Clinic (RHC) program. This program provided Medicare and Medicaid reimbursement for PAs and NPs within these jurisdictions—however,

initially only through a supervising physician or facility. Two decades later, the Balanced Budget Act of 1997, authorized direct Medicare reimbursement for both NP and PA services, strengthening the professions' financial and policy standing within the healthcare system (direct payment via Medicaid had to instead be authorized by individual states) [15] [16].

In addition to legislative milestones, professional advocacy organizations have played an ongoing role in shaping the regulatory environment for APPs. The American Association of Nurse Practitioners (AANP) has been a primary driver behind state-level efforts to achieve full practice authority, supporting model legislation and public campaigns that emphasize safety, access, and cost-effectiveness of NP-led care [13] [17]. Similarly, the American Academy of Physician Associates (AAPA) has advocated for "PA Practice Modernization", seeking to modernize supervision laws and expand PAs' direct participation in care delivery and reimbursement frameworks [7] [18]. Collectively, these advocacy bodies have translated evolving workforce needs into sustained policy change, complementing the statutory reforms outlined above.

## 5. Outcomes

Thirteen randomized controlled trials compared Advanced Nurse Practitioners (ANPs) with standard physician-led care in high-income primary care, hospital, outpatient, and nursing home settings. (Note that ANP is a broader international term used to describe what are specifically labeled NPs in the United States, while also including equivalent degrees and titles in other countries.) The findings suggested that ANPs delivered care that was largely equivalent to that of physicians. In fact, certain clinical outcomes were even *more* effective with ANPs than traditional physicians, including in the areas of indigestion management, blood pressure, and mobility in elderly patients following hip fractures. Service outcomes also favored ANPs, with the patients being more satisfied due to longer consultations involving better communication, with a reduction in both wait time and cost in some cases. Overall, ANPs were shown to not be inferior to physicians, with evidence supporting their positive impacts on patient satisfaction, chronic disease care, cost-effectiveness, and healthcare efficiency, particularly in primary and chronic care [19].

In parallel, multiple reviews have examined whether patients respond differently to care provided by PAs versus NPs. Across international and U.S. studies, patient satisfaction with both professions remains high, with no consistent differences detected between them. In one large comparative analysis, 89% - 96% of patients reported high satisfaction regardless of whether they were treated by a physician, PA, or NP, reflecting similar ratings of communication, accessibility, and confidence in their medical provider [20]. These parallels reinforce the idea that patient satisfaction, perceived care quality, and clinical preparedness are broadly comparable between PAs and NPs—as well as between them and physicians—even though their educational and regulatory paths diverge.

The utility and acceptance of both PAs and NPs is evident in the increased hiring practices in the medical field. From 1997 to 2006, the number of hospital emergency departments (EDs) which employed “advanced practice providers” (APPs) (which includes both PAs and NPs) increased from 28% to 77%. In 2015, out of academic EDs, 74% employed APPs. While the momentum has somewhat plateaued leading to a less drastic increase in subsequent years, that percentage has gradually crept up—as of 2020, 80% of EDs employ APPs. In 2009, 15% of ED visits were performed by either PAs or NPs. Out of those, 40% did not see an attending physician at all and were exclusively treated by the PA/NP [4].

Over time, their roles will likely only increase. Forecasts by the Association of American Medical Colleges project a shortage of 22,000 - 32,000 emergency physicians by 2030, while the NP and PA workforces are expected to grow 6.8% and 4.3% annually, respectively, compared to physicians’ projected 1.1% increase. This imbalance signals that PAs and NPs will likely assume an even greater share of emergency and primary care delivery [4].

## 6. Integration and Evolving Roles

The expansion of physician assistant and nurse practitioner roles in the United States reflects not only educational and policy evolution but also a systemic shift toward collaborative and distributed models of care. Since the mid-2010s, hospital systems have increasingly restructured clinical teams to leverage the flexibility of advanced practice providers, with many emergency departments, primary-care networks, and rural facilities relying on PAs and NPs as first-line clinicians. Their presence has proven essential in mitigating the effects of physician shortages while maintaining continuity of care and accessibility in both urban and underserved regions. Evidence suggests that the inclusion of APPs improves patient throughput, reduces waiting times, and sustains quality metrics even in high-acuity environments [1] [5].

At an institutional level, health systems have begun formalizing integration strategies through standardized privileging frameworks, collaborative practice agreements, and interprofessional leadership models. In academic centers, joint PA/NP fellowship programs have emerged to enhance postgraduate specialization in areas such as critical care, oncology, and emergency medicine [5] [6]. These programs not only address initial readiness gaps but also establish a professional culture of continuous competency assessment and multidisciplinary collaboration [2] [5]. However, it is important to note that while these postgraduate residencies and fellowships are expanding, their availability and standardization remain limited compared with the mandatory residency system for physicians. According to a 2023 NCCPA report, only about 5.7% of clinically active PAs have completed a formal postgraduate residency or fellowship [21]. Similarly, data from one national study suggest that roughly 10% of primary-care NPs have done so [22].

Moreover, the expanding use of APPs aligns with broader healthcare economics. Studies have shown that incorporating PAs and NPs can reduce per-patient

cost without compromising outcomes, largely by optimizing physician time toward complex cases and expanding coverage in cost-sensitive settings [4] [7]. As reimbursement and scope-of-practice laws continue to expand—particularly under state-level full-practice authority statutes for NPs and relaxed supervision rules for PAs—these providers are positioned to function as autonomous and integral components of the U.S. healthcare delivery model [7]. Their evolving roles underscore the transition from hierarchical physician-led structures to team-based, competency-driven systems of care—an adjustment essential to sustaining accessibility and quality in a strained healthcare workforce [6] [13] [16].

## 7. Limitations

This review has several inherent limitations. The studies synthesized vary considerably in design, population, and outcome measures, reflecting the heterogeneity typical of health-services research on APPs. Differences in national and institutional educational requirements for NPs and PAs may complicate direct comparisons across settings [2]. Moreover, patient satisfaction and effectiveness studies often rely on self-reported data and localized practice conditions, which limits generalizability [5]. In addition, while the evidence indicates that patient outcomes associated with NPs and PAs are substantially equivalent to those of physicians, it is important to note that these findings are largely derived from studies conducted in primary care and chronic disease management contexts, and thus outcomes may vary in acute or highly specialized settings. Workforce and compensation analyses depend on cross-sectional data from government surveys that do not fully capture regional market fluctuations or post-pandemic shifts [9]. Finally, healthcare policy and scope-of-practice regulations evolve rapidly; thus, the applicability of specific findings may diminish as new legislation, reimbursement models, and educational standards emerge [13]. These factors should be considered when interpreting the conclusions of this review and when extrapolating to future workforce or policy conditions.

## 8. Conclusion

Nurse Practitioners and Physician Assistants have evolved in parallel to meet modern healthcare demands, blending unique educational and policy frameworks into complementary practice models. Both professions demonstrate substantially equivalent patient outcomes and comparable compensation, reflecting their shared utility in an overextended healthcare system. Future efforts should focus on unifying educational standards, expanding residency programs, and continuing alignment of regulatory frameworks to maximize the overall positive impact on healthcare access and quality that these professions offer.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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