

Recent evidence of nurse practitioner outcomes in a variety of care settings

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ABSTRACT

When nurse practitioners (NPs) work to expand their scope of practice through state legislatures, the opposing lobbying groups are often physician-led organizations. The main argument against NP independence and limited scope of practice is that NP care is inherently inferior to that of physicians. However, more than three decades of research demonstrates quality and cost outcomes to be equal to or better than that of physicians. This article reviews a wide range of evidence documenting NP competency, satisfaction, and safety, as well as the challenges and consequences when limiting NP scope of practice. The evidence is clear and has not changed in over 30 years, NPs provide access to effective primary care in a variety of settings, equal in quality outcomes, safety, and cost-effectiveness compared with physicians.

Keywords: Nurse practitioners; primary care; quality of care outcomes; rural settings.

Journal of the American Association of Nurse Practitioners 33 (2021) 771–775, © 2020 American Association of Nurse Practitioners

DOI# 10.1097/JXX.0000000000000451

Over 30 years ago, the United States Office of Technology Assessment (OTA) studied the contributions of nurse practitioners (NPs), physician assistants (PAs), and certified nurse midwives (CNMs) in meeting the nation's health care needs at the request of the Senate Committee on Appropriations. The study concluded that the quality of care provided by NPs, PAs, and CNMs was equivalent to care provided by physicians (OTA, 1986). When NPs work to expand their scope of practice through state legislatures, the opposing lobbying groups are often physician-led organizations (Lardieri, 2019). The **main argument against NP independence is that NP care is inherently inferior to that of physicians**. Physicians and NPs disagree on the topics of NP autonomy and competency. One study reported that only 17.2% of physicians agreed that NPs should be allowed to lead medical homes, whereas 82.2% of NPs believed so. Concerning competency, 61.1% of physicians agreed that physicians provide "higher quality of examination and consultation" than NPs, whereas 75.3% of NPs disagreed with the statement. Approximately one in three physicians believed that increasing the supply of NPs would possibly harm patient safety (Donelan et al., 2013). The purpose of

this article was to review the evidence of NP outcomes, compared with physicians, in a variety of settings.

Standards and scope of practice

The Consensus Model for APRN Regulation defines Advanced Practice Registered Nurses (APRNs) as NPs, certified registered nurse anesthetists, clinical nurse specialists (CNSs), and CNMs (APRN Joint Dialogue Group, 2008). The literature reviewed for this article focuses on NP practice, with some literature using NP and APRN synonymously. Nurse practitioner practice is regulated by individual states, and their ability to practice independently is broadly categorized into full, reduced, or restricted practice. In full practice states, NPs can practice independently without physician oversight and report directly to their state's board of nursing. Nurse practitioners in these states can independently evaluate, diagnose, order tests, and prescribe for patients. In reduced practice states, NPs must collaborate with an outside health discipline within the parameters of a collaborative agreement for at least one element of practice. In restricted practice states, an outside health discipline must oversee all patient care performed by an NP (Oliver et al., 2014; Ortiz et al., 2018; Peterson, 2017). A study of NP perceptions of physician oversight found that only a minority of NPs believed that physician oversight improved patient care, and a majority believed it was a barrier to understanding the NP role and hampered patient trust (Lowery et al., 2016).

Another study compared states with and without NP full practice authority with quality of care for Medicare and Medicaid patients. The individual categories included

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Received: 25 February 2020; **revised:** 15 April 2020; **accepted:** 20 April 2020

Medicare–Medicaid avoidable hospitalizations, nursing home patient annual hospitalizations, and overall state health outcomes. States with full practice authority for NPs were found to have improved health outcomes and lower hospitalization rates in all groups (Oliver et al., 2014). When comparing the practice and quality of 350 NPs with more restrictive and less restrictive NP scope of practice regulations, there was no significant difference in quality between the states. Patients of NPs in states with less restrictive NP scope of practice received more education and medications and were found to be more likely referred to a physician (Kurtzman & Barnow, 2017). Another study compared the quality of care by NPs in states with more restrictive and less restrictive scope of practice laws to see if care was improved with greater restrictions. An association was not found between NP quality of primary care and state scope of practice restrictions (Perloff et al., 2019).

Studies examined the effect of restrictive scope of practice regulations on NP workforce, access to and utilization of health care, medical cost, and health delivery outcomes. States with fewer restrictions had more positive results in all categories, meaning greater NP supply and lower medical costs. Not only was there greater utilization of health care in states with fewer restrictions but the quality of care was similar, especially with rural and underserved populations (Xue et al., 2016; Yang et al., 2020). When examining prescribing practices, quality was comparable between physicians and nonphysicians (Jiao et al., 2018). A survey of NPs from 118 primary care practices found that when practice administrators supported independent NP practice, patients with asthma were more likely to receive adequate medication management and those with cardiovascular disease were more likely to receive lipid screening (Poghosyan et al., 2018). As the health care delivery system evolves, NPs relentlessly explore ways to overcome restrictive state laws and regulations. However, barriers to NP full practice authority continue to limit the ability of patients to access primary care NP providers.

Over the past three decades, the number of NPs and their responsibilities for providing care to patients has increased, despite the resistance these providers have encountered in their attempts to practice to the top of their licensure and education. Today, there are 290,000 licensed NPs in the United States compared with 15,400 in 1986. Of these licensed NPs, 87.1% are certified in primary care and 72.6% of all NPs deliver primary care (American Association of Nurse Practitioners, 2019). There are 479,856 primary care physicians in the United States with a projected shortage over the next decade (Association of American Medical Colleges, 2019). This will lead to a gap between the increasing population demand for primary care physicians and the number entering and remaining in practice. In contrast, the number of NPs entering primary care is expected to increase by 84% by 2025 (Bodenheimer & Bauer, 2016).

The proportion of NPs working as primary care providers is increasing in both rural and nonrural practices. In the years 2008–2016, the percentage of primary care providers who are NPs increased from 17.6% to 25.2% in rural and from 15.9% to 23% in nonrural practices. States with fewer restrictions on NP practice had the largest proportion of NP primary care providers (Barnes et al., 2018).

Outcomes in primary care

Large-scale studies of primary care visits support NPs in this role. A retrospective study with sampling representing 30 million patient visits to community health centers found no statistical differences between NP or PA care in comparison with that of primary care physicians in seven of nine outcomes, including physical examination, receiving a statin for hyperlipidemia, and depression treatment. Of the other two outcomes, patients visiting NPs were more likely to receive health and smoking cessation counseling than those visiting physicians. The study overall found that NP and PA quality of care was comparable with that of physicians (Kurtzman et al., 2017).

A systematic review of 10 randomized controlled trials evaluated the safety and effectiveness of NPs in primary care for ongoing patient care or consultations for acute conditions. In all studies, the NP group generally had longer consultation times with their patients and “demonstrated equal or better outcomes than physician groups for physiologic measures, patient satisfaction, and cost” (p. 396) (Swan et al., 2015). This study specifically compared NPs with physicians in a primary care provider role and revealed few differences between NP and physician care, and in some areas, NP care was found to be superior (Swan et al., 2015). Another systematic review evaluating NP-led cardiovascular care to physician or PA-led care found a 12% reduction in Framingham scores (10-year risk of developing coronary artery disease) and no difference in health-related quality-of-life outcomes (Smigorowsky et al., 2020).

When the State of Massachusetts attempted to ensure near-universal health care insurance to the state’s residents, it contracted with the RAND Corporation to analyze options. The RAND study found that “Even though they are educated to perform many routine aspects of primary and specialty care and even though studies have shown that they provide care similar to that provided by physicians, PAs and NPs generally cannot practice as independent medical providers and therefore are underutilized in the provision of primary care” (p. 99) (RAND, 2009). A study comparing NP–physician comanagement to individual physician management in primary care revealed no detrimental effects with comanagement and in some cases found comanagement to be more beneficial (Norful et al., 2019).

Outcomes in rural settings

Although the shortage of primary care physicians is an ongoing concern, it is more critical in rural areas.

Research on the distribution of physicians and non-physicians in rural and urban areas found that the physician population was more concentrated in urban areas (Graves et al., 2016). In comparison with states with a limited scope of practice for NPs, states with a less restricted scope of practice had more primary care NPs per 100,000 population (Graves et al., 2016). States with a less restricted scope of practice also were found to have up to 40% more primary care NPs in some areas. Despite this greater availability of primary care NPs in some states, rural areas were still found to have the highest number of uninsured population per primary care provider (Graves et al., 2016).

A study classified NP practice location as urban, large rural, small rural, or isolated small rural and explored the influence of NP regulation on autonomy and satisfaction (Spetz et al., 2017). States with less restrictive regulations were more likely to have a higher number of rural practice NPs. "Rural NPs more often reported they were fully using their NP skills, practicing to the fullest extent of the legal scope of practice, satisfied with their work, and planning to stay in their jobs" (p. 227) (Spetz et al., 2017). Although the study found a lower overall supply of NPs in the most rural areas, the proportion of NPs in primary care was increased. A study of rural health clinics in eight southeastern states examined the impact of NP practice authority on five patient outcomes. Outcomes included 30-day hospital readmission rates and rates of ambulatory care-sensitive conditions, including congestive heart failure and diabetes. The results demonstrated no significant difference between varying NP scope of practice and patient outcomes, and it did not find reduced patient care quality in states where NP scope of practice was expanded (Ortiz et al., 2018).

Outcomes in emergent care settings

Although over 70% of all NPs deliver primary care in urban and rural settings, a burgeoning practice setting for primary care NPs is urgent and emergent care settings. Primary care NPs provide care in a variety of urgent care centers affiliated with hospitals, retail clinics, and walk-in clinics. Nurse practitioner practice in these urgent care settings ensure continuity of care, decreased health care costs, and optimized health outcomes for patients (Carthon et al., 2017; Villasenor & Krouse, 2016).

Several papers studied hospital emergency department (ED) care by NPs. A review article examined the impact of NP care on ED outcomes and reported that NP utilization is an essential component for addressing increasing emergency patient populations, and "NPs are qualified to provide safe, efficient, high-quality care in the ED and were proven to earn equivalent, if not higher, patient satisfaction ratings" (p. 246) (Fowler et al., 2019). A second review describing the impact of NPs on ED outcomes showed a positive association with patient satisfaction and quality of care, and reduced waiting times. Among the studies examined, no significant difference in quality was found

between the NP and physician groups. Patient satisfaction with practitioner care was consistently equal to or better than that of physicians (Jennings et al., 2015).

A retrospective study of over 12,000 emergency patients with an Emergency Severity Index of level 3 presenting with acute abdominal pain compared NP and PA diagnostic performance with that of physicians and with interprofessional collaboration (Hoyt et al., 2018). Although the NPs and PAs working independently had reduced odds of consistent diagnoses, NPs and PAs working in collaboration with physicians had higher odds of consistent diagnoses compared with physicians working alone. The study also found that hospitals with more equal distributions of NPs/PAs and physicians with respect to those with disproportionate distributions had greater odds of consistent diagnoses for acute abdominal pain (Hoyt et al., 2018). This study underscores that full practice authority for NPs does not exclude collaborative care. Indeed, collaboration in patient care by NPs in conjunction with physicians, PAs, pharmacists, and other equally important health care team members may be the best outcome for all.

Department of Veterans Affairs

In 2017, the Department of Veterans Affairs (VA) granted full practice authority to three of the four APRN roles: NPs, CNSs, and CNMs without physician supervision. Granting full practice authority "increases veteran access to needed VA health care, particularly in medically underserved areas, and decreases the amount of time veterans spend waiting for patient appointments" (p. 14) (Sofer, 2017). The supporting evidence for this ruling was the landmark report, *Evidence Brief: The Quality of Care Provided by Advanced Practice Nurses* (McCleery et al., 2014). Although some physician professional organizations voiced opposition to the VA ruling, many stakeholders supported the amended regulation. Senator Bob Dole, a World War II veteran, wrote, "I support the rule because it is based on a wealth of published research and the results of an independent assessment of the Veterans Health Administration (VHA). The research, comprising 14 studies since 2000, shows the quality and safety of care delivered by APRNs. Our veterans deserve the very best, most timely health care services the VA can provide, and enabling APRNs to practice to the full scope of their education and abilities is a logical, cost-effective, and proven safe way for that to happen. We owe it to our nation's heroes" (Dole, 2016). A recent study of patient outcomes comparing VA primary care NPs and MDs reported similar quality of care outcomes with patients seen by NPs experiencing fewer total and ambulatory care sensitive hospitalizations (Liu et al., 2020).

The ongoing debate

The origins of the NP movement date back to 1965, when nurse Loretta Ford and physician Henry Silver sought to improve access and affordability of primary health care.

Even then, fewer physicians were entering the fields of adult and pediatric primary care (Brush & Capezuti, 1996). Over half a century later, NPs are still working to assist patients in obtaining affordable primary health care for themselves and their families. It is only through ongoing research attesting to the competency and safety of NPs, by making this information known to patients and legislators, and by openly debating when challenged, that NPs can fully serve the needs of the deserving public.

New models of health care delivery continue to emerge, with primary care playing an essential role in most care models in the United States. The evidence is clear and has not changed in over 30 years, NPs provide access to and effective primary care, equal in quality and safety, and cost-effective compared with physicians. Barriers to effective utilization of NPs including scope of practice, prescriptive authority, and physician supervision must be eliminated in order for NPs to care for the millions of Americans with multiple chronic diseases who will be without primary care providers due to the looming primary care physician shortage.

Authors' contributions: D. E. Geller wrote the initial draft of the manuscript. B. A. Swan revised the manuscript, conducted a second literature search, and made substantial contributions to the content. D. E. Geller and B. A. Swan developed the brief, gathered the literature, and revised the manuscript for final submission.

Competing interests: The authors report no conflicts of interest.

References

- American Association of Nurse Practitioners (2019). *NP facts*. American Association of Nurse Practitioners.
- APRN Joint Dialogue Group (2008). Consensus model for APRN regulation: Licensure, accreditation, certification, and education. https://www.ncsbn.org/Consensus_Model_for_APRN_Regulation_July_2008.pdf.
- Association of American Medical Colleges (2019). New findings confirm predictions on physician shortage. <https://www.aamc.org/news-insights/press-releases/new-findings-confirm-predictions-physician-shortage>.
- Barnes, H., Richards, M. R., McHugh, M. D., & Martsof, G. (2018). Rural and nonrural primary care physician practices increasingly rely on nurse practitioners. *Health Affairs (Millwood)*, *37*, 908–914.
- Bodenheimer, T., & Bauer, L. (2016). Rethinking the primary care workforce—An expanded role for nurses. *New England Journal of Medicine*, *375*, 1015–1017.
- Brush, B. L., & Capezuti, E. A. (1996). Revisiting “a nurse for all settings”: The nurse practitioner movement, 1965–1995. *Journal of the American Academy of Nurse Practitioners*, *8*, 5–11.
- Carthon, J. M., Sammarco, T., Pancir, D., Chittams, J., Nicely, K. W. (2017). Growth in retail-based clinics after nurse practitioner scope of practice reform. *Nursing Outlook*, *65*, 195–201.
- Dole, R. J. (2016). A veteran's stance on proposed VA rule to reduce wait times. *Forbes*. <https://www.forbes.com/sites/real-spin/2016/08/11/a-veterans-stance-on-proposed-va-rule-to-reduce-wait-times/#777746d21cc3>.
- Donelan, K., DesRoches, C. M., Dittus, R. S., & Buerhaus, P. (2013). Perspectives of physicians and nurse practitioners on primary care practice. *New England Journal of Medicine*, *368*, 1898–1906.
- Fowler, L. H., Landry, J., & Nunn, M. F. (2019). Nurse practitioners improving emergency department quality and patient outcomes. *Critical Care Nursing Clinics of North America*, *31*, 237–247.
- Graves, J. A., Mishra, P., Dittus, R. S., Parikh, R., Perloff, J., & Buerhaus, P. I. (2016). Role of geography and nurse practitioner scope-of-practice in efforts to expand primary care system capacity: Health reform and the primary care workforce. *Medical Care*, *54*, 81–89.
- Hoyt, K. S., Ramirez, E., Topp, R., Nichols, S., & Agan, D. (2018). Comparing nurse practitioners/physician assistants and physicians in diagnosing adult abdominal pain in the emergency department. *Journal of the American Association of Nurse Practitioners*, *30*, 655–661.
- Jennings, N., Clifford, S., Fox, A. R., O'Connell, J., & Gardner, G. (2015). The impact of nurse practitioner services on cost, quality of care, satisfaction and waiting times in the emergency department: A systematic review. *International Journal of Nursing Studies*, *52*, 421–435.
- Jiao, S., Murimi, I. B., Stafford, R. S., Mojtabei, R., & Alexander, G. C. (2018). Quality of prescribing by physicians, nurse practitioners, and physician assistants in the United States. *Pharmacotherapy*, *38*, 417–427.
- Kurtzman, E. T., & Barnow, B. S. (2017). A comparison of nurse practitioners, physician assistants, and primary care physicians' patterns of practice and quality of care in health centers. *Medical Care*, *55*, 615–622.
- Kurtzman, E. T., Barnow, B. S., Johnson, J. E., Simmens, S. J., Infeld, D. L., & Mullan, F. (2017). Does the regulatory environment affect nurse practitioners' patterns of practice or quality of care in health centers? *Health Services Research*, *52*(suppl 1), 437–458.
- Lardieri, A. (2019, July 3). Amid provider shortage, California doctors oppose expanding nurse practitioner abilities. *U.S. News and World Reports*. <https://www.usnews.com/news/health-news/articles/2019-07-03/california-doctors-oppose-expanding-nurse-practitioner-authorities>.
- Liu, C., Herbert, P., Douglas, J., Neely, E., Sulc, C., Reddy, A., Sales, A., & Wong, E. (2020). Outcomes of primary care delivery by nurse practitioners: Utilization, cost, and quality of care. *Health Services Research*, *55*, 178–189.
- Lowery, B., Scott, E., & Swanson, M. (2016). Nurse practitioner perceptions of the impact of physician oversight on quality and safety of nurse practitioner practice. *Journal of the American Association of Nurse Practitioners*, *28*, 436–445.
- McCleery, E., Christensen, V., Peterson, K., Humphrey, L., & Helfand, M. (2011). Evidence brief: The quality of care provided by advanced practice nurses. In *VA evidence synthesis program evidence briefs*. Department of Veterans Affairs (US).
- Norful, A. A., Swords, K., Marichal, M., Cho, H., & Poghosyan, L. (2019). Nurse practitioner-physician comanagement of primary care patients: The promise of a new delivery care model to improve quality of care. *Health Care Management Review*, *44*, 235–245.
- Oliver, G. M., Pennington, L., Revelle, S., & Rantz, M. (2014). Impact of nurse practitioners on health outcomes of Medicare and Medicaid patients. *Nursing Outlook*, *62*, 440–447.
- Ortiz, J., Hofler, R., Bushy, A., Lin, Y. L., Khanijahani, A., & Bitney, A. (2018). Impact of nurse practitioner practice regulations on rural population health outcomes. *Healthcare (Basel)*, *6*. <https://doi.org/10.3390/healthcare6020065>.
- Perloff, J., Clarke, S., DesRoches, C. M., O'Reilly-Jacob, M., & Buerhaus, P. (2019). Association of state-level restrictions in nurse practitioner scope of practice with the quality of primary care provided to Medicare beneficiaries. *Medical Care Research and Review*, *76*, 597–626.
- Peterson, M. E. (2017). Barriers to practice and the impact on health care: A nurse practitioner focus. *Journal of the Advanced Practitioner in Oncology*, *8*, 74–81.
- Poghosyan, L., Norful, A. A., Liu, J., & Friedberg, M. W. (2018). Nurse practitioner practice environments in primary care and quality of care for chronic diseases. *Medical Care*, *56*, 791–797.
- RAND (2009). Controlling health care spending in Massachusetts: An analysis of options. https://www.rand.org/pubs/technical_reports/TR733.html.
- Smigorowsky, M. J., Sebastiani, M., Sean McMurtry, M., Tsuyuki, R. T., & Norris, C. M. (2020). Outcomes of nurse practitioner-led care in patients with cardiovascular disease: A systematic review and meta-analysis. *Journal of Advanced Nursing*, *76*, 81–95.

- Sofer, D. (2017). VA grants most APRNs full practice authority. *American Journal of Nursing*, 117, 14.
- Spetz, J., Skillman, S. M., & Andrilla, C. H. A. (2017). Nurse practitioner autonomy and satisfaction in rural settings. *Medical Care Research and Review*, 74, 227–235.
- Swan, M., Ferguson, S., Chang, A., Larson, E., & Smaldone, A. (2015). Quality of primary care by advanced practice nurses: A systematic review. *International Journal for Quality in Health Care*, 27, 396–404.
- Unites States Office of Technology Assessment (1986). *Nurse practitioners, physician assistants, and certified nurse-midwives: A policy analysis*. U.S. Government Printing Office.
- Villasenor, S. & Krouse, H. (2016). Can the use of urgent care clinics improve access to care without undermining continuity of care. *Journal of the American Association of Nurse Practitioners*, 28, 335–341.
- Xue, Y., Ye, Z., Brewer, C., & Spetz, J. (2016). Impact of state nurse practitioner scope-of-practice regulation on health care delivery: Systematic review. *Nursing Outlook*, 64, 71–85.
- Yang, B. K., Johantgen, M. E., Trinkoff, A. M., Idzik, S. R., Wince, J., & Tomlinson, C. (2020). State nurse practitioner practice regulations and U.S. health care delivery outcomes: A systematic review. *Medical Care Research and Review*, 1077558719901216. <https://doi.org/10.1177/1077558719901216>.