



Articles and Reports on the PA Profession

Selected Topics

Background on the Profession

1. *Accreditation Review Commission on Education for the Physician Assistant, Inc.* Accreditation Standards for Physician Assistant Education: fourth edition. (2010, Updated March 2016). Johns Creek, GA.

ARC-PA recognizes and accredits educational programs that meet the requirements detailed in these *Standards*. The *Standards* ensure that accredited PA programs maintain a core professional curriculum and offer sufficient depth and breadth of education to prepare all PA graduates for practice.

<http://www.arc-pa.org/wp-content/uploads/2016/10/Standards-4th-Ed-March-2016.pdf>

2. *American Academy of PAs*. (2015, Accessed 11/1/2016). 2015 AAPA national survey. Unpublished data. Alexandria, VA.

The AAPA National Survey is a biennial survey of thousands of clinically practicing PAs across the United States that measures personal and practice demographics as well as issues affecting clinical practice and leadership in the profession. Although three-quarters of PAs currently work in specialty practice, 42% have reported they still provide primary care to their patients when necessary. Eighty percent of PAs see between 8 patients and 30 patients per day with the typical PA seeing 16. The number of patients seen varies based on the specialty and setting as well as the hours worked by the PA. The patients PAs see frequently represent complex cases with 50% of their patients having three or more comorbidities. 50% of PAs have opted to change specialties at least once during their career.

3. *National Commission on Certification of Physician Assistants*. (2016). 2015 Annual report: statistical profile of certified physician assistants by specialty. Johns Creek, GA.

Drawing on the responses of PAs certified as of December 31, 2015, NCCPA profiles information on clinical settings, practice area, and salary ranges of the PA profession. The data describes the role PAs fulfill in promoting healthcare equity and meeting the needs of practices and patients throughout the medical and surgical specialties and subspecialties.

<http://www.nccpa.net/Uploads/docs/2015StatisticalProfilebySpecialty.pdf>

4. *National Commission on Certification of Physician Assistants*. (2018). Examination content blueprint. Johns Creek, GA.

NCCPA outlines the organization of its certification and recertification examinations for PAs. This overview lists the knowledge and cognitive skill areas covered in the exams as well as the categories of diseases, disorders, and medical assessments tested. The blueprint describes how NCCPA develops and scores the exam. NCCPA's Physician Assistant National Certification Examination (PANCE) serves as the *de facto* licensing exam for PAs. The Content Blueprint depicts the depth and breadth of medical knowledge required for PA licensure.

<https://www.nccpa.net/examscontentblueprint>

5. *Federal Register*. (2016). Medicare and Medicaid programs: hospital and critical access hospital (CAH) changes to promote innovation, flexibility, and improvement in patient care. 81(116):39452 (to be codified at 42 C.F.R. pt. 482 and 485).

The Centers for Medicare and Medicaid Services (CMS) attested to the quality of PA education through a proposed rule published in the June 16, 2016 issue of the Federal Register. In justifying a recommended change CMS stated, "PAs are trained on a medical model that is similar in content, if not duration, to that of physicians. Further, PA training and education is comparable in many ways to that of APRNs, and in some ways, more extensive."

<https://www.gpo.gov/fdsys/pkg/FR-2016-06-16/pdf/2016-13925.pdf>

6. Davis, A., Radix, S.M., Cawley, J.F., Hooker, R.S. & Walker, C.S. (2015). Access and Innovation in a time of rapid change: physician assistant scope of practice. *Annals of Health Law*, 24(1):286-336.

The authors provide an in-depth analysis of the evolution of PA scope of practice over the nearly 50 year history of the profession. The analysis also provides recommendations of how states can maximize laws to allow for PAs to practice to the fullest extent of their education and experience and looks to the potential future of PAs.

http://www.annalsofhealthlaw.com/annalsofhealthlaw/vol_24_issue_1?pg=42#pg42

Quality and Outcomes of Care Provided by PAs

1. Yang, Y., Long, Q., et. al (2017). Nurse Practitioners, Physician Assistants, and Physicians Are Comparable in Managing the First Five Years of Diabetes. *The American Journal of Medicine*.

The article posits that the increased use of NPs and PAs is a potential solution to the issue of primary care provider shortages in the United States. In this specific investigation, the study found that diabetes management by NPs and PAs were similar to the treatment provided by physicians. Consequently, the researchers believe that employing NPs and PAs in broader sense may combat the shortages of providers observed in the health care setting.

[http://www.amjmed.com/article/S0002-9343\(17\)30904-X/fulltext](http://www.amjmed.com/article/S0002-9343(17)30904-X/fulltext)

2. 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*.

A first-of-its-kind study found that PAs and nurse practitioners (NPs) delivered similar quality of care, services, and referrals in community health centers as physicians. Researchers at The George Washington University School of Nursing reviewed five years of data from the National Ambulatory Medical Care Survey's Community Health Center subsample and compared nine patient outcomes by practitioner type. The study could have implications for the structure of community health centers in the future.

http://journals.lww.com/lww-medicalcare/Abstract/publishahead/A_Comparison_of_Nurse_Practitioners_Physician.98777.aspx (abstract)

3. Dies, N., Rashid, S., et. al (2016). Physician assistants reduce resident workload and improve care in an academic surgical setting. *Journal of the American Academy of Physician Assistants*.
The article investigates the educational demands and restricted hours of practice incurred by residents limiting the ability to provide adequate care at academic hospitals. This study sought to ascertain whether or not the employment of PAs would effect, and improve, patients eligible for discharge, resident workload, and residents perception of PAs as part of the physician and surgical team. The study concluded that PAs lessened the residents' workload and improved the residents' perception of PAs as part of surgical teams.

https://journals.lww.com/jaapa/fulltext/2016/02000/Physician_assistants_reduce_resident_workload_and_7.aspx

4. Moote, M., Englesbe, M., Bahl, V., Hu, H.M., Thompson, M., Kubus, J. & Campbell, D., Jr. (2010). PA-driven VTE risk assessment improves compliance with recommended prophylaxis. *Journal of American Academy of Physician Assistants*, 23(6):27-35.

A PA-driven venous thromboembolism (VTE) risk assessment process resulted in a dramatic increase in the number of patients within the health system who were prescribed appropriate orders for VTE prophylaxis according to published guidelines and according to individual patient risk.

<http://www.ncbi.nlm.nih.gov/pubmed/20653258> (abstract)

5. Miller, W., Riehl, E., Napier, M., Barber, K. & Dabideen, H. (1998). Use of physician assistants as surgery/trauma house staff at an American College of Surgeons-verified level II trauma center. *The Journal of Trauma: Injury, Infection, and Critical Care*, 44(2):372-376.

Utilization of a trauma surgeon-PA model resulted in a 43% decrease in transfer time to the OR, 51% decrease in transfer time to the ICU, 13% decrease in overall length of stay and 33% decrease in length of stay for neurotrauma intensive care.

<http://www.ncbi.nlm.nih.gov/pubmed/9498514> (abstract)

6. Nabagiez, J.P., Shariff, M.A., Khan, M.A., Molloy, W.J., & McGinn, J.T., Jr. (2013). Physician assistant home visit program to reduce hospital readmissions. *Journal of Thoracic Cardiovascular Surgery*, 145(1):225-33.

A PA home care (PAHC) program was initiated to improve the care of patients who had undergone cardiac surgery. The 30-day readmission rate was reduced by 25% in patients receiving PAHC visits. The most common home intervention was medication adjustment, most commonly to diuretic agents, medications for hypoglycemia, and antibiotics.

[http://www.jtcvsonline.org/article/S0022-5223\(12\)01200-7/abstract](http://www.jtcvsonline.org/article/S0022-5223(12)01200-7/abstract) (abstract)

7. *U.S. Department of Health and Human Services, Health Resources and Services Administration*. (2016). National Practitioner Data Bank. Rockville, Maryland.

Nationally, there were 1,399 liability claims paid against PAs in the 10 years from 2005-2014. The ratio of claims to PAs averaged 1 claim for every 550 PAs (1:550). By comparison, the number of physician claims paid from 2005-2014 totaled 105,756; the ratio for physicians during that decade averaged one claim for every 80 physicians (1:80). This data can be extracted from the Data Analysis Tool on the NPDB website.

<https://www.npdb.hrsa.gov/analysistool/> (Data Analysis Tool)

8. Rattray, N.A., Damush, T.M., et al. (2017). Prime movers: Advanced practice professionals in the role of stroke coordinator. *Journal of the American Association of Nurse Practitioners*.

The authors followed a stroke quality improvement clustered randomized trial and a national acute ischemic stroke directive in the VHA in 2011. The study examined the role of advanced practice providers in quality improvement activities among stroke teams. The authors conclude that the presence of PAs and NPs related directly to group-based evaluation of performance data, implementing stroke protocols, monitoring care through data audit, convening interprofessional meetings involving planning activities, and providing direct care. Further, the authors state that, because of their boundary spanning capabilities, the presence of PAs and NPs is an influential feature of local context crucial to developing an advanced, facility-wide approach to stroke care.

<https://www.ncbi.nlm.nih.gov/pubmed/28440589> (abstract)

9. Virani, S.S., Akeroyd, J.M., Ramsey, D.J., et al. (2016). Comparative effectiveness of outpatient cardiovascular disease and diabetes care delivery between advanced practice providers and physician providers in primary care: implications for care under the Affordable Care Act. *American Heart Journal*, 181:74-82.

This study found that physicians and advanced practice providers provided comparable diabetes and cardiovascular disease (CVD) care quality with clinically insignificant differences. The authors conducted the research with diabetic and CVD patients in 130 Veterans Affairs facilities, and found that there is a need to improve performance regardless of provider type.

<http://www.sciencedirect.com/science/article/pii/S0002870316301648> (abstract)

10. Schwarz, H. B., Fritz, J. V., Govindarajan, R., Murray, R. P., Boyle, K. B., Getchius, T. S., & Freimer, M. (2015). Neurology advanced practice providers: a position paper of the American Academy of Neurology. *Neurology: Clinical Practice*, 5(4):333-337.

PAs and NPs can conduct evaluations, prescribe medications, order and interpret testing, and perform some procedures independent of direct physician supervision. They can provide many aspects of care that neurologists currently perform, such as education of patients and families, counseling, resource management, and follow-up care. PAs and NPs have the potential to improve outcomes at a lower cost to patients and to the system by improving outpatient access, potentially reducing the need for emergency care. They also perform patient education, which may also decrease the overuse of the medical system.

<https://www.aan.com/siteassets/home-page/policy-and-guidelines/policy/position-statements/neurology-advanced-practice-providers/neurology-advanced-practice-providers.pdf>

11. Agarwal, A., Zhang, W., Kuo, Y., & Sharma, G. (2016). Process and outcome measures among COPD patients with a hospitalization cared for by an advance practice provider or primary care physician. *Plus One*.

Compared to patients cared for by physicians, patients cared for by PAs and APRNs were more likely to receive short acting bronchodilator, oxygen therapy and been referred to pulmonologist. Patients cared for by PAs and APRNs were less likely to visit an ER for COPD compared to patients cared for by physicians, conversely there was no difference in hospitalization or readmission for COPD between physicians and PAs/APRNs.

<http://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0148522>

12. Liu, H., et al. (2017). The impact of using mid-level providers in face-to-face primary care on health care utilization. *Medical Care*, 55(1): 12-18.

Greater use of NP/PAs in primary care visits in the Kaiser Permanente system in Georgia was not associated with higher specialty referrals, advanced imaging, ED visits, or inpatient stays. The authors conclude that using PAs and APRNs in face-to-face primary care may be a promising primary care delivery model from an efficiency standpoint.

http://journals.lww.com/lww-medicalcare/Abstract/2017/01000/The_Impact_of_Using_Mid_level_Providers_in.3.aspx (abstract)

13. Capstack, T.M., Segujja, C., Vollono, L., Moser, J.D., Meisenberg, B.R., & Michtalik, H.J. (2016). A comparison of conventional and expanded physician assistant hospitalist staffing models at a community hospital. *Journal of Clinical Outcomes Management*, 23(10): 455-460.

The researchers found that an expanded PA hospitalist staffing model at a community hospital provided similar outcomes and a lower cost of care than a conventional one. Researchers did a retrospective study comparing two hospitalist groups at a 384-bed community hospital in Annapolis, MD. One group had an expanded PA staffing model, with three physicians and three PAs. The other group had a "conventional" staffing model, with nine physicians and two PAs.

http://www.turner-white.com/pdf/jcom_oct16_hospitalist.pdf

14. Nestler, D.M., Fratzke, A.R., et. al (2012). Effect of a Physician Assistant as a Triage Liaison Provider on Patient Throughout in an Academic Emergency Department. *Academic Emergency Medicine*.

The article discusses overcapacity issues that routinely inhibit various emergency departments. According to this article, studies suggest that triage liaison providers (TLPs) may benefit emergency departments struggling with overcapacity by shortening a patient's length of stay (LOS). Additionally, the article posits that enabling PAs to serve in such a role, TLPs, may reduce the number of patients who leave the emergency department without being seen. The findings of this study suggest that the LOS for patients was shorter, treatment room times were shorter, and fewer patients left without being seen.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3506172/>

15. Carzoli, R.P., Martinez-Cruz, M., Cuevas, L.L., Murphy, S. & Chiu, T. (1994). Comparison of neonatal nurse practitioners, physician assistants, and residents in the neonatal intensive care unit. *American Medical Association, Archives of Pediatrics and Adolescent Medicine*, 148(12):1271-1276.

Patient charts were analyzed to compare care provided in the neonatal intensive care unit by teams of resident physicians and teams of PAs and NPs. Results demonstrated no significant differences in management, outcome, or charge variables between patients cared for by the two teams.

<http://archpedi.jamanetwork.com/article.aspx?articleid=517388> (abstract)

16. *Colorado Health Institute*, Collaborative Scopes of Care Advisory Committee. (2008). Final report of findings. Denver, CO. 6-7, 23-25.

Governor Ritter issued Executive Order B 003 08 establishing the Collaborative Scopes of Care Study and creating an advisory committee to oversee the conduct of an evidence-based review that would inform the study findings. In issuing this executive order, the governor acknowledged "that it is clear from health manpower studies that we do not have sufficient numbers of providers, especially physicians and dentists, to meet the current [health care] needs of Coloradans." In general, the studies reviewed found

no significant differences in patient outcomes or satisfaction with the care provided by PAs when compared to physicians.

<http://www.coloradohealthinstitute.org/key-issues/detail/health-care-workforce/collaborative-scopes-of-care-advisory-committee-final-report-of-findings>

17. Costa, D.K., Wallace, D.J., Barnato, A.E., & Kahn, J.M. (2014). Nurse practitioner/physician assistant staffing and critical care mortality. *Chest Journal*, 146(6):1566-1573.

ICUs are increasingly staffed with NPs and PAs. The authors examined the association between NP/PA staffing and in-hospital mortality for patients in the ICU, and found NPs/PAs to be a safe adjunct to the ICU team. The findings support NP/PA management of critically ill patients.

<http://www.ncbi.nlm.nih.gov/pubmed/25167081> (abstract)

18. Dhuper, S. & Choski, S. (2009). Replacing an academic internal medicine residency program with a physician assistant-hospitalist model: a comparative analysis study. *American Journal of Medical Quality*, 24(2):132-139.

This study describes a comparative analysis of replacing medical residents with PA-hospitalist teams on patient outcomes in a community hospital. Quality of care provided by the PA-hospitalist model was equivalent to resident physician provided care.

<http://ajm.sagepub.com/content/24/2/132.abstract> (abstract)

19. Everett, C., Thorpe, C., Palta, M., Carayon, P., Bartels, C. & Smith M.A. (2013). Physician assistants and nurse practitioners perform effective roles on teams caring for Medicare patients with diabetes. *Health Affairs*, 32(11):1942-1948.

Medicare claims and electronic health record data from a large physician group was used to compare outcomes for two groups of adult Medicare patients with diabetes whose conditions were at various levels of complexity: those whose care teams included PAs or NPs in various roles, and those who received care from physicians only. Outcomes were generally equivalent in thirteen comparisons.

<http://content.healthaffairs.org/content/32/11/1942.abstract> (abstract)

20. Glotzbecker, B., Yolin-Raley, D.S., DeAngelo, D.J., Stone, R.M., Soiffer, R.J., & Alyea, E. P. (2013). Impact of physician assistants on the outcomes of patients with acute myelogenous leukemia receiving chemotherapy in an academic medical center. *Journal of Oncology Practice*.

The data demonstrated equivalent mortality and ICU transfers, with a decrease in length of stay, readmission rates, and consults for patients cared for in the PA service. This suggests that the PA service is associated with increased operational efficiency and decreased health service use without compromise of healthcare outcomes.

<http://jop.ascopubs.org/content/9/5/e228.full>

21. Hormann, B.M., Bello, S.J., Hartman, A.R. & Jacobs, M. (2004). The effects of a full-time physician assistant staff on postoperative outcomes in the cardiothoracic ICU: 1-year results. *Surgical Physician Assistant*, 10(10): 38-41.

Despite an increased volume of patients and increase in case severity, increasing the role of PAs in a

cardiothoracic ICU resulted a decreased length of stay, increased survival post-arrest and very low invasive procedure complication rate.

<https://www.aapa.org/WorkArea/DownloadAsset.aspx?id=6442451072>

22. Pavlik, D., Sacchetti, A., Seymour, A. & Blass, B. (2016). Physician assistant management of pediatric patients in a general community emergency department: a real world analysis. *Pediatric Emergency Care*.

Based on the outcome measure of 72-hour recidivism, PA management of pediatric patients 6 years or younger is similar to that of attending emergency physicians (EPs). In addition, this study suggests that the PAs have the ability to recognize more severely ill children and elicit the input of a supervising physician in those individuals.

<https://www.ncbi.nlm.nih.gov/pubmed/27798540>

23. *Peterson Center on Healthcare and Stanford Medicine Clinical Excellence Research Center*. (2016). Uncovering America's most valuable care: executive summary.

This study looked at the best primary care practices in the country and put together a list of what makes them so good. Those practices that work closely with their PAs and ensured that PAs were able to work to the full extent of their education and experience ranked the highest.

<http://petersonhealthcare.org/identification-uncovering-americas-most-valuable-care/executive-summary>

24. *U.S. Congress, Office of Technology Assessment*. (1986). Nurse practitioners, physician assistants, and certified nurse-midwives: a policy analysis. Health Technology Case Study 37. Washington, DC.

Within their areas of competence, PAs, NPs and CNMs provide care whose quality is equivalent to that of care provided by physicians.

<http://ota.fas.org/reports/8615.pdf>

25. Virani S.S., et al. (2015). Provider type and quality of outpatient cardiovascular disease care. *Journal of American College of Cardiology*, 66(16):1803-1812.

The large national study sought to determine whether there were clinically meaningful differences in the quality of care delivered by teams of physicians and PAs or NPs versus physicians-only teams. Patients with coronary artery disease, heart failure and atrial fibrillation received comparable outpatient care from physicians, PAs and NPs. There was a higher rate of smoking cessation screening and intervention and cardiac rehabilitation referral among CAD patients receiving care from PA/NPs.

<http://www.ncbi.nlm.nih.gov/pubmed/26483105> (abstract)

26. Wilson, I.B., Landon, B.E., Hirschhorn, L.R., et al. (2005). Quality of HIV care provided by nurse practitioners, physician assistants, and physicians. *Annals of Internal Medicine*, 143(10):729-736.

For the measures examined, the quality of HIV care provided by NPs and PAs was similar to that of physician HIV experts and generally better than physician non-HIV experts. NPs and PAs can provide high-quality care for persons with HIV. Preconditions for this level of performance include high levels of

experience, focus on a single condition, and either participation in teams or other easy access to physicians and other clinicians with HIV expertise.

<http://annals.org/article.aspx?articleid=718840>

27. Hooker, R.S., Nicholson J.C., & Le, T. (2009). Does the employment of physician assistants and nurse practitioners increase liability? *Journal of Medical Licensure and Discipline*, 95(2):6-16.

17 years of data compiled in the United States National Practitioner Data Bank (NPDB) was used to compare and analyze malpractice incidence, payment amount and other measures of liability among doctors, PAs and APNs. Seventeen years of observation suggests that PAs may decrease liability, at least as viewed through the lens of a national reporting system. During the first 17-year study period, there was one payment report for every 2.7 active physicians and one for every 32.5 active PAs. In percentage terms, 37 percent of physicians, 3.1 percent of PAs and at least 1.5 percent of APNs would have made a malpractice payment during the study period. The physician mean payment was 1.7 times higher than PAs and 0.9 times that of APNs, suggesting that PA employment may be a cost savings for the healthcare industry along with the safety of patients. The reasons for disciplinary action against PAs and APNs are largely the same as physicians.

<http://www.paexperts.com/Nicholson%20-%20Hooker%20Article.pdf>

PA Cost Effectiveness and Productivity

1. Johal, J., Dodd, A. (2017). Physician extenders on surgical services: a systematic review. *Canadian Journal of Surgery*.

The study investigated whether or not the introduction of duty hour restrictions and the ensuing house trainee shortages required a long-term solution to provide safe and efficient patient care. A proposed solution was the employment of NPs and PAs in numerous health care settings. The study found that the employment of NPs and PAs to surgical and trauma services was cost-efficient while simultaneously not sacrificing quality of care.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5453759/>

2. Bachrach, D., Frohlich, J., Garcimonde, A. & Nevitt, K. (2015). The value proposition of retail clinics: building a culture of health. *Robert Wood Johnson Foundation and Manatt Health*.

Retail clinics are ambulatory care sites typically located in and associated with brand-name retailers, including pharmacies, groceries and “big-box” stores and are typically staffed by NPs and PAs with some physician oversight. The expertise and training of NPs and PAs is well-suited for retail settings. However, states’ varying regulatory and licensure schemes constrain the ability of retail clinics to make full use of these professionals in every state. Also, the authors argue that telehealth has the potential to reduce cost and improve both access to care for rural and underserved communities and support treatment of patients with acute and chronic conditions at retail clinics and beyond.

https://www.manatt.com/uploadedFiles/Content/5_Insights/White_Papers/Retail_Clinic_RWJF.pdf

3. Eibner, C., Hussey, P., Ridgely, M.S., and McGlynn, E.A. (2009). Controlling health care spending in Massachusetts: an analysis of options. *RAND Corporation*, TR-733-COMMASS.

RAND identified a few options that appear to have the potential to slow the rate of increase in health spending in Massachusetts over the next decade. Those ideas include expanding the scope of practice of PAs and NPs and encouraging the greater use of PAs and NPs in primary care.

http://www.rand.org/pubs/technical_reports/TR733.html

4. Grzybicki, D., Sullivan, P., et. al (2002). The Economic Benefit for Family/General Medicine Practices Employing Physician Assistants.

The study sought to identify whether or not model PA practice in a family or general medicine practice environment was comparable, in terms of care provided and financial productivity, to a physician-only practice. The study found that the employment of family and/or general medicine PAs lead to significant economic benefits to the practices where they are employed.

<http://www.ajmc.com/journals/issue/2002/2002-07-vol8-n7/jul02-165p613-620> (link to PDF of entire study available at this website)

5. Hooker, R.S. (2002). Cost analysis of physician assistants in primary care. *Journal of the American Academy of Physician Assistants*, 15(11):39-50.

This study examines the cost associated with employing PAs from the employer's perspective. Analysis of data on record for episode, patient characteristics, health status, etc., found that for every medical condition managed by PAs, the total episode cost was less than similar episode managed by a physician.

<https://www.ncbi.nlm.nih.gov/pubmed/12474431> (abstract)

6. Hooker, R. S. (2000). The economic basis of physician assistant practice. *Physician Assistant*, 24(4): 51-71.

Cost-benefit analysis of PA-delivered primary care suggests the use of resources is less than physicians under comparable conditions. The PA compensation to production ratio establishes the PA as one of the most cost-effective clinicians to employ.

<https://www.aapa.org/WorkArea/DownloadAsset.aspx?id=6442451073>

7. Timmons, E.J. (2016). The effects of expanded nurse practitioner and physician assistant scope of practice on the cost of Medicaid patient care. *Health Policy*, 1-8.

The author examines how changes to occupational licensing laws for nurse practitioners and physician assistants have affected cost and intensity of health care for Medicaid patients. The results suggest that allowing physician assistants to prescribe controlled substances is associated with a substantial (more than 11%) reduction in the dollar amount of outpatient claims per Medicaid recipient. Relaxing occupational licensing requirements by broadening the scope of practice for healthcare providers may represent a low-cost alternative to providing quality care to America's poor.

[http://www.healthpolicyjrn.com/article/S0168-8510\(16\)30344-X/abstract](http://www.healthpolicyjrn.com/article/S0168-8510(16)30344-X/abstract) (abstract)

6. Medical Group Management Association. (2016). The rising trend of nonphysician provider utilization in healthcare: an MGMA research & analysis report. Englewood, CO.

In this report, healthcare industry influencer Medical Group Management Association (MGMA) aims to help healthcare executives, practice administrators, and others understand how to incorporate PAs and

nurse practitioners (NPs) into medical practice to maximize efficiency and profitability. MGMA found that 78% of better performing medical practices employ PAs and NPs. The analysis gives an overview of the PA and NP workforce, reimbursement, licensure, median salary, and state practice environments.

<http://www.mgma.com/store/surveys-and-benchmarking/e-reports/the-rising-trend-of-nonphysician-provider-utilization-in-healthcare> (abstract)

7. Anderson, T.J. & Althausen, P.L. (2016). The role of dedicated musculoskeletal urgent care centers in reducing cost and improving access to orthopaedic care. *Journal of Orthopaedic Trauma*, 30(5):s1-s2.

In 2014, the authors' practice opened the first dedicated orthopaedic urgent care in the region staffed by PAs and supervised by orthopaedic surgeons. Dedicated musculoskeletal urgent care clinics operated by orthopaedic surgery practices can be extremely beneficial to patients, physicians, and the health care system. They clearly improve access to care, while significantly decreasing overall health care costs for patients with ambulatory orthopaedic conditions and injuries. In addition, they can be financially beneficial to both patients and orthopaedic surgeons alike without cannibalizing local hospital surgical volumes.

<https://www.ncbi.nlm.nih.gov/pubmed/27870667>

8. Pedersen D.M., Chappell, B., Elison, G. & Bunnell R. (2008). The productivity of PAs, APRNs, and physicians in Utah. *Journal of the American Academy of Physician Assistants*, 21(1):42-47.

The Utah Medical Education Council believes that the demand for PAs will be high over the next 10 to 15 years, with several factors fueling this growth. Productivity is one of these factors. Even though Utah PAs make up only approximately 6.3% of the state's combined clinician (physician, PA, APRN) workforce; the PAs contribute approximately 7.2% of the patient care full-time equivalents (FTE) in the state. This is in contrast to the 10% FTE contribution made by the state's APRN workforce, which has nearly triple the number of clinicians providing patient care in the state. The majority (73%) of Utah PAs work at least 36 hours per week. Utah PAs also spend a greater percentage of the total hours worked in patient care, when compared to the physician workforce. The rural PA workforce reported working a greater number of total hours and patient care hours when compared to the overall PA workforce.

http://journals.lww.com/jaapa/Abstract/2008/01000/The_productivity_of_PAs,_APRNs,_and_physicians_in_Utah.aspx (abstract)

9. Morgan, P.A., Shah, N.D., Kaufman, J.S., & Albanese, M.A. (2008). Impact of physician assistant care on office visit resource use in the United States. *Health Services Research*, 43(5 Pt 2):1906-1922.

Analysis of Medicare's Medical Expenditure Panel Survey (MEPS) data found adult patients who saw PAs for a large portion of their yearly office visits had, on average, 16 percent fewer visits per year, than patients who saw only physicians. These findings account for adjustments for patient complexity.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2654167/pdf/hesr0043-1906.pdf>

10. Althausen, P.L., Shannon, S., Owens, B., Coll, D., Cvitash, M., Lu, M., O'Mara, T.J. & Bray, T.J. (2013). Impact of hospital-employed physician assistants on a level II community-based orthopaedic trauma system. *Journal of Orthopaedic Trauma*, 27(4):e87-e91.

The indirect economic and patient care impact of PAs on the community-based orthopaedic trauma team was evaluated. By increasing emergency room pull through and decreasing times to OR, operative

times, lengths of stay, and complications, PAs are clearly beneficial to hospitals, physicians, and patients.

http://journals.lww.com/jorthotrauma/Abstract/2013/04000/Impact_of_Hospital_Employed_Physician_Assistants.16.aspx

11. Essary, A.C., Green, E.P. & Gans, D.N. (2016). Compensation and production in family medicine by practice ownership. *Health Services Research and Managerial Epidemiology*, 3:1-5.

In this national survey of family medicine practices, PA productivity, as defined by mean annual patient encounters, exceeds that of both nurse practitioners (NPs) and physicians in physician-owned practices and of NPs in hospital or integrated delivery system-owned practices. Total compensation, defined as salary, bonus, incentives, and honoraria for physicians, is significantly more compared to both PAs and NPs, regardless of practice ownership or productivity. PAs and NPs earn equivalent compensation, regardless of practice ownership or productivity. Not only do these data support the value and role of PAs and NPs on the primary care team, but also highlight differences in patient encounters between practice settings.

<http://journals.sagepub.com/doi/abs/10.1177/2333392815624111>

12. Mafi, J.N., Wee, C.C., Davis, R.B., & Landon, B.E. (2016). Comparing use of low-value health care services among U.S. advanced practice clinicians and physicians. *Annals of Internal Medicine*, 165(4):237-244.

A comparison of NPs, PAs and physicians found that the three practitioners provided an equivalent amount of low-value health services. The purpose of the comparison was to dispel physicians' perceptions that PAs and NPs provide lower-value care than physicians for patients presenting with upper respiratory infections, back pain, or headaches.

<http://annals.org/article.aspx?articleid=2529481> (abstract)

13. Resnick, C.M., Daniels, K.M., Flath-Sporn, S.J., Doyle M., Heald, R., and Padwa, B.L. (2016). Physician assistants improve efficiency and decrease costs in outpatient oral and maxillofacial surgery. *Journal of Oral Maxillofacial Surgery*, 1-8.

The addition of PAs into the procedural components of an outpatient oral and maxillofacial surgery practice resulted in decreased costs whereas complication rates remained constant. The increased availability of the oral and maxillofacial surgeon after the incorporation of PAs allows for more patients to be seen during a clinic session, which has the potential to further increase efficiency.

[http://www.joms.org/article/S0278-2391\(16\)30591-2/abstract](http://www.joms.org/article/S0278-2391(16)30591-2/abstract) (abstract)

14. Roblin, D.W., Howard, D.H., Becker, E.R., Adams, E.K. & Roberts, M.H. (2004). Use of midlevel practitioners to achieve labor cost savings in the primary care practice of an MCO. *Health Services Research*, 39(3), 607-625.

Data from twenty-six primary care practices and approximately 2 million visit records found PAs/NPs attended to 1 in 3 adult medicine visits and 1 in 5 pediatric. Primary care practices that used more PAs/NPs in care delivery realized lower practitioner labor costs per visit than practices that used fewer.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1361027/>

Policy, Workforce and Access to Care

1. Leach, B., Gradison, M., et. al (2017). Patient preference in primary care provider type. *Healthcare Journal*.

The study investigates the growing role of NPs and PAs which has enabled patients to choose their primary care provider. This begs the question as to whether or not there is any preference in what medical professional a patient wishes to see. The study concluded that the provider's qualifications and the patient's prior health care experiences were determinative. However, the study did find that physicians were preferred for their technical skills as opposed to PAs and NPs who were favored for their interpersonal skills.

<https://www.ncbi.nlm.nih.gov/pubmed/28602803> (abstract)

2. Dill, M., Pankow, S. et. al (2013). Survey Shows Consumers Open To A Greater Role For Physician Assistants And Nurse Practitioners. *Health Affairs*.

Evidence suggests that there is an impending physician shortage in the United States. Should the shortage come to fruition, alternative providers, like PAs and NPs, may become necessary to meet health care demands. The survey conducted in this study investigates whether or not there is a health care provider preference among patients seeking treatment. The study found that approximately half of those surveyed desired to have a physician as their primary care provider. However, when the preference was inquired into with varying hypotheticals and circumstances enabling the patient to be seen by a PA or NP more quickly, a majority of those surveyed decided to see a PA or NP. Consequently, it appears that health care consumers are at least open to the idea of receiving treatment from NPs and PAs.

<https://www.healthaffairs.org/doi/pdf/10.1377/hlthaff.2012.1150>

3. Hooker, R.S., Everett, C.M. (2012). The Contribution of Physician Assistants in Primary Care Systems. *Health & Social Care in the Community*.

The potential shortages of primary care physicians are a rising global trend. A possible solution to the decrease in available primary care physicians but similar health care demands is the employment of PAs. Studies conducted, globally, insinuate that PAs can bridge the shortage by providing primary care functions; including the provision of comprehensive care while not sacrificing accountability or accessibility.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3903046/>

4. Sutton, J.P., Ramos, C., & Lucado, J. (2010). US physician assistant (PA) supply by state and county in 2009. *Journal of the American Academy of Physician Assistants*, 23(9):e5-e8.

Substantial variation exists in the PA-to-population ratio among states, which may be related in part to state practice laws. At a more local level, counties without PAs are more likely to be rural than counties with PAs. States with more favorable laws governing PA practice have a higher PA-to-population ratio. The distribution of PAs is likely to remain geographically uneven in the absence of significant policy efforts to attract PAs to practice in rural communities.

http://journals.lww.com/jaapa/Abstract/2010/09000/US_physician_assistant_PA_supply_by_state_and_18.aspx (abstract)

5. Salsberg, E. (2015). Is the physician shortage real? Implications for the recommendations of the Institute of Medicine Committee on the governance and financing of graduate medical education. *Academic Medicine*, 90(9):1210-1214.

Increased use of PAs, NPs and pharmacists will decrease the impact of the predicted physician shortage. Concerns that quality will be reduced with the use of these clinicians are unfounded for a variety of reasons, including the increasing focus on safety, high professional, educational and credentialing standards and the increase of team-based care which has the potential to allow for better use of the skills of each member of the team, including the physicians.

http://journals.lww.com/academicmedicine/Fulltext/2015/09000/Is_the_Physician_Shortage_Real_Implications_for.17.aspx

6. Green, L.V., Savin, S. & Lu, Y. (2013). Primary care physician shortages could be eliminated through use of teams, nonphysicians, and electronic communication. *Health Affairs*, 32(1):11-19.

Most existing estimates of the shortage of primary care physicians are based on simple ratios, such as one physician for every 2,500 patients. These estimates do not consider the impact of such ratios on patients' ability to get timely access to care. They also do not quantify the impact of changing patient demographics on the demand side and alternative methods of delivering care on the supply side. The authors provide estimates of the number of primary care physicians needed based on a comprehensive analysis considering access, demographics, and changing practice patterns. They conclude that some increasingly popular operational changes in the ways clinicians deliver care—including the use of teams or "pods," better information technology and sharing of data, and the use of PAs and other providers—have the potential to offset completely the increase in demand for physician services while improving access to care, thereby averting a primary care physician shortage.

<http://m.content.healthaffairs.org/content/32/1/11.full.html>

7. Timmons, E.J. (2016). Healthcare license turf wars: the effects of expanded nurse practitioner and physician assistant scope of practice on Medicaid patient access. Mercatus Working Paper, *Mercatus Center at George Mason University*, Arlington, VA.

The author examines how important changes to occupational licensing laws for nurse practitioners and PAs have affected cost and access to healthcare for Medicaid patients. The results suggest that allowing PAs to prescribe drugs (including controlled substances) is associated with a substantial (more than 11 percent) reduction in the dollar amount of outpatient claims per Medicaid recipient. Relaxing occupational licensing requirements by broadening the scope of practice for healthcare providers may represent a low-cost alternative to providing quality care to America's poor.

<https://www.mercatus.org/system/files/Timmons-Scope-of-Practice-v2.pdf>

8. Hooker, R.S. & Muchow, A.N. (2015). Modifying state laws for nurse practitioners and physician assistants can reduce cost of medical services. *Nursing Economic\$,* 33(2):88-94.

A cost analysis was undertaken to determine how changing restrictive practice laws would impact the cost of care. The authors' case study focused on the state of Alabama because of its restrictive PA and NP laws. The cost analysis found that even modest changes to Alabama PA and NP laws would result in a net savings of \$729 million over a 10-year period. Underutilization of PAs and NPs by restrictive state law inhibits the cost benefits of increasing the supply of PAs and NPs.

<http://www.nursingconomics.net/necfiles/14ND/Hooker.pdf>

9. Hamel, L., Norton, M., Jankiewicz, A., & Rousseau, D. (2015). Experiences and attitudes of primary care practitioners after the ACA in Kaiser Family Foundation/Commonwealth Fund 2015 national survey of primary care providers. *Journal of the American Medical Academy*, 314 (19):2013.

Based on a survey of primary care clinicians in early 2015, this Visualizing Health Policy infographic examines the experiences and attitudes of primary care practitioners (PCPs) after the Affordable Care Act's (ACA's) major coverage provisions took effect in January 2014. Generally, primary care physicians have a more negative view of health reform's effect on the cost of patient care, but a more positive view of the law's impact on patient access to healthcare and insurance. Large shares—66% of nurse practitioners and physician assistants and 50% of physicians—report that they're currently accepting new Medicaid patients.

<http://jamanetwork.com/journals/jama/fullarticle/2470432>

10. Hing, E. & Hsiao, C. (2015). In which states are physician assistants or nurse practitioners more likely to work in primary care? *Journal of the American Academy of Physician Assistants*, 28(9):46-53.

After controlling for practice characteristics, higher use of PAs and NPs was found in three states (Minnesota, Montana, and South Dakota). Higher availability of PAs or NPs was associated with favorable PA scope-of-practice laws.

<http://www.ncbi.nlm.nih.gov/pubmed/26302324> (abstract)

11. *IHS Inc.* (2016). The complexities of physician supply and demand 2016 update: projections from 2014 to 2025. Prepared for the *Association of American Medical Colleges*. Washington, DC: *Association of American Medical Colleges*.

This 2016 report examines five scenarios commonly expected to affect physician supply (e.g., early or delayed retirement of physicians) and six scenarios expected to affect the demand for physician services over the next decade (e.g., changing demographics, greater adoption of managed care models, or greater integration of advanced practice registered nurses and PAs). The U.S. could experience a shortfall of between 14,900 and 35,600 primary care physicians by 2025.

https://www.aamc.org/download/458082/data/2016_complexities_of_supply_and_demand_projections.pdf

12. Jones, P.E., & Hooker, R.S. (2001). Physician assistants in Texas. *Texas Medicine*. 97(1): 68-73.

The use of PAs in the state has helped address the maldistribution of physicians. PAs have high productivity and increase the number of patients being seen in a wider variety of healthcare settings.

<https://www.ncbi.nlm.nih.gov/pubmed/11192487> (abstract)

13. Mitchell, C.C., Ashley, S.W., Zinner, M.J., & Moore, F.D. (2007). Predicting future staffing needs at teaching hospitals. *Archives of Surgery*, 142, 329-334.

The study used a computer model to predict future staffing needs due to the impact of changes in resident work hours and service growth. The study estimates in the next 5 years the hospitals will need to hire 10 PAs at the cost of \$1,134,000, which is \$441,000 less expensive than hiring hospitalist physicians.

<http://archsurg.jamanetwork.com/article.aspx?articleid=400017>

14. Morgan, P., Himmerick, K.A., Leach, .B, Dieter, P. & Everett, C. (2016). Scarcity of primary care positions may divert physician assistants into specialty practice. *Medical Care Research and Review*, 1-14.

Despite state and federal efforts to encourage PAs to help fill primary care gaps, the proportion of PAs practicing in primary care continues to decline. Using job posting data from a leading labor analytics firm, this study finds that the decline could be due to a lack of job availability. In 2014, for example, only 18 percent of PA job postings were in primary care, compared with specialty positions. While policies have focused on increasing primary care PA supply, additional efforts are needed to increase labor demand via financial incentives, job-locating assistance and educational outreach.

<http://healthforce.ucsf.edu/publications/scarcity-primary-care-positions-may-divert-physician-assistants-specialty-practice>

15. Willis, J. B. (1993). Barriers to PA practice in primary care and rural medically underserved areas. *Journal of the American Academy of Physician Assistants*, 6(6):418–422.

State imposed limits on PA practice impact the PA workforce. In 1989 Montana authorized prescriptive authority for PAs and by 1991 the number of PAs in Montana increased nearly three-fold. Initiation of prescriptive authority for Texas PAs saw a three-fold increase in the number of PAs practicing in rural areas.

Modern Regulation of PA Practice/Future of the Profession

1. AAPA House of Delegates. (Adopted 1988, most recently revised 2017). Guidelines for state regulation of PAs. *American Academy of PAs*, Alexandria, VA.

The Guidelines seek to enhance and standardize PA practice among jurisdictions. The 2017 amendments to the Guidelines include emphasizing PAs' commitment to team practice with physicians; replacing obsolete supervisory agreement laws with practice-level decision making about collaboration; creating separate majority-PA boards to regulate PAs, or give that authority to healing arts or medical boards that have as members both PAs and physicians who practice with PAs; and authorizing PAs to be directly reimbursed by all public and private insurers.

http://news-center.aapa.org/wp-content/uploads/sites/2/2017/06/Guidelines_for_State_Regulation_2017-A-07-FINAL.pdf

2. Dunker, A., Krofah, E., & Isasi, F. (2014). The role of physician assistants in health care delivery. *National Governor's Association, Center for Best Practices*, Washington, DC.

The education that PAs receive produces a sophisticated and flexible workforce, well suited to succeeding in a rapidly changing healthcare environment. The profession offers a scalable and affordable source of healthcare. States can ensure that PAs are used efficiently by reviewing state laws and regulations—especially the definition of provider—for appropriateness and by facilitating educational and clinical training opportunities for PAs. Finally, states can consider creating financial incentives to encourage PAs to work in underserved communities.

<http://www.nga.org/files/live/sites/NGA/files/pdf/2014/1409TheRoleOfPhysicianAssistants.pdf>

3. *American Congress of Obstetricians and Gynecologists, Task Force on Collaborative Practice*. (2016). Collaboration in practice: implementing team-based care. Washington, DC.

This document provides a framework for organizations or practices across all specialties to develop team-based care. Team-based care will work toward the triple aim of 1) improving the experience of care of individuals and families; 2) improving the health of populations; and 3) lowering per capita costs. Team-based care has the ability to more effectively meet the core expectations of the healthcare system proposed by the Institute of Medicine.

<http://www.acog.org/Resources-And-Publications/Task-Force-and-Work-Group-Reports/Collaboration-in-Practice-Implementing-Team-Based-Care>

4. Streeter, R.A., Zangaro, G.A., & Chattopadhyay, A. (2017). Perspectives: using results from HRSA's health workforce simulation model to examine the geography of primary care. *Health Services Research*. National Center for Health Workforce Analysis, Health Resources and Services Administration, Rockville, MD, 52:1, Part II.

This article examines The Health Resources and Services Administration's 2025 supply and demand projections for primary care physicians, NPs, and PAs. Thirty-seven states are projected to have shortages of primary care physicians in 2025. The article finds that due to potential workforce shortages, it may be necessary to address state licensure and scope of practice laws that limit PAs and NPs. The authors also highlight the importance of developing interstate compacts for PAs and NPs so their licenses have reciprocity with other states.

<http://onlinelibrary.wiley.com/doi/10.1111/1475-6773.12663/abstract> (abstract)

5. Rathfon, E., et al. (2014). Renal physicians and physician assistants: excellence in team-based medicine. *A Joint Statement of the Renal Physicians Association and the American Academy of Physician Assistants*.

RPA and AAPA believe that the intensity, complexity and continuity of care required by patients with kidney disease make the integrated clinical team an ideal approach to providing care. With the dire predictions of patient need and workforce projections for the coming decade, nephrology providers will have to create new and better ways to deliver patient-centered care. Renal physicians and PAs, working together to provide collaborative, patient-centered care, can simultaneously improve quality and expand patient access, improving the lives and health of the nation.

https://testwww.aapa.org/wp-content/uploads/2017/01/Renal_Physicians_and_PAs_FINAL_May.2014.pdf

6. *U.S. Bureau of Labor Statistics, Occupational Employment Statistics Program*. (2016). Employment projections program: fastest growing occupations 2014 and projected 2024.

The U.S. Bureau of Labor Statistics estimates that the PA profession is expected to grow by 30.4 percent by 2024.

http://data.bls.gov/cgi-bin/print.pl/emp/ep_table_103.htm

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