

Quality of Nurse Practitioner Practice

Nurse practitioners (NPs) provide high-quality primary, acute and specialty health care services across the life span and in diverse settings, including patients' homes, community-based clinics, schools, colleges, prisons, hospitals, and long-term care facilities. All NPs have advanced clinical training and competency to provide health care beyond their initial registered nurse preparation. NPs have graduate education, with masters or doctoral degrees, and they bring a unique perspective to health services in that they emphasize both care and cure. NPs diagnose, treat, and manage acute and chronic illness. NPs focus on health promotion, disease prevention, and health education and counseling, guiding patients to make smarter health and lifestyle choices. Since the NP role was created in 1965, over 50 years of research has consistently demonstrated the excellent outcomes and high quality of care provided by NPs.

The body of literature supports the position that NPs provide care that is safe, effective, patient-centered, timely, efficient, equitable and evidenced based. Furthermore, NP care is comparable in quality to that of their physician colleagues. Patients under the care of NPs have higher patient satisfaction, fewer unnecessary hospital readmissions, potentially preventable hospitalizations, and fewer unnecessary emergency room visits than patients under the care of physicians. This paper summarizes a number of important research reports supporting the quality of nurse practitioner practice. These references are listed as an annotated bibliography.

Annotated Bibliography

Avorn, J., Everitt, D.E., & Baker, M.W. (1991). The neglected medical history and therapeutic choices for abdominal pain. A nationwide study of 799 physicians and nurses. *Archives of Internal Medicine*, 151(4), 694-698.

A sample of 501 physicians and 298 NPs participated in a study by responding to a hypothetical scenario regarding epigastric pain in a patient with endoscopic findings of diffuse gastritis. They were able to request additional information before recommending treatment. Adequate history-taking resulted in identifying use of aspirin, coffee, cigarettes, and alcohol, paired with psychosocial stress. Compared to NPs, physicians were more likely to prescribe without seeking relevant history. NPs, in contrast, asked more questions and were less likely to recommend prescription medication.

Bakerjian, D. (2008). Care of nursing home residents by advanced practice nurses: A review of the literature. *Research in Gerontological Nursing*, 1(3), 177-185. doi: 10.3928/00220124-20091301-01.

Bakerjian conducted an extensive review of the literature, particularly of NP-led care. She found that long-term care patients managed by NPs were less likely to have avoidable geriatric complications such as falls, UTIs, pressure ulcers, etc. They also had improved functional status, as well as better managed chronic conditions.

Borgmeyer, A., Gyr, P.M., Jamerson, P.A., & Henry, L.D. (2008). Evaluation of the role of the pediatric nurse practitioner in an inpatient asthma program. *Journal of Pediatric Health Care*, 22(5), 273-281.

Administrative and electronic medical record data from July 1, 2009, to June 30, 2010, was retrospectively reviewed from the Children's Hospital of Colorado's inpatient medical unit as well as inpatient satellite sites in the Children's Hospital Network of Care. This study evaluated cost and pediatric patient outcomes between a pediatric nurse practitioner (PNP) hospitalist team, a combined PNP/MD team, and two resident teams without PNPs. Adherence to clinical care guidelines was comparable, and there was no significant difference in length of stay between the PNP, PNP/MD teams or resident teams. The direct cost of the PNP patient care was significantly less than the PNP/MD team and resident teams.

Brown, S.A. & Grimes, D.E. (1995). A meta-analysis of nurse practitioners and nurse midwives in primary care. *Nursing Research*, 44(6), 332-9.

A meta-analysis of 38 studies comparing a total of 33 patient outcomes of NPs with those of physicians demonstrated that NP outcomes were equivalent to or greater than those of physicians. NP patients had higher levels of compliance with recommendations in studies where provider assignments were randomized and when other means to control patient risks were used. Patient satisfaction and resolution of pathological conditions were greatest for NPs. The NP and physician outcomes were equivalent on all other outcomes.

Carter, A., Chochinov, A. (2007). A systematic review of the impact of nurse practitioners on cost, quality of care, satisfaction and wait times in the emergency department. *Canadian Journal of Emergency Medicine, 9(4), 286-95.*

This systematic review of 36 articles examines if the hiring of NPs in emergency rooms can reduce wait time, improve patient satisfaction and result in the delivery of cost-effective, quality care. Results showed that hiring NPs can result in reduced wait times, leading to higher patient satisfaction. NPs were found to be equally as competent as physicians at interpreting x-rays and more competent at following up with patients by phone, conducting physical examinations, and issuing appropriate referrals.

Congressional Budget Office. (1979). Physician extenders: Their current and future role in medical care delivery. Washington, D.C.: US Government Printing Office.

As early as 1979, the Congressional Budget Office reviewed findings of the numerous studies of NP performance in a variety of settings and concluded that NPs performed as well as physicians with respect to patient outcomes, proper diagnosis, management of specified medical conditions, and frequency of patient satisfaction.

Cooper, M.A., Lindsay, G.M., Kinn, S., Swann, I.J. (2002). Evaluating emergency nurse practitioner services: A randomized controlled trial. *Journal of Advanced Nursing, 40(6), 771-730.*

A study of 199 patients randomly assigned to emergency NP-led care or physician-led care in the U.K. demonstrated the highest level of satisfaction and clinical documentation for NP care. The outcomes of recovery time, symptom level, missed work, unplanned follow-up, and missed injuries were comparable between the two groups.

Ettner, S.L., Kotlerman, J., Abdelmonem, A., Vazirani, S., Hays, R.D., Shapiro, M., et al. (2006). An alternative approach to reducing the costs of patient care? A controlled trial of the multi-disciplinary doctor-nurse practitioner (MDNP) model. *Medical Decision Making, 26, 9-17.*

A total of 1207 patients were randomized to a standard treatment group or to a physician-NP treatment model in an academic medical center. The physician-NP team achieved significant cost savings during the initial inpatient stay and during post-discharge compared to the control group while the outcomes between the treatment and control group were comparable.

Gracias, V. H., Sicoutris, C. P., Stawicki, S.P., Meredith, D. M., Horan, A. D., Gupta, R., Schwab, C.W. (2008). Critical care nurse practitioners improve compliance with clinical practice guidelines in “semiclosed” surgical intensive care unit. *Journal of Nursing Care Quality, 23(4), 338-344. doi:10.1097/01.NCQ.0000323286.56397.8c*

This study examined adherence to clinical practice guidelines in a critical care setting by an NP team and a non-NP team. Critical care patients were prospectively assigned to a NP or non-NP team, and findings indicate that clinical practice guideline adherence was significantly higher among patients belonging to the NP team.

Horrocks, S., Anderson, E., Salisbury, C. (2002). Systematic review of whether nurse practitioners working in primary care can provide equivalent care to doctors. *British Medical Journal, 324, 819-823.*

A systematic review of 11 randomized clinical trials and 23 observational studies identified data on outcomes of patient satisfaction, health status, cost, and/or process of care. Patient satisfaction was highest for patients seen by NPs. Comparisons of the results showed comparable outcomes between NPs and physicians. NPs spent more time with their patients, offered more advice/information, had more complete documentation, and had better communication skills than physicians. No differences were detected in health status, prescriptions, return visits, or referrals. Equivalency in appropriateness of diagnostic studies ordered and interpretations of x-rays were identified.

Kuo, Y., Chen, N., Baillargeon, J., Raji, M. A., & Goodwin, J. S. (2015). Potentially Preventable Hospitalizations in Medicare Patients With Diabetes: A Comparison of Primary Care Provided by Nurse Practitioners Versus Physicians. *Medical Care, 53(9), 776-783. doi:10.1097/MLR.0000000000000406*

Potentially preventable hospitalizations of Medicare beneficiaries with a diagnosis of diabetes were analyzed between patients of physicians and NPs. Several statistical methods demonstrated that receipt of care from NPs decreased the risk of potentially preventable hospitalizations. These findings suggest that NPs are exceptionally effective at treating diabetic patients.

Laurant, M., Reeves, D., Hermens, R., Braspenning, J., Grol, R., & Sibbald, B. (2006). Substitution of doctors by nurses in primary care. *Cochrane Database of Systematic Reviews. 2006, Issue 1. CD001271.*

This meta-analysis included 25 articles relating to 16 studies comparing outcomes of primary care nurses (nurses, NPs, clinical nurse specialists, or other advanced practice registered nurses) and physicians. The quality of care provided by nurses was as high as that of the physicians. Overall, health outcomes and outcomes such as resource utilization and cost were equivalent for nurses and physicians. The satisfaction level was higher for nurses. Studies included a range of care delivery models, with nurses providing first contact, ongoing care, and urgent care for many of the patient cohorts.

Lenz, E.R., Mundinger, M.O., Kane, R.L., Hopkins, S.C., & Lin, S.X. (2004). Primary care outcomes in patients treated by nurse practitioners or physicians: Two-year follow-up. *Medical Care Research and Review 61(3), 332-351.*

The outcomes of care in a prior study described by Mundinger, et al. in 2000 are further described in this report, including two years of follow-up data, confirming continued comparable outcomes for the two groups of patients, one seen by NPs, and one seen by physicians. No differences were identified in health status, physiologic measures, satisfaction, or use of specialist, emergency room, or inpatient services. Patients assigned to physicians had more primary care visits than those assigned to NPs.

Lin, S.X., Hooker, R.S., Lens, E.R., Hopkins, S.C. (2002). Nurse practitioners and physician assistants in hospital outpatient departments, 1997-1999. *Nursing Economics, 20(4), 174-179.*

Data from the National Hospital Ambulatory Medical Care Survey (NHAMCS) were used to identify patterns of NP and PA practice styles. NPs were more likely to see patients alone and to be involved in routine examinations, as well as care directed towards wellness, health promotion, disease prevention, and health education than PAs, regardless of the setting type. In contrast, PAs were more likely to provide acute problem management and to involve another person, such as a support staff person or a physician.

Martsof, G., Auerbach, D., Arifkhanova, A. The Impact of Full Practice Authority for Nurse Practitioners and Other Advanced Practitioners in Ohio. Santa Monica, CA: Rand Corporation, 2015.

The researchers identified three high-quality studies addressing the impact that more favorable NP practice environment laws could have on health care access, quality, and costs. Informed by this review of literature, the authors describe the potential effect of removing state practice law restrictions for APRNs in the state of Ohio. Their review of the literature and effect estimates demonstrate that granting APRNs full practice authority would likely increase access to health-care services for Ohioans, with possible increases in quality and no clear increase in costs.

Mundinger, M.O., Kane, R.L., Lenz, E.R., Totten, A.M., Tsai, W.Y., Cleary, P.D., et al. (2000). Primary care outcomes in patients treated by nurse practitioners or physicians: A randomized trial. *Journal of the American Medical Association, 283(1), 59-68.*

The outcomes of care were measured in a study where patients were randomly assigned either to a physician or to an NP for primary care between 1995 and 1997, using patient interviews and health services utilization data. Comparable outcomes were identified, with a total of 1316 patients. After six months of care, health status was equivalent for both patient groups, although patients treated for hypertension by NPs had lower diastolic values, indicating positive trends in blood pressure for NP patients. Health service utilization was equivalent at both 6 and 12 months, and patient satisfaction was equivalent following the initial visit.

Naylor, M.D. and Kurtzman, E.T. (2010). The Role of Nurse Practitioners in Reinventing Primary Care. *Health Affairs, (5), 893-99.*

This meta-analysis of studies comparing the quality of primary care services of physicians and NPs demonstrates the role NPs play in reinventing how primary care is delivered. The authors found that comparable outcomes are obtained by both providers, with NPs performing better in terms of time spent consulting with the patient, patient follow-ups, and patient satisfaction.

Newhouse, R. et al (2011). Advanced practice nurse outcomes 1999-2008: A systematic review. *Nursing Economics, 29(5), 1-22.*

The outcomes of NP care were examined through a systematic review of 37 published studies, most of which compared NP outcomes with those of physicians. Outcomes included measures such as patient satisfaction, patient perceived health status, functional status, hospitalizations, emergency department visits, and bio-markers such as blood glucose, serum lipids, blood pressure. The authors conclude that NP patient outcomes are comparable to those of physicians.

Office of Technology Assessment. (1986). Nurse practitioners, physician assistants, and certified nurse midwives: A policy analysis. Washington D.C.: US Government Printing Office.

The Office of Technology Assessment reviewed studies comparing NP and physician practice, concluding that, “NPs appear to have better communication, counseling, and interviewing skills than physicians have,” and that malpractice premiums and rates supported patient satisfaction with NP care, pointing out that successful malpractice rates against NPs remained extremely rare.

Ohman-Strickland, P.A., Orzano, A.J., Hudson, S.V., Solberg, L.I., DiCiccio-Bloom, B., O’Malley, D., et al. (2008). Quality of diabetes care in family medicine practices: Influence of nurse-practitioners and physician’s assistants. *Annals of Family Medicine, 6(1), 14-22. doi:10.1370/afm.758*

The authors conducted a cross-sectional study of 46 practices, measuring adherence to American Diabetes Association clinical guidelines. They reported that practices with NPs were more likely to perform better on quality measures including appropriate measurement of glycosylated hemoglobin, lipids, and microalbumin levels and were more likely to be at target for lipid levels.

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(6), 440-447. doi:10.1016/j.outlook.2014.07.004

The relationship between nurse practitioner practice environment and state-level health outcome measures was analyzed. The authors gathered findings from existing publications on potentially avoidable hospitalizations, hospital readmissions, and nursing home resident hospitalization of Medicare and Medicaid patients. Significant differences existed for all three state-level outcome measures between states with and without full practice authority. Results showed that states with full practice authority have decreased hospitalizations and better overall health outcomes. There were no significant differences in the state-level outcome measures between reduced and restricted states, which suggests that any limit on NP practice may negatively impact patient outcomes.

Prescott, P.A. & Driscoll, L. (1980). Evaluating nurse practitioner performance. *Nurse Practitioner*, 5(4), 28-32.

The authors reviewed 26 studies comparing NP and physician care, concluding that NPs scored higher in many areas. These included: amount/depth of discussion regarding child health care, preventative health, and wellness; amount of advice, therapeutic listening, and support offered to patients; completeness of history and follow-up on history findings; completeness of physical examination and interviewing skills; and patient knowledge of the management plan given to them by the provider.

Ritsema, T. S., Bingenheimer, J. B., Scholting, P., & Cawley, J. F. (2014). Differences in the delivery of health education to patients with chronic disease by provider type, 2005-2009. *Preventing Chronic Disease*, 11E33. doi:10.5888/pcd11.130175

This original Centers for Disease Control and Prevention (CDC) research paper utilizes a large sample of more than 136,000 adult patients with select chronic conditions drawn from the National Hospital Ambulatory Medical Care Survey (NHAMCS). Across all conditions, the study finds that nurse practitioners provide health education to patients more frequently than physicians.

Roblin, D.W., Becker, R., Adams, E.K., Howard, D. H., & Roberts, M.H. (2004). Patient satisfaction with primary care: Does type of practitioner matter? *Medical Care*, 42(6), 606-623.

A retrospective observational study of 41,209 patient satisfaction surveys randomly sampled between 1997 and 2000 for visits by pediatric and medicine departments identified higher satisfaction with NP and/or PA interactions than those with physicians, for the overall sample and by specific conditions.

Sackett, D.L., Spitzer, W. O., Gent, M., & Roberts, M. (1974). The Burlington randomized trial of the nurse practitioner: Health outcomes of patients. *Annals of Internal Medicine*, 80(2), 137-142.

A sample of 1,598 families were randomly allocated, so that two-thirds continued to receive primary care from a family physician and one-third received care from a NP. The outcomes included: mortality, physical function, emotional function, and social function. Results demonstrated comparable outcomes for patients, whether assigned to physician or to NP care.

Safriet, B. J. (1992). Health care dollars and regulatory sense: The role of advanced practice nursing. *Yale Journal on Regulation*, 9(2).

The full Summer 1992 issue of this journal was devoted to the topic of advanced practice nursing, including documenting the cost-effective and high quality care provided, and to call for eliminating regulatory restrictions on their care. Safriet summarized the U.S. Office of Technology Administration study concluding that NP care was equivalent to that of physicians and pointed out that 12 of the 14 studies reviewed in this report which showed differences in quality reported higher quality for NP care. Reviewing a range of data on NP productivity, patient satisfaction, and prescribing, Safriet concludes "APNs are proven providers, and removing the many barriers to their practice will only increase their ability to respond to the pressing need for basic health care in our country."

Spitzer, W.O., Sackett, D.L., Sibley, J.C., Roberts, M., Gent, M., Kergin, D.J., Hackett, B.D., & Olynich, A. (1974). The Burlington randomized trial of the nurse practitioner. *New England Journal of Medicine*, 290(3), 252-256.

This report provides further details of the Burlington trial, also described by Sackett, et al.. This study involved 2,796 patients being randomly assigned to either one of two physicians or to an NP, so that one-third were assigned to NP care, from July 1971 to July 1972. At the end of the period, physical status and satisfaction were comparable between the two groups. Clinical activities were evaluated and it was determined that 69% of NP management was adequate compared to 66% for the physicians. The conclusion was that "a nurse practitioner can provide first-contact primary clinical care as safely and effectively as a family physician".

Stanik-Hutt, J., Newhouse, R., (2013). The quality and effectiveness of care provided by Nurse Practitioners. *The Journal for Nurse Practitioners*, 9(8). doi:10.1016/j.nurpra.2013.07.004

Evidence regarding the impact of nurse practitioners (NPs) compared to physicians (MDs) on health care quality, safety, and effectiveness was systematically reviewed. Data from 37 of 27,993 articles published from 1990-2009 were summarized into 11 aggregated outcomes. Outcomes for NPs compared to MDs are comparable or better for all 11 outcomes reviewed. A high level of evidence indicated better serum lipid levels in patients cared for by NPs in primary care settings. A high level of evidence also indicated that patient outcomes on satisfaction with care, health status, functional status, number of emergency department visits and hospitalizations, blood glucose, blood pressure, and mortality are similar for NPs and MDs.

Traczynski, J., Udalova, V. (2013). Nurse Practitioner independence, health care utilization and health outcomes. Retrieved from http://www.lafollette.wisc.edu/research/health_economics/Traczynski.pdf.

The authors examined how state practice laws impact health care utilization and patient outcomes. In states that have fewer unnecessary practice restrictions on NPs, the frequency of routine checkups and preventive health exams increases. More favorable practice environments also were associated with higher patient-reported health status, and less emergency room visits by patients with ambulatory sensitive conditions.

Virani, S. S., Maddox, T. M., Chan, P. S., Tang, F., Akeroyd, J. M., Risch, S. A., & ... Petersen, L. A. (2015). Provider Type and Quality of Outpatient Cardiovascular Disease Care: Insights From the NCDR PINNACLE Registry. *Journal of the American College of Cardiology*, 66(16), 1803-1812. doi:10.1016/j.jacc.2015.08.017

Quality of coronary artery disease (CAD), heart failure, and atrial fibrillation care was compared for care delivered by physicians versus NPs or physicians assistants (PAs) for outpatient visits during a one month period. Quality measures were comparable among both groups, and smoking cessation screening intervention was higher among the NP / PA group for CAD patients.

Wright, W.L., Romboli, J.E., DiTulio, M.A., Wogen, J., and Belletti, D.A. (2011). Hypertension treatment and control within an independent nurse practitioner setting. *American Journal of Managed Care*, 17(1), 58-65.

A cross-sectional, retrospective study of 1,284 propensity score-matched patients with hypertension, one-half of whom were treated by NPs and the other half by physicians, found comparable controlled blood pressure rates among the comparison groups.