AUG 13 2013

August 12, 2013

Jennifer L. Filippone, Chief
Practitioner Licensing and Investigations Section
Department of Public Health
401 Capitol Avenue, MS#12MQA
P.O. Box 340308
Hartford, CT 06134

Dear Ms. Filippone:

Attached please find the Connecticut Advanced Practice Registered Nurse Society (CTAPRNS) request for a change of scope. This request has been made with input from the Connecticut Coalition of Advanced Practice Nurses, but CTAPRNS is the only entity formally submitting this request. Specifically, we request the removal of the mandatory collaborative agreement currently required by our practice act. As detailed in our request, the agreement serves no public safety or quality assurance purpose, and presents significant negative impacts on health care cost and access to care.

We have also submitted copies of the data on which we base our request, as well as examples of the negative impacts of the current statutory requirements on APRN practice, and a copy of the national practice standards and 2012 competencies for nurse practitioners.

Thank you and your staff in advance for your consideration. Please do not hesitate to contact me should you have questions or require further information or clarification.

Sincerely,

Signed

Vanessa Pomarico-Denino, MSN, FNP-BC, APRN
President, CT APRN Society (CTAPRNS)
www.ctaprns.org

Per P.A. 11-209, the Connecticut Advanced Practice Registered Nurse Society (CTAPRNS) submits a request to change statutory language affecting the requirements for practice by Advanced Practice Registered Nurses (APRNs).

1. Plain Language Description of the Request:

CTAPRNS respectfully requests removal of the mandatory collaborative agreement requirement for APRNs practicing as nurse practitioners or clinical nurse specialists.[1] Nurses licensed to practice in Connecticut do so under the requirements of Section 20-87a. APRNs practice under subsection "a" of this section, relating to registered nursing practice. In addition, APRNs are under the requirements of subsection "b" of this section, which states in relevant part:

> (b) Advanced nursing practice is defined as the performance of advanced level nursing practice activities that, by virtue of post_basic specialized education and experience, are appropriate to and may be performed by an advanced practice registered nurse. The advanced practice registered nurse performs acts of diagnosis and treatment of alterations in health status, as described in subsection (a) of this section, and shall collaborate with a physician licensed to practice medicine in this state. In all settings, the advanced practice registered nurse may, in collaboration with a physician licensed to practice medicine in this state, prescribe, dispense and administer medical therapeutics and corrective measures and may request, sign for, receive and dispense drugs in the form of professional samples in accordance with sections 20-14c to 20-14e, inclusive, [...] For purposes of this subsection, "collaboration" means a mutually agreed upon relationship between an advanced practice registered nurse and a physician who is educated, trained or has relevant experience that is related to the work of such advanced practice registered nurse. The collaboration shall address a reasonable and appropriate level of consultation and referral, coverage for the patient in the absence of the advanced practice registered nurse, a method to review patient outcomes and a method of disclosure of the relationship to the patient. Relative to the exercise of prescriptive authority, the collaboration between an advanced practice registered nurse and a physician shall be in writing and shall address the level of schedule II and III controlled substances that the advanced practice registered nurse may prescribe and provide a method to review patient outcomes, including, but not limited to, the review of medical therapeutics, corrective measures,

[1] Certified Registered Nurse Anesthetists (CRNAs) are licensed as APRNs, but have a different practice arrangement; CRNAs are not requesting any change to their scope of practice. Certified Nurse Midwives (CNMs) are not licensed as APRNs in Connecticut, having their own practice act and scope requirements (Chapter 377).

> laboratory tests and other diagnostic procedures that the advanced practice registered nurse may prescribe, dispense and administer. An advanced practice registered nurse licensed under the provisions of this chapter may make the determination and pronouncement of death of a patient, provided the advanced practice registered nurse attests to such pronouncement on the certificate of death and signs the certificate of death no later than twenty-four hours after the pronouncement.

The historical context of health professional scopes of practice greatly informs the understanding of today's regulatory schema. As noted in the 2012 consensus statement about scope of practice issued by the national boards for medicine, nursing, occupational therapy, pharmacy, physical therapy and social work:

> The history of professional licensure must be taken into account if one is to understand the current regulatory system governing scope of practice. Physicians were the first health professionals to obtain legislative recognition and protection of their practice authority. The practice of medicine was defined in broad and undifferentiated terms to include all aspects of an individual's care. Therefore, when other healthcare professions sought legislative recognition, they were seen as claiming the ability to do tasks which were already included in the universal and implicitly exclusive authority of medicine. This dynamic has fostered a view of scope of practice that is conceptually faulty and potentially damaging.[2]

The nature of health professional practice is inherently collaborative, between many types of professionals. One of the leading physician organizations, the American College of Physicians (ACP), agrees: "ACP believes that the future of health care delivery will require multidisciplinary teams of health care professionals that collaborate to provide patient-centered care".[3] Mandating an agreement with a physician does not truly speak to such collaboration, however, despite the statutory terminology. The statute requires that the collaborative agreement be made with a physician "who is educated, trained or has relevant experience that is related to the work" of the APRN.[4] While collaboration with a physician in the same field does occur, it stems from the natural flow of clinical practice, much as physicians consult

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[2] Association of Social Work Boards (ASWB), Federation of State Boards of Physical Therapy (FSBPT), Federation of State Medical Boards of the United States, Inc. (FSMB), National Association of Boards of Pharmacy (NABP®), National Board for Certification in Occupational Therapy, Inc. (NBCOT®), National Council of State Boards of Nursing, Inc. (NCSBN®). (January, 2012). *Changes in Health Professions' Scope of Practice: Legislative Considerations.*

[3] American College of Physicians. (2010). American College of Physicians Response to the Institute of Medicine's Report, The Future of Nursing: Leading Change, Advancing Health, p. 4 (pages unnumbered). See also http://www.fsmb.org/pdf/2005_grpol_scope_of_practice.pdf.

[4] General Statutes of Connecticut, Section 20-87a (b)(a).

with each other or with APRNs about patient care. Often, collaboration on a patient will mean consultation with a physician in the same field who is not the "collaborating physician," or even more likely with a specialist outside of the APRN's (and collaborating physician's) field. In a survey conducted with CTAPRNS membership August 1-11, 2013, 72 of 94 respondents (76 %) report collaborating with the MD who signed the mandatory agreement as the APRN deems necessary. They reported collaborating with MDs, NPs and other health care providers in the best interest of the patient as their norm. Several respondents noted that the collaborating physician had never seen any of the APRN's patients. One respondent noted that "I am asked to collaborate on HIS patients."

In 2010, after a two-year long investigation by a select interdisciplinary committee of health professionals and legal experts, the Institute of Medicine (IOM) issued recommendations regarding the future of nursing practice. The first recommendation is:[5]

> Recommendation 1: Remove scope-of-practice barriers. Advanced practice registered nurses should be able to practice to the full extent of their education and training. To achieve this goal, the committee recommends the following actions [...]

The Committee details this recommendation further for federal and state policymakers:

> For state legislatures:
> Reform scope-of-practice regulations to conform to the National Council of State Boards of Nursing Model Nursing Practice Act and Model Nursing Administrative Rules (Article XVIII, Chapter 18).

The referenced Model Nursing Practice Act[6] contemplates that APRNs practice with autonomous authority, with full prescriptive authority. Neither IOM nor the National Council of State Boards of Nursing recommend mandatory involvement of other health professionals as a threshold to APRN practice.

Since our August, 2012 submission to DPH, other data-based literature has been published supporting the removal of barriers to advanced nursing practice. In December, 2012, the National Governors Association (NGA) issued a white paper on Nurse Practitioners (NPs) entitled "The Role of Nurse Practitioners in Meeting Increased Demand for Primary Care." The NGA concluded "none of the studies in

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[5] Institute of Medicine (2010). Future of Nursing: Recommendations.

[6] National Council of State Boards of Nursing (2011). Model Nursing Practice Act and Model Nursing Administrative Rules.

NGA's literature review raise concerns about the quality of care offered by NPs."[7] The NGA goes on to suggest "states might consider changing scope of practice restrictions....as a way of encouraging and incentivizing greater NP involvement in the provision of primary health care."[8]

In March, 2013, the Federal Trade Commission FTC) issued a data-based response to Representative Theresa Conroy's invitation to examine the "likely competitive impact" of HB6391, which proposed removing the mandatory agreement requirement for APRN practice. The FTC notes that "collaboration does not necessarily require direct supervision by or accountability to another licensed health care provider." The FTC concludes that removing the mandatory practice agreement would likely increase access and decrease costs while increasing patient choice.[9]

A study published in the July 2013 issue of *Health Affairs*[10] examined a national sample of Medicare beneficiaries served by nurse practitioners (NPs) over the period 1998-2010. Seventy-percent of the nurse practitioners were providing primary care in ambulatory and long-term care settings. The researchers found the greatest growth of primary care NPs (and thus patients enrolled in primary care practices) occurred in states that did not require physician involvement in NP practice and prescribing. This finding reaffirms similar findings from 1994,[11] 2004,[12] and 2012.[13] The 2012 study, by Perry, specifically finds that "NPs do 'vote with their feet.'...an NP in a state that has granted greater practice authority to NPs is less likely to move from the state than otherwise."[14]

Removing the mandatory agreement eliminates a problematic and unnecessary barrier to entrepreneurial nursing practice. Removal of such barriers is frequently termed "independent," "autonomous," or "plenary authority" practice. Parties

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[7] National Governors Association (2012). NGA Paper: The Role of Nurse Practitioners in Meeting Increasing Demand for Primary Care, page 7.

[8] *Ibid.*, Page 11.

[9] Federal Trade Commission (March 19, 2013). Letter to the Honorable Theresa W. Conroy, Connecticut State Representative.

[10] Kuo, Y.F., Loresto, F.L., Rounds, L.R., & Goodwin, J.S. (2013). States with the least restrictive regulations experienced the largest increase in patients seen by nurse practitioners. *Health Affairs,* 32(7), pp. 1236-1243.

[11] Sekscenski, E.S, Sansom, S., Bazell, C., Salmon, M.E, & Mullan, F. (1994). State practice environments and the supply of physician assistants, nurse practitioners, and certified nurse-midwives. *The New England Journal of Medicine*, 331(19), pp. 1266-1271.

[12] U.S. Department of Health and Human Services. (2004). A comparison of changes in the professional practice of nurse practitioners, physician assistants, and certified nurse midwives. HRSA Contract 230-00-0099; Kalist, D.E. & Spurr, S.J. (2004). The effect of state laws on the supply of advanced practice nurses. *International Journal of Health Care Finance and Economics*, 4(4), pp. 271-281.

[13] Perry, J.J. (October, 2012). State-granted practice authority: Do nurse practitioners vote with their feet? *Nursing Research and Practice,* vol.12. 5 pages. doi:10.1155/2012/482178.

[14] *Ibid.*, p. 2.

unfamiliar with APRN practice may unwittingly believe that such terms indicate the APRN would practice in isolation, or without benefit of collegial consultation. This specter is one of the very first rebuttals in the formal response to the IOM report by the American College of Physicians.[15] However, removal of a mandatory agreement as a requirement of practice does not mean that APRNs will practice in some sort of non-collaborative vacuum. Twenty jurisdictions allow APRNs to practice without mandatory involvement from medicine or other professions as a threshold to practice, and in none of these jurisdictions are APRNs practicing without collaboration from across the health care team. A more practical view, and one endorsed by the APRN community, is that of the Editor-in-Chief of *The Journal of Family Practice*, addressing the Future of Nursing report's recommendations for full nursing practice:

"...[J]oining forces with APNs to develop innovative models of team care will lead to the best health outcomes. In a world of accountable health care organizations, health innovation zones, and medical "neighborhoods," we gain far more from collaboration than from competition."[16]

2. Public Health and Safety Benefits and Risks

APRNs generally have at least a master's degree in nursing, as is required for licensure in Connecticut, further described in Section 6.

In addition to the educational requirements for APRNs, two important steps for maintaining public safety already exist in the nursing practice act. First, APRNs in Connecticut can apply for licensure only after successfully completing a national board exam in the appropriate area of practice. Second, an APRN cannot sit for the exam without proof that the APRN graduated from an accredited nursing education program in the relevant practice arena. National board exams for health and other professionals are routinely accepted as evidence that the successful candidates are competent practitioners in their respective fields. As noted by the Federal Trade Commission in March, 2013[17], removing the mandatory agreement "does not otherwise change either the scope of APRN practice or established regulatory oversight of APRNs in Connecticut..."[18] The mandatory agreement components only echo the professional standards expected of nurse practitioners and other APRNS, and is not necessary for public safety; see Exhibit A for a detailed listing of professional standards for nurse practitioners.

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[15] American College of Physicians. (2010). *American College of Physicians Response to the Institute of Medicine's Report, The Futu0re of Nursing: Leading Change, Advancing Health*, p. 1 (pages unnumbered).

[16] Susman, J. (December, 2010). It's time to collaborate – not compete –with NPs. *The Journal of Family Practice, 59(12),* p. 672.

[17] Federal Trade Commission (March 19, 2013). Letter to the Honorable Theresa W. Conroy, Connecticut State Representative.

[18] *Ibid.*, p. 6

Unlike many other health professions, including physicians, APRNs have been thoroughly studied for over five decades.[19] Consistently, they are found to produce patient outcomes comparable to or exceeding those of physicians in health status and functional status, the use of the emergency department, and patient satisfaction.[20] A 2011 systematic review of studies on nurse practitioner outcomes from 1990-2008 determined there is a high level of evidence to conclude that NP outcomes are similar to those of physicians; a total of 59 studies, including 34 randomized control trials, support the finding that NP care equals that of physicians in the following:[21]

- Patient satisfaction with care and provider
- Functional status
- Self-reported perceptions of health status
- Management of blood glucose
- Management of hypertension
- Management of serum lipids
- Emergency department visits
- Hospitalization
- Mortality

A retrospective cross-sectional analysis of data collected from the US Veteran's Health Administration (VHA) from 2005-2010 determined that APRN and physician

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[19] Newhouse, R.P., Stanik-Hutt, J., White, K.M., Johantgen, M., Bas, E.B., et al. (2011). Advanced practice nurse outcomes 1990-2008: A systematic review. *Nursing Economics*, 29(5), pp. 1-21.

[20] Spitzer, W.O., Sackett, D.L., Sibley, J.C., Roberts, R.S., Gent, M., Kerigan, D.J. et al. (1974). The Burlington randomized trial of nurse practitioners. *NEJM*, 290(5), pp. 251-256; Office of Technology Assessment. (1986) Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives: A Policy Analysis, NTIS order #PB87-177465; Mundinger, M.O., Kane, R.L., Lenz, E.R., Totten, A., Tsai. W.Y., & Cleary, P.D. (2000). Primary care outcomes in patients treated by nurse practitioners or physicians: A randomized trial. *JAMA,* 283(1), pp. 59-68; 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), pp. 332-351; Horrocks, S., Anderson, E., & Salisbury, C. (April, 2002). Systematic review of whether nurse practitioners working in primary care can provide equivalent care to doctors. *British Medical Journal*, 324, pp. 819-823; Laurent, M., Reeves, D., Hermens, R., Braspenning, J., Grol, R., & Sibbald, B. (2004). Substitution of doctors by nurses in primary care: Cochrane Review; Dierick-van Daele, A.T., Metsemakers, J.F., Derckx, E.W., Spreeiwenberg, C., & Vrijhoef, H.J. (2009). Nurse practitioners substituting for general practitioners: randomized controlled trial. *Journal of Advanced Nursing*, 65(2), pp. 391-401; Newhouse, R.P., Stanik-Hutt, J., White, K.M., Johantgen, M., Bas, E.B., et al. (2011). Advanced practice nurse outcomes 1990-2008: A systematic review. *Nursing Economics*, 29(5), pp. 230-250.

[21] Newhouse, R.P., Stanik-Hutt, J., White, K.M., Johantgen, M., Bas, E.B., et al. (2011). Advanced practice nurse outcomes 1990-2008: A systematic review. *Nursing Economics*, 29(5), pp. 230-250.

assistant visits were substantially similar to those of physicians.[22] The authors note that NPs in the VHA manage their own patient panels, and do not need physician signature or other involvement for treatments, prescriptions, orders or other documentation. The authors also note the "high burden of chronic disease" in the VHA population.[23]

There is no risk to public safety by eliminating the mandatory collaborative agreement as a condition of APRN practice. This is illustrated by national data tracked by the Health Resources and Services Administration (HRSA) of the federal Department of Health and Human Services. HRSA compiles two distinct databases: the National Practitioner Data Bank (NPDB), which records "all licensure actions taken against all health care practitioners and any negative actions or findings taken against a health care practitioner…"[24] The Healthcare Integrity and Protection Data Bank (HIPDB) "discloses reports related to final adverse actions taken against health care practitioners…"[25]

In 2012, as in previous years, the *American Journal for Nurse Practitioners* published an online analysis of this data for nurse practitioners and physicians (including those trained as osteopaths) by state representing the latest national data of this type.[26] This data has also consistently indicated the safety of APRN practice. The following table illustrates the 2011 ratios for Connecticut and for the [then] nineteen jurisdictions that allow APRNs full practice without mandatory physician involvement in practice.[27]

Table One

STATE	*NP state ratio for NPDB event*	*DO state ratio for NPDB event*	*MD state ratio for NPDB event*	*NP state ratio for HIPDB event*	*DO state ratio for HIPDB event*	*MD state ratio for HIPDB event*
1. Alaska	1:123	1:8	1:4	1:4	1:5	1:5
2. Arizona	1:74	1:3	1:3	1:521	1:6	1:7

[22] Morgan, P.A., Abbott, D.H., McNeil, R.B., & Fisher, D.A. (2012). Characteristics of primary care office visits to nurse practitioners, physician assistants and physicians in United States Veterans Health Administration facilities, 2005-2010: a retrospective cross-sectional analysis. *Human Resources for Health*, 10, 8 pages.

[23] *Ibid.*, p.2.

[24] Pearson, L. (2012). Annual Pearson Report NPDB & HIPDB State Ratios.

[25] *Ibid.* Note: As of May 6, 2013, the NPDB and HIPDB were merged, now known as NPDB. See http://www.npdb-hipdb.hrsa.gov/resources/factsheets/MergerQandA.pdf

[26] Pearson, L. (2012). NPDB & HIPDB State Ratios [part of overall Annual Pearson Report].

[27] Note: 27 jurisdictions do not require involvement of physicians in diagnosing or treatment.

3. Colorado	1:91	1:5	1:4	1:3184	1:5	1:10
4. Wash., D.C.	1:46	1:5	1:5	0	0	1:22
5. Hawaii	1:456	1:7	1:5	1:456	1:13	1:17
6. Idaho	1:73	1:8	1:4	1:82	1:16	1:13
7. Iowa	1:148	1:3	1:3	0	1:6	1:9
8. Maine	1:155	1:7	1:4	1:544	1:7	1:11
9. Maryland	1:134	1:14	1.4	0	1:33	1:16
10. Montana	1:69	1:4	1:2	0	1:11	1:13
11. New Hampshire	1:139	1:15	1:3	1:764	1:15	1:13
12. New Mexico	1:51	1:2	1:2	1:584	1:261	1:11
13. North Dakota	1:238	1:6	1:3	1:475	1:3	1:6
14. Oregon	1:82	1:7	1:5	1:106	1:8	1:12
15. Rhode Island	1:77	1:2	1:3	1:345	1:15	1:17
16. Utah	1:131	1:9	1:3	1:131	1:10	1:13
17. Vermont	0	1:12	1:4	1:250	1:7	1:10
18. Washington	1:91	1:5	1:4	1:36	1:8	1:13
19. Wyoming	1:85	1:2	1:2	0	1:5	1:7
CONNECTICUT	1:685	1:22	1:6	1:95	1:33	1:20

There are multiple benefits to allowing APRNs to practice to the full extent of their education, without requiring a physician's agreement to practice. APRNs are known for their emphasis on holistic patient care, prevention, health promotion, and living well with chronic conditions. Removal of the requirement for the mandatory agreement creates an environment in which APRNs can expand current practice, and explore other avenues for delivering these types of services.[28] Additional benefits include:

- Increased access to health care, increasingly important as the number of insured individuals and families is expected to increase with full implementation of the Affordable Care Act; this will be more fully detailed in the following section.
- Increased patient choice of health care provider;
- Decrease in costs over time with increased prevention and health promotion services.
- Decreased duplication of services

3. Impact on Public Access to Health Care

[28] Rowe, J.W. (May 7, 2012). Why nurses need more authority. *The Atlantic*. See also Newhouse, R., Weiner, J., Stanik-Hutt, J., White, K.M., Johantgen, M, Steinwachs, D., Sangaro, G., Aldebron, J. and Bass, E.B. (2012). Policy implications for optimizing advanced practice registered nurse use nationally. *Policy, Politics & Nursing Practice,* 13(2), pp. 81-89.

In 1999, the Connecticut General Assembly removed the requirement for physician supervision of APRN practice, and instituted the collaborative agreement. In the years following the enactment of this law, APRN practice expanded into venues that had proved unrealistic in the setting of supervision, due to the lack of physician presence. APRNs are now routinely found in correctional health and long term care settings, and some have opened successful private practices.

Unfortunately, the requirement to have a collaborative agreement has, over the years, presented a barrier to APRNs who wish to practice without formal physician involvement in the business. Although an APRN may legally open such a practice with a collaborative agreement, the risks of doing so are high. Should the collaborating physician exit the agreement, however benignly, the APRN is immediately placed in an untenable dilemma of practicing without legal authority, despite the professional ethical requirement not to abandon patients. The suspension of practice has no reflection on the APRN's skill or fitness for practice, but hinges entirely on the vanishing collaborative agreement.

APRNs who lose a collaborating physician often have difficulty finding an immediate replacement, and sometimes are unable to find any replacement. CTAPRNS surveyed members in early August, 2013, with 94 respondents. The average number of patients in an APRN panel was 1050. Twenty-two NPs (23.4%) had a negative experience with the mandatory agreement. Reasons cited include:

- Difficulty finding a collaborating physician
- Collaborating physician retired
- Collaborating physician made unreasonable demands
- Collaborating physician thought "collaboration" meant supervision
- Collaborating physician took too long to respond, and
- Collaborating physician refused to provide coverage for patients in the absence of the APRN.

Twenty-two respondents (23 %) report the mandatory collaborative agreement has a negative impact on their practice, due to the insecurity of a sustainable practice under the current requirement for a collaborative requirement as a threshold to APRN practice. Respondents noted that physician retirement, death, re-location, or other severance of the mandatory agreement, automatically renders the APRN practice illegal, despite the professional requirement of all providers that patients not be abandoned.

CTAPRNS conducted a survey in late July, 2013 of 12 APRNs owning their own practices caring for 15,629 patients. Eight APRNs (66%) had a negative experience with the collaborative agreement. Many fear having to involuntarily abandon their patients. Four APRNs had experienced a loss of the collaborating physician. Two APRNs reported finding another collaborator took a significant amount of time (six to twelve months. The other two APRNs experienced a delay of more than one year to find another collaborating physician. Two had to pay for the physician signature

on the mandatory agreement. Two APRNs saw a significant disruption in the care of their patients.

During the past years several APRNs have been unable to secure a collaborator or to replace a collaborator. According to the CTAPRNSS survey, loss of a collaborating physician occurs for a variety of reasons. These include the relocation of the collaborator out of state, the retirement of the collaborator, the transition of the collaborator to another type of practice such as hospital coverage only; this corroborates the qualitative data we have heard over the years from practicing APRNs in Connecticut (see Exhibit C for specifics). The lack of a collaborator inhibits the ability of the APRN to practice. In addition to not being able to secure a physician signature on the mandatory agreement for practice, the cost of obtaining and keeping this agreement has caused other APRN practices to close. Without a collaborator, access to care disappears for some of the most vulnerable in our state.

It is notable that nationally approximately 68% of APRNs practice in primary care settings, and often in areas with large numbers of underserved patients.[29] A 2013 study reporting on the 2012 American Association of Medical Colleges (AAMC) consumer survey found that patients with annual household incomes less than $50,000 were most likely to have seen a nurse practitioner (or physician assistant) at the most recent medical visit, which was also true for Medicaid recipients.[30] The researchers found that "younger adults were more likely than others to prefer a physician assistant or nurse practitioner or to have no preference at all."[31] Younger adults and patients with lower incomes are the patients most likely to gain insurance through the health reform efforts, with active insurance status as of January 1, 2013. Connecticut anticipates close to 400,000 individuals to obtain health care coverage through the health coverage reforms effective in 2014, including 150,000 additional Medicaid enrollees. Removing the mandatory physician "agreement" to APRN practice will undoubtedly lead to increased access to care for these and other patients, as noted by the National Governors Association[32] and the Federal Trade Commission.[33]

The current requirement for a mandatory agreement before an APRN can practice is stifling much needed innovation and access to care. One innovation that has emerged nationally is Nurse Managed Health Centers (NMHCs). These centers are very similar to community health centers, and serve similar populations in rural or other underserved areas such as housing projects. As the name suggests, the centers

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[29] American Academy of Nurse Practitioners. (2012) Nurse Practitioner Facts.

[30] Dill, M.J., Pankow, S., Erikson, C. & Shipman, S. (2013). Survey shows consumers open to greater role for physician assistants and nurse practitioners. *Health Affairs*, 32(6), pp. 1135-1142.

[31] *Ibid.*, p. 1138.

[32] National Governors Association (2012). NGA Paper: The Role of Nurse Practitioners in Meeting Increasing Demand for Primary Care.

[33] Federal Trade Commission. (March 19, 2013). Letter to the Honorable Theresa W. Conroy, State Representative, Connecticut General Assembly.

are run by APRNs. A Robert Wood Johnson Foundation report issued in 2010 found that 60% of the 2 million annual patient encounters in NMHCs were patients without insurance or on state Medicaid plans.[34] Two barriers exist to establishing functional NMHCs:

- Restrictions on APRN scope of practice (requiring physician presence), and
- Lag in the insurance industry to recognize APRNs as primary care providers.

Connecticut has largely addressed the second barrier in Public Law 11-199. Removing the statutory barrier to full practice would greatly enhance the likelihood that full-fledged NMHCs could come to fruition in our state, giving much needed access to those who most need it.

4. Brief Summary of State or Federal Laws Governing the Profession:

Chapter 378 – Nurse Practice Act: governs education, licensure, certification requirements, prescriptive authority and mandates a collaborative agreement with a physician in the same field as a threshold to practice. Relevant sections include:

Section 20-87a of the Nurse Practice Act: requires APRNs who are not CRNAs to maintain a collaborative agreement with a physician as a requirement of practice, defines collaboration, and requires the mandatory agreement to be in writing regarding prescriptive authority.

Section 20-94b of the Nurse Practice Act: requires APRNs who are not certified as nurse anesthetists to have a written collaborative agreement with a physician in order to prescribe.

Section 20-94c of the Nurse Practice Act: requires APRNs who are not certified as nurse anesthetists to hold professional liability insurance "not less than five hundred thousand dollars for one person, per occurrence, with an aggregate of not less than one million five hundred thousand dollars…"

Chapter 420b – Dependency Producing Drugs Act: sets out the legal authority for pharmacists to fill and dispense controlled substances prescribed by authorized providers, including APRNs.

5. Current State Regulatory Oversight of the Profession

[34] Kovner, C. & Walani, S. (2010). *Nurse Managed Health Centers.* Robert Wood Johnson Foundation Research Brief.

The practice of APRNs in Connecticut is subject to State regulation in several aspects:

- The State Board of Examiners for Nursing (SBEN) has jurisdiction in determining whether particular actions or procedures fall within the APRN scope of practice.

- In addition to Federal Drug Enforcement Agency licensure, the State Department of Consumer Protection Drug Division has jurisdiction over the APRN's license to prescribe controlled substances; the agency regulates other prescribing professions in an identical manner.

- The Department of Public Health oversees APRN's eligibility for licensure and investigates complaints regarding APRNs.

6. All Current Education, Training, and Examination Requirements and Any Relevant Certification Requirements Applicable to the Profession

APRNs in Connecticut are required by Section 20-94a to have a graduate degree in nursing or a related field allowing the individual to become certified as an APRN.[35] Prior to entering a master's or doctoral program to become an APRN, the individual must have achieved a baccalaureate degree (typically in nursing) and passed the national licensure exam for registered nurses.

Master's and doctoral nurse practitioner programs typically consist of approximately 45 credits (two year full time study) and 65 credits (three year full time study) respectively. A minimum of 500 hours in supervised clinical is required for master's programs; the doctoral (DNP) programs require 1,000 hours. Students in both types of programs study advanced health assessment, advanced pharmacology, and advanced pathophysiology in addition to acute and chronic disease assessment and treatment, professional ethics and standards, biostatistics, quantitative and qualitative research, and health policy. Doctoral students, by virtue of the expanded curriculum, have additional opportunity to engage in quality improvement projects, health informatics, and epidemiology. See Exhibits A and B, below, for details on the professional standards and competencies expected of all nurse practitioner graduates.

To gain licensure as an APRN, an APRN must hold a national board certification from one of the certifying bodies recognized in statute, and must provide proof that at least thirty hours of education in pharmacology has been completed. Periodic mandatory recertification by the recognized certifying bodies assures that APRNs maintain currency in their field of practice.

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[35] There is a grandfathering provision regarding the educational requirements for persons certified for practice as an APRN prior to December 31, 1994.

7. Summary of Known Scope of Practice Changes Requested or Enacted Concerning the Profession in the Five Years Preceding the Request

2007 Raised Bill No. 7161 (File #458) AN ACT REVISING THE DEFINITION OF ADVANCED NURSING PRACTICE - Died on House calendar. This bill would have removed the mandate for a collaborative agreement.

2009 Raised Bill No. 6674 AN ACT CONCERNING WORKFORCE DEVELOPMENT AND IMPROVED ACCESS TO HEALTH CARE SERVICES – Died in Committee. This bill would have removed the mandate for a collaborative agreement.

2009 PA09-7 AN ACT IMPLEMENTING THE PROVISIONS OF THE BUDGET CONCERNING GENERAL GOVERNMENT AND MAKING CHANGES TO VARIOUS PROGRAMS – This Act repealed a deletion in PA09-187 that removed the authority of APRNs to certify disabilities for special license plates (authority that was obtained in PA 04-199).

2010 Substitute Bill No. 192 AN ACT CONCERNING THE LISTING OF ADVANCED PRACTICE REGISTERED NURSES IN MANAGED CARE ORGANIZATION PROVIDER LISTINGS, AND PRIMARY CARE PROVIDER DESIGNATIONS – File #291 Died on House Calendar

2011 PA 11-199 AN ACT CONCERNING THE LISTING OF ADVANCED PRACTICE REGISTERED NURSES IN MANAGED CARE ORGANIZATION PROVIDER LISTINGS, AND PRIMARY CARE PROVIDER DESIGNATIONS – Allows enrollees to choose APRNs as primary care providers

2012 PA 12-197 AN ACT CONCERNING VARIOUS REVISIONS TO THE PUBLIC HEALTH STATUTES – Changes some 20 Statutes to allow the signature of APRNs on various certification forms.

2013 House Bill 6391 AN ACT CONCERNING THE PRACTICE OF ADVANCED PRACTICE REGISTERED NURSES – Died in Committee. This bill would have removed the mandatory agreement for APRN practice.

2013 House Bill 5568 AN ACT CONCERNING TARGETED HEALTH AREAS – had a strike-all amendment filed (LCO #7295) that intended to address the same issue of removing the mandatory collaborative agreement for APRN practice, although it was not called. The amendment had 79 co-sponsors.

8. Extent to Which the Request Directly Affects Existing Relationships within the Health Care Delivery System

Eliminating the need for an APRN to obtain agreement from a collaborating physician as a threshold to practice would alter the need to obtain such agreement. Actual patient care, collegial consultation and collaboration, specialty referrals and other norms of professional practice would continue without interruption or change. Patient relationships to APRNs would change to the extent that direct access would increase.

The APRN community has documented occasions where obtaining the mandatory agreement has come with an actual price tag, as evidenced by responses to the August 2013 CTAPRNS membership survey, and further detailed in Exhibit C, below. APRNs who are now required in individual situations to compensate a physician to obtain the required collaborative agreement would no longer need to do so, altering the current fiscal relationship once the statutory mandate is removed.

9. Anticipated Economic Impact of the Request on the Health Care Delivery System

Removing barriers from APRN practice has positive impacts on state and federal health care costs, for several reasons. APRNs have long been documented to provide cost-effective care in primary, long term, occupational and acute care settings.[36] Cost savings include lower drug costs when compared to physicians,[37] lower per-patient costs,[38] lower visit costs,[39] and lower rates of emergency department referrals.[40] This last finding is contained in the 2009 RAND study about the Massachusetts health infrastructure reforms adopted in 2008. The study estimates cumulative state savings of 0.6 to 1.3 percent for the period 2010-2020 by allowing NPs and other "non-physician providers" to practice without mandated physician involvement. Although apparently modest, this equates to $4.2 - $8.4 billion in cumulative savings by 2020.

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[36] American Academy of Nurse Practitioners. (2010). Nurse Practitioner Cost-Effectiveness.

[37] Paez, K. & Allen, J. (2006). Cost-effectiveness of nurse practitioner management of hypercholesterolemia following coronary revascularization. *Journal of the American Academy of Nurse Practitioners.* 18(9), pp. 436-444.

[38] Coddington, J. & Sands, L. (2008). Cost of health care and quality of care at nurse-managed clinics. *Nursing Economics.* 26(2), pp. 75-94.

[39] Eibner, C., Hussey P., Ridgely M.S., & McGlynn E.A. (2009). Controlling health care spending in Massachusetts: an analysis of options. Santa Monica, CA: RAND Corporation.

[40] Traczynski, J. & Udalova, V. (2013). Nurse practitioner independence, health care utilization, and health outcomes. Available at http://www.lafollette.wisc.edu/research/health_economics/Traczynski.pdf

Further, recent research suggests that 50% of health care expenses stem from preventable conditions or preventable exacerbations of chronic conditions.[41] APRNs are known for their ability to successfully manage patients with potential or existing chronic conditions, due to the nursing focus on education, case management, and holistic assessment of the patient, family and available resources.[42]

A keystone element of the Affordable Care Act, the Patient-Centered Medical Home (PCMH) delivery model, has shown APRNs to be cost-effective in delivering care. Data was presented to the American Association of Nurse Practitioners Annual Conference June 19, 2013 by Sean Lyon, APRN and Kitty Kidder, APRN, owners and operators of the Lifelong Care PCMH practice located in New Hampshire. This APRN PCMH demonstrated a Per Member Per Month (PMPM) cost of $105.00 when compared with CIGNA average of $160.00 PMPM. The APRN cost was also less than most physician-run PCMH costs and far better than non-medical home practices. The APRN PCMH consistently performed well over time. Additionally, unnecessary presentation to the emergency room was greatly reduced; patients who presented to the emergency room truly needed to go there.

Any APRN required to pay for obtaining the agreement incurs significant business expenses in doing so, and may end up closing the practice rather than continue to pay for the required agreement. Eliminating the mandatory agreement would remove this economic impact on APRN practice.

10. Regional and National Trends in Licensing of the Health Profession Making the Request and a Summary of Relevant Scope of Practice Provisions Enacted in Other States

Twenty jurisdictions allow APRNs to practice autonomously to the full scope of their education. In the last several years, Colorado, Hawaii, Idaho, Vermont, North Dakota, Nevada and Maryland eliminated all regulatory and statutory requirements for physician involvement in APRN practice. Of the six New England states, only two have not yet removed such practice barriers: Massachusetts and Connecticut. In our region, Vermont was the most recent to grant full scope practice for APRNs, having achieved this through regulatory reform in 2011.

During the 2013 state legislative season, twelve states (California, Connecticut, Illinois, Kentucky, Kansas, Massachusetts, Michigan, Minnesota, North Carolina, New Jersey, Nevada, New York and Pennsylvania) sponsored legislation to remove physician involvement from APRN practice per IOM recommendations; Nevada passed its legislation. We expect at least as many states to present such legislation in the 2014 state legislative season.

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[41] Carruth, P. L. & Carruth, A. K. (Fall, 2011). The financial and cost accounting implications of the increased role of advanced nurse practitioners in U.S. healthcare. *American Journal of Health Sciences*, pp 1 – 8.

[42] Institute of Medicine (2010). The Future of Nursing: Leading Change, Advancing Health. Washington, DC: National Academies Press.

11. Identification of Any Health Care Professions that can Reasonably be Anticipated to be Directly Affected by the Request, the Nature of the Impact, and Efforts Made by the Requestor to Discuss It with Such Health Care Professions

During the fourteen years since the statutory requirement for a collaborative agreement was imposed, the APRN community in Connecticut has several times asked the General Assembly to remove this requirement. As it stands, the removal of the mandated collaborative agreement has no direct impact on any other profession. There is no evidence to support that removing the mandatory agreement will alter APRN patient care or put patients at risk. The quality care and patient responsibility of APRN practice will continue as it exists today. Access to care will be enhanced at a time when more individuals will have health insurance. APRN practices will not be threatened with unnecessary closure and more practices can open. Lastly, cost to the health care system would be reduced by decreasing redundancies, duplication of care and costs to deliver care.

The APRN community reasonably anticipates that the Medical Society will again object to this current request. The state Medical Society has historically opposed such legislation with concerns of public safety and APRN education; the literature clearly dispels those arguments. There have been several cordial meetings with the Connecticut State Medical Society where they have expressed opposition and we have received no indication that their position has changed. We recently notified the Medical Society that we would be filing a Scope of Practice Request with the Department of Public Health.

The Connecticut Medical Society in the past has argued that lack of attention to the need to continue to develop the physician workforce would occur should APRNs be allowed to practice without the now-required agreement.[43] Connecticut policymakers, however, are aware of the need for increasing the numbers of many types of primary care providers, and have been for many years. Physicians are clearly recognized as vital to the workforce, and multiple policies to support education and retention are detailed in various policy documents.[44] Further, a 2012 study of the fiscal impact on physicians removing barriers of APRN practice found no differences in economic status between physicians practicing in states that had removed barriers to APRN practice and states that had not.[45]

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[43] Connecticut State Medical Society (March 16, 2009). Testimony in Opposition to House Bill 6674 An Act Concerning Workforce Development and Improved Access to Health Care Services, submitted to the Public Health Committee of the Connecticut General Assembly.

[44] *Governor's Hospital Strategic Task Force, Findings and Recommendations*, January 8, 2008; Holm, R., Quimby,S., & Dorrer, J. (2011). *Connecticut Health Care Workforce Assessment.*

[45] Pittman,P. & Williams, B. (2012). Physician wages in states with expanded APRN scope of practice. *Nursing Research and Practice*, (2012, Article ID 671974), 5 pages. The

12. Description of How the Request Relates to the Health Care Profession's Ability to Practice to the Full Extent of the Profession's Education and Training

The request to remove the statutory mandate for a collaborative agreement with a physician as a threshold to APRN practice would allow APRNs to practice to the full extent of their education, training and national board certification. Removing the requirement for the mandatory agreement removes another profession from serving as a gatekeeper to an APRN's ability to offer much-needed health care to the general public. If the agreement is not sustainable, APRN practice is not sustainable.

Exhibit A - Standards of Practice for Nurse Practitioners American Association of Nurse Practitioners[46]

I. Qualifications

Nurse practitioners are licensed, independent practitioners who provide primary and/or specialty nursing and medical care in ambulatory, acute and long-term care settings. They are registered nurses with specialized, advanced education and clinical competency to provide health and medical care for diverse populations in a variety of primary care, acute and long-term care settings. Master's, post-master's or doctoral preparation is required for entry-level practice (AANP 2006).

II. Process of Care

The nurse practitioner utilizes the scientific process and national standards of care as a framework for managing patient care. This process includes the following components.

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authors clearly identify the fact that the sample was necessarily limited to employee physicians. No evidence exists, however, to suggest in this study or elsewhere that APRNs practicing in full scope have limited physician income where physicians are self-employed.

[46] American Association of Nurse Practitioners, 1993; Revised 1999, 2003, 2007, 2010, 2013

A. Assessment of health status

The nurse practitioner assesses health status by:

- Obtaining a relevant health and medical history
- Performing a physical examination based on age and history
- Performing or ordering preventative and diagnostic procedures based on the patient's age and history
- Identifying health and medical risk factors

B. Diagnosis

The nurse practitioner makes a diagnosis by:

- Utilizing critical thinking in the diagnostic process
- Synthesizing and analyzing the collected data
- Formulating a differential diagnosis based on the history, physical examination and diagnostic test results
- Establishing priorities to meet the health and medical needs of the individual, family, or community

C. Development of a treatment plan

The nurse practitioner, together with the patient and family, establishes an evidence-based, mutually acceptable, cost-awareness plan of care that maximizes health potential. Formulation of the treatment plan includes:

- Ordering and interpreting additional diagnostic tests
- Prescribing or ordering appropriate pharmacologic and non-pharmacologic interventions
- Developing a patient education plan
- Recommending consultations or referrals as appropriate

D. Implementation of the plan

Interventions are based upon established priorities. Actions by the nurse practitioners are:

- Individualized
- Consistent with the appropriate plan for care
- Based on scientific principles, theoretical knowledge and clinical expertise
- Consistent with teaching and learning opportunities

E. Follow-up and evaluation of the patient status

The nurse practitioner maintains a process for systematic follow-up by:

- Determining the effectiveness of the treatment plan with documentation of patient care outcomes
- Reassessing and modifying the plan with the patient and family as necessary to achieve health and medical goals

III. Care Priorities

The nurse practitioner's practice model emphasizes:

A. Patient and family education

The nurse practitioner provides health education and utilizes community resource opportunities for the individual and/or family

B. Facilitation of patient participation in self care.

The nurse practitioner facilitates patient participation in health and medical care by providing information needed to make decisions and choices about:

- Promotion, maintenance and restoration of health
- Consultation with other appropriate health care personnel
- Appropriate utilization of health care resources

C. Promotion of optimal health

D. Provision of continually competent care

E. Facilitation of entry into the health care system

F. The promotion of a safe environment

IV. Interdisciplinary and Collaborative Responsibilities

As a licensed, independent practitioner, the nurse practitioner participates as a team leader and member in the provision of health and medical care, interacting with professional colleagues to provide comprehensive care.

V. Accurate Documentation of Patient Status and Care

The nurse practitioner maintains accurate, legible and confidential records.

VI. Responsibility as Patient Advocate

Ethical and legal standards provide the basis of patient advocacy. As an advocate, the nurse practitioner participates in health policy activities at the local, state, national and international levels.

VII. Quality Assurance and Continued Competence

Nurse practitioners recognize the importance of continued learning through:

A. Participation in quality assurance review, including the systematic, periodic review of records and treatment plans

B. Maintenance of current knowledge by attending continuing education programs

C. Maintenance of certification in compliance with current state law

D. Application of standardized care guidelines in clinical practice

VIII. Adjunct Roles of Nurse Practitioners

Nurse practitioners combine the roles of provider, mentor, educator, researcher, manager and consultant. The nurse practitioner interprets the role of the nurse practitioner to individuals, families and other professionals.

IX. Research as Basis for Practice

Nurse practitioners support research by developing clinical research questions, conducting or participating in studies, and disseminating and incorporating findings into practice.

Exhibit B - 2012 Nurse Practitioner Core Competencies
National Organization of Nurse Practitioner Faculty (NONPF)
available at
http://www.nonpf.com/associations/10789/files/NPCoreCompetenciesFinal2012.pdf

Scientific Foundation Competencies

1. Critically analyzes data and evidence for improving advanced nursing practice.
2. Integrates knowledge from the humanities and sciences within the context of nursing science.
3. Translates research and other forms of knowledge to improve practice processes and outcomes.
4. Develops new practice approaches based on the integration of research, theory, and practice knowledge

Leadership Competencies

1. Assumes complex and advanced leadership roles to initiate and guide change.

2. Provides leadership to foster collaboration with multiple stakeholders (e.g. patients, community, integrated health care teams, and policy makers) to improve health care..
3. Demonstrates leadership that uses critical and reflective thinking.
4. Advocates for improved access, quality and cost effective health care.
5. Advances practice through the development and implementation of innovations incorporating principles of change.
6. Communicates practice knowledge effectively both orally and in writing.
7. Participates in professional organizations and activities that influence advanced practice nursing and/or health outcomes of a population focus.

Quality Competencies

1. Uses best available evidence to continuously improve quality of clinical practice.
2. Evaluates the relationships among access, cost, quality, and safety and their influence on health care.
3. Evaluates how organizational structure, care processes, financing, marketing and policy decisions impact the quality of health care.
4. Applies skills in peer review to promote a culture of excellence.
5. Anticipates variations in practice and is proactive in implementing interventions to ensure quality.

Practice Inquiry Competencies

1. Provides leadership in the translation of new knowledge into practice.
2. Generates knowledge from clinical practice to improve practice and patient outcomes.
3. Applies clinical investigative skills to improve health outcomes.
4. Leads practice inquiry, individually or in partnership with others.
5. Disseminates evidence from inquiry to diverse audiences using multiple modalities.
6. Analyzes clinical guidelines for individualized application into practice

Technology and Information Literacy Competencies

1. Integrates appropriate technologies for knowledge management to improve health care.
2. Translates technical and scientific health information appropriate for various users' needs.

2a) Assesses the patient's and caregiver's educational needs to provide effective, personalized health care.

2b). Coaches the patient and caregiver for positive behavioral change.

3. Demonstrates information literacy skills in complex decision making.
4. Contributes to the design of clinical information systems that promote safe, quality and cost effective care.
5. Uses technology systems that capture data on variables for the evaluation of nursing care.

Policy Competencies

1. Demonstrates an understanding of the interdependence of policy and practice.
2. Advocates for ethical policies that promote access, equity, quality, and cost.
3. Analyzes ethical, legal, and social factors influencing policy development.
4. Contributes in the development of health policy.
5. Analyzes the implications of health policy across disciplines.
6. Evaluates the impact of globalization on health care policy development.

Health Delivery System Competencies

1. Applies knowledge of organizational practices and complex systems to improve health care delivery.
2. Effects health care change using broad based skills including negotiating, consensus-building, and partnering.
3. Minimizes risk to patients and providers at the individual and systems level.
4. Facilitates the development of health care systems that address the needs of culturally diverse populations, providers, and other stakeholders.

5. Evaluates the impact of health care delivery on patients, providers, other stakeholders, and the environment.
6. Analyzes organizational structure, functions and resources to improve the delivery of care.
7. Collaborates in planning for transitions across the continuum of care.

Ethics Competencies

1. Integrates ethical principles in decision making.
2. Evaluates the ethical consequences of decisions.
3. Applies ethically sound solutions to complex issues related to individuals, populations and systems of care.

Independent Practice Competencies

1. Functions as a licensed independent practitioner.
2. Demonstrates the highest level of accountability for professional practice.
3. Practices independently managing previously diagnosed and undiagnosed patients.

3a). Provides the full spectrum of health care services to include health promotion, disease prevention, health protection, anticipatory guidance, counseling, disease management, palliative, and end of life care.

3b). Uses advanced health assessment skills to differentiate between normal, variations of normal and abnormal findings.

3c). Employs screening and diagnostic strategies in the development of diagnoses.

3d). Prescribes medications within scope of practice.

3e). Manages the health/illness status of patients and families over time.

4. Provides patient-centered care recognizing cultural diversity and the patient or designee as a full partner in decision-making.

4a). Works to establish a relationship with the patient characterized by mutual respect, empathy, and collaboration.

4b). Creates a climate of patient-centered care to include confidentiality, privacy, comfort, emotional support, mutual trust, and respect.

4c). Incorporates the patient's cultural and spiritual preferences, values, and beliefs into health care.

4d). Preserves the patient's control over decision making by negotiating a mutually acceptable plan of care.

Exhibit C - Specific Cases of APRN Experience of Practice Barriers Related to the Mandatory Collaborative Agreement

Case #1: An APRN with her own practice learned in late July, 2013 that her collaborator was relocating to another state in two months. Her panel of 400 patients have relied on her since 2005; she has less than 90 days to make arrangements that will either allow her to continue to practice or to steer her patients to another provider. The loss of the collaborating agreement has placed her practice in peril and yet has nothing to do with the quality of her care.

Case #2: An APRN attempted to start a practice providing health care services for people with disabilities living in group homes an underserved population. She was able to find a physician as a collaborator at a price of $1000 per quarter with the understanding that this price could go up if the practice was successful; however, the high fee ultimately caused the APRN to close her practice. She has gone back to school for her DNP. She would like to open a practice but feels this could never be possible for her based upon current practice restrictions.

Case #3: An APRN lost her collaborating MD, forcing her to leave her position resulting in lost wages, vacation, sick time benefits, retirement and medical insurance. She chose to leave

than to work in an environment illegally. Recently, this APRN opened a practice in Rhode Island stating she could not wait for CT to change their requirements.

Case #4: An APRN with expertise in endocrinology decided to open her own practice after separating from a physician practice. She was unable to find a collaborator willing to sign for little or no payment. Despite this, demand for her services increased, so she entered an agreement with a "collaborating" physician who required 70% of her reimbursement for her four days of practice. Of this 40% went to overhead and billing expenses and 30% was his profit. After one year, the physician wanted to increase his percentage and add another day to collect more revenue from the APRN. During that year, she had collaborated on patient care with him three times and asked him three questions. The APRN left this practice due to the unreasonable collaboration fees. It took her almost a year to find another collaborator with a lapse for her patients in care that was made worse when she had to be re-credentialed on all health plans. She currently has a new practice with another collaborating MD but fears unreasonable demands to maintain this agreement may force her to close her practice once again.

Case #5: An insurance company is interested in establishing long-term care practice with APRNs providing home visits; the company has not been able to secure collaborative agreements and is thus unable to launch this initiative.

Case #6: An APRN started her own practice and was charged $30,000 per year for collaboration with a physician several years ago. The APRN was fortunate to find another physician "collaborator" after one year, who provided the signature on the agreement at no charge. This APRN currently has a successful practice with a collaborating MD serving 2000 patients.

Case #7: An APRN with psychiatric expertise relocated to Connecticut in 2009 after 16 ½ years maintaining a practice with Medicaid patients in a state where APRNs are not required to have physician presence in the business. In seeking a collaborator in Connecticut, she contacted a physician friend willing to be her collaborator for $6000/year—the amount he stated his malpractice would increase to list her as a collaborator. She has not opened a practice here.

Case #8: An APRN with wound care expertise services patients in long-term, sub-acute and acute care settings. Her collaborating MD is approaching retirement. Given her setting and past experience in the APRN community, it will likely be hard to find a willing physician to be her collaborator; she worries the cost of signing an agreement may force her to close her practice. She saves patients and facilities significant transportation expenses, as she goes to their location. Patients may be faced with having to be transported to a wound care clinic, a cost many patients and facilities may not be able to bear, in addition to likely substantial wait times for access to the specialty clinics.

Case #9: A psychiatric APRN works in a not-for-profit clinic serving 2000 patients. The collaborating MD is close to retiring. There is a great fear these vulnerable patients will be left with a lapse in care. This APRN also has a private practice with a collaborating MD who will be transitioning to New York City; this collaborator also has agreements with 20 other APRNs. It is doubtful another collaborator will be willing to take on these APRNs. This will leave patients with a lapse in care.

Case #10: A Primary Care APRN with 2000 patients has a collaborating MD soon to retire. She has begun the process of location a replacement. Several MDs had concerns after contacting

their malpractice insurance carrier that their costs will increase. One MD offered to sign an agreement for $10,000 per year, a cost too steep for her business and she may be forced to close her practice.

Case #11: A psychiatric APRN had three episodes of collaboration separation. The first, on the advice of her attorney, the collaborating MD abruptly severed the agreement. The second involved the collaborating MD whose license was suspended due to prescribing practices. The next psychiatrist only provided the agreement for a few months. Now there are 7 APRNs with a panel of 2000 patients sharing the same psychiatrist, each paying a stipend for the signed agreement.

Case #12: An APRN provides in-home care to dementia and patients with memory problems. It took her 12 months to find a collaborating MD. These are vulnerable elderly and senior patients who would have difficulty finding care if this APRN practice were to close. She reports that her collaborating MD is currently entertaining offers for his own career which threaten the agreement, thus placing her practice in jeopardy.

Case #13: An APRN had issues with laboratory testing from a hospital that would not recognize her as an ordering provider. They wanted the orders signed by an MD. This resulted in many laboratory results going to another MD delaying care and potentially causing undue harm to patients.

Case #14: A psychiatric APRN had difficulty finding a psychiatrist willing to sign the collaborative agreement. She finally found someone who will sign the agreement for a $300 per hour fee.

Case #15: A psychiatric APRN has a 73 year old collaborating psychiatrist who she is fearful will retire leaving 300 patients with a lapse in care.

Case #16: In 2008, an APRN was without a signed agreement after the MD abruptly left. The newly hired MD refused to sign an agreement. The APRN had to contact the Department of Public Health to intervene. Because the APRN could no longer legally diagnose and treat, patients were turned away from the center. Four months later, an agreement was signed.

Case #17: An APRN left a practice in Waterbury after 15 years to move to Cheshire. It took her several months to find a collaborating MD leaving her patients with a lapse in care.

Case #18: Recently, an APRN was brought before the Department of Public Health for alleged absence of a valid collaborative agreement. The concern stemmed from the lack of a signature on the document by the collaborating MD. Her collaborating psychiatrist met with her on several occasions and the psychiatrist billed her for this service. Both parties were acting in concert with the written collaborative agreement. Following the pre-hearing review, the Nursing board agreed a valid agreement was in place and withdrew any charges. Even a low level disciplinary action in this case could have disproportionate impact on this APRN's livelihood, future employment and third party reimbursement, as well as the patients who could lose a provider, even though there was no issue with the care rendered by the APRN.

Table of Contents

- Spitzer et al.: The Burlington randomized trial of nurse practitioners (1974)

- Office of Technology Assessment: Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives: A Policy Analysis (1986)

- Mundinger et al.: Primary care outcomes in patients treated by nurse practitioners or physicians: a randomized trial (2000)

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- Paez et al.: Cost-effectiveness of nurse practitioner management of hypercholesterolemia following coronary revascularization (2006)
- Coddington et al.: Cost of health care and quality of care at nurse-managed clinics (2008)
- Eibner et al. at RAND: Controlling health care spending in Massachusetts: an analysis of options (2009)
- Traczynski et al.: Nurse practitioner independence, health care utilization, and health outcomes (2013)
- Carruth et al.: The financial and cost accounting implications of the increased role of advanced nurse practitioners in U.S. healthcare (2011)
- Connecticut State Medical Society: Testimony in Opposition to House Bill 6674 (2009)
- *Governor's Hospital Strategic Task Force, Findings and Recommendations* (2008)
- Holm et al. *Connecticut Health Care Workforce Assessment* (2008)
- Pittman et al.: Physician wages in states with expanded APRN scope of practice (2012)

Request for Consideration of Scope of Practice Change

Submitted to the Connecticut Department of Public Health
by the Connecticut Advanced Practice Registered Nurse Society

August 12, 2013

Per P.A. 11-209, the Connecticut Advanced Practice Registered Nurse Society (CTAPRNS) submits a request to change statutory language affecting the requirements for practice by Advanced Practice Registered Nurses (APRNs).

1. Plain Language Description of the Request:

CTAPRNS respectfully requests removal of the mandatory collaborative agreement requirement for APRNs practicing as nurse practitioners or clinical nurse specialists.[1] Nurses licensed to practice in Connecticut do so under the requirements of Section 20-87a. APRNs practice under subsection "a" of this section, relating to registered nursing practice. In addition, APRNs are under the requirements of subsection "b" of this section, which states in relevant part:

> (b) Advanced nursing practice is defined as the performance of advanced level nursing practice activities that, by virtue of post_basic specialized education and experience, are appropriate to and may be performed by an advanced practice registered nurse. The advanced practice registered nurse performs acts of diagnosis and treatment of alterations in health status, as described in subsection (a) of this section, and shall collaborate with a physician licensed to practice medicine in this state. In all settings, the advanced practice registered nurse may, in collaboration with a physician licensed to practice medicine in this state, prescribe, dispense and administer medical therapeutics and corrective measures and may request, sign for, receive and dispense drugs in the form of professional samples in accordance with sections 20-14c to 20-14e, inclusive, [...] For purposes of this subsection, "collaboration" means a mutually agreed upon relationship between an advanced practice registered nurse and a physician who is educated, trained or has relevant experience that is related to the work of such advanced practice registered nurse. The collaboration shall address a reasonable and appropriate level of consultation and referral, coverage for the patient in the absence of the advanced practice registered nurse, a method to review patient outcomes and a method of disclosure of the relationship to the patient. Relative to the exercise of prescriptive authority, the collaboration between an advanced practice registered nurse and a physician shall be in writing and shall address the level of schedule II and III controlled substances that the advanced practice registered nurse may prescribe and provide a method to review patient outcomes, including, but not limited to, the review of medical therapeutics, corrective measures,

[1] Certified Registered Nurse Anesthetists (CRNAs) are licensed as APRNs, but have a different practice arrangement; CRNAs are not requesting any change to their scope of practice. Certified Nurse Midwives (CNMs) are not licensed as APRNs in Connecticut, having their own practice act and scope requirements (Chapter 377).

> laboratory tests and other diagnostic procedures that the advanced practice registered nurse may prescribe, dispense and administer. An advanced practice registered nurse licensed under the provisions of this chapter may make the determination and pronouncement of death of a patient, provided the advanced practice registered nurse attests to such pronouncement on the certificate of death and signs the certificate of death no later than twenty-four hours after the pronouncement.

The historical context of health professional scopes of practice greatly informs the understanding of today's regulatory schema. As noted in the 2012 consensus statement about scope of practice issued by the national boards for medicine, nursing, occupational therapy, pharmacy, physical therapy and social work:

> The history of professional licensure must be taken into account if one is to understand the current regulatory system governing scope of practice. Physicians were the first health professionals to obtain legislative recognition and protection of their practice authority. The practice of medicine was defined in broad and undifferentiated terms to include all aspects of an individual's care. Therefore, when other healthcare professions sought legislative recognition, they were seen as claiming the ability to do tasks which were already included in the universal and implicitly exclusive authority of medicine. This dynamic has fostered a view of scope of practice that is conceptually faulty and potentially damaging.[2]

The nature of health professional practice is inherently collaborative, between many types of professionals. One of the leading physician organizations, the American College of Physicians (ACP), agrees: "ACP believes that the future of health care delivery will require multidisciplinary teams of health care professionals that collaborate to provide patient-centered care".[3] Mandating an agreement with a physician does not truly speak to such collaboration, however, despite the statutory terminology. The statute requires that the collaborative agreement be made with a physician "who is educated, trained or has relevant experience that is related to the work" of the APRN.[4] While collaboration with a physician in the same field does occur, it stems from the natural flow of clinical practice, much as physicians consult

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[2] Association of Social Work Boards (ASWB), Federation of State Boards of Physical Therapy (FSBPT), Federation of State Medical Boards of the United States, Inc. (FSMB), National Association of Boards of Pharmacy (NABP®), National Board for Certification in Occupational Therapy, Inc. (NBCOT®), National Council of State Boards of Nursing, Inc. (NCSBN®). (January, 2012). *Changes in Health Professions' Scope of Practice: Legislative Considerations.*

[3] American College of Physicians. (2010). American College of Physicians Response to the Institute of Medicine's Report, The Future of Nursing: Leading Change, Advancing Health, p. 4 (pages unnumbered). See also http://www.fsmb.org/pdf/2005_grpol_scope_of_practice.pdf.

[4] General Statutes of Connecticut, Section 20-87a (b)(a).

with each other or with APRNs about patient care. Often, collaboration on a patient will mean consultation with a physician in the same field who is not the "collaborating physician," or even more likely with a specialist outside of the APRN's (and collaborating physician's) field. In a survey conducted with CTAPRNS membership August 1-11, 2013, 72 of 94 respondents (76 %) report collaborating with the MD who signed the mandatory agreement as the APRN deems necessary. They reported collaborating with MDs, NPs and other health care providers in the best interest of the patient as their norm. Several respondents noted that the collaborating physician had never seen any of the APRN's patients. One respondent noted that "I am asked to collaborate on HIS patients."

In 2010, after a two-year long investigation by a select interdisciplinary committee of health professionals and legal experts, the Institute of Medicine (IOM) issued recommendations regarding the future of nursing practice. The first recommendation is:[5]

> Recommendation 1: Remove scope-of-practice barriers. Advanced practice registered nurses should be able to practice to the full extent of their education and training. To achieve this goal, the committee recommends the following actions [...]

The Committee details this recommendation further for federal and state policymakers:

> For state legislatures:
> Reform scope-of-practice regulations to conform to the National Council of State Boards of Nursing Model Nursing Practice Act and Model Nursing Administrative Rules (Article XVIII, Chapter 18).

The referenced Model Nursing Practice Act[6] contemplates that APRNs practice with autonomous authority, with full prescriptive authority. Neither IOM nor the National Council of State Boards of Nursing recommend mandatory involvement of other health professionals as a threshold to APRN practice.

Since our August, 2012 submission to DPH, other data-based literature has been published supporting the removal of barriers to advanced nursing practice. In December, 2012, the National Governors Association (NGA) issued a white paper on Nurse Practitioners (NPs) entitled "The Role of Nurse Practitioners in Meeting Increased Demand for Primary Care." The NGA concluded "none of the studies in

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[5] Institute of Medicine (2010). Future of Nursing: Recommendations.

[6] National Council of State Boards of Nursing (2011). Model Nursing Practice Act and Model Nursing Administrative Rules.

NGA's literature review raise concerns about the quality of care offered by NPs."[7] The NGA goes on to suggest "states might consider changing scope of practice restrictions....as a way of encouraging and incentivizing greater NP involvement in the provision of primary health care."[8]

In March, 2013, the Federal Trade Commission FTC) issued a data-based response to Representative Theresa Conroy's invitation to examine the "likely competitive impact" of HB6391, which proposed removing the mandatory agreement requirement for APRN practice. The FTC notes that "collaboration does not necessarily require direct supervision by or accountability to another licensed health care provider." The FTC concludes that removing the mandatory practice agreement would likely increase access and decrease costs while increasing patient choice.[9]

A study published in the July 2013 issue of *Health Affairs*[10] examined a national sample of Medicare beneficiaries served by nurse practitioners (NPs) over the period 1998-2010. Seventy-percent of the nurse practitioners were providing primary care in ambulatory and long-term care settings. The researchers found the greatest growth of primary care NPs (and thus patients enrolled in primary care practices) occurred in states that did not require physician involvement in NP practice and prescribing. This finding reaffirms similar findings from 1994,[11] 2004,[12] and 2012.[13] The 2012 study, by Perry, specifically finds that "NPs do 'vote with their feet.'...an NP in a state that has granted greater practice authority to NPs is less likely to move from the state than otherwise."[14]

Removing the mandatory agreement eliminates a problematic and unnecessary barrier to entrepreneurial nursing practice. Removal of such barriers is frequently termed "independent," "autonomous," or "plenary authority" practice. Parties

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[7] National Governors Association (2012). NGA Paper: The Role of Nurse Practitioners in Meeting Increasing Demand for Primary Care, page 7.

[8] *Ibid.,* Page 11.

[9] Federal Trade Commission (March 19, 2013). Letter to the Honorable Theresa W. Conroy, Connecticut State Representative.

[10] Kuo, Y.F., Loresto, F.L., Rounds, L.R., & Goodwin, J.S. (2013). States with the least restrictive regulations experienced the largest increase in patients seen by nurse practitioners. *Health Affairs,* 32(7), pp. 1236-1243.

[11] Sekscenski, E.S, Sansom, S., Bazell, C., Salmon, M.E, & Mullan, F. (1994). State practice environments and the supply of physician assistants, nurse practitioners, and certified nurse-midwives. *The New England Journal of Medicine*, 331(19), pp. 1266-1271.

[12] U.S. Department of Health and Human Services. (2004). A comparison of changes in the professional practice of nurse practitioners, physician assistants, and certified nurse midwives. HRSA Contract 230-00-0099; Kalist, D.E. & Spurr, S.J. (2004). The effect of state laws on the supply of advanced practice nurses. *International Journal of Health Care Finance and Economics*, 4(4), pp. 271-281.

[13] Perry, J.J. (October, 2012). State-granted practice authority: Do nurse practitioners vote with their feet? *Nursing Research and Practice,* vol.12. 5 pages. doi:10.1155/2012/482178.

[14] *Ibid.,* p. 2.

unfamiliar with APRN practice may unwittingly believe that such terms indicate the APRN would practice in isolation, or without benefit of collegial consultation. This specter is one of the very first rebuttals in the formal response to the IOM report by the American College of Physicians.[15] However, removal of a mandatory agreement as a requirement of practice does not mean that APRNs will practice in some sort of non-collaborative vacuum. Twenty jurisdictions allow APRNs to practice without mandatory involvement from medicine or other professions as a threshold to practice, and in none of these jurisdictions are APRNs practicing without collaboration from across the health care team. A more practical view, and one endorsed by the APRN community, is that of the Editor-in-Chief of *The Journal of Family Practice*, addressing the Future of Nursing report's recommendations for full nursing practice:

"...[J]oining forces with APNs to develop innovative models of team care will lead to the best health outcomes. In a world of accountable health care organizations, health innovation zones, and medical "neighborhoods," we gain far more from collaboration than from competition."[16]

2. Public Health and Safety Benefits and Risks

APRNs generally have at least a master's degree in nursing, as is required for licensure in Connecticut, further described in Section 6.

In addition to the educational requirements for APRNs, two important steps for maintaining public safety already exist in the nursing practice act. First, APRNs in Connecticut can apply for licensure only after successfully completing a national board exam in the appropriate area of practice. Second, an APRN cannot sit for the exam without proof that the APRN graduated from an accredited nursing education program in the relevant practice arena. National board exams for health and other professionals are routinely accepted as evidence that the successful candidates are competent practitioners in their respective fields. As noted by the Federal Trade Commission in March, 2013[17], removing the mandatory agreement "does not otherwise change either the scope of APRN practice or established regulatory oversight of APRNs in Connecticut..."[18] The mandatory agreement components only echo the professional standards expected of nurse practitioners and other APRNS, and is not necessary for public safety; see Exhibit A for a detailed listing of professional standards for nurse practitioners.

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[15] American College of Physicians. (2010). *American College of Physicians Response to the Institute of Medicine's Report, The Futu0re of Nursing: Leading Change, Advancing Health*, p. 1 (pages unnumbered).

[16] Susman, J. (December, 2010). It's time to collaborate – not compete –with NPs. *The Journal of Family Practice, 59(12),* p. 672.

[17] Federal Trade Commission (March 19, 2013). Letter to the Honorable Theresa W. Conroy, Connecticut State Representative.

[18] *Ibid.,* p. 6

Unlike many other health professions, including physicians, APRNs have been thoroughly studied for over five decades.[19] Consistently, they are found to produce patient outcomes comparable to or exceeding those of physicians in health status and functional status, the use of the emergency department, and patient satisfaction.[20] A 2011 systematic review of studies on nurse practitioner outcomes from 1990-2008 determined there is a high level of evidence to conclude that NP outcomes are similar to those of physicians; a total of 59 studies, including 34 randomized control trials, support the finding that NP care equals that of physicians in the following:[21]

- Patient satisfaction with care and provider
- Functional status
- Self-reported perceptions of health status
- Management of blood glucose
- Management of hypertension
- Management of serum lipids
- Emergency department visits
- Hospitalization
- Mortality

A retrospective cross-sectional analysis of data collected from the US Veteran's Health Administration (VHA) from 2005-2010 determined that APRN and physician

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[19] Newhouse, R.P., Stanik-Hutt, J., White, K.M., Johantgen, M., Bas, E.B., et al. (2011). Advanced practice nurse outcomes 1990-2008: A systematic review. *Nursing Economics*, 29(5), pp. 1-21.

[20] Spitzer, W.O., Sackett, D.L., Sibley, J.C., Roberts, R.S., Gent, M., Kerigan, D.J. et al. (1974). The Burlington randomized trial of nurse practitioners. *NEJM*, 290(5), pp. 251-256; Office of Technology Assessment. (1986) Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives: A Policy Analysis, NTIS order #PB87-177465; Mundinger, M.O., Kane, R.L., Lenz, E.R., Totten, A., Tsai. W.Y., & Cleary, P.D. (2000). Primary care outcomes in patients treated by nurse practitioners or physicians: A randomized trial. *JAMA,* 283(1), pp. 59-68; 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), pp. 332-351; Horrocks, S., Anderson, E., & Salisbury, C. (April, 2002). Systematic review of whether nurse practitioners working in primary care can provide equivalent care to doctors. *British Medical Journal*, 324, pp. 819-823; Laurent, M., Reeves, D., Hermens, R., Braspenning, J., Grol, R., & Sibbald, B. (2004). Substitution of doctors by nurses in primary care: Cochrane Review; Dierick-van Daele, A.T., Metsemakers, J.F., Derckx, E.W., Spreeiwenberg, C., & Vrijhoef, H.J. (2009). Nurse practitioners substituting for general practitioners: randomized controlled trial. *Journal of Advanced Nursing*, 65(2), pp. 391-401; Newhouse, R.P., Stanik-Hutt, J., White, K.M., Johantgen, M., Bas, E.B., et al. (2011). Advanced practice nurse outcomes 1990-2008: A systematic review. *Nursing Economics*, 29(5), pp. 230-250.

[21] Newhouse, R.P., Stanik-Hutt, J., White, K.M., Johantgen, M., Bas, E.B., et al. (2011). Advanced practice nurse outcomes 1990-2008: A systematic review. *Nursing Economics*, 29(5), pp. 230-250.

assistant visits were substantially similar to those of physicians.[22] The authors note that NPs in the VHA manage their own patient panels, and do not need physician signature or other involvement for treatments, prescriptions, orders or other documentation. The authors also note the "high burden of chronic disease" in the VHA population.[23]

There is no risk to public safety by eliminating the mandatory collaborative agreement as a condition of APRN practice. This is illustrated by national data tracked by the Health Resources and Services Administration (HRSA) of the federal Department of Health and Human Services. HRSA compiles two distinct databases: the National Practitioner Data Bank (NPDB), which records "all licensure actions taken against all health care practitioners and any negative actions or findings taken against a health care practitioner…"[24] The Healthcare Integrity and Protection Data Bank (HIPDB) "discloses reports related to final adverse actions taken against health care practitioners…"[25]

In 2012, as in previous years, the *American Journal for Nurse Practitioners* published an online analysis of this data for nurse practitioners and physicians (including those trained as osteopaths) by state representing the latest national data of this type.[26] This data has also consistently indicated the safety of APRN practice. The following table illustrates the 2011 ratios for Connecticut and for the [then] nineteen jurisdictions that allow APRNs full practice without mandatory physician involvement in practice.[27]

Table One

STATE	*NP state ratio for NPDB event*	*DO state ratio for NPDB event*	*MD state ratio for NPDB event*	*NP state ratio for HIPDB event*	*DO state ratio for HIPDB event*	*MD state ratio for HIPDB event*
1. Alaska	1:123	1:8	1:4	1:4	1:5	1:5
2. Arizona	1:74	1:3	1:3	1:521	1:6	1:7

[22] Morgan, P.A., Abbott, D.H., McNeil, R.B., & Fisher, D.A. (2012). Characteristics of primary care office visits to nurse practitioners, physician assistants and physicians in United States Veterans Health Administration facilities, 2005-2010: a retrospective cross-sectional analysis. *Human Resources for Health*, 10, 8 pages.
[23] *Ibid.*, p.2.
[24] Pearson, L. (2012). Annual Pearson Report NPDB & HIPDB State Ratios.
[25] *Ibid.* Note: As of May 6, 2013, the NPDB and HIPDB were merged, now known as NPDB. See http://www.npdb-hipdb.hrsa.gov/resources/factsheets/MergerQandA.pdf
[26] Pearson, L. (2012). NPDB & HIPDB State Ratios [part of overall Annual Pearson Report].
[27] Note: 27 jurisdictions do not require involvement of physicians in diagnosing or treatment.

3. Colorado	1:91	1:5	1:4	1:3184	1:5	1:10
4. Wash., D.C.	1:46	1:5	1:5	0	0	1:22
5. Hawaii	1:456	1:7	1:5	1:456	1:13	1:17
6. Idaho	1:73	1:8	1:4	1:82	1:16	1:13
7. Iowa	1:148	1:3	1:3	0	1:6	1:9
8. Maine	1:155	1:7	1:4	1:544	1:7	1:11
9. Maryland	1:134	1:14	1.4	0	1:33	1:16
10. Montana	1:69	1:4	1:2	0	1:11	1:13
11. New Hampshire	1:139	1:15	1:3	1:764	1:15	1:13
12. New Mexico	1:51	1:2	1:2	1:584	1:261	1:11
13. North Dakota	1:238	1:6	1:3	1:475	1:3	1:6
14. Oregon	1:82	1:7	1:5	1:106	1:8	1:12
15. Rhode Island	1:77	1:2	1:3	1:345	1:15	1:17
16. Utah	1:131	1:9	1:3	1:131	1:10	1:13
17. Vermont	0	1:12	1:4	1:250	1:7	1:10
18. Washington	1:91	1:5	1:4	1:36	1:8	1:13
19. Wyoming	1:85	1:2	1:2	0	1:5	1:7
CONNECTICUT	1:685	1:22	1:6	1:95	1:33	1:20

There are multiple benefits to allowing APRNs to practice to the full extent of their education, without requiring a physician's agreement to practice. APRNs are known for their emphasis on holistic patient care, prevention, health promotion, and living well with chronic conditions. Removal of the requirement for the mandatory agreement creates an environment in which APRNs can expand current practice, and explore other avenues for delivering these types of services.[28] Additional benefits include:

- Increased access to health care, increasingly important as the number of insured individuals and families is expected to increase with full implementation of the Affordable Care Act; this will be more fully detailed in the following section.
- Increased patient choice of health care provider;
- Decrease in costs over time with increased prevention and health promotion services.
- Decreased duplication of services

3. Impact on Public Access to Health Care

[28] Rowe, J.W. (May 7, 2012). Why nurses need more authority. *The Atlantic*. See also Newhouse, R., Weiner, J., Stanik-Hutt, J., White, K.M., Johantgen, M, Steinwachs, D., Sangaro, G., Aldebron, J. and Bass, E.B. (2012). Policy implications for optimizing advanced practice registered nurse use nationally. *Policy, Politics & Nursing Practice,* 13(2), pp. 81-89.

In 1999, the Connecticut General Assembly removed the requirement for physician supervision of APRN practice, and instituted the collaborative agreement. In the years following the enactment of this law, APRN practice expanded into venues that had proved unrealistic in the setting of supervision, due to the lack of physician presence. APRNs are now routinely found in correctional health and long term care settings, and some have opened successful private practices.

Unfortunately, the requirement to have a collaborative agreement has, over the years, presented a barrier to APRNs who wish to practice without formal physician involvement in the business. Although an APRN may legally open such a practice with a collaborative agreement, the risks of doing so are high. Should the collaborating physician exit the agreement, however benignly, the APRN is immediately placed in an untenable dilemma of practicing without legal authority, despite the professional ethical requirement not to abandon patients. The suspension of practice has no reflection on the APRN's skill or fitness for practice, but hinges entirely on the vanishing collaborative agreement.

APRNs who lose a collaborating physician often have difficulty finding an immediate replacement, and sometimes are unable to find any replacement. CTAPRNS surveyed members in early August, 2013, with 94 respondents. The average number of patients in an APRN panel was 1050. Twenty-two NPs (23.4%) had a negative experience with the mandatory agreement. Reasons cited include:

- Difficulty finding a collaborating physician
- Collaborating physician retired
- Collaborating physician made unreasonable demands
- Collaborating physician thought "collaboration" meant supervision
- Collaborating physician took too long to respond, and
- Collaborating physician refused to provide coverage for patients in the absence of the APRN.

Twenty-two respondents (23 %) report the mandatory collaborative agreement has a negative impact on their practice, due to the insecurity of a sustainable practice under the current requirement for a collaborative requirement as a threshold to APRN practice. Respondents noted that physician retirement, death, re-location, or other severance of the mandatory agreement, automatically renders the APRN practice illegal, despite the professional requirement of all providers that patients not be abandoned.

CTAPRNS conducted a survey in late July, 2013 of 12 APRNs owning their own practices caring for 15,629 patients. Eight APRNs (66%) had a negative experience with the collaborative agreement. Many fear having to involuntarily abandon their patients. Four APRNs had experienced a loss of the collaborating physician. Two APRNs reported finding another collaborator took a significant amount of time (six to twelve months. The other two APRNs experienced a delay of more than one year to find another collaborating physician. Two had to pay for the physician signature

on the mandatory agreement. Two APRNs saw a significant disruption in the care of their patients.

During the past years several APRNs have been unable to secure a collaborator or to replace a collaborator. According to the CTAPRNSS survey, loss of a collaborating physician occurs for a variety of reasons. These include the relocation of the collaborator out of state, the retirement of the collaborator, the transition of the collaborator to another type of practice such as hospital coverage only; this corroborates the qualitative data we have heard over the years from practicing APRNs in Connecticut (see Exhibit C for specifics). The lack of a collaborator inhibits the ability of the APRN to practice. In addition to not being able to secure a physician signature on the mandatory agreement for practice, the cost of obtaining and keeping this agreement has caused other APRN practices to close. Without a collaborator, access to care disappears for some of the most vulnerable in our state.

It is notable that nationally approximately 68% of APRNs practice in primary care settings, and often in areas with large numbers of underserved patients.[29] A 2013 study reporting on the 2012 American Association of Medical Colleges (AAMC) consumer survey found that patients with annual household incomes less than $50,000 were most likely to have seen a nurse practitioner (or physician assistant) at the most recent medical visit, which was also true for Medicaid recipients.[30] The researchers found that "younger adults were more likely than others to prefer a physician assistant or nurse practitioner or to have no preference at all."[31] Younger adults and patients with lower incomes are the patients most likely to gain insurance through the health reform efforts, with active insurance status as of January 1, 2013. Connecticut anticipates close to 400,000 individuals to obtain health care coverage through the health coverage reforms effective in 2014, including 150,000 additional Medicaid enrollees. Removing the mandatory physician "agreement" to APRN practice will undoubtedly lead to increased access to care for these and other patients, as noted by the National Governors Association[32] and the Federal Trade Commission.[33]

The current requirement for a mandatory agreement before an APRN can practice is stifling much needed innovation and access to care. One innovation that has emerged nationally is Nurse Managed Health Centers (NMHCs). These centers are very similar to community health centers, and serve similar populations in rural or other underserved areas such as housing projects. As the name suggests, the centers

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[29] American Academy of Nurse Practitioners. (2012) Nurse Practitioner Facts.

[30] Dill, M.J., Pankow, S., Erikson, C. & Shipman, S. (2013). Survey shows consumers open to greater role for physician assistants and nurse practitioners. *Health Affairs*, 32(6), pp. 1135-1142.

[31] *Ibid.*, p. 1138.

[32] National Governors Association (2012). NGA Paper: The Role of Nurse Practitioners in Meeting Increasing Demand for Primary Care.

[33] Federal Trade Commission. (March 19, 2013). Letter to the Honorable Theresa W. Conroy, State Representative, Connecticut General Assembly.

are run by APRNs. A Robert Wood Johnson Foundation report issued in 2010 found that 60% of the 2 million annual patient encounters in NMHCs were patients without insurance or on state Medicaid plans.[34] Two barriers exist to establishing functional NMHCs:

- Restrictions on APRN scope of practice (requiring physician presence), and
- Lag in the insurance industry to recognize APRNs as primary care providers.

Connecticut has largely addressed the second barrier in Public Law 11-199. Removing the statutory barrier to full practice would greatly enhance the likelihood that full-fledged NMHCs could come to fruition in our state, giving much needed access to those who most need it.

4. Brief Summary of State or Federal Laws Governing the Profession:

Chapter 378 – Nurse Practice Act: governs education, licensure, certification requirements, prescriptive authority and mandates a collaborative agreement with a physician in the same field as a threshold to practice. Relevant sections include:

Section 20-87a of the Nurse Practice Act: requires APRNs who are not CRNAs to maintain a collaborative agreement with a physician as a requirement of practice, defines collaboration, and requires the mandatory agreement to be in writing regarding prescriptive authority.

Section 20-94b of the Nurse Practice Act: requires APRNs who are not certified as nurse anesthetists to have a written collaborative agreement with a physician in order to prescribe.

Section 20-94c of the Nurse Practice Act: requires APRNs who are not certified as nurse anesthetists to hold professional liability insurance "not less than five hundred thousand dollars for one person, per occurrence, with an aggregate of not less than one million five hundred thousand dollars…"

Chapter 420b – Dependency Producing Drugs Act: sets out the legal authority for pharmacists to fill and dispense controlled substances prescribed by authorized providers, including APRNs.

5. Current State Regulatory Oversight of the Profession

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[34] Kovner, C. & Walani, S. (2010). *Nurse Managed Health Centers.* Robert Wood Johnson Foundation Research Brief.

The practice of APRNs in Connecticut is subject to State regulation in several aspects:

- The State Board of Examiners for Nursing (SBEN) has jurisdiction in determining whether particular actions or procedures fall within the APRN scope of practice.

- In addition to Federal Drug Enforcement Agency licensure, the State Department of Consumer Protection Drug Division has jurisdiction over the APRN's license to prescribe controlled substances; the agency regulates other prescribing professions in an identical manner.

- The Department of Public Health oversees APRN's eligibility for licensure and investigates complaints regarding APRNs.

6. All Current Education, Training, and Examination Requirements and Any Relevant Certification Requirements Applicable to the Profession

APRNs in Connecticut are required by Section 20-94a to have a graduate degree in nursing or a related field allowing the individual to become certified as an APRN.[35] Prior to entering a master's or doctoral program to become an APRN, the individual must have achieved a baccalaureate degree (typically in nursing) and passed the national licensure exam for registered nurses.

Master's and doctoral nurse practitioner programs typically consist of approximately 45 credits (two year full time study) and 65 credits (three year full time study) respectively. A minimum of 500 hours in supervised clinical is required for master's programs; the doctoral (DNP) programs require 1,000 hours. Students in both types of programs study advanced health assessment, advanced pharmacology, and advanced pathophysiology in addition to acute and chronic disease assessment and treatment, professional ethics and standards, biostatistics, quantitative and qualitative research, and health policy. Doctoral students, by virtue of the expanded curriculum, have additional opportunity to engage in quality improvement projects, health informatics, and epidemiology. See Exhibits A and B, below, for details on the professional standards and competencies expected of all nurse practitioner graduates.

To gain licensure as an APRN, an APRN must hold a national board certification from one of the certifying bodies recognized in statute, and must provide proof that at least thirty hours of education in pharmacology has been completed. Periodic mandatory recertification by the recognized certifying bodies assures that APRNs maintain currency in their field of practice.

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[35] There is a grandfathering provision regarding the educational requirements for persons certified for practice as an APRN prior to December 31, 1994.

7. **Summary of Known Scope of Practice Changes Requested or Enacted Concerning the Profession in the Five Years Preceding the Request**

2007 Raised Bill No. 7161 (File #458) AN ACT REVISING THE DEFINITION OF ADVANCED NURSING PRACTICE - Died on House calendar. This bill would have removed the mandate for a collaborative agreement.

2009 Raised Bill No. 6674 AN ACT CONCERNING WORKFORCE DEVELOPMENT AND IMPROVED ACCESS TO HEALTH CARE SERVICES – Died in Committee. This bill would have removed the mandate for a collaborative agreement.

2009 PA09-7 AN ACT IMPLEMENTING THE PROVISIONS OF THE BUDGET CONCERNING GENERAL GOVERNMENT AND MAKING CHANGES TO VARIOUS PROGRAMS – This Act repealed a deletion in PA09-187 that removed the authority of APRNs to certify disabilities for special license plates (authority that was obtained in PA 04-199).

2010 Substitute Bill No. 192 AN ACT CONCERNING THE LISTING OF ADVANCED PRACTICE REGISTERED NURSES IN MANAGED CARE ORGANIZATION PROVIDER LISTINGS, AND PRIMARY CARE PROVIDER DESIGNATIONS – File #291 Died on House Calendar

2011 PA 11-199 AN ACT CONCERNING THE LISTING OF ADVANCED PRACTICE REGISTERED NURSES IN MANAGED CARE ORGANIZATION PROVIDER LISTINGS, AND PRIMARY CARE PROVIDER DESIGNATIONS – Allows enrollees to choose APRNs as primary care providers

2012 PA 12-197 AN ACT CONCERNING VARIOUS REVISIONS TO THE PUBLIC HEALTH STATUTES – Changes some 20 Statutes to allow the signature of APRNs on various certification forms.

2013 House Bill 6391 AN ACT CONCERNING THE PRACTICE OF ADVANCED PRACTICE REGISTERED NURSES – Died in Committee. This bill would have removed the mandatory agreement for APRN practice.

2013 House Bill 5568 AN ACT CONCERNING TARGETED HEALTH AREAS – had a strike-all amendment filed (LCO #7295) that intended to address the same issue of removing the mandatory collaborative agreement for APRN practice, although it was not called. The amendment had 79 co-sponsors.

8. Extent to Which the Request Directly Affects Existing Relationships within the Health Care Delivery System

Eliminating the need for an APRN to obtain agreement from a collaborating physician as a threshold to practice would alter the need to obtain such agreement. Actual patient care, collegial consultation and collaboration, specialty referrals and other norms of professional practice would continue without interruption or change. Patient relationships to APRNs would change to the extent that direct access would increase.

The APRN community has documented occasions where obtaining the mandatory agreement has come with an actual price tag, as evidenced by responses to the August 2013 CTAPRNS membership survey, and further detailed in Exhibit C, below. APRNs who are now required in individual situations to compensate a physician to obtain the required collaborative agreement would no longer need to do so, altering the current fiscal relationship once the statutory mandate is removed.

9. Anticipated Economic Impact of the Request on the Health Care Delivery System

Removing barriers from APRN practice has positive impacts on state and federal health care costs, for several reasons. APRNs have long been documented to provide cost-effective care in primary, long term, occupational and acute care settings.[36] Cost savings include lower drug costs when compared to physicians,[37] lower per-patient costs,[38] lower visit costs,[39] and lower rates of emergency department referrals.[40] This last finding is contained in the 2009 RAND study about the Massachusetts health infrastructure reforms adopted in 2008. The study estimates cumulative state savings of 0.6 to 1.3 percent for the period 2010-2020 by allowing NPs and other "non-physician providers" to practice without mandated physician involvement. Although apparently modest, this equates to $4.2 - $8.4 billion in cumulative savings by 2020.

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[36] American Academy of Nurse Practitioners. (2010). Nurse Practitioner Cost-Effectiveness.

[37] Paez, K. & Allen, J. (2006). Cost-effectiveness of nurse practitioner management of hypercholesterolemia following coronary revascularization. *Journal of the American Academy of Nurse Practitioners.* 18(9), pp. 436-444.

[38] Coddington, J. & Sands, L. (2008). Cost of health care and quality of care at nurse-managed clinics. *Nursing Economics.* 26(2), pp. 75-94.

[39] Eibner, C., Hussey P., Ridgely M.S., & McGlynn E.A. (2009). Controlling health care spending in Massachusetts: an analysis of options. Santa Monica, CA: RAND Corporation.

[40] Traczynski, J. & Udalova, V. (2013). Nurse practitioner independence, health care utilization, and health outcomes. Available at http://www.lafollette.wisc.edu/research/health_economics/Traczynski.pdf

Further, recent research suggests that 50% of health care expenses stem from preventable conditions or preventable exacerbations of chronic conditions.[41] APRNs are known for their ability to successfully manage patients with potential or existing chronic conditions, due to the nursing focus on education, case management, and holistic assessment of the patient, family and available resources.[42]

A keystone element of the Affordable Care Act, the Patient-Centered Medical Home (PCMH) delivery model, has shown APRNs to be cost-effective in delivering care. Data was presented to the American Association of Nurse Practitioners Annual Conference June 19, 2013 by Sean Lyon, APRN and Kitty Kidder, APRN, owners and operators of the Lifelong Care PCMH practice located in New Hampshire. This APRN PCMH demonstrated a Per Member Per Month (PMPM) cost of $105.00 when compared with CIGNA average of $160.00 PMPM. The APRN cost was also less than most physician-run PCMH costs and far better than non-medical home practices. The APRN PCMH consistently performed well over time. Additionally, unnecessary presentation to the emergency room was greatly reduced; patients who presented to the emergency room truly needed to go there.

Any APRN required to pay for obtaining the agreement incurs significant business expenses in doing so, and may end up closing the practice rather than continue to pay for the required agreement. Eliminating the mandatory agreement would remove this economic impact on APRN practice.

10. Regional and National Trends in Licensing of the Health Profession Making the Request and a Summary of Relevant Scope of Practice Provisions Enacted in Other States

Twenty jurisdictions allow APRNs to practice autonomously to the full scope of their education. In the last several years, Colorado, Hawaii, Idaho, Vermont, North Dakota, Nevada and Maryland eliminated all regulatory and statutory requirements for physician involvement in APRN practice. Of the six New England states, only two have not yet removed such practice barriers: Massachusetts and Connecticut. In our region, Vermont was the most recent to grant full scope practice for APRNs, having achieved this through regulatory reform in 2011.

During the 2013 state legislative season, twelve states (California, Connecticut, Illinois, Kentucky, Kansas, Massachusetts, Michigan, Minnesota, North Carolina, New Jersey, Nevada, New York and Pennsylvania) sponsored legislation to remove physician involvement from APRN practice per IOM recommendations; Nevada passed its legislation. We expect at least as many states to present such legislation in the 2014 state legislative season.

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[41] Carruth, P. L. & Carruth, A. K. (Fall, 2011). The financial and cost accounting implications of the increased role of advanced nurse practitioners in U.S. healthcare. *American Journal of Health Sciences*, pp 1 – 8.

[42] Institute of Medicine (2010). The Future of Nursing: Leading Change, Advancing Health. Washington, DC: National Academies Press.

11. Identification of Any Health Care Professions that can Reasonably be Anticipated to be Directly Affected by the Request, the Nature of the Impact, and Efforts Made by the Requestor to Discuss It with Such Health Care Professions

During the fourteen years since the statutory requirement for a collaborative agreement was imposed, the APRN community in Connecticut has several times asked the General Assembly to remove this requirement. As it stands, the removal of the mandated collaborative agreement has no direct impact on any other profession. There is no evidence to support that removing the mandatory agreement will alter APRN patient care or put patients at risk. The quality care and patient responsibility of APRN practice will continue as it exists today. Access to care will be enhanced at a time when more individuals will have health insurance. APRN practices will not be threatened with unnecessary closure and more practices can open. Lastly, cost to the health care system would be reduced by decreasing redundancies, duplication of care and costs to deliver care.

The APRN community reasonably anticipates that the Medical Society will again object to this current request. The state Medical Society has historically opposed such legislation with concerns of public safety and APRN education; the literature clearly dispels those arguments. There have been several cordial meetings with the Connecticut State Medical Society where they have expressed opposition and we have received no indication that their position has changed. We recently notified the Medical Society that we would be filing a Scope of Practice Request with the Department of Public Health.

The Connecticut Medical Society in the past has argued that lack of attention to the need to continue to develop the physician workforce would occur should APRNs be allowed to practice without the now-required agreement.[43] Connecticut policymakers, however, are aware of the need for increasing the numbers of many types of primary care providers, and have been for many years. Physicians are clearly recognized as vital to the workforce, and multiple policies to support education and retention are detailed in various policy documents.[44] Further, a 2012 study of the fiscal impact on physicians removing barriers of APRN practice found no differences in economic status between physicians practicing in states that had removed barriers to APRN practice and states that had not.[45]

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[43] Connecticut State Medical Society (March 16, 2009). Testimony in Opposition to House Bill 6674 An Act Concerning Workforce Development and Improved Access to Health Care Services, submitted to the Public Health Committee of the Connecticut General Assembly.

[44] *Governor's Hospital Strategic Task Force, Findings and Recommendations*, January 8, 2008; Holm, R., Quimby,S., & Dorrer, J. (2011). *Connecticut Health Care Workforce Assessment.*

[45] Pittman,P. & Williams, B. (2012). Physician wages in states with expanded APRN scope of practice. *Nursing Research and Practice*, (2012, Article ID 671974), 5 pages. The

12. Description of How the Request Relates to the Health Care Profession's Ability to Practice to the Full Extent of the Profession's Education and Training

The request to remove the statutory mandate for a collaborative agreement with a physician as a threshold to APRN practice would allow APRNs to practice to the full extent of their education, training and national board certification. Removing the requirement for the mandatory agreement removes another profession from serving as a gatekeeper to an APRN's ability to offer much-needed health care to the general public. If the agreement is not sustainable, APRN practice is not sustainable.

Exhibit A - Standards of Practice for Nurse Practitioners American Association of Nurse Practitioners[46]

I. Qualifications

Nurse practitioners are licensed, independent practitioners who provide primary and/or specialty nursing and medical care in ambulatory, acute and long-term care settings. They are registered nurses with specialized, advanced education and clinical competency to provide health and medical care for diverse populations in a variety of primary care, acute and long-term care settings. Master's, post-master's or doctoral preparation is required for entry-level practice (AANP 2006).

II. Process of Care

The nurse practitioner utilizes the scientific process and national standards of care as a framework for managing patient care. This process includes the following components.

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authors clearly identify the fact that the sample was necessarily limited to employee physicians. No evidence exists, however, to suggest in this study or elsewhere that APRNs practicing in full scope have limited physician income where physicians are self-employed.

[46] American Association of Nurse Practitioners, 1993; Revised 1999, 2003, 2007, 2010, 2013

A. Assessment of health status

The nurse practitioner assesses health status by:

- Obtaining a relevant health and medical history
- Performing a physical examination based on age and history
- Performing or ordering preventative and diagnostic procedures based on the patient's age and history
- Identifying health and medical risk factors

B. Diagnosis

The nurse practitioner makes a diagnosis by:

- Utilizing critical thinking in the diagnostic process
- Synthesizing and analyzing the collected data
- Formulating a differential diagnosis based on the history, physical examination and diagnostic test results
- Establishing priorities to meet the health and medical needs of the individual, family, or community

C. Development of a treatment plan

The nurse practitioner, together with the patient and family, establishes an evidence-based, mutually acceptable, cost-awareness plan of care that maximizes health potential. Formulation of the treatment plan includes:

- Ordering and interpreting additional diagnostic tests
- Prescribing or ordering appropriate pharmacologic and non-pharmacologic interventions
- Developing a patient education plan
- Recommending consultations or referrals as appropriate

D. Implementation of the plan

Interventions are based upon established priorities. Actions by the nurse practitioners are:

- Individualized
- Consistent with the appropriate plan for care
- Based on scientific principles, theoretical knowledge and clinical expertise
- Consistent with teaching and learning opportunities

E. Follow-up and evaluation of the patient status

The nurse practitioner maintains a process for systematic follow-up by:

- Determining the effectiveness of the treatment plan with documentation of patient care outcomes
- Reassessing and modifying the plan with the patient and family as necessary to achieve health and medical goals

III. Care Priorities

The nurse practitioner's practice model emphasizes:

A. Patient and family education

The nurse practitioner provides health education and utilizes community resource opportunities for the individual and/or family

B. Facilitation of patient participation in self care.

The nurse practitioner facilitates patient participation in health and medical care by providing information needed to make decisions and choices about:

- Promotion, maintenance and restoration of health
- Consultation with other appropriate health care personnel
- Appropriate utilization of health care resources

C. Promotion of optimal health

D. Provision of continually competent care

E. Facilitation of entry into the health care system

F. The promotion of a safe environment

IV. Interdisciplinary and Collaborative Responsibilities

As a licensed, independent practitioner, the nurse practitioner participates as a team leader and member in the provision of health and medical care, interacting with professional colleagues to provide comprehensive care.

V. Accurate Documentation of Patient Status and Care

The nurse practitioner maintains accurate, legible and confidential records.

VI. Responsibility as Patient Advocate

Ethical and legal standards provide the basis of patient advocacy. As an advocate, the nurse practitioner participates in health policy activities at the local, state, national and international levels.

VII. Quality Assurance and Continued Competence

Nurse practitioners recognize the importance of continued learning through:

A. Participation in quality assurance review, including the systematic, periodic review of records and treatment plans

B. Maintenance of current knowledge by attending continuing education programs

C. Maintenance of certification in compliance with current state law

D. Application of standardized care guidelines in clinical practice

VIII. Adjunct Roles of Nurse Practitioners

Nurse practitioners combine the roles of provider, mentor, educator, researcher, manager and consultant. The nurse practitioner interprets the role of the nurse practitioner to individuals, families and other professionals.

IX. Research as Basis for Practice

Nurse practitioners support research by developing clinical research questions, conducting or participating in studies, and disseminating and incorporating findings into practice.

Exhibit B - 2012 Nurse Practitioner Core Competencies
National Organization of Nurse Practitioner Faculty (NONPF)
available at
http://www.nonpf.com/associations/10789/files/NPCoreCompetenciesFinal2012.pdf

Scientific Foundation Competencies

1. Critically analyzes data and evidence for improving advanced nursing practice.
2. Integrates knowledge from the humanities and sciences within the context of nursing science.
3. Translates research and other forms of knowledge to improve practice processes and outcomes.
4. Develops new practice approaches based on the integration of research, theory, and practice knowledge

Leadership Competencies

1. Assumes complex and advanced leadership roles to initiate and guide change.

2. Provides leadership to foster collaboration with multiple stakeholders (e.g. patients, community, integrated health care teams, and policy makers) to improve health care..
3. Demonstrates leadership that uses critical and reflective thinking.
4. Advocates for improved access, quality and cost effective health care.
5. Advances practice through the development and implementation of innovations incorporating principles of change.
6. Communicates practice knowledge effectively both orally and in writing.
7. Participates in professional organizations and activities that influence advanced practice nursing and/or health outcomes of a population focus.

Quality Competencies

1. Uses best available evidence to continuously improve quality of clinical practice.
2. Evaluates the relationships among access, cost, quality, and safety and their influence on health care.
3. Evaluates how organizational structure, care processes, financing, marketing and policy decisions impact the quality of health care.
4. Applies skills in peer review to promote a culture of excellence.
5. Anticipates variations in practice and is proactive in implementing interventions to ensure quality.

Practice Inquiry Competencies

1. Provides leadership in the translation of new knowledge into practice.
2. Generates knowledge from clinical practice to improve practice and patient outcomes.
3. Applies clinical investigative skills to improve health outcomes.
4. Leads practice inquiry, individually or in partnership with others.
5. Disseminates evidence from inquiry to diverse audiences using multiple modalities.
6. Analyzes clinical guidelines for individualized application into practice

Technology and Information Literacy Competencies

1. Integrates appropriate technologies for knowledge management to improve health care.
2. Translates technical and scientific health information appropriate for various users' needs.

2a) Assesses the patient's and caregiver's educational needs to provide effective, personalized health care.

2b). Coaches the patient and caregiver for positive behavioral change.

3. Demonstrates information literacy skills in complex decision making.
4. Contributes to the design of clinical information systems that promote safe, quality and cost effective care.
5. Uses technology systems that capture data on variables for the evaluation of nursing care.

Policy Competencies

1. Demonstrates an understanding of the interdependence of policy and practice.
2. Advocates for ethical policies that promote access, equity, quality, and cost.
3. Analyzes ethical, legal, and social factors influencing policy development.
4. Contributes in the development of health policy.
5. Analyzes the implications of health policy across disciplines.
6. Evaluates the impact of globalization on health care policy development.

Health Delivery System Competencies

1. Applies knowledge of organizational practices and complex systems to improve health care delivery.
2. Effects health care change using broad based skills including negotiating, consensus-building, and partnering.
3. Minimizes risk to patients and providers at the individual and systems level.
4. Facilitates the development of health care systems that address the needs of culturally diverse populations, providers, and other stakeholders.

5. Evaluates the impact of health care delivery on patients, providers, other stakeholders, and the environment.
6. Analyzes organizational structure, functions and resources to improve the delivery of care.
7. Collaborates in planning for transitions across the continuum of care.

Ethics Competencies

1. Integrates ethical principles in decision making.
2. Evaluates the ethical consequences of decisions.
3. Applies ethically sound solutions to complex issues related to individuals, populations and systems of care.

Independent Practice Competencies

1. Functions as a licensed independent practitioner.
2. Demonstrates the highest level of accountability for professional practice.
3. Practices independently managing previously diagnosed and undiagnosed patients.

3a). Provides the full spectrum of health care services to include health promotion, disease prevention, health protection, anticipatory guidance, counseling, disease management, palliative, and end of life care.

3b). Uses advanced health assessment skills to differentiate between normal, variations of normal and abnormal findings.

3c). Employs screening and diagnostic strategies in the development of diagnoses.

3d). Prescribes medications within scope of practice.

3e). Manages the health/illness status of patients and families over time.

4. Provides patient-centered care recognizing cultural diversity and the patient or designee as a full partner in decision-making.

4a). Works to establish a relationship with the patient characterized by mutual respect, empathy, and collaboration.

4b). Creates a climate of patient-centered care to include confidentiality, privacy, comfort, emotional support, mutual trust, and respect.

4c). Incorporates the patient's cultural and spiritual preferences, values, and beliefs into health care.

4d). Preserves the patient's control over decision making by negotiating a mutually acceptable plan of care.

Exhibit C - Specific Cases of APRN Experience of Practice Barriers Related to the Mandatory Collaborative Agreement

Case #1: An APRN with her own practice learned in late July, 2013 that her collaborator was relocating to another state in two months. Her panel of 400 patients have relied on her since 2005; she has less than 90 days to make arrangements that will either allow her to continue to practice or to steer her patients to another provider. The loss of the collaborating agreement has placed her practice in peril and yet has nothing to do with the quality of her care.

Case #2: An APRN attempted to start a practice providing health care services for people with disabilities living in group homes an underserved population. She was able to find a physician as a collaborator at a price of $1000 per quarter with the understanding that this price could go up if the practice was successful; however, the high fee ultimately caused the APRN to close her practice. She has gone back to school for her DNP. She would like to open a practice but feels this could never be possible for her based upon current practice restrictions.

Case #3: An APRN lost her collaborating MD, forcing her to leave her position resulting in lost wages, vacation, sick time benefits, retirement and medical insurance. She chose to leave

than to work in an environment illegally. Recently, this APRN opened a practice in Rhode Island stating she could not wait for CT to change their requirements.

Case #4: An APRN with expertise in endocrinology decided to open her own practice after separating from a physician practice. She was unable to find a collaborator willing to sign for little or no payment. Despite this, demand for her services increased, so she entered an agreement with a "collaborating" physician who required 70% of her reimbursement for her four days of practice. Of this 40% went to overhead and billing expenses and 30% was his profit. After one year, the physician wanted to increase his percentage and add another day to collect more revenue from the APRN. During that year, she had collaborated on patient care with him three times and asked him three questions. The APRN left this practice due to the unreasonable collaboration fees. It took her almost a year to find another collaborator with a lapse for her patients in care that was made worse when she had to be re-credentialed on all health plans. She currently has a new practice with another collaborating MD but fears unreasonable demands to maintain this agreement may force her to close her practice once again.

Case #5: An insurance company is interested in establishing long-term care practice with APRNs providing home visits; the company has not been able to secure collaborative agreements and is thus unable to launch this initiative.

Case #6: An APRN started her own practice and was charged $30,000 per year for collaboration with a physician several years ago. The APRN was fortunate to find another physician "collaborator" after one year, who provided the signature on the agreement at no charge. This APRN currently has a successful practice with a collaborating MD serving 2000 patients.

Case #7: An APRN with psychiatric expertise relocated to Connecticut in 2009 after 16 ½ years maintaining a practice with Medicaid patients in a state where APRNs are not required to have physician presence in the business. In seeking a collaborator in Connecticut, she contacted a physician friend willing to be her collaborator for $6000/year—the amount he stated his malpractice would increase to list her as a collaborator. She has not opened a practice here.

Case #8: An APRN with wound care expertise services patients in long-term, sub-acute and acute care settings. Her collaborating MD is approaching retirement. Given her setting and past experience in the APRN community, it will likely be hard to find a willing physician to be her collaborator; she worries the cost of signing an agreement may force her to close her practice. She saves patients and facilities significant transportation expenses, as she goes to their location. Patients may be faced with having to be transported to a wound care clinic, a cost many patients and facilities may not be able to bear, in addition to likely substantial wait times for access to the specialty clinics.

Case #9: A psychiatric APRN works in a not-for-profit clinic serving 2000 patients. The collaborating MD is close to retiring. There is a great fear these vulnerable patients will be left with a lapse in care. This APRN also has a private practice with a collaborating MD who will be transitioning to New York City; this collaborator also has agreements with 20 other APRNs. It is doubtful another collaborator will be willing to take on these APRNs. This will leave patients with a lapse in care.

Case #10: A Primary Care APRN with 2000 patients has a collaborating MD soon to retire. She has begun the process of location a replacement. Several MDs had concerns after contacting

their malpractice insurance carrier that their costs will increase. One MD offered to sign an agreement for $10,000 per year, a cost too steep for her business and she may be forced to close her practice.

Case #11: A psychiatric APRN had three episodes of collaboration separation. The first, on the advice of her attorney, the collaborating MD abruptly severed the agreement. The second involved the collaborating MD whose license was suspended due to prescribing practices. The next psychiatrist only provided the agreement for a few months. Now there are 7 APRNs with a panel of 2000 patients sharing the same psychiatrist, each paying a stipend for the signed agreement.

Case #12: An APRN provides in-home care to dementia and patients with memory problems. It took her 12 months to find a collaborating MD. These are vulnerable elderly and senior patients who would have difficulty finding care if this APRN practice were to close. She reports that her collaborating MD is currently entertaining offers for his own career which threaten the agreement, thus placing her practice in jeopardy.

Case #13: An APRN had issues with laboratory testing from a hospital that would not recognize her as an ordering provider. They wanted the orders signed by an MD. This resulted in many laboratory results going to another MD delaying care and potentially causing undue harm to patients.

Case #14: A psychiatric APRN had difficulty finding a psychiatrist willing to sign the collaborative agreement. She finally found someone who will sign the agreement for a $300 per hour fee.

Case #15: A psychiatric APRN has a 73 year old collaborating psychiatrist who she is fearful will retire leaving 300 patients with a lapse in care.

Case #16: In 2008, an APRN was without a signed agreement after the MD abruptly left. The newly hired MD refused to sign an agreement. The APRN had to contact the Department of Public Health to intervene. Because the APRN could no longer legally diagnose and treat, patients were turned away from the center. Four months later, an agreement was signed.

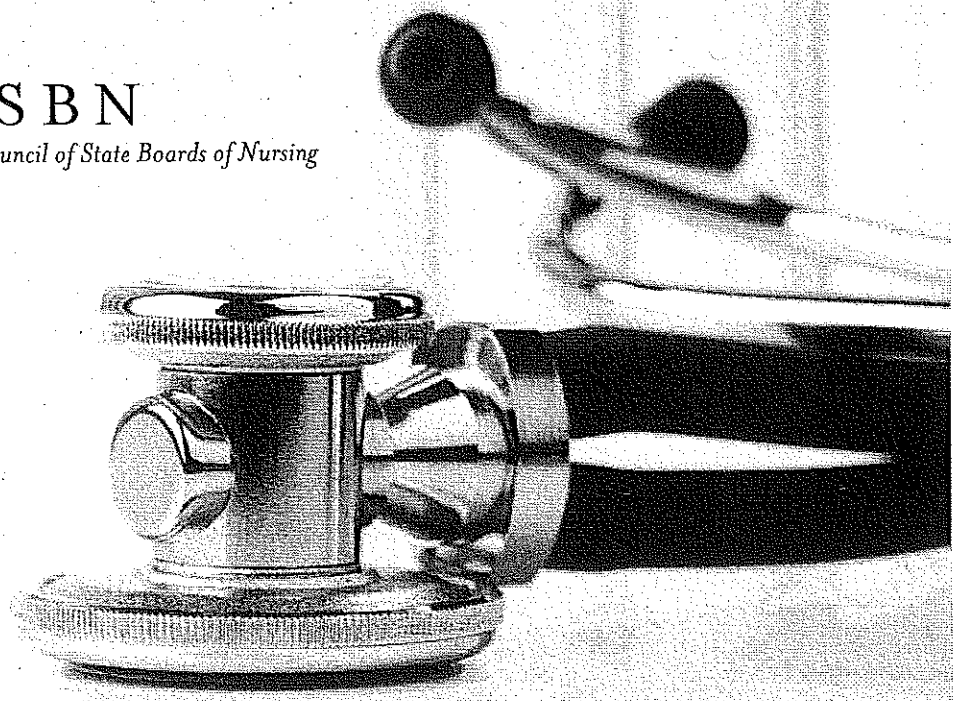
Case #17: An APRN left a practice in Waterbury after 15 years to move to Cheshire. It took her several months to find a collaborating MD leaving her patients with a lapse in care.

Case #18: Recently, an APRN was brought before the Department of Public Health for alleged absence of a valid collaborative agreement. The concern stemmed from the lack of a signature on the document by the collaborating MD. Her collaborating psychiatrist met with her on several occasions and the psychiatrist billed her for this service. Both parties were acting in concert with the written collaborative agreement. Following the pre-hearing review, the Nursing board agreed a valid agreement was in place and withdrew any charges. Even a low level disciplinary action in this case could have disproportionate impact on this APRN's livelihood, future employment and third party reimbursement, as well as the patients who could lose a provider, even though there was no issue with the care rendered by the APRN.

Changes In Healthcare Professions' Scope of Practice: Legislative Considerations

NCSBN

National Council of State Boards of Nursing



In 2009, a new era of healthcare reform is sweeping state and federal government in the U.S. During these difficult economic times policymakers are faced with many challenges, not the least of which are legislative and regulatory debates on how to maximize the use of all healthcare practitioners and the debate among healthcare practitioners, regarding the continuous evolution of scopes of practice. Law and rule makers charged with consumer protection will find this document helpful in guiding discussions on how the most effective and efficient care can be delivered to the American public in an era of continuous changes in healthcare.

Executive Summary

This document is a result of a collaborative effort in 2006 by representatives from six healthcare regulatory organizations. It has been developed to assist legislators and regulatory bodies with making decisions about changes to healthcare professions' scopes of practice.

Proposed changes to a healthcare professions' scope of practice often elicit strongly worded comments from several professional interest groups. Typically, these debates are perceived as turf battles between two or more professions, with the common refrain of "this is part of my practice so it can't be part of yours." Often lost among the competing arguments and assertions are the most important issues of whether this proposed change will better protect the public and enhance consumers' access to competent healthcare services.

Healthcare education and practice have developed in such a way that most professions today share some skills or procedures with other professions. It is no longer reasonable to expect each profession to have a completely unique scope of practice, exclusive of all others. We believe that scope of practice changes should reflect the evolution of abilities of each healthcare discipline, and we therefore have attempted to develop a rational and useful way to make decisions when considering practice act changes.

Based on reports from the Institute of Medicine[1] and the Pew Healthcare Commission[2] we propose a process for addressing scope of practice, which is focused on patient safety. The question that healthcare professionals must answer today is whether their profession can provide this proposed service in a safe and effective manner. If an issue does not address this question, it has no relevance to the discussion.

This process gets to the heart of regulation which, according to Schmitt and Shimberg, is intended to:

1. "Ensure that the public is protected from unscrupulous, incompetent and unethical practitioners";
2. "Offer some assurance to the public that the regulated individual is competent to provide certain services in a safe and effective manner"; and
3. "Provide a means by which individuals who fail to comply with the profession's standards can be disciplined, including the revocation of their licenses."[3]

The argument for scope of practice changes should have a foundational basis within four areas: 1) an established history of the practice scope within the profession, 2) education and training, 3) supporting evidence, and 4) appropriate regulatory environment. If a profession can provide support evidence in these areas, the proposed changes in scope of practice are likely to be in the public's best interest.

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[1] *Crossing the Quality Chasm: A New Health System for the 21st Century,* The Institute of Medicine, National Academy Press, 2001.

[2] *Reforming Healthcare Workforce Regulation: Policy Considerations for the 21st Century,* Report of the Pew Health Professions Commission's Taskforce on Healthcare Workforce Regulation, December 1995, ix.

[3] *Demystifying Occupational and Professional Regulation: Answers to Questions You May Have Been Afraid to Ask,* Schmitt, K. and Shimberg, B., Council on Licensure, Enforcement and Regulation, 1996.

Changes in Healthcare Professions Scope of Practice: Legislative Considerations

A. Purpose

The purpose of this document is to provide information and guidance for legislative and regulatory agency decision making regarding changes in the scope of practice of healthcare professions. Specifically, the purpose is to:

- Promote better consumer care across professions and competent providers
- Improve access to care
- Recognize the inevitability of overlapping scopes of practice.

We envision this document as an additional resource to be used by state legislatures, healthcare professions and regulatory boards in preparing proposed changes to practice acts and briefing legislators regarding those changes, just as various professions' model practice acts are used.

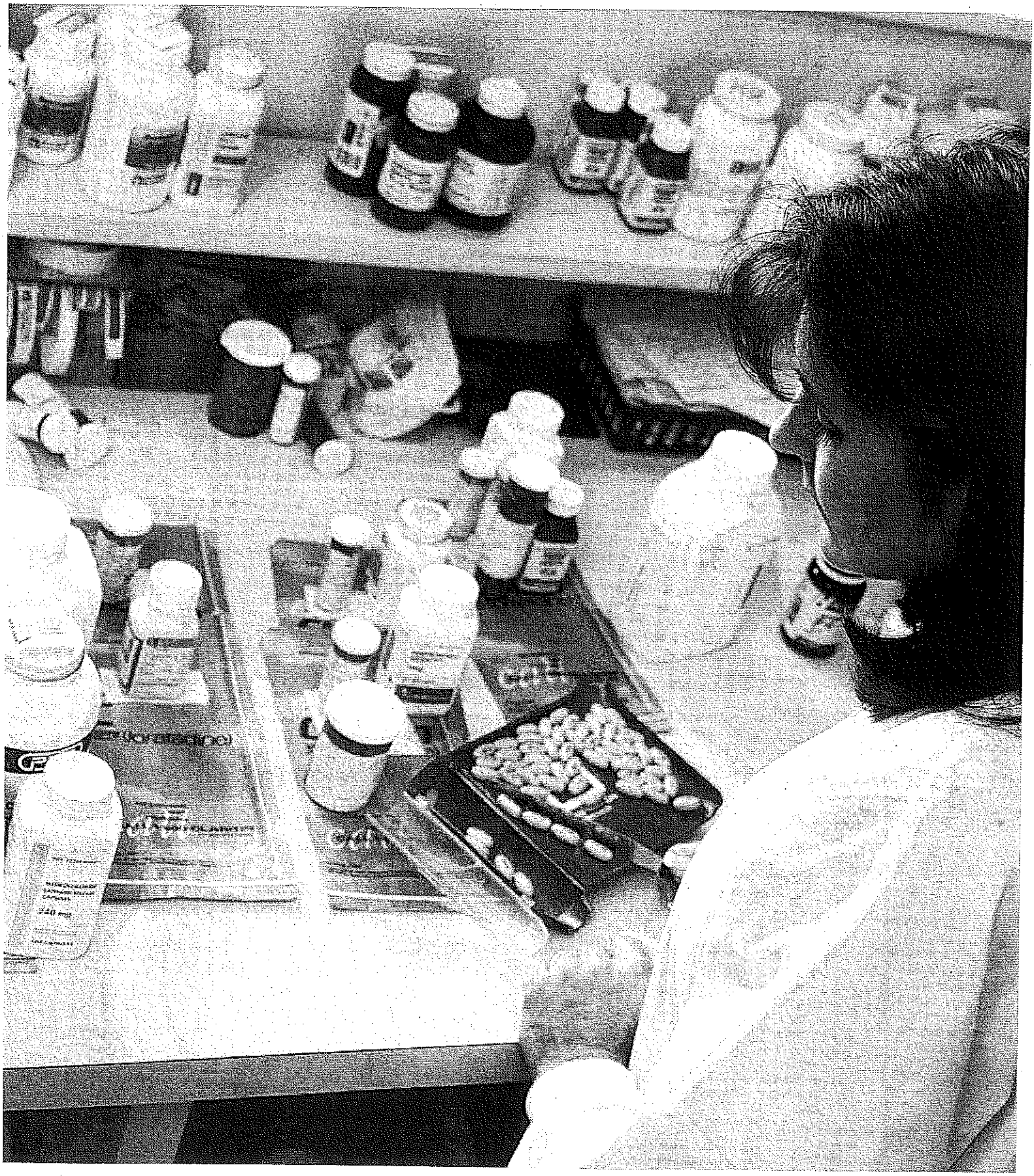
B. Background

This paper was a collaborative project developed by representatives of the regulatory boards of the following healthcare professions: medicine, nursing, occupational therapy, pharmacy, physical therapy and social work. It attempts to address scope of practice issues from a public protection viewpoint by determining whether a specific healthcare profession is capable of providing the proposed care in a safe and effective manner.

We believe that it is critical to review scope of practice issues broadly if our regulatory system is going to achieve the recommendations made by both the Institute of Medicine and the Pew Health Commission Taskforce on Healthcare Workforce Regulation. These reports urge regulators to allow for innovation in the use of all types of clinicians in meeting consumer needs in the most effective and efficient way, and to explore pathways to allow all professionals to provide services to the full extent of their current knowledge, training, experience and skills.

C. Historical Context

The history of professional licensure must be taken into account if one is to understand the current regulatory system governing scope of practice. Physicians were the first health professionals to obtain legislative recognition and protection of their practice authority. The practice of medicine was defined in broad and undifferentiated terms to include all aspects of individuals' care. Therefore, when other healthcare professions sought legislative recognition, they were seen as claiming the ability to do tasks which were already included in the universal and implicitly exclusive authority of medicine. This dynamic has fostered a view of scope of practice that is conceptually faulty and potentially damaging.



D. Introduction

The scope of practice of a licensed healthcare profession is statutorily defined in each state's laws in the form of a practice act. State legislatures have the authority to adopt or modify practice acts and therefore adopt or modify a particular scope of practice of a healthcare profession. Sometimes such modifications of practice acts are just the formalization of changes already occurring in education or practice within a profession, due to the results of research, advances in technology, and changes in societal healthcare demands, among other things.

This process sometimes pits one profession against another before the state legislature. As an example, one profession may perceive another profession as "encroaching" into their area of practice. The profession may be economically or otherwise threatened and therefore opposes the other profession's legislative effort to change scope of practice. Proposed changes in scopes of practice that are supported by one profession but opposed by other professions may be perceived by legislators and the public as "turf battles." These turf battles are often costly and time consuming for the regulatory bodies, the professions and the legislators involved.[4] Aside from guidance on scope of practice issues, this document may assist in preventing costly legislative battles; promote better consumer care and collaboration among regulatory bodies, the professions and between competent providers; and improve access to care.

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[4] *Strengthening Consumer Protection: Priorities for Healthcare Workforce Regulation*, Report from Pew Health Professions Commission, 1998.

The Purpose of Regulation

Before providing information regarding scope of practice decisions, we must ask the very basic question, "What is the purpose of regulation?" According to Schmitt and Shimberg, regulation is intended to:

1. "Ensure that the public is protected from unscrupulous, incompetent and unethical practitioners";
2. "Offer some assurance to the public that the regulated individual is competent to provide certain services in a safe and effective manner"; and
3. "Provide a means by which individuals who fail to comply with the profession's standards can be disciplined, including the revocation of their licenses."[5]

A. Defining Scope of Practice

A 2005 Federation of State Medical Boards report defined scope of practice as the "Definition of the rules, the regulations, and the boundaries within which a fully qualified practitioner with substantial and appropriate training, knowledge, and experience may practice in a field of medicine or surgery, or other specifically defined field. Such practice is also governed by requirements for continuing education and professional accountability."[6]

B. Assumptions Related to Scope of Practice

In attempting to provide a framework for scope of practice decisions, basic assumptions can be made:

1. **The purpose of regulation — public protection — should have top priority in scope of practice decisions, rather than professional self-interest.** This encompasses the belief that the public should have access to providers who practice safely and competently.
2. **Changes in scope of practice are inherent in our current healthcare system.** Healthcare and its delivery are necessarily evolving. These changes relate to demographic changes (such as the aging of the "baby boomers"); advances in technology; decreasing healthcare dollars; advances in evidence-based healthcare procedures, practices and techniques; and many other societal and environmental factors. Healthcare practice acts also need to evolve as healthcare demands and capabilities change.
3. **Collaboration between healthcare providers should be the professional norm.** Inherent in this statement is the concept that competent providers will refer to other providers when faced with issues or situations beyond the original provider's own practice competence, or where greater competence or specialty care is determined as necessary or even helpful to the consumer's condition.

4. **Overlap among professions is necessary.** No one profession actually owns a skill or activity in and of itself. One activity does not define a profession, but it is the entire scope of activities within the practice that makes any particular profession unique. Simply because a skill or activity is within one profession's skill set does not mean another profession cannot and should not include it in its own scope of practice.
5. **Practice acts should require licensees to demonstrate that they have the requisite training and competence to provide a service.** No professional has enough skills or knowledge to perform all aspects of the profession's scope of practice. For instance, physicians' scope of practice is "medicine," but no physician has the skill and knowledge to perform every aspect of medical care. In addition, all healthcare providers' scopes of practice include advanced skills that are not learned in entry-level education programs, and would not be appropriate for an entry-level practitioner to perform. As professions evolve, new techniques are developed; not all practitioners are competent to perform these new techniques.

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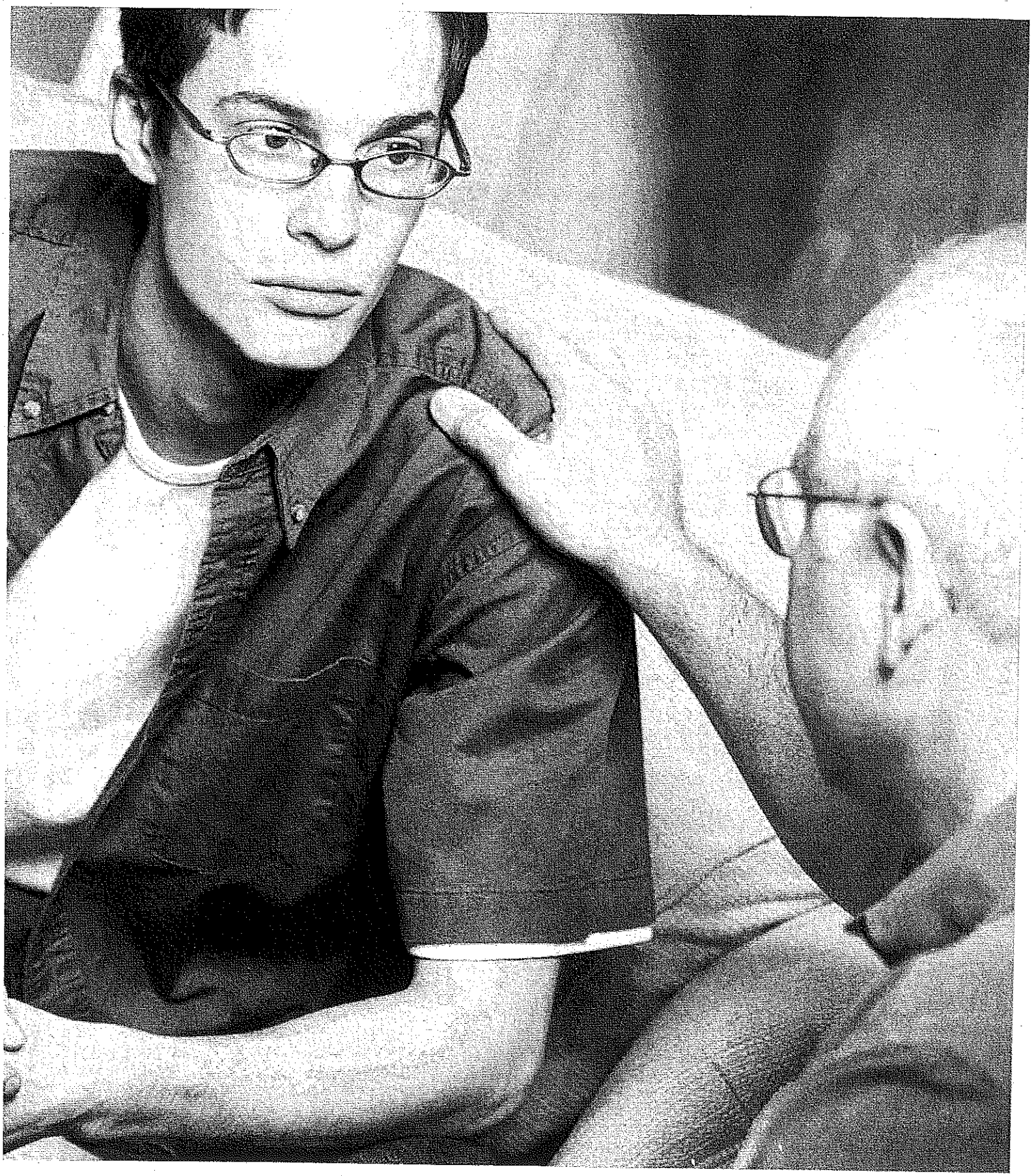
[5] *Demystifying Occupational and Professional Regulation: Answers to Questions You May Have Been Afraid to Ask*, Schmitt, K. and Shimberg, B., Council on Licensure, Enforcement and Regulation, 1996.

[6] *Assessing Scope of Practice in Health Care Delivery: Critical Questions in Assuring Public Access and Safety*, Federation of State Medical Boards, 2005.



The Basis for Decisions Related to Changes in Scope of Practice

Arguments for scope of practice changes should have a foundational basis within four areas: 1) an established history of the practice scope within the profession, 2) education and training, 3) supportive evidence, and 4) appropriate regulatory environment. This foundation should provide the framework for analyzing and determining if a change in statutory scope of practice is warranted in a particular situation. If a profession can provide supporting evidence in these areas, the proposed changes in scope of practice should be adopted.

A. Historical Basis

The first of these relates to the history and evolution of the profession and its practice. This historical framework provides the basis for the essentials of the profession, including its theoretical basis, how it developed over the years and how it is presently defined. Changes in statutory scope of practice should fit within the historical, evolutionary and present practice context for the profession.

Questions to be considered in this area include:

1. Has there been an evolution of the profession towards the addition of the new skill or service?
2. What is the evidence of this evolution?
3. How does the new skill or service fit within or enhance a current area of expertise?

B. Education and Training

Tasks added to scopes of practice are often initially performed by professionals as advanced skills. Over time, as these new skills and techniques are utilized by a sufficient cohort of practitioners, they become entry-level skills and are taught as such in entry-level curricula. It is not realistic to require a skill or activity to be taught in an entry-level program before it becomes part of a profession's scope of practice. If this were the standard, there would be few, if any, increases in scope of practice. However, the entry-level training program and its accompanying accrediting standards should provide the framework, including the basic knowledge and skills needed, to acquire the new skill once out in the field. There should be appropriate accredited post-professional training programs and competence assessment tools that indicate whether the practitioner is competent to perform the advanced skill safely.

Questions to be considered in this area include:

1. Does current entry-level education prepare practitioners to perform this skill as their experience increases?
2. If the change in scope is an advanced skill that would not be tested on the entry-level licensure examination, how is competence in the new technique assured?

3. What competence measures are available and what is the validity of these measures?
4. Are there training programs within the profession for obtaining the new skill or technique?
5. Are standards and criteria established for these programs?
6. Who develops these standards?
7. How and by whom are these programs evaluated against these standards?

C. Evidence

There should be evidence that the new skill or technique, as used by these practitioners, will promote access to quality healthcare. The base of evidence should include the best available clinical evidence, clinical expertise and research. Other forms of evidence include evolving concepts of disease/disability management, quality improvement and risk data, standards of care, infection control data, cost-effectiveness analysis and benchmarking data. Available evidence should be presented in an easy-to-understand format and in an objective and transparent manner.

Questions to be considered in this area include:

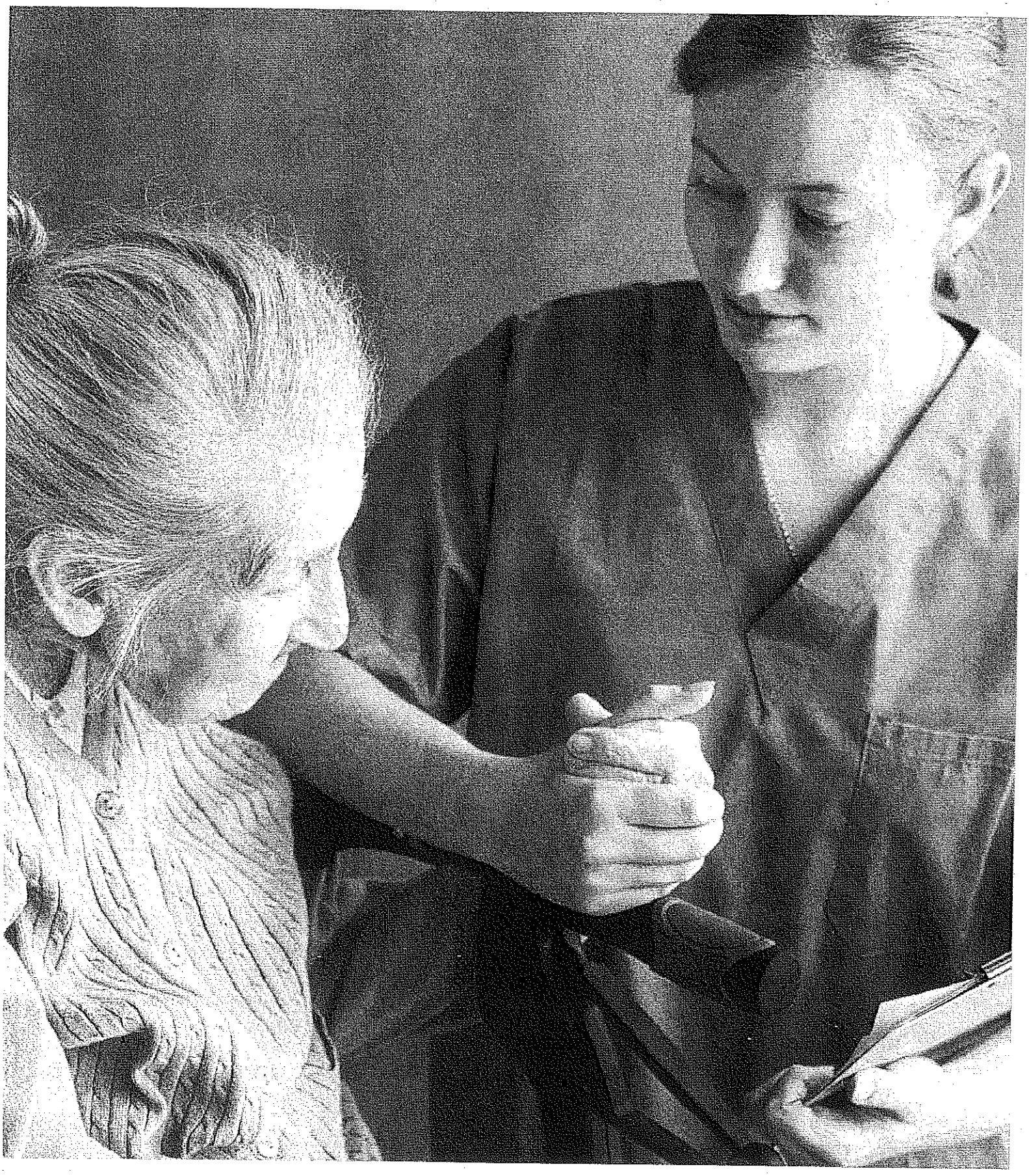
1. Is there evidence within the profession related to the particular procedures and skills involved in the changes in scope?
2. Is there evidence that the procedure or skill is beneficial to public health?

D. Regulatory Environment

A consideration in proposing changes in scope of practice is the regulatory environment. Often, it is the professional association that promotes and lobbies for scope of practice changes. The regulatory board should be involved in the process and be prepared to deal with the regulatory issues related to the proposed changes.

Questions to be considered in this area include:

1. Is the regulatory board authorized to develop rules related to a changed or expanded scope?
2. Is the board able to determine the assessment mechanisms for determining if an individual professional is competent to perform the task?
3. Is the board able to determine the standards that training programs should be based on?
4. Does the board have sufficient authority to discipline any practitioner who performs the task or skill incorrectly or might likely harm a patient?
5. Have standards of practice been developed for the new task or skill?
6. How has the education, training and assessment within the profession expanded to include the knowledge base, skill set and judgments required to perform the tasks and skills?
7. What measures will be in place to assure competence?



Basis for Legislative Decision Making

Although the areas for decision making listed above do not specifically mention public protection, supplying documentation in historical basis, education and training, evidence and the regulatory environment is likely to ensure that the public will be protected when these changes are made.

Potential for harm to the consumer is difficult to prove or disprove relative to scope of practice. It is the very fact that there is potential for harm that necessitates regulation. If a strong basis for the redefined scope is demonstrated as described above, this basis will be rooted in public protection.

This paper rests on the premise that the only factors relevant to scope of practice decision making are those designed to ensure that all licensed practitioners be capable of providing competent care.

Conclusion

This paper presents important issues for consideration by legislators and regulatory bodies when establishing or modifying a profession's scope of practice. The primary focus of this paper is public protection. When defining a profession's scope of practice, the goal of public protection can be realized when legislative and/or regulatory bodies include the following critical factors in their decision-making process:

- **Historical basis** for the profession, especially the evolution of the profession advocating a scope of practice change,
- Relationship of **education and training** of practitioners to scope of practice,
- **Evidence** related to how the new or revised scope of practice benefits the public, and
- The **capacity of the regulatory agency** involved to effectively manage modifications to scope of practice changes.

Overlapping scopes of practice are a reality in a rapidly changing healthcare environment. The criteria related to who is qualified to perform functions safely without risk of harm to the public are the only justifiable conditions for defining scopes of practice.

Appendix

Contact Information

Association of Social Work Boards (ASWB)
400 South Ridge Parkway, Suite B
Culpeper, VA 22701
800.225.6880 toll free
540.829.6880 phone
www.aswb.org

Federation of State Boards of Physical Therapy (FSBPT)
124 West Street South, Third Floor
Alexandria, VA 22314
703.299.3100
www.fsbpt.org

Federation of State Medical Boards of the United States, Inc. (FSMB)
PO Box 619850
Dallas, TX 75261-9850
Main phone: 817.868.4000
www.fsmb.org

Related resource information:
www.fsmb.org/pdf/2005_grpol_scope_of_practice.pdf

National Association of Boards of Pharmacy (NABP)
1600 Feehanville Drive
Mount Prospect, IL 60056
Tel: 847.391.4406
www.nabp.net

National Board for Certification in Occupational Therapy, Inc. (NBCOT)
12 South Summit Avenue
Suite 100
Gaithersburg, MD 20877-4150
301.990.7979
www.nbcot.org

Related resource information:
Foundations of NBCOT Certification Examinations
www.nbcot.org/WebArticles/articlefiles/106-monograph_foundations_exams.pdf

Occupational Therapy State Regulatory Boards and NBCOT
www.nbcot.org/WebArticles/articlefiles/106-RegulatoryBoardsAndNBCOT_brochure.pdf

National Council of State Boards of Nursing, Inc. (NCSBN)
111 East Wacker Drive
Suite 2900
Chicago, Illinois 60601
312.525.3600
www.ncsbn.org

Related resource information:
www.ncsbn.org/NursingRegandInterpretationofSoP.pdf

Developed by:
(In May 2006)

Association of Social Work Boards (ASWB)
Donna DeAngelis, LICSW, ACSW, Executive Director

Federation of State Boards of Physical Therapy (FSBPT)
William A. Hatherill, CEO
Barbara J. Safriet, Public Member and Associate Dean and Lecturer in Law, Yale Law School

Federation of State Medical Boards (FSMB)
Lisa Robin, Vice-President, Government Relations, Policy and Education

National Board for Certification in Occupational Therapy (NBCOT®)
Paul Grace, MS, CAE, President/CEO

National Council of State Boards of Nursing, Inc. (NCSBN®)
Kathy Apple, MS, RN, CAE, Executive Director

National Association of Boards of Pharmacy (NABP®)
Carmen A. Catizone, MS, RPh, DPh, Executive Director/Secretary

NCSBN
National Council of State Boards of Nursing

111 East Wacker Drive
Suite 2900
Chicago, Illinois 60601-4277
312.525.3600 Phone
312.279.1032 Fax
www.ncsbn.org

Revised 10/09

The Future of Nursing

Leading Change, Advancing Health

Report Recommendations

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Key Messages

- Nurses should practice to the full extent of their education and training.
- Nurses should achieve higher levels of education and training through an improved education system that promotes seamless academic progression.
- Nurses should be full partners, with physicians and other health care professionals, in redesigning health care in the United States.
- Effective workforce planning and policy making require better data collection and an improved information infrastructure.

Recommendations

Recommendation 1: Remove scope-of-practice barriers. *Advanced practice registered nurses should be able to practice to the full extent of their education and training. To achieve this goal, the committee recommends the following actions.*

For the Congress:

- Expand the Medicare program to include coverage of advanced practice registered nurse services that are within the scope of practice under applicable state law, just as physician services are now covered.
- Amend the Medicare program to authorize advanced practice registered nurses to perform admission assessments, as well as certification of patients for home health care services and for admission to hospice and skilled nursing facilities.
- Extend the increase in Medicaid reimbursement rates for primary care physicians included in the ACA to advanced practice registered nurses providing similar primary care services.
- Limit federal funding for nursing education programs to only those programs in states that have adopted the National Council of State Boards of Nursing Model Nursing Practice Act and Model Nursing Administrative Rules (Article XVIII, Chapter 18).

For state legislatures:

- Reform scope-of-practice regulations to conform to the National Council of State Boards of Nursing Model Nursing Practice Act and Model Nursing Administrative Rules (Article XVIII, Chapter 18).
- Require third-party payers that participate in fee-for-service payment arrangements to provide direct reimbursement to advanced practice registered nurses who are practicing within their scope of practice under state law.

For the Centers for Medicare and Medicaid Services:

- Amend or clarify the requirements for hospital participation in the Medicare program to ensure that advanced practice registered nurses are eligible for clinical privileges, admitting privileges, and membership on medical staff.

For the Office of Personnel Management:

- Require insurers participating in the Federal Employees Health Benefits Program to include coverage of those services of advanced practice registered nurses that are within their scope of practice under applicable state law.

For the Federal Trade Commission and the Antitrust Division of the Department of Justice:

- Review existing and proposed state regulations concerning advanced practice registered nurses to identify those that have anticompetitive effects without contributing to the health and safety of the public. States with unduly restrictive regulations should be urged to amend them to allow advanced practice registered nurses to provide care to patients in all circumstances in which they are qualified to do so.

Recommendation 2: Expand opportunities for nurses to lead and diffuse collaborative improvement efforts. *Private and public funders, health care organizations, nursing education programs, and nursing associations should expand opportunities for nurses to lead and manage collaborative efforts with physicians and other members of the health care team to conduct research and to redesign and improve practice environments and health systems. These entities should also provide opportunities for nurses to diffuse successful practices.*

To this end:

- The Center for Medicare and Medicaid Innovation should support the development and evaluation of models of payment and care delivery that use nurses in an expanded and leadership capacity to improve health outcomes and reduce costs. Performance measures should be developed and implemented expeditiously where best practices are evident to reflect the contributions of nurses and ensure better-quality care.
- Private and public funders should collaborate, and when possible pool funds, to advance research on models of care and innovative solutions, including technology, that will enable nurses to contribute to improved health and health care.
- Health care organizations should support and help nurses in taking the lead in developing and adopting innovative, patient-centered care models.
- Health care organizations should engage nurses and other front-line staff to work with developers and manufacturers in the design, development, purchase, implementation, and evaluation of medical and health devices and health information technology products.

- Nursing education programs and nursing associations should provide entrepreneurial professional development that will enable nurses to initiate programs and businesses that will contribute to improved health and health care.

Recommendation 3: Implement nurse residency programs. *State boards of nursing, accrediting bodies, the federal government, and health care organizations should take actions to support nurses' completion of a transition-to-practice program (nurse residency) after they have completed a prelicensure or advanced practice degree program or when they are transitioning into new clinical practice areas.*

The following actions should be taken to implement and support nurse residency programs:

- State boards of nursing, in collaboration with accrediting bodies such as the Joint Commission and the Community Health Accreditation Program, should support nurses' completion of a residency program after they have completed a prelicensure or advanced practice degree program or when they are transitioning into new clinical practice areas.
- The Secretary of Health and Human Services should redirect all graduate medical education funding from diploma nursing programs to support the implementation of nurse residency programs in rural and critical access areas.
- Health care organizations, the Health Resources and Services Administration and Centers for Medicare and Medicaid Services, and philanthropic organizations should fund the development and implementation of nurse residency programs across all practice settings.
- Health care organizations that offer nurse residency programs and foundations should evaluate the effectiveness of the residency programs in improving the retention of nurses, expanding competencies, and improving patient outcomes.

Recommendation 4: Increase the proportion of nurses with a baccalaureate degree to 80 percent by 2020. *Academic nurse leaders across all schools of nursing should work together to increase the proportion of nurses with a baccalaureate degree from 50 to 80 percent by 2020. These leaders should partner with education accrediting bodies, private and public funders, and employers to ensure funding, monitor progress, and increase the diversity of students to create a workforce prepared to meet the demands of diverse populations across the lifespan.*

- The Commission on Collegiate Nursing Education, working in collaboration with the National League for Nursing Accrediting Commission, should require all nursing schools to offer defined academic pathways, beyond articulation agreements, that promote seamless access for nurses to higher levels of education.
- Health care organizations should encourage nurses with associate's and diploma degrees to enter baccalaureate nursing programs within 5 years of graduation by offering tuition reimbursement, creating a culture that fosters continuing education, and providing a salary differential and promotion.

- Private and public funders should collaborate, and when possible pool funds, to expand baccalaureate programs to enroll more students by offering scholarships and loan forgiveness, hiring more faculty, expanding clinical instruction through new clinical partnerships, and using technology to augment instruction. These efforts should take into consideration strategies to increase the diversity of the nursing workforce in terms of race/ethnicity, gender, and geographic distribution.
- The U.S. Secretary of Education, other federal agencies including the Health Resources and Services Administration, and state and private funders should expand loans and grants for second-degree nursing students.
- Schools of nursing, in collaboration with other health professional schools, should design and implement early and continuous interprofessional collaboration through joint classroom and clinical training opportunities.
- Academic nurse leaders should partner with health care organizations, leaders from primary and secondary school systems, and other community organizations to recruit and advance diverse nursing students.

Recommendation 5: Double the number of nurses with a doctorate by 2020. *Schools of nursing, with support from private and public funders, academic administrators and university trustees, and accrediting bodies, should double the number of nurses with a doctorate by 2020 to add to the cadre of nurse faculty and researchers, with attention to increasing diversity.*

- The Commission on Collegiate Nursing Education and the National League for Nursing Accrediting Commission should monitor the progress of each accredited nursing school to ensure that at least 10 percent of all baccalaureate graduates matriculate into a master's or doctoral program within 5 years of graduation.
- Private and public funders, including the Health Resources and Services Administration and the Department of Labor, should expand funding for programs offering accelerated graduate degrees for nurses to increase the production of master's and doctoral nurse graduates and to increase the diversity of nurse faculty and researchers.
- Academic administrators and university trustees should create salary and benefit packages that are market competitive to recruit and retain highly qualified academic and clinical nurse faculty.

Recommendation 6: Ensure that nurses engage in lifelong learning. *Accrediting bodies, schools of nursing, health care organizations, and continuing competency educators from multiple health professions should collaborate to ensure that nurses and nursing students and faculty continue their education and engage in lifelong learning to gain the competencies needed to provide care for diverse populations across the lifespan.*

- Faculty should partner with health care organizations to develop and prioritize competencies so curricula can be updated regularly to ensure that graduates at all levels are prepared to meet the current and future health needs of the population.
- The Commission on Collegiate Nursing Education and the National League for Nursing Accrediting Commission should require that all nursing students demonstrate a comprehensive set of clinical performance competencies that encompass the knowledge and skills needed to provide care across settings and the lifespan.
- Academic administrators should require all faculty to participate in continuing professional development and to perform with cutting-edge competence in practice, teaching, and research.
- All health care organizations and schools of nursing should foster a culture of lifelong learning and provide resources for interprofessional continuing competency programs.
- Health care organizations and other organizations that offer continuing competency programs should regularly evaluate their programs for adaptability, flexibility, accessibility, and impact on clinical outcomes and update the programs accordingly.

Recommendation 7: Prepare and enable nurses to lead change to advance health. *Nurses, nursing education programs, and nursing associations should prepare the nursing workforce to assume leadership positions across all levels, while public, private, and governmental health care decision makers should ensure that leadership positions are available to and filled by nurses.*

- Nurses should take responsibility for their personal and professional growth by continuing their education and seeking opportunities to develop and exercise their leadership skills.
- Nursing associations should provide leadership development, mentoring programs, and opportunities to lead for all their members.
- Nursing education programs should integrate leadership theory and business practices across the curriculum, including clinical practice.
- Public, private, and governmental health care decision makers at every level should include representation from nursing on boards, on executive management teams, and in other key leadership positions.

Recommendation 8: Build an infrastructure for the collection and analysis of interprofessional health care workforce data. *The National Health Care Workforce Commission, with oversight from the Government Accountability Office and the Health Resources and Services Administration, should lead a collaborative effort to improve research and the collection and analysis of data on health care workforce requirements. The Workforce Commission and the Health Resources and Services Administration should collaborate with state licensing boards, state nursing workforce centers, and the Department of Labor in this effort to ensure that the data are timely and publicly accessible.*

- The Workforce Commission and the Health Resources and Services Administration should coordinate with state licensing boards, including those for nursing, medicine, dentistry, and pharmacy, to develop and promulgate a standardized minimum data set across states and professions that can be used to assess health care workforce needs by demographics, numbers, skill mix, and geographic distribution.
- The Workforce Commission and the Health Resources and Services Administration should set standards for the collection of the minimum data set by state licensing boards; oversee, coordinate, and house the data; and make the data publicly accessible.
- The Workforce Commission and the Health Resources and Services Administration should retain, but bolster, the Health Resources and Services Administration's registered nurse sample survey by increasing the sample size, fielding the survey every other year, expanding the data collected on advanced practice registered nurses, and releasing survey results more quickly.
- The Workforce Commission and the Health Resources and Services Administration should establish a monitoring system that uses the most current analytic approaches and data from the minimum data set to systematically measure and project nursing workforce requirements by role, skill mix, region, and demographics.
- The Workforce Commission and the Health Resources and Services Administration should coordinate workforce research efforts with the Department of Labor, state and regional educators, employers, and state nursing workforce centers to identify regional health care workforce needs, and establish regional targets and plans for appropriately increasing the supply of health professionals.
- The Government Accountability Office should ensure that the Workforce Commission membership includes adequate nursing expertise.

Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing, at the Institute of Medicine

Donna E. Shalala (Chair)
President, University of Miami, Coral Gables, FL

Linda Burnes Bolton (Vice Chair)
Vice President and Chief Nursing Officer, Cedars-Sinai Health System and Research Institute, Los Angeles, CA

Michael R. Bleich
Dean and Dr. Carol A. Lindeman Distinguished Professor, Vice Provost for Inter-professional Education and Development, Oregon Health & Science University School of Nursing, Portland

Troyen A. Brennan
Executive Vice President, Chief Medical Officer, CVS Caremark, Woonsocket, RI

Robert E. Campbell
Vice Chairman (*retired*), Johnson & Johnson, New Brunswick, NJ

Leah Devlin
Professor of the Practice, University of North Carolina at Chapel Hill School of Public Health, Raleigh

Catherine Dower
Associate Director of Research, Center for the Health Professions, University of California, San Francisco

Rosa Gonzalez-Guarda
Assistant Professor, School of Nursing and Health Studies, University of Miami, Coral Gables, FL

David C. Goodman
Professor of Pediatrics and of Health Policy, and Director, Center for Health Policy Research, The Dartmouth Institute for Health Policy and Clinical Practice, Hanover, NH

Jennie Chin Hansen
Chief Executive Officer, American Geriatrics Society, New York

C. Martin Harris
Chief Information Officer, Cleveland Clinic, OH

Anjli Aurora Hinman
Certified Nurse-Midwife, Intown Midwifery, Atlanta, GA

William D. Novelli
Distinguished Professor, McDonough School of Business, Georgetown University, Washington, DC

Liana Orsolini-Hain
Nursing Instructor, City College of San Francisco, CA

Yolanda Partida
Director, National Center, *Hablamos Juntos*, and Assistant Adjunct Professor, Center for Medical Education and Research, University of California, San Francisco, Fresno

Robert D. Reischauer
President, The Urban Institute, Washington, DC

John W. Rowe
Professor, Mailman School of Public Health, Department of Health Policy and Management, Columbia University, New York

Bruce C. Vladeck
Senior Advisor, Nexera Consulting, New York

INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES
Advising the nation/Improving health

500 Fifth Street, NW
Washington, DC 20001
TEL 202.334.2352
FAX 202.334.1412

www.iom.edu

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American College of Physicians Response
to the
Institute of Medicine's Report,
The Future of Nursing: Leading Change, Advancing Health

November 1, 2010

The Institute of Medicine (IOM) recently released a study, *The Future of Nursing: Leading Change, Advancing Health*.[1] The report calls for new and expanded roles for nurses in a redesigned health care system. It recommends improving education for all nurses and allowing nurses to practice to the full extent of their license and ability. It advocates overhauling state scope of practice acts and suggests that advanced practice registered nurses (APRNs) -- certified registered nurse anesthetists, certified nurse-midwives, clinical nurse specialists, and certified nurse practitioners – should be allowed to practice independently.

Although many of the recommendations of the IOM report are consistent with positions advocated by the American College of Physicians (ACP),[2] other elements are of concern:

- The College agrees that the nursing and medical professions together have critical roles and responsibilities in providing comprehensive, team-based and patient-centered care that takes full advantage of the training and experiences of each profession. As trained health care professionals, physicians and nurses share a commitment to providing high-quality care.[3]

- Recommendation #1 of the IOM report seeks to remove scope-of-practice barriers. It includes calls upon state legislatures to reform scope-of-practice regulations to conform to the National Council of State Boards of Nursing advanced practice registered nurse model rules and regulations that would allow APRNs to practice independently. The IOM's emphasis on independent practice is at odds with the goal of ensuring that patients receive comprehensive and patient-centered care within the context of a health care team.

    - Today, no one clinician should practice independently of other clinicians. Instead, the goal should be to develop collaborative and team-based models that allow every member of the team to contribute to the best possible outcomes to the full level of their training and skills while recognizing differences in their training and skills.

- Physicians and nurses complete training with different levels of knowledge, skills, and abilities that are complementary but not equivalent:[4]

    - Physicians must complete four years of medical school with two years of clinical rotations during the third and fourth years of medical school (3200 hours of general clinical education) and a minimum of three years of full-time clinical postgraduate residency training (minimum 7800 hours) in their specialty.

- Licensed Practical /Licensed Vocational Nurses (LPN/LVNs) complete a 12 to 18 month educational program at a vocational/technical school or community college. They work under the supervision of a physician or registered nurse.

- Registered Nurses (RNs) may complete a two-three year Associate Degree (ASN) program of study at a community college, diploma school of nursing or a four-year college or university; however, a four-year Baccalaureate Degree in Nursing (BSN) is the standard for a registered nurse and Recommendation 4 of the IOM calls for increasing the proportion of nurses with a baccalaureate degree to 80 percent by 2020. Many registered nurses receive additional training and specialize in areas such as critical care, public health, or oncology.

- Advanced Practice Registered Nurses (APRNs) generally receive a Master's degree and/or post Master's Certificate. Increasingly, APRNs go on to obtain degrees as Doctor of Nursing Practice (DNP) or Doctor of Philosophy in Nursing (PhD). There are also post-baccalaureate programs that combine the Master's and Doctorate programs and take approximately three years to complete on a fulltime schedule.

- The IOM report acknowledges that "the nursing profession itself must undergo a fundamental transformation if the committee's vision for health care is to be realized." It also recognizes that physicians receive more extensive and specialized education and training than nurses. The IOM report concludes, "Nurses should achieve higher levels of education and training through an improved education system that promotes seamless academic progression."

- Internists are particularly well suited to provide long-term, comprehensive care in the office and the hospital, managing both common and complex illnesses of adolescents, adults, and the elderly: [5]

  - Internists receive in-depth training in the diagnosis and treatment of conditions affecting all organ systems.

  - Internists have a strong grounding in the scientific basis of clinical medicine and in disease pathophysiology, providing them with the background to effectively integrate current and evolving scientific knowledge with the delivery of clinical care.

  - Internists are specially trained to solve puzzling diagnostic problems and can handle severe, complex chronic illnesses and situations where several different illnesses may strike at the same time.

  - Internists' training is solely directed to care of adult patients; consequently, internists are especially focused on care of adult and aged patients with multiple complex chronic diseases.

- Internists are trained in the essentials of primary care internal medicine, which incorporates an understanding of disease prevention, wellness, substance abuse, and mental health.

- Because of the differences in years and content of training, patients with complex problems, multiple diagnoses, or difficult management challenges will typically be best served by internists and other physician specialists working with a team of health care professionals that may include nurse practitioners, physician assistants (PAs), and other non-physician clinicians.[6]

- A personal physician, working collaboratively with teams of other qualified health professionals, plays an essential role in delivering high quality, patient-centered, and coordinated care to patients. Advanced practice nursing cannot substitute for nor replace primary care medical practice as provided by general internists, family physicians, pediatricians and other physicians.[7]

- Whenever possible, the needs and preferences of every patient should be met by the health care professional with the most appropriate skills and training to provide the necessary care:[8]

  - Patients rely on a health care clinician's professional designation as an indication of the level of training, skills, and knowledge of those providing their care. The use of the prefix "Dr." or "Doctor" by nurses who have obtained the DNP degree could lead to confusion and misconceptions by patients.

  - Patients have the right to be informed of the credentials and qualifications of health care professionals involved in their care to better enable them to understand the background and orientation of their care givers. Consequently, information should be available to patients to help them distinguish among the different health care professionals involved in their care

- Workforce policies should recognize that training more nurse practitioners or physician assistants does not eliminate the need or substitute for increasing the numbers of general internists and other physicians trained to provide primary care. A recent study projects a shortage of tens of thousands of primary care physicians for adult patients, even after the contributions of the nursing profession, physician assistants, and other non-physician health professionals are taken into account.[9]

- In addition to nursing, the contributions of physician assistants, working together with physicians, nurses and other health professionals in a team-oriented practice, such as the patient-centered medical home, should be supported as a proven model for delivering high-quality, cost-effective patient care.[10]

- Physicians, nurses, APRNs, and physician assistants need to be trained to know when they should refer or hand-off a patient to a clinician with a different level of skill and

training. This applies not only to non-physicians, but also to primary care physicians and subspecialists who need to engage the skills of another physician-specialist.

- The IOM recommends that the FTC and the Antitrust Division of the Department of Justice should review state regulations concerning APRNs to identify those that have anti-competitive effects without contributing to the health and safety of the public. It further recommends that "States with unduly restrictive regulations should be urged to amend them to allow advanced practice registered nurses to provide care to patients in all circumstances in which they are qualified to do so."

    - State licensing laws and regulations are intended to protect the public by ensuring that all licensed health clinicians and health professionals have the skills, training and experience required to provide a defined level of service to patients.

    - In this era of transformation of health care delivery, review of state licensing laws would be better served by looking at those areas where APRNs are not allowed to perform functions within the patient-centered medical home that evidence suggests their knowledge, skills, and abilities should allow them to perform. Delivery models such as the VA could be looked to for guidance. Data from patient-centered medical homes can provide additional evidence-based guidance over time as to the specific functions best filled by different health care professionals.

    - Review of state licensing laws should not lead to changes that could harm patient care by allowing any group of health care professionals to provide care for which that profession does not have the requisite training, experience and skills. Such laws should, however, allow all health care professionals to practice to the full level of their training, experience and skills working in a collaborative, team-based environment.

ACP believes that the future of health care delivery will require multidisciplinary teams of health care professionals that collaborate to provide patient-centered care. The key to high performance in multidisciplinary teams is an understanding of the distinctive roles, skills, and values of all team members – primary care physicians, medical and surgical specialists, nurses (including APRNs, RNs and NPs), physician assistants, and other health professionals – working together to delivery high quality, effective, coordinated and team-based care.

Recognizing and building on the common ground between the physicians, nurses, physician assistants, and other health professionals is vital to improving collaboration to meet the complex health care needs of the population.

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[1] **Institute of Medicine Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing.** The Future of Nursing: Leading Change, Advancing Health, Oct 2010. Washington, DC: The National Academies Press. Accessed at http://www.nap.edu/catalog/12956.html

[2] **American College of Physicians.** Nurse Practitioners in Primary Care, position paper, 2009.

[3] **Ibid.**

[4] **Ibid.**

[5] **American College of Physicians**. Solutions to the Challenges Facing Primary Care Medicine. Philadelphia: American College of Physicians; 2009: Policy Monograph.

[6] **American College of Physicians.** Nurse Practitioners in Primary Care, position paper, 2009.

[7] **Ibid.**

[8] **Ibid.**

[9] **Colwill JM, Cultice JM, and Kruse RL.** Will Generalist Physician Supply Meet Demands of an Increasing and Aging Population? *Health Affairs – Web Exclusive*, 29 Apr 2008, w232-41.

[10] **American College of Physicians**. Internists and Physician Assistants: Team-Based Primary Care. Philadelphia: American College of Physicians; 2010: Policy Monograph.

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Key Messages

- Nurses should practice to the full extent of their education and training.
- Nurses should achieve higher levels of education and training through an improved education system that promotes seamless academic progression.
- Nurses should be full partners, with physicians and other health care professionals, in redesigning health care in the United States.
- Effective workforce planning and policy making require better data collection and an improved information infrastructure.

Recommendations

Recommendation 1: Remove scope-of-practice barriers. *Advanced practice registered nurses should be able to practice to the full extent of their education and training. To achieve this goal, the committee recommends the following actions.*

For the Congress:

- Expand the Medicare program to include coverage of advanced practice registered nurse services that are within the scope of practice under applicable state law, just as physician services are now covered.
- Amend the Medicare program to authorize advanced practice registered nurses to perform admission assessments, as well as certification of patients for home health care services and for admission to hospice and skilled nursing facilities.
- Extend the increase in Medicaid reimbursement rates for primary care physicians included in the ACA to advanced practice registered nurses providing similar primary care services.
- Limit federal funding for nursing education programs to only those programs in states that have adopted the National Council of State Boards of Nursing Model Nursing Practice Act and Model Nursing Administrative Rules (Article XVIII, Chapter 18).

For state legislatures:

- Reform scope-of-practice regulations to conform to the National Council of State Boards of Nursing Model Nursing Practice Act and Model Nursing Administrative Rules (Article XVIII, Chapter 18).
- Require third-party payers that participate in fee-for-service payment arrangements to provide direct reimbursement to advanced practice registered nurses who are practicing within their scope of practice under state law.

For the Centers for Medicare and Medicaid Services:

- Amend or clarify the requirements for hospital participation in the Medicare program to ensure that advanced practice registered nurses are eligible for clinical privileges, admitting privileges, and membership on medical staff.

For the Office of Personnel Management:

- Require insurers participating in the Federal Employees Health Benefits Program to include coverage of those services of advanced practice registered nurses that are within their scope of practice under applicable state law.

For the Federal Trade Commission and the Antitrust Division of the Department of Justice:

- Review existing and proposed state regulations concerning advanced practice registered nurses to identify those that have anticompetitive effects without contributing to the health and safety of the public. States with unduly restrictive regulations should be urged to amend them to allow advanced practice registered nurses to provide care to patients in all circumstances in which they are qualified to do so.

Recommendation 2: Expand opportunities for nurses to lead and diffuse collaborative improvement efforts. *Private and public funders, health care organizations, nursing education programs, and nursing associations should expand opportunities for nurses to lead and manage collaborative efforts with physicians and other members of the health care team to conduct research and to redesign and improve practice environments and health systems. These entities should also provide opportunities for nurses to diffuse successful practices.*

To this end:

- The Center for Medicare and Medicaid Innovation should support the development and evaluation of models of payment and care delivery that use nurses in an expanded and leadership capacity to improve health outcomes and reduce costs. Performance measures should be developed and implemented expeditiously where best practices are evident to reflect the contributions of nurses and ensure better-quality care.
- Private and public funders should collaborate, and when possible pool funds, to advance research on models of care and innovative solutions, including technology, that will enable nurses to contribute to improved health and health care.
- Health care organizations should support and help nurses in taking the lead in developing and adopting innovative, patient-centered care models.
- Health care organizations should engage nurses and other front-line staff to work with developers and manufacturers in the design, development, purchase, implementation, and evaluation of medical and health devices and health information technology products.

- Nursing education programs and nursing associations should provide entrepreneurial professional development that will enable nurses to initiate programs and businesses that will contribute to improved health and health care.

Recommendation 3: Implement nurse residency programs. *State boards of nursing, accrediting bodies, the federal government, and health care organizations should take actions to support nurses' completion of a transition-to-practice program (nurse residency) after they have completed a prelicensure or advanced practice degree program or when they are transitioning into new clinical practice areas.*

The following actions should be taken to implement and support nurse residency programs:

- State boards of nursing, in collaboration with accrediting bodies such as the Joint Commission and the Community Health Accreditation Program, should support nurses' completion of a residency program after they have completed a prelicensure or advanced practice degree program or when they are transitioning into new clinical practice areas.
- The Secretary of Health and Human Services should redirect all graduate medical education funding from diploma nursing programs to support the implementation of nurse residency programs in rural and critical access areas.
- Health care organizations, the Health Resources and Services Administration and Centers for Medicare and Medicaid Services, and philanthropic organizations should fund the development and implementation of nurse residency programs across all practice settings.
- Health care organizations that offer nurse residency programs and foundations should evaluate the effectiveness of the residency programs in improving the retention of nurses, expanding competencies, and improving patient outcomes.

Recommendation 4: Increase the proportion of nurses with a baccalaureate degree to 80 percent by 2020. *Academic nurse leaders across all schools of nursing should work together to increase the proportion of nurses with a baccalaureate degree from 50 to 80 percent by 2020. These leaders should partner with education accrediting bodies, private and public funders, and employers to ensure funding, monitor progress, and increase the diversity of students to create a workforce prepared to meet the demands of diverse populations across the lifespan.*

- The Commission on Collegiate Nursing Education, working in collaboration with the National League for Nursing Accrediting Commission, should require all nursing schools to offer defined academic pathways, beyond articulation agreements, that promote seamless access for nurses to higher levels of education.
- Health care organizations should encourage nurses with associate's and diploma degrees to enter baccalaureate nursing programs within 5 years of graduation by offering tuition reimbursement, creating a culture that fosters continuing education, and providing a salary differential and promotion.

- Private and public funders should collaborate, and when possible pool funds, to expand baccalaureate programs to enroll more students by offering scholarships and loan forgiveness, hiring more faculty, expanding clinical instruction through new clinical partnerships, and using technology to augment instruction. These efforts should take into consideration strategies to increase the diversity of the nursing workforce in terms of race/ethnicity, gender, and geographic distribution.
- The U.S. Secretary of Education, other federal agencies including the Health Resources and Services Administration, and state and private funders should expand loans and grants for second-degree nursing students.
- Schools of nursing, in collaboration with other health professional schools, should design and implement early and continuous interprofessional collaboration through joint classroom and clinical training opportunities.
- Academic nurse leaders should partner with health care organizations, leaders from primary and secondary school systems, and other community organizations to recruit and advance diverse nursing students.

Recommendation 5: Double the number of nurses with a doctorate by 2020. *Schools of nursing, with support from private and public funders, academic administrators and university trustees, and accrediting bodies, should double the number of nurses with a doctorate by 2020 to add to the cadre of nurse faculty and researchers, with attention to increasing diversity.*

- The Commission on Collegiate Nursing Education and the National League for Nursing Accrediting Commission should monitor the progress of each accredited nursing school to ensure that at least 10 percent of all baccalaureate graduates matriculate into a master's or doctoral program within 5 years of graduation.
- Private and public funders, including the Health Resources and Services Administration and the Department of Labor, should expand funding for programs offering accelerated graduate degrees for nurses to increase the production of master's and doctoral nurse graduates and to increase the diversity of nurse faculty and researchers.
- Academic administrators and university trustees should create salary and benefit packages that are market competitive to recruit and retain highly qualified academic and clinical nurse faculty.

Recommendation 6: Ensure that nurses engage in lifelong learning. *Accrediting bodies, schools of nursing, health care organizations, and continuing competency educators from multiple health professions should collaborate to ensure that nurses and nursing students and faculty continue their education and engage in lifelong learning to gain the competencies needed to provide care for diverse populations across the lifespan.*

- Faculty should partner with health care organizations to develop and prioritize competencies so curricula can be updated regularly to ensure that graduates at all levels are prepared to meet the current and future health needs of the population.
- The Commission on Collegiate Nursing Education and the National League for Nursing Accrediting Commission should require that all nursing students demonstrate a comprehensive set of clinical performance competencies that encompass the knowledge and skills needed to provide care across settings and the lifespan.
- Academic administrators should require all faculty to participate in continuing professional development and to perform with cutting-edge competence in practice, teaching, and research.
- All health care organizations and schools of nursing should foster a culture of lifelong learning and provide resources for interprofessional continuing competency programs.
- Health care organizations and other organizations that offer continuing competency programs should regularly evaluate their programs for adaptability, flexibility, accessibility, and impact on clinical outcomes and update the programs accordingly.

Recommendation 7: Prepare and enable nurses to lead change to advance health. *Nurses, nursing education programs, and nursing associations should prepare the nursing workforce to assume leadership positions across all levels, while public, private, and governmental health care decision makers should ensure that leadership positions are available to and filled by nurses.*

- Nurses should take responsibility for their personal and professional growth by continuing their education and seeking opportunities to develop and exercise their leadership skills.
- Nursing associations should provide leadership development, mentoring programs, and opportunities to lead for all their members.
- Nursing education programs should integrate leadership theory and business practices across the curriculum, including clinical practice.
- Public, private, and governmental health care decision makers at every level should include representation from nursing on boards, on executive management teams, and in other key leadership positions.

Recommendation 8: Build an infrastructure for the collection and analysis of interprofessional health care workforce data. *The National Health Care Workforce Commission, with oversight from the Government Accountability Office and the Health Resources and Services Administration, should lead a collaborative effort to improve research and the collection and analysis of data on health care workforce requirements. The Workforce Commission and the Health Resources and Services Administration should collaborate with state licensing boards, state nursing workforce centers, and the Department of Labor in this effort to ensure that the data are timely and publicly accessible.*

- The Workforce Commission and the Health Resources and Services Administration should coordinate with state licensing boards, including those for nursing, medicine, dentistry, and pharmacy, to develop and promulgate a standardized minimum data set across states and professions that can be used to assess health care workforce needs by demographics, numbers, skill mix, and geographic distribution.
- The Workforce Commission and the Health Resources and Services Administration should set standards for the collection of the minimum data set by state licensing boards; oversee, coordinate, and house the data; and make the data publicly accessible.
- The Workforce Commission and the Health Resources and Services Administration should retain, but bolster, the Health Resources and Services Administration's registered nurse sample survey by increasing the sample size, fielding the survey every other year, expanding the data collected on advanced practice registered nurses, and releasing survey results more quickly.
- The Workforce Commission and the Health Resources and Services Administration should establish a monitoring system that uses the most current analytic approaches and data from the minimum data set to systematically measure and project nursing workforce requirements by role, skill mix, region, and demographics.
- The Workforce Commission and the Health Resources and Services Administration should coordinate workforce research efforts with the Department of Labor, state and regional educators, employers, and state nursing workforce centers to identify regional health care workforce needs, and establish regional targets and plans for appropriately increasing the supply of health professionals.
- The Government Accountability Office should ensure that the Workforce Commission membership includes adequate nursing expertise.

Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing, at the Institute of Medicine

Donna E. Shalala (Chair)
President, University of Miami, Coral Gables, FL

Linda Burnes Bolton (Vice Chair)
Vice President and Chief Nursing Officer, Cedars-Sinai Health System and Research Institute, Los Angeles, CA

Michael R. Bleich
Dean and Dr. Carol A. Lindeman Distinguished Professor, Vice Provost for Inter-professional Education and Development, Oregon Health & Science University School of Nursing, Portland

Troyen A. Brennan
Executive Vice President, Chief Medical Officer, CVS Caremark, Woonsocket, RI

Robert E. Campbell
Vice Chairman (*retired*), Johnson & Johnson, New Brunswick, NJ

Leah Devlin
Professor of the Practice, University of North Carolina at Chapel Hill School of Public Health, Raleigh

Catherine Dower
Associate Director of Research, Center for the Health Professions, University of California, San Francisco

Rosa Gonzalez-Guarda
Assistant Professor, School of Nursing and Health Studies, University of Miami, Coral Gables, FL

David C. Goodman
Professor of Pediatrics and of Health Policy, and Director, Center for Health Policy Research, The Dartmouth Institute for Health Policy and Clinical Practice, Hanover, NH

Jennie Chin Hansen
Chief Executive Officer, American Geriatrics Society, New York

C. Martin Harris
Chief Information Officer, Cleveland Clinic, OH

Anjli Aurora Hinman
Certified Nurse-Midwife, Intown Midwifery, Atlanta, GA

William D. Novelli
Distinguished Professor, McDonough School of Business, Georgetown University, Washington, DC

Liana Orsolini-Hain
Nursing Instructor, City College of San Francisco, CA

Yolanda Partida
Director, National Center, *Hablamos Juntos*, and Assistant Adjunct Professor, Center for Medical Education and Research, University of California, San Francisco, Fresno

Robert D. Reischauer
President, The Urban Institute, Washington, DC

John W. Rowe
Professor, Mailman School of Public Health, Department of Health Policy and Management, Columbia University, New York

Bruce C. Vladeck
Senior Advisor, Nexera Consulting, New York

INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

Advising the nation / Improving health

500 Fifth Street, NW
Washington, DC 20001
TEL 202.334.2352
FAX 202.334.1412

www.iom.edu

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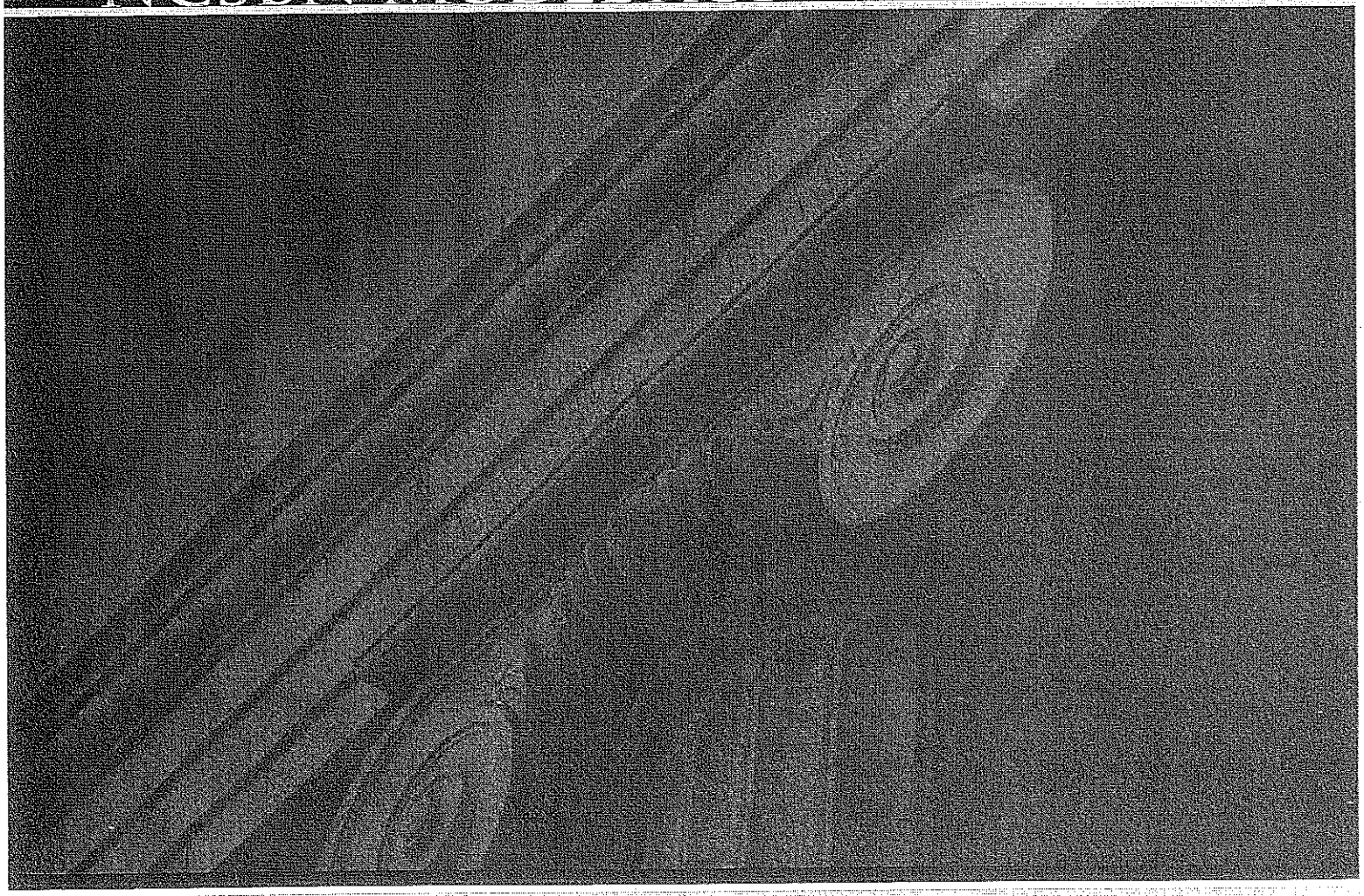
NCSBN MODEL ACT



NCSBN
National Council of State Boards of Nursing

Mission Statement

The National Council of State Boards of Nursing (NCSBN®) provides education, service and research through collaborative leadership to promote evidence-based regulatory excellence for patient safety and public protection.

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NCSBN MODEL ACT (2012)

Table of Contents

Article I. Title and Purpose

a. This Act shall be known and may be cited as <the JURISDICTION> Nurse Practice Act (NPA), which creates and empowers the board of nursing (BON) to regulate nursing and to enforce the provisions of this Act.
b. The purpose of this Act is to protect the health, safety and welfare of the residents of this state.

Article II. Definitions

As used in Articles III through XI of this Act, unless the context thereof requires otherwise:

a. "Advanced assessment" means the taking by an advanced practice registered nurse (APRN) of the history, physical and psychological assessment of a patient's signs, symptoms, pathophysiologic status and psychosocial variations in the determination of differential diagnoses and treatment.
b. "Clinical learning experiences" means the planned, faculty-guided learning experiences that involve direct contact with patients.
c. "Competence" means the ability of the nurse to integrate knowledge, skills, judgment, and personal attributes to practice safely and ethically in a designated role and setting in accordance with the scope of nursing practice.
d. "Comprehensive nursing assessment" means collection, analysis and synthesis of data performed by an RN used to establish a health status baseline, plan care and address changes in a patient's condition.
e. "Delegating" means transferring to a competent individual the authority to perform a selected nursing task in a selected situation.
f. "Eligible for graduation" means having met all program and institutional requirements pending conferment of the degree.
g. "Encumbered" means a license with current discipline, conditions or restrictions.
h. "Focused nursing assessment" means recognizing patient characteristics by an LPN/VN that may affect the patient's health status, gathering and recording assessment data and demonstrating attentiveness by observing, monitoring, and reporting signs, symptoms, and changes in patient condition in an ongoing manner to the supervising registered nurse or physician.
i. "Inactive license" means the voluntary termination of an individual's license to practice nursing or failure to renew a license.
j. "Internationally educated applicants" means a person educated outside the U.S. who applies for licensure or seeks temporary authorization to practice as a graduate nursing student to complete program objectives.
k. "License" means the authority granted by the BON to practice nursing as an RN, LPN/VN or APRN.
l. "Nursing" means a profession focused on the care of individuals, families and populations to attain, maintain or recover optimal health and quality of life from conception to death.
m. "Patient" means a recipient of care; may be an individual, family, group or community. May also be referred to as client.
n. "Patient-centered health care plan" means, in collaboration with patient, the identification of desired goals, strategies for meeting goals and processes for promoting, attaining and maintaining optimal patient health outcomes.
o. "Reactivation" means reissuance of a license that has lapsed, expired or been placed on inactive status in absence of disciplinary action.
p. "Reinstatement" means reissuance of a license following disciplinary action by the BON.
q. "Supervision" means provision of guidance or oversight by a qualified nurse for the accomplishment of a nursing task or activity with initial direction of the task or activity and periodic inspection of the actual act of accomplishing the task or activity.
r. "Unlicensed assistive personnel" means any unlicensed personnel, regardless of title, to whom nursing tasks are delegated.

Article III. Scope of RN and LPN/VN Practice

Section 1. Licensed Practical/Vocational Nurse (LPN/VN)

a. Licensed Practical/Vocational Nurse is the title given to an individual licensed to practice practical/vocational nursing.
b. An LPN/VN practices, with or without compensation or personal profit, under the supervision of an RN, advanced practice registered nurse (APRN), licensed physician or other health care provider authorized by the state; that is guided by nursing standards established or recognized by the BON; and includes:
    1. Collecting data and conducting focused nursing assessments of the health status of patients.
    2. Participating with other health care providers in the development and modification of the patient centered health care plan.

3. Implementing nursing interventions within a patient centered health care plan.
4. Assisting in the evaluation of responses to interventions.
5. Providing for the maintenance of safe and effective nursing care rendered directly or indirectly.
6. Advocating the best interest of patients.
7. Communicating and collaborating with patients and members of the health care team.
8. Providing health care information to patients.
9. Delegating and assigning nursing interventions to implement the plan of care.
10. Wearing identification which clearly identifies the nurse as an LPN/VN when providing direct patient care, unless wearing identification creates a safety or health risk for either the nurse or the patient.
11. Other acts that require education and training consistent with professional standards as prescribed by the BON and commensurate with the LPN/VN's education, demonstrated competencies and experience.

Section 2. Registered Nurse (RN)

a. Registered Nurse is the title given to an individual licensed to practice registered nursing.
b. The practice of registered nurses shall include:
   1. Providing comprehensive nursing assessment of the health status of patients.
   2. Collaborating with health care team to develop and coordinate an integrated patient centered health care plan.
   3. Developing the comprehensive patient centered health care plan, including:
      a. Establishing nursing diagnoses;
      b. Setting goals to meet identified health care needs; and
      c. Prescribing nursing interventions.
   4. Implementing nursing care through the execution of independent nursing strategies, and the provision of regimens requested, ordered or prescribed by authorized health care providers.
   5. Evaluating responses to interventions and the effectiveness of the plan of care.
   6. Designing and implementing teaching plans based on patient needs.
   7. Delegating and assigning nursing interventions to implement the plan of care.
   8. Providing for the maintenance of safe and effective nursing care rendered directly or indirectly.
   9. Advocating the best interest of patients.
   10. Communicating and collaborating with other health care providers in the management of health care and the implementation of the total health care regimen within and across care settings.
   11. Managing, supervising and evaluating the practice of nursing.
   12. Teaching the theory and practice of nursing.
   13. Participating in development of health care policies, procedures and systems.
   14. Wearing identification that clearly identifies the nurse as an RN when providing direct patient care, unless wearing identification creates a safety or health risk for either the nurse or the patient.
   15. Other acts that require education and training consistent with professional standards as prescribed by the BON and commensurate with the RN's education, demonstrated competencies and experience.

Article IV. Board of Nursing (BON)

Section 1. Membership, Nominations, Qualifications, Appointment and Term of Office

a. The BON shall consist of < > members to be appointed by the governor. Nominations for appointment may be made to the governor by any interested individual, association or any other entity.
b. The membership of the BON shall be < > RNs, < > LPN/VNs, < > APRNs, and < > members representing the public.
c. Each RN member shall be a resident in this jurisdiction, licensed in good standing under the provisions of this chapter, currently engaged in RN practice and shall have no less than five years of experience as an RN, at least three of which immediately preceded appointment.
d. Each LPN/VN member shall be a resident in this jurisdiction, licensed in good standing under the provisions of this chapter, currently engaged in LPN/VN practice and shall have no less than five years of experience as an LPN/VN, at least three of which immediately preceded appointment.
e. Each APRN member shall be a resident in this jurisdiction, licensed in good standing under the provisions of this chapter, currently engaged in APRN practice and shall have no less than five years of experience as an APRN, at least three of which immediately preceded appointment.

f. The public member(s) of the BON shall be a resident of this jurisdiction and shall not be, nor shall ever have been, a person who has ever had any material financial interest in the provision of nursing services or who has engaged in any activity directly related to nursing.
g. Members of the BON shall be appointed for a term of < > years. Terms shall be staggered.
h. No member shall serve more than two consecutive full terms. The completion of an unexpired portion of a full term shall not constitute a full term for purposes of this section. Any member initially appointed for less than a full term shall be eligible to serve two additional terms.
i. Each term of office shall expire at midnight on the last day of the term of the appointment or at midnight on the date on which any vacancy occurs. If a replacement appointment has not been made, the term of the member shall be extended until a replacement is made.

Section 2. Officers

a. The BON shall elect officers from its members. Officers elected by the BON shall serve a term of < > years, beginning < > and ending < >.
b. The <first officer> shall preside at board meetings and shall be responsible for the performance of all duties and functions of the BON required or permitted by this Act. In the absence of the first officer, the <second officer> shall assume these duties.
c. Additional offices may be established and filled by the BON at its discretion.

Section 3. Meetings

a. The BON shall meet at least quarterly for the purpose of transacting business. A majority of the members of the BON constitutes a quorum; however, if there is a vacancy on the BON, a majority of the members serving constitutes a quorum. A BON member is required to attend meetings or to provide proper notice and justification of inability to do so. Unexcused absences from meetings may result in removal from the BON.
b. One meeting shall be designated for the purpose of electing officers and BON reorganization and planning.
c. The BON may meet additional times. Additional meetings may be called by the <first officer> of the BON or shall be called at the request of two-thirds of the board members.
d. The BON shall give official and public notice of the place and time of the meeting. Board meetings and hearings shall be open to the public. In accordance with the law, the BON may, at its discretion, conduct part of the meeting in executive session closed to the public. Notice of all board meetings shall be given in the manner and pursuant to requirements prescribed by the jurisdiction's applicable statutes and rules and regulations.

Section 4. Guidelines

a. The BON may develop guidelines to assist board members in the evaluation of possible conflicts of interests. Members shall recuse themselves from the discussion and abstain from voting when a conflict arises.
b. The BON may develop guidelines to assist board members in the disclosure of ex parte communications.
c. The BON may develop other guidelines as needed that would support governance and direction of work.

Section 5. Vacancies, Removal and Immunity

a. Any vacancy that occurs for any reason in the membership of the BON shall be filled by the governor in the manner prescribed in the provisions of this article regarding appointments. A person appointed to fill a vacancy shall serve for the unexpired portion of the term.
b. The governor may remove any member from the BON for neglect of any duty required by law, for incompetence, or for unprofessional or dishonorable conduct. The general laws of this jurisdiction controlling the removal of public officials from office shall be followed in dismissing board members.
c. All members of the BON shall have immunity from individual civil liability while acting within the scope of the duties as board members.
d. In the event that the entire BON, an individual member or staff is sued, the attorney general shall appoint an attorney to represent the involved party, or pursuant to jurisdictional law.

Section 6. Powers and Duties

The BON shall be responsible for the interpretation and enforcement of the provisions of this Act. The BON shall have all of the duties, powers and authority specifically granted by and necessary to the enforcement of this Act, as well as other duties, powers and authority as it may be granted by appropriate statute, including:

a. Make, adopt, amend, repeal and enforce such administrative rules consistent with the law, as it deems necessary for the proper administration of this Act and to protect public health, safety and welfare.
b. Develop and enforce standards for nursing education.
c. Provide consultation, conduct conferences, forums, studies and research on nursing education and practice.
d. Maintain membership in national organizations that develop national licensure examinations and exclusively promote the improvement of the legal standards of the practice of nursing for the protection of public health, safety and welfare.
e. Grant temporary permits for qualified applicants as set forth in rule.
f. License qualified applicants for RN, LPN/VN and APRN licensure and regulate their practice.
g. Develop standards for maintaining competence of licensees and requirements for returning to practice.
h. Certify and regulate unlicensed assistive personnel (UAP), including certified nursing assistants (CNAs) and medication assistants certified (MACs).
i. Develop and enforce standards for nursing practice.
j. Issue advisory opinions, interpretive statements and declaratory statements regarding the interpretation and application of the jurisdiction's nursing law and regulation.
k. Regulate the manner in which nurses announce their practice to the public.
l. Implement the discipline process:
    1. Issue subpoenas in connection with investigations, inspections and hearings.
    2. Obtain access to records as reasonably requested by the BON to assist the BON in its investigation; the BON shall maintain any records pursuant to this paragraph as confidential data.
    3. Order licensees to submit and pay for physical, mental health or chemical dependency evaluations for cause.
    4. Prosecute alleged violations of this Act.
    5. Conduct hearings, compel attendance of witnesses and administer oaths to persons giving testimony at hearings, consistent with administrative rules.
    6. Provide alternatives to discipline:
        a. Establish alternative programs for monitoring of nurses who agree to seek treatment of substance use disorders, mental health or physical health conditions that could lead to disciplinary action by the BON as established by rule; and
        b. Establish programs to educate and re-mediate nurses with practice concerns who meet criteria established in rule.
m. Discipline nurses for violation of any provision of this Act.
n. Maintain a record of all persons regulated by the BON.
o. Maintain records of proceedings as required by the laws of this jurisdiction.
p. Collect and analyze data regarding nursing education, nursing practice and nursing resources. Data may be collected with license applications.
q. Submit an annual report to the governor summarizing the BON's proceedings and activities.
r. Appoint and employ a qualified RN to serve as executive officer and approve such additional staff positions as may be necessary, in the opinion of the BON, to administer and enforce the provisions of the Act.
s. Delegate to the executive officer those activities that expedite the functions of the BON, including employing professional and support staff, investigators, legal counsel and other personnel necessary for the BON to carry out its functions.
t. Adopt a seal that shall be in the care of the executive officer and shall be affixed only in a manner as prescribed by the BON.
u. Share current significant investigative information with other regulatory bodies and law enforcement entities.
v. Withdraw a license issued in error.
w. Conduct criminal background checks for nurse licensure in accordance with state and federal law under Section 9 of Article V of this Act.
x. Issue a cease and desist order for any violation of this Act.
y. Adopt criteria for recognizing national certifying bodies for APRN roles and population foci

Section 7. Financial

a. The BON is authorized to establish by rule appropriate fees for licensure by examination, reexamination, endorsement and such other fees and fines as the BON determines necessary.
b. All fees collected by the BON shall be administered according to the established fiscal policies of this jurisdiction and in such manner as to adequately implement the provisions of this Act.
c. The BON may accept grants, contributions, devices, bequests and gifts that shall be kept in a separate fund and shall be used by the BON to enhance the practice of nursing.
d. The BON may receive and expend funds in addition to appropriations from this jurisdiction, provided such funds are received and expended for the pursuit of the authorized objectives of the BON, such funds are maintained in a separate account, and periodic reports of the receipt and expenditures of such funds are submitted to the governor.
e. All fees collected by the BON shall be retained by the BON. The monies retained shall be used for any of the BON's duties, including but not limited to, the addition of full time equivalent positions for program services and investigations. Monies retained by the BON pursuant to this section are not subject to reversion to the general fund of the jurisdiction.

Section 8. Executive Officer

a. The executive officer shall be responsible for:
    1. The performance of administrative responsibilities of the BON.
    2. Employment of personnel needed to carry out the functions of the BON.
    3. The performance of any other duties as necessary to the proper conduct of BON business and to the fulfillment of the BON's responsibilities as defined by this Act.
b. The BON shall monitor and periodically evaluate the effectiveness of the executive officer.

Article V. RN and LPN/VN Licensure and Exemptions

Section 1. Titles and Abbreviations for Licensed Nurses

Only those persons who hold a license to practice nursing in this state shall have the right to use the following title abbreviations:
a. Title: "Registered Nurse" and the abbreviation "RN."
b. Title: "Licensed Practical/Vocational Nurse" and the abbreviation "LPN/VN."

Section 2. Examinations

a. The BON shall authorize the administration of the examination to applicants for licensure as RNs or LPN/VNs.
b. The BON may employ, contract and cooperate with any entity in the preparation and process for determining results of a uniform licensure examination. When such an examination is utilized, the BON shall restrict access to questions and answers.
c. The BON shall determine whether a licensure examination may be repeated, the frequency of reexamination and any requisite education prior to reexamination.

Section 3. Licensure by Examination

a. An applicant for licensure by examination to practice as an RN or LPN/VN who successfully meets the requirements of this section shall be entitled to licensure as an RN or LPN/VN, whichever is applicable.
b. An applicant shall:
    1. Submit a completed application and fees as established by the BON.
    2. Graduate or be eligible for graduation from a <your jurisdiction> BON-approved prelicensure program or a program that meets criteria comparable to those established by the <your jurisdiction> BON in its rules.
    3. Pass an examination authorized by the BON.
    4. Report any criminal conviction, nolo contendere plea, Alford plea, deferred judgment, or other plea arrangements in lieu of conviction.
    5. Report any substance use disorder in the last five years.
    6. Report any actions taken or initiated against a professional or occupational license, registration or certification.
    7. Have committed no acts or omissions that are grounds for disciplinary action as set forth in Article VII of this Act; and

8. Meet other criteria established by the BON in rule.

c. Graduates from an RN prelicensure program may take the LPN/VN licensure examination if they have completed a BON approved LPN/VN role delineation course. The BON shall by rule set standards for approval of the role delineation course.

Section 4. Licensure by Examination of Internationally Educated Applicants

Requirements for licensure by examination of internationally educated applicants, include:

a. Graduation from a nursing program comparable to a BON approved prelicensure RN or LPN/VN program, whichever is applicable, and meet all other requirements of section 3.
b. Applicant must submit a credentials evaluation by a credentials review agency for the level of licensure being sought.
c. Successful passage of an English proficiency exam that includes the components of reading, speaking, writing and listening, except for applicants from countries where English is the native language, and the nursing program where the applicant attended was taught in English, used English textbooks and clinical experiences were conducted in English.
d. Disclosure of nursing licensure status in country of origin, if applicable.

Section 5. Licensure by Endorsement

a. An applicant for licensure by endorsement to practice as an RN or LPN/VN shall:
   1. Submit a completed application and fees as established by the BON.
   2. Graduate from a <your jurisdiction> BON-approved prelicensure program or a program that meets criteria comparable to those established by the <your jurisdiction> BON in its rules.
   3. Hold a license as an RN or an LPN/VN that is not encumbered.
   4. Pass an examination authorized by the BON.
   5. Report status of all nursing licenses, including any BON actions taken or any current or pending investigations.
   6. Report any criminal conviction, nolo contendere plea, Alford plea, deferred judgment, or other plea arrangements in lieu of conviction.
   7. Report any substance use disorder in the last five years.
   8. Report any actions taken or initiated against a professional or occupational license, registration or certification
   9. Report current participation in an alternative to discipline program in any jurisdiction.
   10. Have committed no acts or omissions which are grounds for disciplinary action in another jurisdiction or, if such acts have been committed and would be grounds for disciplinary action as set forth in Article VII of this Act.
   11. Be proficient in English language as set forth in the BON rules.
   12. Submit verification of licensure status directly from the U.S. jurisdiction of licensure by examination.
   13. Meet continued competency requirements as set forth by the BON.
   14. Meet other criteria established by the BON in rule.
b. Temporary Permits
   1. The BON may issue time-limited authorization to practice nursing through the granting of temporary permits, as set forth in BON rules.
   2. Any person who has been approved as an applicant for licensure and has been granted a temporary permit shall have the right to use the titles < > and abbreviations < > designated by the state.

Section 6. Renewal of RN and LPN/VN Licenses

a. RN and LPN/VN licenses issued under this Act shall be renewed every < > years according to a schedule established by the BON.
b. An applicant for renewal of license to practice as an RN or LPN/VN shall:
   1. Report any criminal conviction, nolo contendere plea, Alford plea, deferred judgment, or other plea arrangements in lieu of conviction.
   2. Report status of all nursing licenses, including any BON actions taken or any current or pending investigations.
   3. Report any substance use disorder in the last five years.
   4. Report any actions taken or initiated against a professional or occupational license, registration or certification.
   5. Report current participation in an alternative to discipline program in any jurisdiction.
c. A renewal license shall be issued to an RN or LPN/VN who submits an application, remits the required fee and satisfactorily completes any other requirements established by the BON as set forth in rules.

d. No license shall be renewed unless the RN or LPN/VN shows evidence of continued competence as specified in BON rule.
e. Failure to renew the license shall result in forfeiture of the right to practice nursing in this jurisdiction.

Section 7. Reactivation of License

a. Applicants for RN or LPN/VN licensure reactivation shall:
   1. Report any criminal conviction, nolo contendere plea, Alford plea, deferred judgment, or other plea arrangements in lieu of conviction.
   2. Report status of all nursing licenses, including any BON actions taken or any current or pending investigations.
   3. Report any substance use disorder in the last five years.
   4. Report any actions taken or initiated against a professional or occupational license, registration or certification.
   5. Report current participation in an alternative to discipline program in any jurisdiction.
b. A reactivated license shall be issued to an RN or LPN/VN who submits an application, remits the required fee and satisfactorily completes any other requirements established by the BON as set forth in rules.
c. No license shall be reactivated unless the RN or LPN/VN shows evidence of continued competence as specified in BON rule.

Section 8. Duties of Licensees

a. The nurse shall comply with the provisions of this Act. The burden of responsibility is on the licensee to know and practice according to the laws and regulations of this jurisdiction.
b. The nurse shall report to the BON those acts or omissions that are violations of the Act or grounds for disciplinary action as set forth in Articles VII and VIII of this Act.
c. The licensee shall, in response to BON inquiries, provide relevant and truthful personal, professional or demographic information requested by the BON to perform its duties in regulating and controlling nursing practice in order to protect the public health, safety and welfare.
d. Failure to provide the requested information may result in non-renewal of the license to practice nursing or licensure disciplinary action.

Section 9. Criminal Background Checks

Each applicant for licensure shall submit a full set of fingerprints to the BON for the purpose of obtaining a state and federal criminal records check pursuant to <state statute> and Public Law 92-544. The <state agency responsible for managing fingerprint data> may exchange this fingerprint data with the Federal Bureau of Investigation (FBI).

Section 10. Exemptions

No provisions of this Act shall be construed to prohibit:

a. The practice of nursing by a student currently enrolled in and actively pursuing completion of a prelicensure nursing education program, or a graduate nursing program involving nursing practice, if all the following are met:
   1. The student is participating in a program located in this jurisdiction and approved by the BON or participating in this jurisdiction in a component of a program located in another jurisdiction and approved by a BON that is a member of NCSBN.
   2. The student's practice is under the auspices of the program.
   3. The student acts under the supervision of an RN serving for the program as a faculty member or teaching assistant.
   4. The student in a graduate program preparing for APRN licensure must be a licensed RN and under the supervision of qualified faculty/preceptor, licensed in the state of clinical practice.
b. The provision of nursing services to family members or in emergency situations.
c. Caring for the sick when done in connection with the practice of religious tenets of any church and by or for its members.
d. The individual is engaging in the practice of nursing by discharging official duties while employed by or under contract with the United States government or any agency thereof.
e. The activities of an individual currently licensed to practice nursing in another jurisdiction, if the individual's license has not been revoked, the individual is not currently under suspension or on probation, and one of the following:
   1. The individual is engaging in the practice of nursing as an employee of an individual agency or corporation located in the other jurisdiction in a position with employment responsibilities that include transporting patients into, out of, or

through this state, as long as each trip in this state does not exceed seventy-two hours.
2. The individual is consulting with an individual licensed in this state to practice any health-related profession.
3. The individual is engaging in activities associated with teaching in this state as a guest lecturer at a nursing education program, continuing nursing education program or in-service presentation.
4. The individual is conducting evaluations of nursing care that are undertaken on behalf of a nationally recognized accrediting organization.
5. The individual is providing nursing care to an individual who is in this state on a temporary basis, not to exceed six months in any one calendar year, if the nurse is directly employed by or under contract with the individual or a guardian or other person acting on the individual's behalf.
6. The individual is providing nursing care during any disaster, natural or otherwise, that has been officially declared to be a disaster by a public announcement issued by an appropriate federal, state, county or municipal official.

Article VI. Prelicensure Nursing Education

Section 1. Approval Standards

a. The BON shall, by rule, set standards for the establishment and outcomes of prelicensure nursing education programs, including clinical learning experiences, and approve such programs that meet the requirements of this Act and BON rule.
b. The BON shall set requirements for the continuing approval of prelicensure nursing programs.
c. The BON may deny or withdraw approval or take such action as deemed necessary when prelicensure nursing education programs fail to meet the standards established by the BON, provided that all such actions shall be in accordance with ≤jurisdiction's Administrative Procedures Act≥ and/or BON rule.
d. The BON may reinstate approval of a prelicensure nursing education program upon submission of satisfactory evidence that the program meets the standards established by the BON.

Section 2. Closure of Prelicensure Nursing Education Programs

The BON shall, by rule, identify the process for prelicensure nursing education programs that cease operation.

Section 3. Provision for Innovative Approaches in Prelicensure Nursing Education Programs

The BON shall, by rule, identify the process for implementing innovative approaches in prelicensure nursing education programs.

Article VII. Discipline and Proceedings

Section 1. Authority

For any one or combination of the grounds set forth in Sections 2 and 3 below, the BON is granted the authority to deny a license or impose the following discipline on a license:

a. Revoke a license.
b. Place a license on probation.
c. Place a license on suspension.
d. Summarily issue emergency limitation or restriction of a license subject to Section 10 of this Article.
e. Summarily issue an emergency suspension of a license subject to Section 10 of this Article.
f. Reprimand or censure a license.
g. Accept a voluntary surrender of a license.
h. Accept other voluntary limitation or restriction of a license.
i. Place other limitations or restrictions on a license.
j. Deny license renewal.
k. Deny initial issuance of license.
l. Impose a fine or monetary penalty.
m. Impose other publicly known conditions or findings.
n. Impose restitution.
o. Recover the costs of the proceedings resulting in disciplinary action against a nursing license. The cost of proceedings

shall include, but is not limited to: the cost paid by the BON to the office of administrative hearings and the office of the attorney general or other BON counsel for legal and investigative services; the costs of a court reporter and witnesses; reproduction of records; BON staff time, travel and expenses; and BON members' per diem reimbursements, travel costs and expenses.

p. Any other action as warranted by the facts in the case.

Section 2. Accountability

a. Each nurse is required to know and comply with the requirements of this Act and related rules.
b. All individuals licensed or privileged under this Act shall be responsible and accountable for making decisions that are based upon the individuals' educational preparation and experience in nursing and shall practice nursing with reasonable skill and safety.

Section 3. Grounds for Discipline

The BON may discipline a licensee or deny a license to an applicant for any one or a combination of the following:

a. Non-compliance with federal, jurisdictional or contractual requirements.
b. Criminal conviction or adjudication in any jurisdiction including, but not limited to being convicted of, pleading guilty to, entering a plea of nolo contendere or no contest to, or receiving a deferred judgment or suspended sentence.
c. Confidentiality, patient privacy, consent or disclosure violations.
d. Misconduct or abuse.
e. Fraud, deception or misrepresentation.
f. Unsafe practice, substandard care or unprofessional conduct.
g. Improper supervision or allowing unlicensed practice.
h. Drug related offenses.
i. Other violations of the Act or administrative rules adopted thereunder.

Section 4. Procedure

The BON shall establish a disciplinary process by rule based on the Administrative Procedure Act of the Jurisdiction of <JURISDICTION>.

Section 5. Immunity and Protection from Retaliation

a. Anyone, including BON staff or member, who in good faith reports to the BON information relating to alleged violations of this Act or administrative rules shall not be subject to a civil action for damages as a result of reporting such information.
b. A person may not suspend, terminate, or otherwise discipline, discriminate against, or retaliate against anyone who reports, or advises on reporting, in good faith under this section.
c. A person who in good faith reports violations in accordance with this Article has a cause of action against a person who violates subsection b., and may recover:
    1. The greater of:
        a. Actual damages, including damages for mental anguish even if no other injury is shown; or
        b. $5,000.
    2. Exemplary damages.
    3. Court costs.
    4. Reasonable attorney's fees.
d. In addition to the amount recovered under subsection c., a person whose employment is suspended or terminated in violation of this section is entitled to:
    1. Reinstatement in the employee's former position or severance pay in an amount equal to three months of the employee's most recent salary.
    2. Compensation for wages lost during the period of suspension or termination.

Section 6. Notification

a. The BON shall communicate disciplinary actions taken as set forth in rule and may report to other entities.
b. The BON may notify certification programs when an APRN has an encumbered license or privilege to practice.

Section 7. Alternative to Discipline Monitoring Program

The BON may establish through rule an alternative to discipline program for nurses with substance use disorder or mental health conditions.

Section 8. Practice Remediation Program (PRP)

The BON may establish through rules a practice remediation program to offer an alternative to discipline program for early identification and remediation of practice deficiencies of the nurse to promote effective nursing practice and public safety.

Section 9. Reporting

a. Licensees shall report, within 30 days of the event, the following: change of address, criminal convictions, malpractice claims, or discipline or complaints pending in another jurisdiction or by another professional licensing board.
b. A licensed nurse shall report names of individuals to the BON if the nurse has reasonable cause to suspect that a nurse or an applicant engaged in conduct that may constitute grounds for disciplinary action under this Act, except for minor incidents as described in rule.
c. Duty to report by others:
    1. Hospitals, nursing homes, temporary staffing agencies and other employers of RNs, LPN/VNs or APRNs shall report to the BON the names of any licensee or applicant for nursing licensure whose conduct may constitute grounds for disciplinary action under this Act.
    2. A jurisdictional agency that licenses, registers or certifies a hospital, nursing home, home health agency or other type of health care facility or agency section, or surveys one of these facilities or agencies shall report to the BON when that agency has evidence that the nurse has engaged in conduct that may constitute grounds for disciplinary action under this Act.
    3. Each insurer that provides professional liability insurance that covers claims arising from providing or failing to provide nursing care shall report to the BON any payment made on behalf of a nurse in a claim or lawsuit.
    4. The court administrator of any court of competent jurisdiction shall report to the BON any judgment or other determination of the court that adjudges or includes a finding that a nurse is:
        a. Mentally ill;
        b. Mentally incompetent;
        c. Chemically dependent;
        d. Dangerous to the public;
        e. Guilty of a crime;
        f. Guilty of a violation of federal or jurisdictional narcotics laws or controlled substances act;
        g. Guilty of operating a motor vehicle while under the influence of alcohol or a controlled substance;
        h. Guilty of an abuse or fraud under Medicare or Medicaid;
        i. Appointed a guardian; or
        j. Committed under the laws of the jurisdiction.
    5. A person who is required to report a nurse under this section because the nurse is impaired or suspected of substance use disorder or mental illness may report to the alternative to discipline program instead of reporting to the BON. Alternative to discipline programs have a duty to report to the BON any nurse's failure to comply with the program requirements or termination from the program.
d. Minor incidents are exceptions to reporting requirements when the continuing practice by the subject nurse does not pose a risk of harm to a patient or others and can be addressed through corrective action by the nurse's employing health care facility. The BON shall adopt rules governing reporting of minor incidents. The BON may evaluate a complaint and determine that it is a minor incident under this section.
e. The BON may seek an order from a court of competent jurisdiction for a report from any of the parties stipulated in this Article if one is not forthcoming voluntarily.

f. Any organization or person reporting in good faith information to the BON under this Article shall be immune from civil action as provided in Article VII, Section 5.
g. Any licensed health care professional who examines a nurse at the request of the BON shall be immune from suit for damages by the nurse examined if the examining health care professional conducted the examination and made findings or diagnoses in good faith.

Section 10. Emergency Action

a. Summary Suspension
   1. The BON is authorized to summarily suspend the license of a nurse without a hearing if:
      a. The BON finds that there is probable cause to believe that the nurse has violated a statute or rule that the BON is empowered to enforce and continued practice by the nurse would create imminent and serious risk of harm to others; or
      b. The nurse fails to obtain a BON ordered evaluation.
   2. The suspension shall remain in effect until the BON issues a stay of suspension or a final order in the matter after a hearing or upon agreement between the BON and licensee.
   3. Upon request of the nurse, the BON shall schedule a disciplinary hearing to be held under the Administrative Procedures Act, to begin no later than < > days after receipt of the request. The licensee shall receive at least < > days notice of the hearing.
b. Automatic Suspension
   1. Unless the BON orders otherwise, a license to practice nursing is automatically suspended if:
      a. A guardian of a nurse is appointed by order of a court under sections <REFERENCE TO GOVERNING JURISDICTIONAL LAW>;
      b. The nurse is committed by order of a court under <REFERENCE TO GOVERNING JURISDICTIONAL LAW>; or
      c. The nurse is determined to be mentally incompetent, mentally ill, chemically dependent or a person dangerous to the public by a court of competent jurisdiction within or without this jurisdiction.
   2. The nurse shall petition the BON for reinstatement. The BON may terminate the suspension after a hearing or upon agreement between the BON and the nurse.
c. Injunctive Relief
   1. The BON or any prosecuting officer, upon a proper showing of the facts, is authorized to petition a court of competent jurisdiction for an order to enjoin:
      a. Any person who is practicing nursing within the meaning of this Act from practicing without a valid license, unless exempted under Article V;
      b. Any person, firm, corporation, institution or association from employing any person who is not licensed to practice nursing under this Act or exempted under Article V;
      c. Any person, firm, corporation, institution or association from operating a school of nursing without approval;
      d. Any person whose license has been suspended or revoked from practicing as an RN, LPN/VN or APRN; or
      e. Any person from using the title "nurse," "licensed practical/vocational nurse," "registered nurse," "advanced practice registered nurse" or their authorized abbreviations unless licensed or privileged to practice nursing in this jurisdiction.
   2. The court may, without notice or bond, enjoin such acts and practice. A copy of the complaint shall be served on the defendant and the proceedings thereafter shall be conducted as in other civil cases.
d. The emergency proceedings herein described shall be in addition to, not in lieu of, all penalties and other remedies provided by law.

Article VIII. Violations and Penalties

Section 1. Violations

No person shall:

a. Use the title "nurse," "registered nurse," "licensed practical/vocational nurse," "advanced practice registered nurse," their authorized abbreviations, or any other words, abbreviations, figures, letters, title, sign, card or device that would lead a person to believe the individual is a licensed nurse unless permitted by this Act.

b. Employ a nurse without verifying the nurse's authority to practice in this jurisdiction.
c. Engage in the practice of nursing as defined in the Act without a valid, current license or privilege to practice, except as otherwise permitted under this Act.
d. Practice nursing under cover of any diploma, license, or record that was illegally or fraudulently obtained, or that was signed or issued unlawfully or under fraudulent representation.
e. Practice nursing during the time a license is suspended, revoked, surrendered, inactive, lapsed or otherwise prohibited to practice by agreement or order.
f. Fraudulently obtain or furnish a license.
g. Knowingly employ unlicensed persons in the practice of nursing.
h. Conduct a program for the preparation for licensure under this chapter, unless the BON has approved the program.
i. Otherwise violate, or aid or abet another person to violate, any provision of this Act.
j. Engage in irregular behavior in connection with the licensure examination, including, but not limited to, the giving or receiving of aid in the examination or the unauthorized possession, reproduction, or disclosure of examination questions or answers.
k. Act in violation of Article VII section 5.

Section 2. Penalties

Violation of any provision of this Article shall also constitute a misdemeanor/crime.

Section 3. Criminal Prosecution

Nothing in this Act shall be construed as a bar to criminal prosecution for violation of the provisions of this Act.

Section 4. Civil Penalties

The BON may, in addition to any other sanctions herein provided, impose on any person violating a provision of this Act or Administrative Rules a civil penalty not to exceed <$> for each count or separate offense.

Article IX. Implementation

Section 1. Persons Licensed Under a Previous Law

a. Any person holding a license to practice nursing as an RN in this jurisdiction that is valid on < EFFECTIVE DATE > shall be deemed to be licensed as an RN under the provisions of this Act and shall be eligible for renewal of such license under the conditions and standards prescribed in this Act.
b. Any person holding a license to practice nursing as an LPN/VN in this jurisdiction that is valid on < EFFECTIVE DATE > shall be deemed to be licensed as an LPN/VN under the provisions of this Act and shall be eligible for renewal of such license under the conditions and standards prescribed in this Act.
c. Any person holding a license to practice nursing as an APRN in this jurisdiction that is valid on < EFFECTIVE DATE > shall be deemed to be licensed as an APRN under the provisions of this Act and shall be eligible for renewal of such license under the conditions and standards prescribed in this Act.
d. Any person eligible for reactivation of a license as an RN, LPN/VN or APRN, respectively, under provisions, conditions and standards prescribed in this Act by applying for reactivation according to rules established by the BON. Application for such reactivation must be made within < > months of the effective date of this Act.
e. Any person holding an inactive license to practice nursing as an RN, LPN/VN or an APRN on <EFFECTIVE DATE> because of failure to renew may become licensed as an RN, LPN/VN or APRN, respectively, under the provisions of this Act by applying for reactivation according to rules established by the BON. Application for such reactivation must be made within < > months of the effective date of this Act.
f. Those licensed under the provisions of this Article shall be eligible for renewal of such license under the conditions and standards prescribed by this Act.

Section 2. Severability

The provisions of this Act are severable. If any provision of this Act is declared unconstitutional, illegal or invalid, the constitutionality, legality and validity of the remaining portions of this Act shall be unaffected and shall remain in full force and effect.

Section 3. Repeal

The laws specified below are repealed, except with rights and duties that have matured, penalties that were incurred and proceedings that were begun before the effective date of this Act. <LIST STATUTES TO BE REPEALED, FOR EXAMPLE THE CURRENT NPA OR APPROPRIATE SECTIONS.>

Article X. Unlicensed Assistive Personnel

Section 1. Certified Nursing Assistant (CNA)

A CNA is an unlicensed person who has been determined by the BON to meet the education and certification requirements of this Act and rule and is supervised by a licensed nurse.

Section 2. Medication Assistant Certified (MAC)

a. An MAC is a CNA with additional education and training as set forth in rule who may administer medications as prescribed by an authorized provider and delegated by a supervising licensed nurse within the parameters set forth in rule.
b. An MAC shall perform medication administration and related tasks only.

Section 3. Delegation

The BON shall promulgate rules regarding delegation including conditions for delegation and the tasks, functions and activities that may be delegated to CNAs and MACs.

Section 4. Nursing Assistive Personnel

a. The BON shall:
    1. Maintain a list of BON approved training programs.
    2. Establish testing and certification requirements.
    3. Establish recertification requirements.
    4. Assess fees, consistent with state and federal requirements.
    5. Conduct state and federal criminal background checks on all applicants.
    6. Adopt an application process in rule.
b. Each applicant for CNA or MAC certification shall submit a full set of fingerprints to the BON for the purpose of obtaining a state and federal criminal records check pursuant to <state statute> and Public Law 92-544. The <state agency responsible for managing fingerprint data> may exchange this fingerprint data with the FBI.
c. Each individual who successfully meets all requirements for certification shall be certified.
d. An applicant whose certificate or listing in another jurisdiction has been disciplined or who has had a criminal conviction may not be eligible for certification.
e. All persons certified under this Article shall meet the requirements of the BON as established in rule.
f. The BON shall require the periodic renewal of certifications.

Section 5. Titles and Abbreviations

A person shall not use the titles "certified nursing assistant," "medication-aide certified," or the abbreviations "CNA" or "MAC" unless the person has been duly certified under this Article.

Section 6. Education and Training Program Approval

The BON shall adopt rules governing the approval and re-approval of education and training programs for CNAs and MACs.

Section 7. CNA and MAC Competency Evaluation

The BON shall set forth in rule criteria for acceptable CNA and MAC competency evaluations.

Section 8. Disciplinary Procedures

a. For any one or a combination of grounds, the BON shall have the authority to:
   1. File a letter of concern if the BON believes there is insufficient evidence to support direct action against the CNAs and MACs.
   2. Indicate on the certificate the existence of any substantiated complaints against the certificate holder.
   3. Deny certification or recertification, suspend, revoke or accept the voluntary surrender of a certificate if a CNA or MAC commits an act of unprofessional conduct.
   4. Refer criminal violations of this Article to the appropriate law enforcement agency.
   5. Revoke the certificate or not issue a certificate or recertification to an applicant who has a criminal conviction.
   6. Issue a public reprimand for a violation of statute or rule.
   7. Recover costs of case prosecution.
   8. In addition to any other disciplinary action it may take, impose a civil penalty of not more than one thousand dollars per violation.

b. Grounds for denial, suspension, revocation of a certificate or other discipline of a CNA or MAC include the inability to function with reasonable skill and safety for the following reasons:
   1. Substance use disorder.
   2. Patient neglect, abuse or abandonment.
   3. Fraud or deceit, which may include, but is not limited to:
      a. Filing false credentials;
      b. Falsely representing facts on an application for initial certification, reinstatement or certificate renewal; or
      c. Giving or receiving assistance in taking the competency evaluation.
   4. Boundary violations.
   5. Performance of unsafe patient care.
   6. Performance of acts beyond the tasks, functions and activities that may be delegated to a CNA or MAC under BON rule.
   7. Misappropriation or misuse of property.
   8. Misappropriation of money or property of a patient or resident by fraud, misrepresentation or duress.
   9. Criminal conviction.
   10. Failure to conform to the standards of CNA or MAC.
   11. Violation of privacy or failure to maintain the confidentiality of patient or resident information.
   12. Any conduct or practice that is or might be harmful or dangerous to the health of a patient or the public.

c. The BON shall comply with the provisions of the <JURISDICTION> Administrative Procedures Act for taking disciplinary actions against certificates.

d. The BON shall maintain records of disciplinary actions and make available all disciplinary findings of the CNA or MAC.

e. The BON shall notify the <relevant state and federal agencies> of the disciplinary action.

Article XI. APRN

Section 1. Title and Scope of Practice

a. Advanced Practice Registered Nurse (APRN) is the title given to an individual licensed to practice advanced practice registered nursing within one of the following roles: certified nurse practitioner (CNP), certified registered nurse anesthetist (CRNA), certified nurse-midwife (CNM) or clinical nurse specialist (CNS), and who functions in a population focus as set forth in rule. An APRN may serve as primary or acute care provider of record.

b. Population focus shall include:
   1. Family/individual across the lifespan.
   2. Adult-gerontology.
   3. Neonatal.
   4. Pediatrics.
   5. Women's health/gender-related.
   6. Psychiatric/mental health.

c. In addition to the RN scope of practice and within the APRN role and population focus, APRN practice shall include:
   1. Conducting an advanced assessment.
   2. Ordering and interpreting diagnostic procedures.
   3. Establishing primary and differential diagnoses.
   4. Prescribing, ordering, administering, dispensing and furnishing therapeutic measures as set forth in Section 5 of this Article.
   5. Delegating and assigning therapeutic measures to assistive personnel.
   6. Consulting with other disciplines and providing referrals to health care agencies, health care providers and community resources.
   7. Wearing identification which clearly identifies the nurse as an APRN when providing direct patient care, unless wearing identification creates a safety or health risk for either the nurse or the patient.
   8. Other acts that require education and training consistent with professional standards and commensurate with the APRN's education, certification, demonstrated competencies and experience.

d. APRNs are licensed independent practitioners within standards established or recognized by the BON. Each APRN is accountable to patients, the nursing profession and the BON for:
   1. Complying with the requirements of this Act and the quality of advanced nursing care rendered.
   2. Recognizing limits of knowledge and experience.
   3. Planning for the management of situations beyond the APRN's expertise.
   4. Consulting with or referring patients to other health care providers as appropriate.

Section 2. Licensure

a. An applicant for initial licensure to practice as an APRN shall:
   1. Submit a completed written application and appropriate fees as established by the BON.
   2. Hold a current RN license or privilege to practice and shall not hold an encumbered license or privilege to practice as an RN in any state or territory.
   3. Have completed an accredited graduate or post-graduate level APRN program in one of the four roles and at least one population focus.
   4. Be currently certified by a national certifying body recognized by the BON in the APRN role and population foci appropriate to educational preparation.
   5. Report any criminal conviction, nolo contendere plea, Alford plea or other plea arrangement in lieu of conviction.
   6. Have committed no acts or omissions that are grounds for disciplinary action as set forth in Article VII of this Act.
   7. Provide other evidence as required by rule.

b. The BON may issue a license by endorsement to an APRN licensed under the laws of another state if, in the opinion of the BON, the applicant meets the qualifications for licensure in this jurisdiction. An applicant for APRN licensure by endorsement shall:
   1. Submit a completed written application and appropriate fees as established by the BON.
   2. Hold a current license or privilege to practice as an RN and APRN in a state or territory.
   3. Not have an encumbered license or privilege to practice in any state or territory.
   4. Have completed an accredited graduate or post-graduate level APRN program in one of the four roles and at least one population focus or meets the standards for grandfathering as described in section 7 of this Article.
   5. Be currently certified by a national certifying body recognized by the BON in the APRN role and at least one population focus appropriate to educational preparation.
   6. Meet continued competency requirements as set forth in BON rules.
   7. Report any conviction, nolo contendere plea, Alford plea or other plea arrangement in lieu of conviction.
   8. Have committed no acts or omissions, which are grounds for disciplinary action in another jurisdiction.
   9. Provide other evidence as required by the BON in its rules.

c. APRN licenses issued under this Act shall be renewed at least every < > years according to a schedule established by the BON. An applicant for APRN license renewal shall:
   1. Submit a renewal application as directed by the BON and remit the required fee as set forth in rule.
   2. Maintain national certification in the appropriate APRN role and at least one population focus, authorized by licensure, through an ongoing certification maintenance program of a nationally recognized certifying body recognized by the BON.
   3. Meet other requirements set forth in rule.

d. The BON may reactivate or reinstate an APRN license as set forth in BON rules.
e. The duties of licensees are the same as previously stated in Article V Section 8 for RNs and LPN/VNs.

Section 3: Titles and Abbreviations

a. Only those persons who hold a license or privilege to practice advanced practice registered nursing in this state shall have the right to use the title "advanced practice registered nurse" and the roles of "certified registered nurse anesthetist," "certified nurse-midwife," "clinical nurse specialist" and "certified nurse practitioner;" and the abbreviations "APRN," "CRNA," "CNM," "CNS" and "CNP," respectively.
b. The abbreviation for the APRN designation of a certified registered nurse anesthetist, a certified nurse-midwife, a clinical nurse specialist and for a certified nurse practitioner will be APRN, plus the role title, i.e., CRNA, CNM, CNS and CNP.
c. It shall be unlawful for any person to use the title "APRN" or "APRN" plus their respective role titles, the role title alone, authorized abbreviations or any other title that would lead a person to believe the individual is an APRN, unless permitted by this Act.

Section 4. Education Programs

a. The BON shall, by administrative rules, set standards for the establishment and outcomes of APRN education programs, including clinical learning experiences, and approve such programs that meet the requirements of the Act and BON rules.
b. The BON shall, by administrative rules, identify the process for determining APRN education program compliance with standards.
c. The BON shall set requirements for the establishment of a new APRN education program. New programs will be preapproved by an APRN accrediting body.

Section 5. Prescribing, Ordering, Dispensing and Furnishing Authority

a. The BON shall grant prescribing, ordering, dispensing and furnishing authority through the APRN license.
d. Prescribing, ordering, dispensing and furnishing shall include the authority to:
    1. Diagnose, prescribe and institute therapy or referrals of patients to health care agencies, health care providers and community resources.
    2. Prescribe, procure, administer, dispense and furnish pharmacological agents, including over the counter, legend and controlled substances.
    3. Plan and initiate a therapeutic regimen that includes ordering and prescribing non-pharmacological interventions, including, but not limited to, durable medical equipment, medical devices, nutrition, blood and blood products, and diagnostic and supportive services including, but not limited to, home health care, hospice, and physical and occupational therapy.

Section 6. Discipline

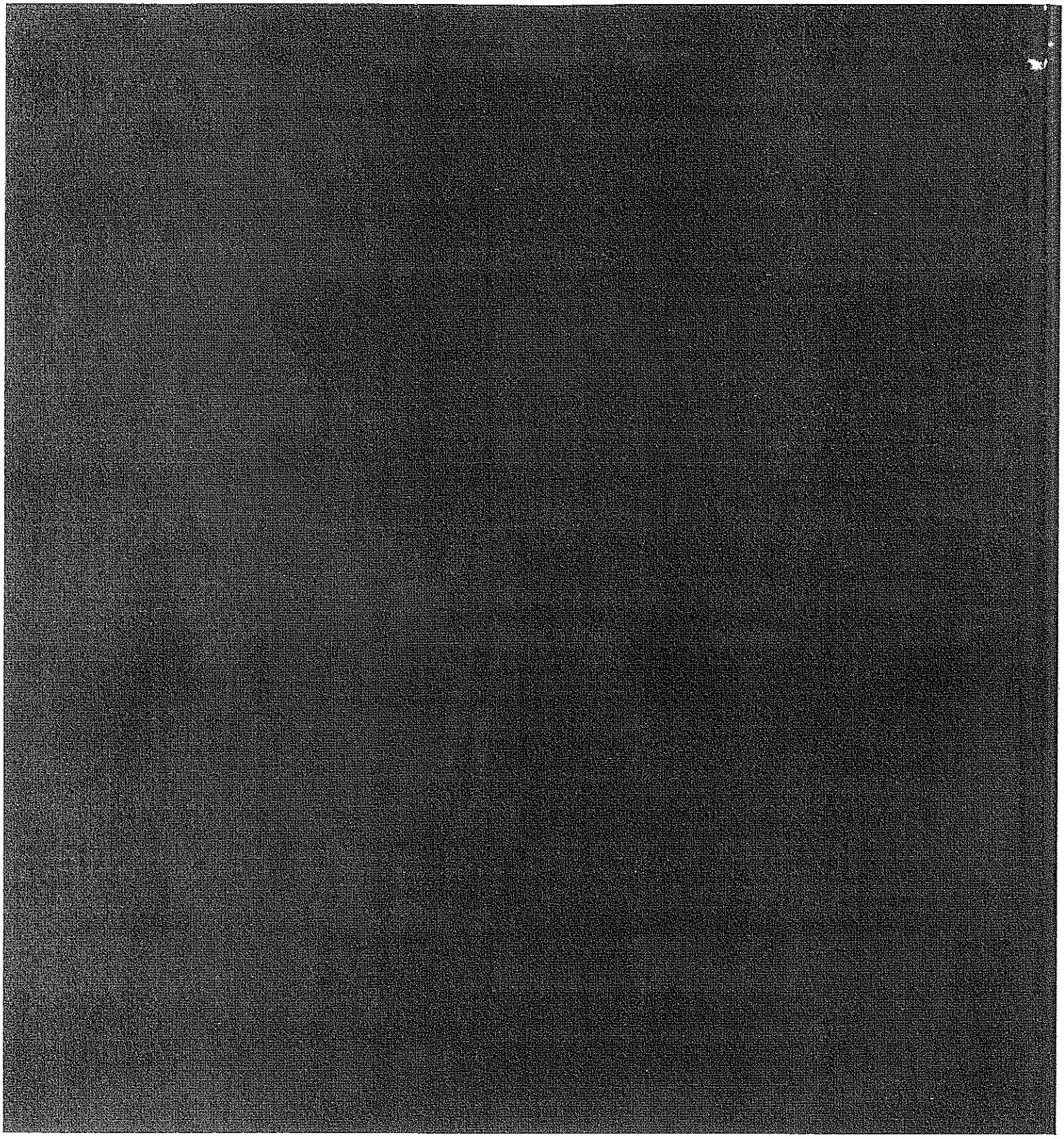
APRN discipline and proceedings shall be the same as stated in Article VII for RNs and LPN/VNs.

Section 7. Implementation

Any person holding a license to practice nursing as an APRN in this state that is valid on Dec. 30, 2015, shall be deemed to be licensed as an APRN under the provisions of this Act with their current privileges and shall be eligible for renewal of such license under the conditions and standards prescribed in this Act.

Article XII. Nursing Licensure Compact

Article XIII. APRN Compact



NCSBN
National Council of State Boards of Nursing

111 E. Wacker Drive, Suite 2900
Chicago, IL 60601-4277
312.525.3600
312.279.1032 fax
www.ncsbn.org

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States With The Least Restrictive Regulations Experienced The Largest Increase In Patients Seen By Nurse Practitioners

Yong-Fang Kuo (yokuo@utmb.edu) is a professor of preventive medicine and community health at the University of Texas Medical Branch, in Galveston.

Figaro L. Loresto Jr. is a graduate student in preventive medicine and community health at the University of Texas Medical Branch.

Linda R. Rounds is a professor of nursing at the University of Texas Medical Branch.

James S. Goodwin is a professor of internal medicine at the University of Texas Medical Branch.

ABSTRACT **The use of nurse practitioners (NPs) is one way to address the shortage of physician primary care providers. NP training programs and the number of practicing NPs have increased in the past two decades. However, regulations limiting their scope of practice vary greatly by state. We assessed the impact of state regulations on the increase in care provided by NPs in the United States, using a 5 percent national sample of Medicare beneficiaries. We found that between 1998 and 2010 the number of Medicare patients receiving care from NPs increased fifteenfold. By 2010 states with the least restrictive regulations of NP practice had a 2.5-fold greater likelihood of patients' receiving their primary care from NPs than did the most restrictive states. Relaxing state restrictions on NP practice should increase the use of NPs as primary care providers, which in turn would reduce the current national shortage of primary care providers.**

Increasing access to primary care is a key focus of health reform in the United States. Primary care helps patients in decision making, provides opportunities for disease prevention and health promotion, and can engage patients' family and community to help meet the health needs of the patients.[1] States with a higher ratio of primary care physicians to patients have lower Medicare expenditures and lower total and disease-specific mortality.[2] However, since 1998 the proportion of US medical students choosing careers in primary care has dropped from around 60 percent to 20–27 percent.[3,4]

One way to address the shortage of physician primary care providers is with nurse practitioners (NPs).[5,6] The past two decades have witnessed an increase in NP training programs and the number of practicing NPs.[7–10] However, states vary greatly in regulating the scope of NPs' practice and in the precision and detail of those regulations.[5] In some states NPs have essentially the same authority to practice that physicians have. Other states require physician supervision and limit NPs' hospital privileges as well as their authority to order tests, make referrals, and prescribe medications.[6,11–14] The online Appendix contains (in Exhibits 1a and 2a)[15] a summary of regulations for each state and how they have changed over time.[16–30] These restrictions may inhibit the spread of care provided by NPs.[31,32]

Previous studies have found an increase over time in both the number of nurse practitioners and the number of patients receiving care from them.[9,10,33] These studies were based on national health care surveys and included small numbers of NPs. In this article we assess the growth in care provided by nurse practitioners from 1998 through 2010 and how this varies by practice setting, using national Medicare data as well as the number of licensed NPs as reported by state authorities. We were particularly interested in the variation among states in NPs serving as primary care providers. We hypothesized that states with fewer restrictions on NP practice and areas with a lower supply of primary care

physicians and physician assistants would have the highest percentage of NPs as primary care providers.

Study Data And Methods

DATA We estimated NP care from the 5 percent national sample of Medicare beneficiaries for 1998–2010. We started in 1998, the year Medicare liberalized reimbursement to NPs. Data on the number of NPs by state were based on license records from state boards of nursing.[16–30]

STUDY COHORT We selected Medicare beneficiaries age sixty-five or older with Parts A and B coverage and not in a health maintenance organization (HMO) for the entire twelve months of each year during 1998–2010. Beneficiaries whose original entitlement to Medicare was based on disability or end-stage renal disease were excluded, as were patients with any nursing home stay in a given year.

PROVIDERS We identified individual providers by their Unique Provider Identification Number for 1998–2007 and National Provider Identifier for 2007–10. Provider specialty was based on the Part B claims in the Medicare Carrier files or Outpatient Statistical Analysis files in a given year. We identified the clinical setting—inpatient, outpatient, or emergency department—based on the type of evaluation and management billing code in the data sets.

To identify the primary care provider, we included only beneficiaries with billing records for two or more outpatient evaluation and management services by a generalist physician (general practitioner, family physician, general internist, or geriatrician) or NP in a given year. Patients were identified as having an NP as the primary care provider if the NP billed for most of patients' evaluation and management services. If a physician and an NP billed the same number of evaluation and management charges in a given year for a given patient, the physician was designated as the primary care provider. For some analyses, we identified patients for whom NPs provided all generalist evaluation and management services during that year.

STATE REGULATIONS We initially classified state regulations into three levels: allowing independent practice and prescription authority; allowing independent practice but requiring supervision for prescriptions; and requiring physician supervision for practice and prescriptions. We reviewed any changes in these categories obtained from annual legislative updates[16–30] from 1998 to 2012 (Exhibit 2a in the online Appendix).[15]

In some analyses we further classified state regulations of NP practice into five categories related to patients' ability to choose an NP: exemplary, partially support, confine, restrict, and severely restrict.[11–13,34] The categories were produced by an expert panel, whose members evaluated three dimensions of patients' access to NPs: in governance and education of the NP profession, in providing health care services, and in ability to prescribe medications. We used the 2006 and 2010 ratings[11,13] in our analyses (Exhibit 3a in the Appendix).[15]

COVARIATES Patient age (65–74, 75–84, or ≥85 years), sex, and race or ethnicity (white, black, or other) were obtained from Medicare enrollment files. Income for ZIP code areas was obtained from the 2000 and 2010 census data and categorized by quartile. The number of primary care physicians per 100,000 residents in each Hospital Service Area was obtained from the *Dartmouth Atlas of Health Care* for 2006—the latest year available—and categorized by quartiles.[35] The numbers of physician assistants per 100,000 residents in each county (the smallest unit of data collection for physician assistants) in 2007 and 2010 were obtained from 2011–12 Area Resource Files, maintained by the federal Health Resources and Services Administration.

Sizes of residential areas were categorized using Rural-Urban Continuum Codes that distinguish metropolitan counties by size and nonmetropolitan counties by degree of urbanization and proximity to metropolitan areas.[36] A comorbidity index for each enrollee, indicating the number of his or her diagnosed conditions, was generated from all claims in the twelve months before each study year and categorized as 0, 1, 2, and ≥3.[37] The percentages of state residents older than age seventy-five, male, nonwhite, with fewer than twelve years of education, or uninsured were obtained from the 2000 and 2010 census data, and primary care physician availability was obtained from the 2006 and 2010 Area Resource Files.

STATISTICAL ANALYSES For the years 2006 and 2010, we evaluated the association of patient characteristics with the odds of having an NP as the primary care provider, using hierarchical generalized linear mixed models. The associations between having an NP as the primary care provider and either state regulations or the availability of primary care physicians and physician assistants were also assessed. We treated the variable of states as a random effect to assess how much of the variation in having an NP as the primary care provider was explained by state regulations. We also evaluated the change over time in the percentage of patients with an NP as the primary care provider as a function of state regulations by adding the interaction between year and level of regulation in the model.

In addition, we assessed the association of state regulations with the estimated number of NPs per 100,000 state residents in 2006 and 2010,[24,28] using a least squares regression model adjusted for population age, sex, race or ethnicity, education, insurance, and primary care physician availability in each state. All tests of statistical significance were two-sided ($p < 0.05$). Analyses were performed with the statistical software SAS, version 9.2. Maps were constructed using ArcGIS 9.3.

LIMITATIONS Our main analyses assessed NP Medicare charges, not activity. Medicare allows physicians to submit evaluation and management charges for a split or shared visit in which both the physician and the NP perform and document a substantive portion of a face-to-face encounter with the patient.[38] In such situations, the physician rather than the NP would normally submit the charge, because the reimbursement rate for physicians is 15 percent higher than that for nurse practitioners.[39] Thus, measuring only NP charges would tend to underestimate total NP activity. However, we also examined associations between state regulations and the number of NPs licensed in a state, as previously done by others.[40] Finally, some institutions may have policies against NPs' billing independently for their services.

Our method for identifying patients with an NP as the primary care provider assumed that all evaluation and management charges by NPs and generalist physicians were for primary care services. Approximately 5 percent of NPs in adult outpatient settings are not in primary care, so our method overestimated primary care by NPs.[41] The increasing trend for NPs to receive training and certification in a subspecialty[42] will decrease the availability of NPs as primary care providers. This is analogous to the negative impact that increasing specialization by physicians has had on the numbers of primary care physicians.[3,4]

We studied community-dwelling elders with fee-for-service Medicare coverage. Nurse practitioner care may differ for beneficiaries under age sixty-five, those who reside in nursing homes, or those with HMO coverage. Last, we analyzed the number of licensed NPs as a proxy for the number of practicing NPs. This could tend to underestimate the impact of state regulations.

Study Results

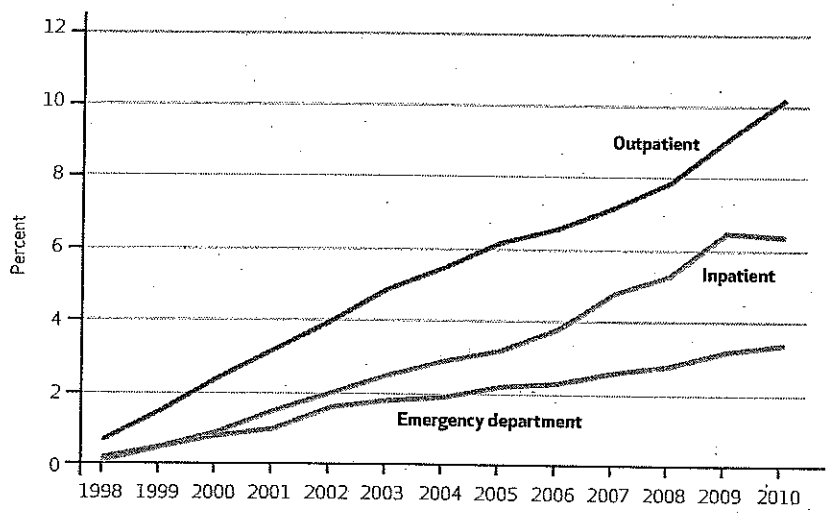
GROWTH IN NURSE PRACTITIONER CARE From 1998 to 2010 the proportion of Medicare patients billed by NPs grew 6.2 percentage points for hospitalized patients, 3.3 percentage points for emergency department patients, and 9.5 percentage points for patients seen in an outpatient setting (Exhibit 1). The overall number of NPs reimbursed for evaluation and management services in the 5 percent Medicare claims data rose from 3,114 in 1998 to 37,638 in 2010. Of the 37,638 NPs who billed Medicare in 2010, 59.0 percent provided services in an outpatient setting, 10.0 percent in nursing facilities, 8.6 percent in hospitals, 6.8 percent in emergency departments, and 15.5 percent in multiple settings.

NURSE PRACTITIONERS AS PRIMARY CARE PROVIDERS The percentage of Medicare beneficiaries having an NP as the primary care provider increased from 0.2 percent in 1998 to 2.9 percent in 2010, representing more than 450,000 Medicare beneficiaries in 2010. In 2010 the percentage of Medicare beneficiaries with NPs as primary care providers varied from 0.8 percent in Hawaii to 14.8 percent in Alaska (Exhibit 2). Exhibit 3 shows that the growth in NPs as primary care providers was greatest (from 0.6 percent in 1998 to 5.3 percent in 2010) in states that allowed NPs to practice and prescribe independently.

Exhibit 4 presents the results of analyses examining the association between the percentage of Medicare recipients with NPs as primary care providers and the degree of state regulations restricting NPs' practice. Data are shown for 2006 and 2010 from unadjusted analyses and from multilevel multivariable analyses adjusting for patient characteristics and the area supply of primary care physicians and physician assistants.

EXHIBIT 1

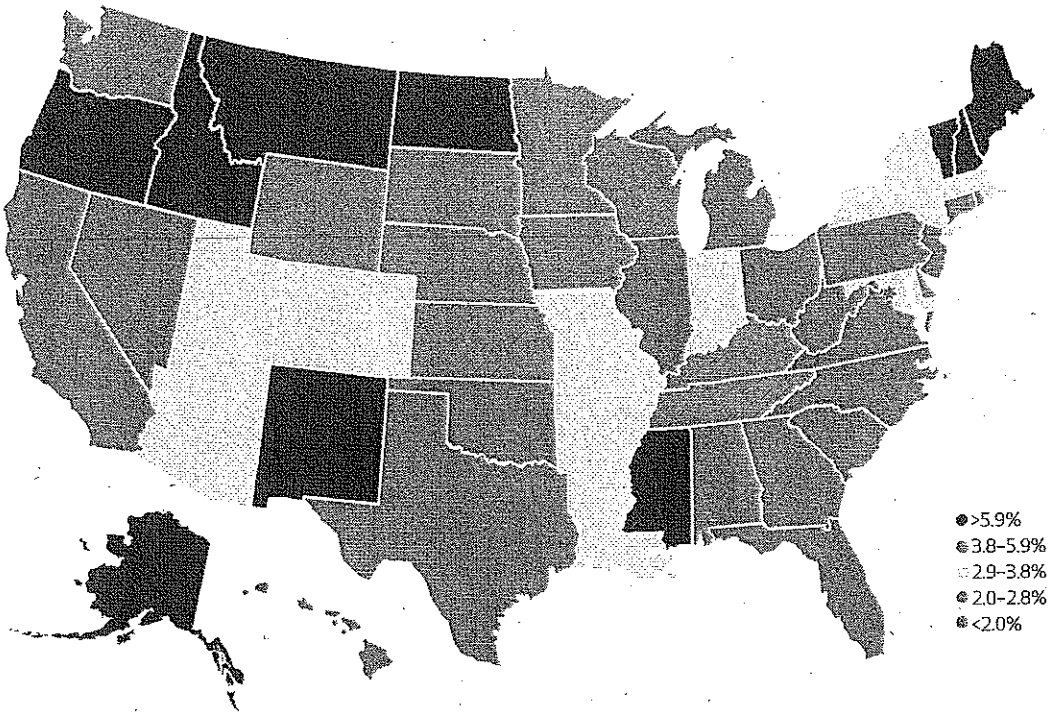
Percentage Of Community-Dwelling Medicare Patients Billed For Evaluation And Management Services By Nurse Practitioners, By Practice Setting, 1998–2010



SOURCE Authors' analysis of claims and enrollment data from a 5 percent national sample of Medicare beneficiaries.

EXHIBIT 2

Percentage Of Community-Dwelling Medicare Patients With Nurse Practitioners As Their Primary Care Providers, By State, 2010



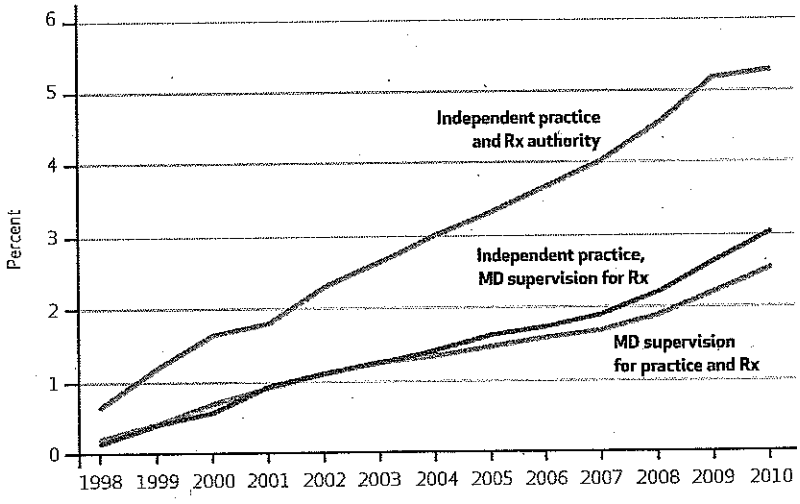
SOURCE Authors' analysis of claims and enrollment data from a 5 percent national sample of Medicare beneficiaries. **NOTE** Categories were based on quintiles; see details in text.

The unadjusted and adjusted results show a strong association between the percentage of patients with NPs as primary care providers and the degree of state restrictions. In both years there was more than 2.5-fold difference in the odds of having an NP as a primary care provider between the most and least restrictive states.

Several aspects of Exhibit 4 are worth noting. First, the percentage of patients with NPs as primary care providers increased significantly from 2006 to 2010, for every category of state regulation and every level of physician supply. Second, the supply of primary care physicians in a Hospital Service Area was inversely related to the odds of having an NP as a primary care provider. Third, patients living in counties with the lowest quartile of physician assistants were more likely than patients in other counties to have NPs as their primary care provider. Fourth, the amount of variation in having an NP as a primary care provider (measured as residual intraclass correlation coefficient) attributed to states was 9.5 percent after adjustment for patient and geographical characteristics in 2010; in other words, 9.5 percent of the

EXHIBIT 3

Percentage Of Community-Dwelling Medicare Patients With Nurse Practitioner As Their Primary Care Providers, By State Practice And Prescription Authority, 1998–2010



SOURCE Authors' analysis of claims and enrollment data from a 5 percent national sample of Medicare beneficiaries. **NOTE** Categorizations of state practice and prescription authority by years were based on annual legislative updates published in *The Nurse Practitioner* and summarized in Exhibit 2a in the online Appendix (see Note 15 in text).

EXHIBIT 4

Percentage Of Medicare Beneficiaries With Nurse Practitioners (NPs) As Their Primary Care Providers, As A Function Of State Laws Regulating NP Practice And Supply Of Primary Care Physicians And Physician Assistants

	2006			2010		
Characteristic	No. of patients	Percent of patients	Odds ratio	No. of patients	Percent of patients	Odds ratio
Total population	678,946	1.8	—	709,868	2.9	—
STATE REGULATIONS ON NP PRACTICE						
1 (least restrictive)	40,915	3.7	1.00	76,074	4.9	1.00
2	102,476	2.2	0.84	104,501	3.1	0.63
3	180,650	1.6	0.55[a]	192,785	3.0	0.64[a]
4	130,540	1.8	0.47[a]	167,897	2.8	0.60[a]
5 (most restrictive)	224,365	1.4	0.36[a]	168,431	2.1	0.40[a]
PRIMARY CARE PHYSICIANS PER 100,000 RESIDENTS IN HEALTH SERVICE AREA						
Quartile 1 (<48.6)	165,922	1.8	1.00	179,374	2.9	1.00
Quartile 2 (≥48.6 to <55.8)	167,678	1.6	0.93[a]	176,589	2.6	0.90[a]
Quartile 3 (≥55.8 to <64.8)	170,523	1.8	0.88[a]	174,834	2.9	0.86[a]
Quartile 4 (≥64.8)	173,558	2.0	0.76[a]	175,004	3.4	0.79[a]
PHYSICIAN ASSISTANTS PER 100,000 RESIDENTS IN COUNTY[b]						
Quartile 1	166,080	2.1	1.00	173,629	3.8	1.00
Quartile 2	167,417	1.4	0.83[a]	174,185	2.1	0.79[a]
Quartile 3	167,349	1.9	0.94	176,780	2.8	0.86[a]
Quartile 4	166,720	1.8	0.88[a]	172,906	3.0	0.83[a]

SOURCE Authors' analysis of claims and enrollment data from a 5 percent national sample of Medicare beneficiaries. **NOTES** Odds ratios were estimated by multilevel analyses adjusted for clustering within states. All percentages of Medicare recipients with NPs as their primary care providers were greater in 2010 than 2006 ($p < 0.05$). In 2006 the amount of variation (residual intraclass correlation coefficient, or residual ICC) in having an NP as the primary care provider attributed to states was 12.6 percent and 10.2 percent, without and with adjustment for state regulations, respectively. These models included all variables listed in Exhibit 4a in the Appendix (see Note 15 in text). In 2010 the amount of variation (residual ICC) attributed to states was 9.5 percent and 7.9 percent, respectively. See Exhibit 3a in the Appendix for a description of regulations. The variables of primary care physicians per 100,000 Health Service Area residents and physician assistants per 100,000 county residents had missing data ranging from 0.6 percent to 2.0 percent. The results for the unknown categories are not shown. [a]Odds ratio is significantly different from 1 at the 0.05 level. [b]Quartile designations were not the same in 2006 and 2010. They are provided in Exhibit 4a in the Appendix.

variation in having an NP as a primary care provider was explained by the state in which patients lived. State regulations mediated 16.8 percent of this variation. The full model for Exhibit 4 is in Exhibit 4a in the online Appendix,[15] including patient characteristics. Patient characteristics associated with an increased likelihood of having an NP as a primary care provider included younger age, female, non-Hispanic white ethnicity, higher level of comorbidity, and living in a lower-income and rural location.

The analyses presented in Exhibit 4 show a significant interaction between the degree of state regulation and the year of analysis ($p < 0.0001$). States with the least restrictive regulations had larger increases from 2006 to 2010 in the percentage of patients with NPs as primary care providers.

We repeated the analyses in Exhibit 4 using a more stringent definition of having an NP as a primary care provider: receipt of all generalist care from NPs, with no claims from generalist physicians during that year. Using this definition, 0.9 percent and 1.5 percent of patients received all of their primary care from NPs in 2006 and 2010, respectively. The association of degree of state regulations with having an NP as a primary care provider using this definition was slightly stronger than that shown in Exhibit 4 (odds ratio for category 5 of state regulation equaled 0.33 [95% confidence interval: 0.19, 0.59] in 2006 and 0.35 [95% confidence interval: 0.20, 0.61] in 2010).

We also assessed the association of state regulations with the number of nurse practitioners licensed to practice in each state in 2006 and 2010 (Exhibit 5a in the Appendix).[15] The increase in the number of NPs per 100,000 residents between 2006 and 2010 was greatest in states with the least restrictive regulations.

Discussion

Several factors contribute to the current and projected shortage of primary care providers in the United States. These include overall population growth, population aging, an expected large increase in the number of people with

health insurance, and a decade-long decrease in the number of medical school graduates choosing primary care as a career.[3,4] Increasing the role of NPs as primary care providers can be an important approach to increasing primary care capacity.[5–8]

The Institute of Medicine, building on a recommendation in its landmark 2001 report *Crossing the Quality Chasm*,[32] recommended liberalizing state laws regulating the practice of NPs in its 2010 report *The Future of Nursing*.[5] That report cited resistance by physician professional organizations, particularly state medical boards. It discussed a number of possible steps to make regulations more uniform across states, including attention by the Federal Trade Commission to anticompetitive practices by state medical boards and changing reimbursement policies by Medicare and Medicaid that promote subscribers' choice of provider types.

The past decade has seen a slow but steady trend toward liberalization of state regulations of NP practice.[16–30] One factor driving those changes is that increased availability of primary care providers may reduce overall health care costs.[2] For example, a 2009 RAND Corporation report commissioned by the State of Massachusetts estimated savings over ten years of $4–$8 billion if the state were to liberalize regulations to allow NPs and physician assistants to independently treat six common primary care conditions.[43]

THE AFFORDABLE CARE ACT The expanded Medicaid coverage in the Affordable Care Act will affect states differently, depending on their current eligibility requirements for Medicaid and their current supply of primary care providers.[44] States projected to experience the largest need for additional primary care providers include Oklahoma, Georgia, Texas, and Louisiana. In 2010 all of these states, except Oklahoma, were in the two most restrictive categories of regulations on NP practice.[13]

GROWTH AND STATE REGULATIONS The proportion of patients with an NP as the primary care provider and the number of licensed NPs increased most in states with the least restrictive regulations. In additional analyses not presented here, we further divided states into four categories based on whether or not they allowed independent practice and independent prescription authority. States with independent prescription authority had the greatest growth, regardless of the independence of other aspects of NP practice.

OTHER FACTORS A number of other factors partially explain the variation among states in the proportion of Medicare patients with NPs as primary care providers. These include the availability of primary care physicians and physician assistants; the size of urban areas and rural populations; and the race, ethnicity, and sex of the population. However, when those factors were controlled for, states' degree of regulation explained 16.8 percent of the variation in NP care at state level.

Physician assistants also serve as primary care providers, under physician supervision. However, fewer than half of them practice in primary care settings.[45] The association between state regulations and having an NP as the primary care provider changed minimally after adjustment for physician assistant supply, which is consistent with other studies.[40]

PROCESSES AND OUTCOMES Nurse practitioners undergo different training from general internal medicine or family medicine physicians. Previous trials have shown that NPs in community care settings have comparable outcomes to physicians.[46–51] However, those trials were conducted in controlled settings with limited patient populations. The comparative effectiveness of NPs versus physicians in primary care must be rigorously assessed in national population-based data.

Conclusion

The number of Medicare patients receiving care from nurse practitioners rose fifteenfold between 1998 and 2010. State regulations of the scope of NPs' practice, especially prescription authority, have a strong influence on the growth in numbers of NPs and patients receiving primary care from them. Modifying state regulations of NPs' practice is one path to expanding access to primary care. ■

2.5-fold

Difference

In both 2006 and 2010 there was more than a 2.5-fold difference in the odds of having an NP as a primary care provider between the most and least restrictive states.

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15 To access the Appendix, click on the Appendix link in the box to the right of the article online.

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SPECIAL ARTICLE

STATE PRACTICE ENVIRONMENTS AND THE SUPPLY OF PHYSICIAN ASSISTANTS, NURSE PRACTITIONERS, AND CERTIFIED NURSE-MIDWIVES

EDWARD S. SEKSCENSKI, M.P.H., STEPHANIE SANSOM, M.P.H., M.P.P., CAROL BAZELL, M.D., M.P.H., MARLA E. SALMON, SC.D., R.N., AND FITZHUGH MULLAN, M.D.

Abstract *Background.* Most proposals to increase access to primary care in the United States emphasize increasing the proportion of generalist physicians. Another approach is to increase the number of physician assistants, nurse practitioners, and certified nurse-midwives.

Methods. We analyzed variations in the regulation of nurse practitioners, physician assistants, and certified nurse-midwives in all 50 states and the District of Columbia. Using a 100-point scoring system, we assigned numerical values to specific characteristics of the practice environment in each state for each group of practitioners, awarding a maximum of 20 points for legal status, 40 points for reimbursement for services, and 40 points for the authority to write prescriptions. We calculated coefficients for the correlation of summary measures of these values within states with estimates of the supply of practitioners per 100,000 population.

Results. There was wide variation among states in both practice-environment scores and practitioner-to-population ratios for all three groups of practitioners. We found positive correlations within states between the supply of physician assistants, nurse practitioners, and certified nurse-midwives and the practice-environment score for the state (Spearman rank-correlation coefficients, 0.63 [$P<0.001$], 0.41 [$P = 0.003$], and 0.51 [$P<0.001$], respectively). Positive associations were also found in the states between the supply of generalist physicians and the supply of physician assistants ($r = 0.54$, $P<0.001$) and nurse practitioners ($r = 0.35$, $P = 0.014$). Nevertheless, in the 17 states with the greatest shortages of primary care physicians, favorable practice-environment scores were still associated with higher practitioner-to-population ratios for physician assistants ($r = 0.68$, $P = 0.003$), nurse practitioners ($r = 0.54$, $P = 0.026$), and certified nurse-midwives ($r = 0.42$, $P = 0.09$).

Conclusions. State regulation of physician assistants, nurse practitioners, and certified nurse-midwives varies widely. Favorable practice environments are strongly associated with a larger supply of these practitioners. (N Engl J Med 1994;331:1266-71.)

MOST proposals to increase access to primary care in the United States emphasize increasing the proportion of generalist physicians.[1-5] Another approach is to increase the number of other practitioners — specifically, physician assistants, nurse practitioners, and certified nurse-midwives.[6-9] Within their areas of competency, and with appropriate training and supervision, these practitioners may provide medical care similar in quality to that of physicians and at less cost.[10-15] These practitioners may be especially valuable in areas where there are shortages of primary care physicians. Yet state legislation and regulation may discourage or prevent them from seeking employment, even when jobs would otherwise be available. To understand the relation between states' practice environments and the supply of these practitioners, we analyzed variation in the regulation of nurse practitioners, physician assistants, and certified nurse-midwives in all 50 states and the District of Columbia (which, for the purposes of this analysis, we considered a state).

Although the education, licensure, and regulation of nurse practitioners and physician assistants differ, many have similar job descriptions.[16] They diagnose illness, perform physical examinations, order and interpret laboratory tests, establish and carry out treatment plans, suture wounds, and provide preventive health services. Each profession is about 25 years old in the United States. Physician assistants are salaried employees who by law must work under the supervision of a physician. Of the 22,300 physician assistants practicing in 1992, 44 percent worked in primary care specialties, and another 8 percent were in emergency medicine. The majority were educated in two-year training programs. About 34 percent of physician assistants worked in rural areas.[17]

In some states, nurse practitioners can establish independent practices and be reimbursed directly for their services. Because the states have no common definition of nurse practitioners, estimates of their number vary widely. Through 1992, about 42,600 employed registered nurses had received formal training as nurse practitioners beyond their professional education as nurses[18]; estimates of the number practicing as nurse practitioners ranged from 21,900[19] to 27,200.[20] The majority were educated in certificate programs averaging about one year in length; 4 of every 10 had master's degrees. About three quarters were in primary care. Eighteen percent of nurse practitioners worked outside metropolitan areas in 1992.[19]

Certified nurse-midwives are registered nurses with advanced education in the provision of prenatal, perinatal, postpartum, newborn, and routine gynecologic care. About 61 percent had master's degrees in 1991.[21] Since 1971, national certification as a nurse-midwife has required graduation from an accredited program for nurse-midwifery and the passing of an

From the Bureau of Health Professions, Health Resources and Services Administration, Department of Health and Human Services, Rockville, Md. Address reprint requests to Mr. Sekscenski at the Bureau of Health Professions, Health Resources and Services Administration, Rm. 8-47, 5600 Parklawn Dr., Rockville, MD 20857.

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examination administered by the American College of Nurse-Midwives. In 1992, 43 states recognized certified nurse-midwives in their statutes or regulations.[22] About half of all states allowed direct reimbursement for the services of a certified nurse-midwife. In 1992, between 3500 and 4300 certified nurse-midwives were eligible to practice in private offices, community health centers, free-standing birthing centers, and other health care settings[23] (and unpublished data). Certified nurse-midwives attended 4.1 percent of all deliveries in the United States in 1991.[24] Between 11 and 22 percent practiced in rural areas.[13,24]

Methods

Practice environments in the states were assessed by reviewing journal articles and legislation and by consulting with researchers, legal scholars, and professional organizations. In all jurisdictions, information was sought about conditions in 1992. Specific criteria are shown in Table 1.

A 100-point scoring system was constructed for each group; a maximum of 20 points was allocated if practitioners had legal status as professionals, 40 points if reimbursement for their services was required, and 40 points if they had the authority to write prescriptions. More weight was given to the second and third categories because the simple recognition of professional identity entailed in the conferring of legal status alone was considered less important; however, when equal weight was given to each of the three major categories, the results did not change substantially. Points were allocated within each category and then totaled. A score of 100 represented the most favorable environment, and a score of 0 the least favorable. The assessment was performed consistently for all the states in a given discipline, but the actual criteria for the disciplines varied because of professional and regulatory differences. Thus, comparison of scores between states is more appropriate within a discipline than between disciplines.

The practice environments for physician assistants were quantified primarily on the basis of information from the American Academy of Physician Assistants[25] and other published studies.[8,26] The practice environments for nurse practitioners were quantified on the basis of information from published studies.[15,27] The practice environments for certified nurse-midwives were quantified on the basis of information from the American College of Nurse-Midwives[23,28] and a survey by the Office of the Inspector General of the Department of Health and Human Services.[21] Supplemental information on all three groups of practitioners was obtained from the 1993 annual report of the Physician Payment Review Commission.[4]

Estimates of the supply of nonphysician practitioners in each state were obtained from various sources (Table 2). The estimates of 27,200 practicing nurse practitioners and 4300 certified nurse-midwives were the only available estimates that provided state-specific figures. The estimates of the number of physician assistants do not include federal employees. The supply of generalist physicians was estimated as the total number of nonfederal allopathic physicians actively involved in patient care who designated themselves as being in general practice, family practice, general internal medicine, or general pediatrics in the 1992 Area Resource File.[29] Practice-environment scores and estimates of the supply of practitioners were calculated independently. Data from the Bureau of the Census on state populations in 1992 were obtained from the American Medical Association.[30] Estimates of the percentage of each state's population that was living in areas designated as having a shortage of primary care were obtained from the Bureau of Primary Health Care of the Department of Health and Human Services.[31]

Because the practice-environment scores we developed had non-normal distributions, they were analyzed with nonparametric methods. States were ranked according to their practice-environment scores and the number of practitioners per 100,000 population (practitioner-to-population ratios). Rank-correlation coefficients were derived for pairs of individual practitioner-to-population ratios and practice-environment scores, according to the method of Spearman.[32]

We calculated partial correlation coefficients that compared the supply of nonphysician practitioners with that of generalist physicians, with control for the state population.[33] All P values are based on two-tailed tests.

Results

There was wide variation in both state practice-environment scores and practitioner-to-population ratios for all the groups of practitioners (Table 2, Fig. 1). For physician assistants, the practice-environment scores ranged from a high of 100 in the state of Washington to 0 in Mississippi. Twenty states had scores of 90 or higher; 14 had scores below 50. Practitioner-to-population ratios varied from a high of 24.6 physician assistants per 100,000 population in Maine to a low of 0.2 in Mississippi. Twenty-one states had 10 or more physician assistants for every 100,000 people, whereas 13 states had 5 or fewer.

Practice-environment scores for nurse practitioners ranged from 100 in Oregon to 14 in Ohio and Illinois. Twelve states scored 86 or above; 19 had scores below 50. The ratios of the number of nurse practitioners

Table 1. Scoring System Used to Quantify the Practice Environment in States in Regard to Physician Assistants, Nurse Practitioners, and Certified Nurse-Midwives.

Scoring Category	Physician Assistants	Nurse Practitioners	Certified Nurse-Midwives
Legal status (20 points)	License recognition, 5 points; scope of practice regulations, 0–5 points more; practice under physician's indirect supervision, additional 0–10 points.	License or title recognition, 6 points; scope of practice defined by board of nursing alone, 7 more points; no required supervision by physician, another 7 points.	License or title recognition, 10 points; regulation by board of nursing alone, additional 10 points.
Reimbursement (40 points)	Mandated payment, 30 points; payment for services under indirect supervision, 10 points more unless payment was less than that paid to physician, then percentage multiplied by 10, for 0–10 points.	Mandated payment, 20 points; services covered, another 0–10 points; percentage of physician fees paid by Medicaid (times 10), 0–10 points more.	Mandated payment, 20 points; types of maternity, perinatal, or family-planning services covered, additional 0–20 points.
Authority to prescribe (40 points)	Any authority to write prescriptions, 20 points; 0–20 more points based on absence of specific restrictions. (Limited authority to order medications in inpatient settings, 0–10 points.)	Continuum of points based on level of independence: no authority, 0 points; full authority without physician oversight, 40 points.	Three categories: no authority, 0 points; limited or restricted authority, 20 points; full authority, 40 points.

to members of the population also varied widely, from 37.2 per 100,000 in the District of Columbia to 2.7 per 100,000 in Nebraska. Twenty-six states had ratios of more than 10, including 10 above 20. In contrast, five states had ratios of 5 or fewer.

Table 2. Practitioner-to-Population Ratios and Practice-Environment Scores for Physician Assistants, Nurse Practitioners, and Certified Nurse-Midwives According to State, 1992.*

State	Physician Assistants†		Nurse Practitioners‡		Certified Nurse-Midwives§	
	Ratio	Score	Ratio	Score	Ratio	Score
Alabama	2.7	39	6.3	33	0.9	32
Alaska	20.8	90	30.5	93	6.4	84
Arizona	8.9	99	23.3	86	2.8	76
Arkansas	1.2	54	28.9	48	0.4	35
California	5.1	58	12.9	30	1.7	80
Colorado	11.0	80	16.2	59	3.2	50
Connecticut	15.3	87	20.1	58	3.2	93
Delaware	7.7	55	20.4	60	2.1	60
District of Columbia	5.9	92	37.2	53	4.7	60
Florida	8.2	48	14.9	68	2.3	98
Georgia	9.0	59	7.8	32	2.7	70
Hawaii	4.6	38	9.4	27	1.8	42
Idaho	5.7	89	8.1	46	0.8	54
Illinois	2.1	59	7.0	14	1.4	31
Indiana	2.4	37	7.4	34	0.4	25
Iowa	9.3	99	8.3	73	0.5	55
Kansas	10.6	87	7.4	52	0.4	68
Kentucky	6.2	42	6.0	78	1.4	68
Louisiana	2.2	37	3.8	20	0.4	37
Maine	24.6	94	21.5	42	2.6	90
Maryland	13.9	49	11.8	93	3.1	69
Massachusetts	8.9	83	18.3	68	3.5	57
Michigan	10.4	89	4.5	45	1.3	70
Minnesota	7.1	83	9.7	68	2.3	100
Mississippi	0.2	0	4.8	72	1.1	59
Missouri	2.0	39	9.6	63	0.5	27
Montana	7.3	98	16.0	98	1.2	98
Nebraska	13.0	93	2.7	46	0.1	50
Nevada	6.2	98	8.2	73	0.8	30
New Hampshire	12.7	95	22.9	95	4.0	70
New Jersey	2.3	37	5.0	65	2.1	54
New Mexico	10.4	94	17.0	62	4.6	78
New York	12.3	98	11.7	93	2.3	67
North Carolina	15.5	92	7.2	43	1.2	90
North Dakota	18.2	87	12.3	98	1.1	55
Ohio	4.5	51	7.8	14	0.9	60
Oklahoma	5.0	46	7.1	40	0.5	54
Oregon	5.3	99	21.3	100	4.1	80
Pennsylvania	11.5	86	10.8	66	1.5	34
Rhode Island	10.5	93	19.7	50	2.5	84
South Carolina	2.1	37	9.1	41	2.6	59
South Dakota	19.5	94	10.1	65	1.1	70
Tennessee	5.7	42	7.2	27	0.9	56
Texas	4.8	77	6.5	42	1.0	54
Utah	9.1	93	10.7	91	3.2	73
Vermont	12.7	86	17.3	68	5.1	57
Virginia	4.6	42	15.4	38	1.3	47
Washington	11.4	100	21.4	90	2.8	70
West Virginia	10.1	96	7.7	89	1.2	47
Wisconsin	12.3	95	7.5	67	1.0	62
Wyoming	12.5	97	11.0	94	0.7	80
Mean	8.7	72.8	12.7	60.2	2.0	62.1
Median	8.9	86.0	10.1	62.0	1.4	60.0
Standard deviation	5.3	25.3	7.4	23.8	1.4	19.2

*Practitioner-to-population ratios for each group of practitioners are based on estimates of the total supply of practitioners per 100,000 population in each state.

†Estimates of the supply of practicing nonfederal physician assistants were obtained from the American Academy of Physician Assistants,[17] with extrapolations for nonmembers. Federal employees are not included.

‡Estimates of the supply of practicing nurse practitioners were obtained from the study by Morgan.[20]

§Estimates of the supply of practicing certified nurse-midwives were calculated by the Division of Nursing of the Bureau of Health Professions on the basis of data from the American College of Nurse-Midwives.[23]

Practice-environment scores for certified nurse-midwives ranged from 100 in Minnesota to 25 in Indiana. Six states had scores of 90 or higher; 13 had scores of 50 or less. The number of certified nurse-midwives per 100,000 population was low in all the states, ranging from a high of 6.4 in Alaska to a low of 0.1 in Nebraska. Six states had practitioner-to-population ratios of 4 or above, and 14 had fewer than 1 certified nurse-midwife per 100,000 population.

With a few exceptions, states that had favorable practice-environment scores for one group of practitioners also had favorable scores for the other two groups. States with more favorable practice-environment scores were clustered in the West and Northwest; several states with less favorable scores were in the Southeast.

Among states with generally unfavorable practice environments, the lack of authority to write prescriptions was an important contributor to low scores for all groups. For example, 16 of the 17 states with the lowest practice-environment scores for physician assistants prohibited these practitioners from writing prescriptions, as did 11 of the 17 states with the lowest scores for certified nurse-midwives and 9 of the 17 with the lowest scores for nurse practitioners.

Reimbursement was an important factor in the practice-environment scores for nurse practitioners, but it was somewhat less important for physician assistants, who, as salaried employees, are not reimbursed directly for their services, and for certified nurse-midwives. Of the 17 states with the least favorable practice environments for nurse practitioners, 4 had a score of 0 on the reimbursement scale, and none scored higher than 20 out of a possible 40 points.

Correlations among Groups of Practitioners

We found significant positive correlations for all three groups of practitioners between favorable state practice-environment scores and higher practitioner-to-population ratios (Table 3). Positive associations were also found in the states between the supply of physician assistants and the practice-environment score of nurse practitioners and between the supply of nurse practitioners and the practice-environment score of physician assistants (Table 3). This suggests that in most instances a greater supply of practitioners in one group was not associated with barriers to practice for the other. We examined the possibility that the supply of physician assistants, nurse practitioners, and certified nurse-midwives in a particular state depends on educational opportunities for these practitioners. We analyzed the supply of each group of practitioners in relation to the number of accredited schools in the states in 1992. The results were inconclusive (data not shown). Although several states with schools had a higher-than-average supply of practitioners of the discipline in question, no overall correlation was found between the state-specific supply of practitioners and the number of accredited schools for any group.

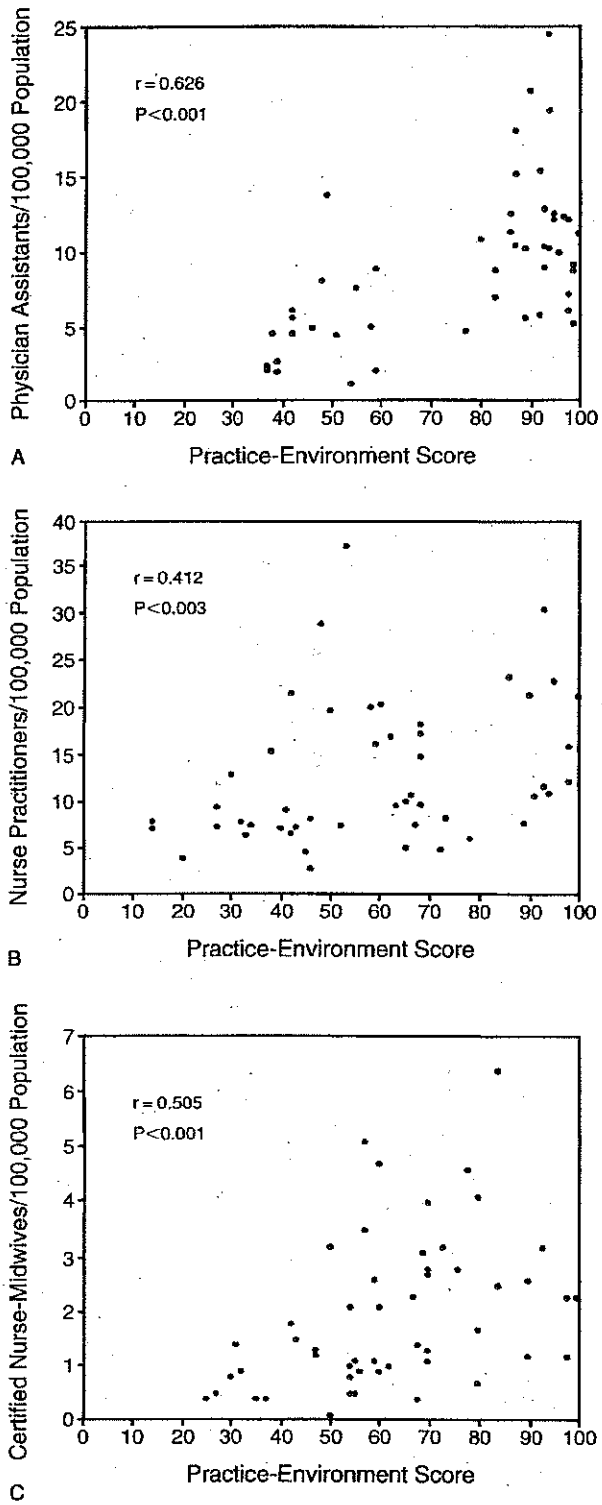

Figure 1. Correlation of the Practitioner-to-Population Ratio with the Practice-Environment Score for Three Groups of Practitioners in Each of the 50 States and the District of Columbia, 1992.

The numbers of practicing, nonfederally employed physician assistants (Panel A), nurse practitioners (Panel B), and licensed, certified nurse-midwives (Panel C) per 100,000 population are shown, with Spearman rank-correlation coefficients and P values for the correlations.

To examine the potential effect of competition between physicians and either physician assistants or nurse practitioners, we compared the supply of each group of practitioners with that of generalist physicians in the state. (Certified nurse-midwives were excluded from this analysis because of their relatively small numbers; federally employed physicians were also excluded.) We found significant positive relations between the supply of each group of practitioners and the supply of allopathic generalist physicians (with residents in graduate medical training excluded) after controlling for state population (Table 4). In most states, a greater number of physician assistants and nurse practitioners did not appear to be associated with a lesser supply of generalist physicians.

We found a positive correlation in the states between the supply of physician assistants and the number of resident physicians in graduate medical training, suggesting that a disproportionate number of physician assistants may be employed in teaching hospitals (Table 4). No comparable relation was apparent between the supply of nurse practitioners and the number of resident physicians in the states.

Some studies suggest that competition between physicians and nonphysicians has triggered the creation of barriers to practice for nonphysician practitioners in some states.[15,34] We therefore compared the supply of generalist physicians in the states with the practice-environment scores for nurse practitioners and physician assistants. No associations were found between the practice-environment scores for either group of practitioners and the supply of generalist physicians, whether resident physicians were included or excluded from the analysis.

Areas with Shortages of Primary Care Physicians

An adequate supply of physician assistants, nurse practitioners, and certified nurse-midwives may be particularly important in areas lacking sufficient numbers of primary care physicians. We repeated some of our analyses for the 17 states with the highest proportions of people living in areas designated as having a shortage of primary care in 1992 (Table 3). These proportions ranged from 11.6 percent of people in North Carolina to 25.0 percent in North Dakota. Three quarters of these areas with primary care shortages were rural. Nonphysician practitioners are not counted in the formula used by the federal government to characterize these areas.[31]

In the 17 states, favorable practice-environment scores for physician assistants and nurse practitioners were associated with practitioner-to-population ratios significantly above the national average (Table 3). For certified nurse-midwives there was a similar trend ($P = 0.09$). The nine states with practice-environment scores of 90 or higher for physician assistants had an average ratio of 13.4 physician assistants per 100,000 people, as compared with 1.8 in the states with scores of 40 or less. The four states with practice-environ-

ment scores of 90 or higher for nurse practitioners had an average of 17.5 nurse practitioners per 100,000 people, as compared with 6.4 in the five states with scores of 40 or less. For certified nurse-midwives, the ratios were 1.2 per 100,000 for the two states with scores of 90 or higher, and 0.8 per 100,000 for the four states with scores of 40 or less.

Discussion

Favorable state practice environments for physician assistants, nurse practitioners, and certified nurse-midwives were strongly associated with a greater supply of these practitioners. States with less favorable practice environments had fewer such practitioners for every 100,000 people. In general, practice environments within a state were consistently favorable or unfavorable for all three groups. Inability or limited ability to write prescriptions was a major factor in lowering practice-environment scores for all three groups. Reimbursement issues were important in lowering the scores for nurse practitioners, but they were of lesser importance for physician assistants and certified nurse-midwives.

Table 3. Rank-Correlation Coefficients and P Values for Practitioner-to-Population Ratios and Practice-Environment Scores for All States and for the 17 States with the Largest Proportions of People Living in Areas with a Shortage of Primary Care Physicians.*

Measures Compared	All States and D.C. (N = 51)		Shortage Areas (N = 17)	
	Coefficient	P value	Coefficient	P value
Ratios and scores within group				
Physician assistants	0.626	<0.001	0.681	0.003
Nurse practitioners	0.412	0.003	0.538	0.026
Certified nurse-midwives	0.505	<0.001	0.424	0.090
First-practitioner ratio and second-practitioner score†				
Physician assistants and nurse practitioners	0.452	0.001	0.513	0.035
Physician assistants and certified nurse-midwives	0.502	<0.001	0.623	0.008
Nurse practitioners and physician assistants	0.416	0.002	0.493	0.044
Nurse practitioners and certified nurse-midwives	0.417	0.002	0.442	0.076
Certified nurse-midwives and physician assistants	0.226	0.110	0.219	0.398
First-practitioner score and second-practitioner score‡				
Physician assistants and nurse practitioners	0.570	<0.001	0.593	0.012
Nurse practitioners and certified nurse-midwives	0.357	0.010	0.512	0.036
Physician assistants and certified nurse-midwives	0.432	0.002	0.602	0.011

*Spearman rank-correlation coefficients are shown. Shortage areas were determined on the basis of the percentage of each state's population that was living in areas with a designated shortage of health professionals in September 1992, according to the Bureau of Primary Health Care.[31] The 17 states with the highest percentages of people residing in such areas were North Dakota (25.0 percent), Mississippi (24.3), South Dakota (22.4), New Mexico (21.9), Idaho (19.6), Wyoming (19.5), Louisiana (19.1), West Virginia (19.1), South Carolina (18.4), Alabama (16.8), Alaska (14.0), Montana (13.5), Arkansas (13.5), Georgia (13.5), the District of Columbia (D.C.) (12.0), Illinois (11.9), and North Carolina (11.6).

†Indicates that the ratio for the first group listed is compared with the score for the second group.

‡Indicates that the score for the first group listed is compared with the score for the second group.

Table 4. Partial Correlation Coefficients and P Values for the Comparison of Estimates of the Supply of Physician Assistants and Nurse Practitioners with That of Generalist Physicians and Residents in the 50 States and the District of Columbia, with Control for State Population, 1992.*

Groups Compared	Nonresident Generalist Physicians†		All Allopathic Resident Physicians‡	
	r	P value	r	P value
Physicians and physician assistants	0.539	<0.001	0.583	<0.001
Physicians and nurse practitioners	0.347	0.014	−0.033	NS

*First-order partial correlation coefficients with population held constant are shown. NS denotes not significant.

†Includes all allopathic physicians in general practice, family practice, general internal medicine, or general pediatrics, excluding federal employees, according to the Bureau of Health Professions.[29]

‡Includes all allopathic residents and fellows in all specialties in 1992, according to the Association of American Medical Colleges.[30]

Our findings do not support the hypothesis that a larger supply of generalist physicians in a state is associated with a less favorable practice environment for nonphysician practitioners. Indeed, we found that the supplies of generalist physicians, physician assistants, and nurse practitioners within states were positively associated. However, states with documented shortages of primary care physicians that had environments favorable to physician assistants and nurse practitioners had more such practitioners than the national average.

Factors other than those we identified affect the practice environment for nonphysicians at the state level. For example, acceptance as professionals by physicians (including the extension of hospital admitting privileges and professional collaboration), inclusion in the terms of private and corporate health insurance policies, ability to obtain malpractice insurance, and acceptance by the public are probably important determinants of the supply of practitioners at the community, regional, and state levels. In addition, because our analysis applied to only one short period, we could not determine whether the greater supply of nonphysician practitioners preceded the removal of barriers to practice, or the reverse.

Our study demonstrates that regulation by the states of physician assistants, nurse practitioners, and certified nurse-midwives varies widely. These findings may help state legislators and regulators reduce specific barriers to practice and thus make these practitioners more available to patients.

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Research Article

State-Granted Practice Authority: Do Nurse Practitioners Vote with Their Feet?

John J. Perry

Economics Program, Centre College, 600 West Walnut Street, Danville, KY 40422, USA

Correspondence should be addressed to John J. Perry, john.perry@centre.edu

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Nurse practitioners have become an increasingly important part of the US medical workforce as they have gained greater practice authority through state-level regulatory changes. This study investigates one labor market impact of this large change in nurse practitioner regulation. Using data from the National Sample Survey of Registered Nurses and a dataset of state-level nurse practitioner prescribing authority, a multivariate estimation is performed analysing the impact of greater practice authority on the probability of a nurse practitioner moving from a state. The empirical results indicate that nurse practitioners in states that grant expanded practice are less likely to move from the state than nurse practitioners in states that have not granted expanded practice authority. The estimated effect is robust and is statistically and economically meaningful. This finding is in concert with and strengthens the wider literature which finds states that grant expanded practice authority to nurse practitioners tend to have larger nurse practitioner populations.

1. Introduction

Nurse practitioners (NPs) are, according to the International Council of Nurses, "a registered nurse who has acquired the expert knowledge base, complex decision-making skills, and clinical competencies for expanded practice, the characteristics of which are shaped by the context and/or country in which s/he is credentialed to practice" [1]. In the United States, NPs are typically masters-prepared registered nurses and have become an increasingly important part of the health care system. They have over time obtained greater practice authority through state-level regulatory changes which has fundamentally altered what an NP can do as a caregiver. This has, in turn, altered their role in the health care system. In particular, these changes have allowed NPs to take a more central, independent role in providing health care. While NPs were initially seen as "physician extenders" by the wider health care industry in the United States, they have become, in many respects, "physician replacers." Today, in most U.S. states, NPs can see, diagnose, prescribe, and in general provide care for patients as a general practice physician would. As such, these regulatory changes in practice authority, and the "rise" of the NP they have ushered in, have fundamentally changed the NP labor market.

As would be expected in an industry as important as health care, the "rise of the NP" has been accompanied by a large body of research. In general, this research can be grouped into four broad categories: their rise as caregivers, the cost and quality of NP care, NP populations, and NP labor market outcomes.

The first body of research details the NP's rise as a primary caregiver. This body, of work traces the origins of the NP in the U.S., their history, and the current role of NPs in the health U.S. care industry [2–6].

The second and the largest and most active line in the literature investigates the quality and cost of care NPs provide. A primary finding that can be drawn from this literature is that care provided by NPs is nearly outcome-indistinguishable to that of physicians [7–12]. In addition, the research shows that care provided by NPs tends to receive at least as high patient satisfaction ratings as that of physicians [13–15]. This branch of the literature also gives compelling evidence that beyond providing quality care, NP care is also cost effective [16, 17].

A third branch of the literature, and one that is directly pertinent to this research, examines how regulatory changes to NP practice authority have impacted total NP populations in states. Sekscenski et al. [18] found, using an index measure of state-level practice authority granted to NPs, states which granted greater practice authority tended to have larger populations of NPs than those that did not. The United States Department of Health and Human Services [6], expanding on Sekscenski et al., also found that the level of practice authority granted was correlated with increased NP populations. Kalist and Spurr [19], using a regression framework, found that states that had granted NPs greater practice authority had larger enrolments in masters nursing programs, all else equal.

The fourth and smallest branch of the literature on NPs examines the impact of regulatory changes in NP practice authority on their own labor market outcomes. Dueker et al. [20] made an early contribution to this literature and found the unintuitive result that greater practice authority leads NPs to have lower incomes. Perry [21], using a richer data set in which NPs can be specifically identified, a shortcoming of Dueker et al. work, finds that NPs who are granted greater practice authority experience significant increases in their incomes relative to NPs who are not granted greater practice authority.

The current project sits at the nexus of the third and fourth bodies of literature. No research that the author is aware has taken a broad, microlevel approach and examined individual NP location responses to state-level regulation. This research does just that by examining the impact of state-granted practice authority on individual NP migration choices.

Using a national sample of NPs spanning 1991 to 2003, a period of significant state-level change in NP regulation, this paper finds that NPs do "vote with their feet." In specific, an NP in a state that has granted greater practice authority to NPs is less likely to move from the state than otherwise. This result is in concert with—and helps explain—the larger macrolevel literature that practice authority expansions are associated with greater NP populations in a state as well as the research on the economic impact to NPs of authority expansions.

2. Methods

There are many reasons an NP could choose to move from one state to another. Since the work an NP is allowed to perform is governed by the authority a state grants, it is reasonable to expect the level of practice granted by a state would impact any move decision, even if at the margin. If practice authority is important, one would expect to see NPs "vote with their feet," all else equal. If practice authority is not substantially important, NP moves would not be responsive and move rates would be largely unaffected by changes in state-level practice authority. In either case, the question is an empirical one and policy is directly informed.

A straightforward empirical model that estimates the impact of expanded practice authority on a NP's likelihood to move while controlling for other confounding factors is as follows:

$$P(\text{move}_{i,s,t} = 1 \mid \text{controls}) = \alpha + \text{NPAuthority}_{s,t} * \beta + X_{i,s,t} * \partial + \eta_s + \theta_t + u_{i,s,t}, \quad (1)$$

where move is a dichotomous variable that equals "1" if the ith NP moves from state s in year t and "0" otherwise. NPAuthority is a measure of NP practice authority in a state, equal to "1" if the authority is present in state s in year t and "0" otherwise. X is a matrix of personal characteristics of the ith NP in state s in year t. θ_t is a vector of year dummies to control for year-specific differences and η_s is a vector of state fixed effects.

Equation (1) is estimated both as an Ordinary Least Squares linear probability model and a probit model where the dependent variable is set to zero if the NP did not move and one if the NP moved from one state to another.

The data used in the analysis comes from two sources. The first is the National Sample Survey of Registered Nurses (NSSRN). The NSSRN is a probability sample of the universe of Registered Nurses (RN) in the United States and is conducted every four years by the U.S. Department of Health and Human Services. While the focus of the survey is the RN population, NPs are included and identifiable in the data. The NSSRN observation level is the individual and contains a variety of demographic, geographic, and professional variables. The NSSRN sample years included in this research are 2004, 2000, 1996, and 1992 which corresponds nicely to a large wave of change in state-granted NP practice authority.

Critical to this study, the NSSRN has information on the state the NP lived in during the year of the survey as well as where the NP lived the *previous* year. While the combined NSSRN data is a repeated cross-section, the questions about where the NP lived in the year of the survey and where the NP lived the year prior provides the opportunity to "see" where an individual lived in two contiguous years. This yields a unique opportunity to "see" an individual NP move or, just as important, not move. A total of 4,103 NPs are included in the sample aged from 26 to 64. Table 1 provides summary statistics for the sample.

With data on location and demographics of individual NPs, some measure of state-level practice authority is needed. This study follows the larger literature on NPs and uses the level of prescriptive authority granted as a general measure of NP practice authority a state grants. Specifically, whether or not a state grants NPs some level of controlled substance prescriptive authority is used.

While controlled substance prescriptive authority is an admittedly imperfect measure of NP authority, it is a widely used component of practice authority in the literature [18, 19, 21]. It also, in a single measure, provides an intuitive and tractable measure of the authority an NP enjoys in a state.

A by year, by state database of state regulation on controlled substance authority for NPs was compiled by the author through a review of the annual "Legislative Update" of the journal *Nurse Practitioner* by Pearson [22–25] and

Table 1: Sample summary statistics.

Variable	Mean	Std. dev.	Min	Max
Move	0.065	0.247	0	1
NPs have controlled substance prescriptive authority	0.684	0.465	0	1
Married	0.734	0.442	0	1
Male	0.051	0.220	0	1
White	0.891	0.312	0	1
Child at home	0.394	0.489	0	1
Age	44.549	8.624	26	64

$n = 4103$.
Years: 1992, 1996, 2000, and 2004.

Table 2: Number and percent of states granting NPs controlled substance prescriptive authority.

Year	States	Percent
2003	45	88%
1999	37	73%
1995	29	57%
1991	15	30%

supplemented with research of individual state statues. This data was used to create a dichotomous variable that was equal to one if the state allowed NPs some level of controlled substance prescriptive authority and zero if it did not for each year.

Table 2 provides a snapshot of the number and percent of states authorizing NPs to prescribe controlled substances by year, from 1991 to 2003. As can be seen from Table 2, there was a significant change in the proportion of states that authorized NPs to have controlled substance authority. This variation in state practice authority makes the time period ideal to investigate.

3. Results

The results of the regression estimations can be found in Table 3. For the probit estimation, the marginal effects are reported since probit coefficient estimates are not directly interpretable. The interpretation of the marginal effect coefficient is the change in the probability of a move for an NP with the sample mean characteristics if there is a one unit change the independent variable in question.

All of the demographic variable coefficients are in line with expectations and most are statistically significant. Of most interest is that the estimated impact of state practice authority is negative and significantly different than zero at conventional significance levels. This is true for both the linear probability model and the probit model which provides some robustness check.

The interpretation is that an NP is less likely to move from a state that has granted expanded prescriptive authority than if the state had not, controlling for other influences. Not only is the effect statistically significant, it is also material. The point estimate from both estimates is approximately -0.03. This implies that if a state has granted NPs expanded prescriptive authority, the probability of an average NP moving from the state falls by roughly three percentage points. Considering that on average about 6.5% of NPs in the sample moved in a given year, a state authorizing expanded authority to NPs leads to a reduction in the probability of moving of around 46%. This implies that the level of authority a state grants to NPs is meaningful to NP locational decisions.

It is also informative that the estimation results are robust to changes in specification and sample. The estimated results are materially unchanged when age restrictions and/or demographic variables are changed or omitted. The robustness of the empirical estimates provides some assurance that the effect of NP expanded prescriptive authority being measured is real.

There are weaknesses in the current research that should be acknowledged. Of particular note, while the NSSRN has high level of detail on an individual NP, the information is for the specific survey year. For example, the 2004 NSSRN data asks the respondent about the status in 2004 of most variables, such as income and marital status. Since the NSSRN asks where the NP was in the previous year, the the data allows us to "see" what state the NP lived in 2003 which in turn allows us to see an NP move. Unfortunately, we do not "see" many other variables of note in 2003. This limits the controls that can be included in the regression. Most of the independent control variables that were included are variables that can be known or inferred from year to year (sex, age, race). Marital status and whether the NP has a child at home were also included in the final specifications even though they are reported only in the current year and not the previous year. That the coefficient estimates are as expected and the model is robust to whether these demographic variables are included are not provides some reassurance that the measured impact of NP authority is valid and not adversely impacted.

There is also the limitation as to the measure of state practice authority. Whether or not a state allows NPs to prescribe controlled substances was the measure employed but there are a number of reasonable approaches to measuring a state's practice environment. However, there is no definitive measure. The current measure is commonly used in the literature as well as intuitive, tractable and represents a clear measure of difference between states as to what NPs are

Table 3: NP's move regression selected results.

	OLS		Probit	
	Coef.	Std. Err.	Coef.~	Std. Err.
NPs have controlled substance prescriptive authority	−0.030*	0.014	−0.032*	0.017
Married	−0.026*	0.010	0.024*	0.009
Male	0.060*	0.023	0.060*	0.023
White	0.003	0.013	0.002	0.011
Age	−0.015*	0.005	−0.011*	0.003
Age squared	0.000*	0.000	0.000*	0.000
Child at home	−0.028*	0.010	−0.024*	0.008

*Significant at 5% level.
~Probit coefficient estimates are reported as marginal effects for comparison purposes.
Note: NPs between 26 and 64 are included. Year and state fixed effects are incorporated. Standard errors are robust.

authorized to do as caregivers. It is not, however, a perfect measure of NP authority.

4. Conclusion

This research provides the first broad, microlevel analysis of the impact of state-regulated practice authority changes on individual NPs' migration choices. The core finding is that an NP in a state that has granted expanded practice authority as measured through controlled substance prescriptive authority is less likely to move than if the state had not granted such authority. This finding is robust to specification and estimation technique.

This finding is in line with the macrolevel literature that finds a positive correlation between expanded practice authority and NP populations. In fact, it strengthens the macrolevel literature by providing a likely mechanism for which populations of NPs can change between states in response to state-level regulatory changes. Coupled with the research literature on quality and cost of care, which generally finds NPs provide care clinically similar to same-level physician-provided care, the results are informative to policy makers interested in the effects of regulatory changes on NP practice authority on the health care industry. This research also suggests that for regulated occupations, which include nearly all medical occupations, regulation changes of practice authority can materially impact individual behaviour.

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The Effect of State Laws on the Supply of Advanced Practice Nurses

DAVID E. KALIST

Visiting Assistant Professor in the Department of Economics, Oakland University, Detroit, Michigan 48202

STEPHEN J. SPURR sspurr@wayne.edu.

Professor in the Department of Economics, Wayne State University, Detroit, Michigan 48202

This paper considers how the decision to enter advanced practice nursing (e.g., the occupations of nurse practitioner, certified nurse-midwife, nurse anesthetist, and clinical nurse specialist) is affected by State laws on the scope of practice of APNs. We find that enrollments in APN programs are 30 percent higher in States where APNs have a high level of professional independence. Our work differs from previous studies by estimating a fixed effects model on cross-sectional and time series data, to avoid problems of endogeneity of State laws.

Keywords: occupational regulation, nursing, labor supply

JEL classification: I1, J4, K3

1. Introduction

The purpose of this paper is to analyze the decision to enter the occupations collectively known as "advanced practice nursing." These are the occupations of nurse practitioner, certified nurse-midwife, certified registered nurse anesthetist, and clinical nurse specialist. In order to enter one of these nursing specialties, a registered nurse must complete a master's degree program, and may also be required to complete a period of clinical practice.

These health care providers are of special interest because there is a considerable overlap between their responsibilities and those of physicians in corresponding areas of medical practice. At the same time, their earnings, and the cost of their education, are much lower than those of physicians. If the quality of their services is comparable, they represent a low-cost alternative to physicians. In recent years a number of States, in an effort to reduce costs and increase access to care in "underserved" areas, have liberalized their scope of practice laws, by allowing advanced practice nurses ("APNs") to practice without physician supervision, recognizing their legal status as independent professionals, and giving them broad authority to write prescriptions.

Address correspondence to: Stephen J. Spurr, Department of Economics, 2115 F.A.B.,Wayne State University, Detroit, Michigan 48202.

A principal objective of this paper is to determine whether, and if so, how, legislation on the scope of practice of APNs affects entry into advanced practice nursing. We would like to determine whether there is an increase in supply of APNs in States that liberalize their scope of practice laws. Our hypothesis is that legislation granting greater professional autonomy to APNs makes this profession more attractive to potential entrants, and increases the enrollment in master's degree nursing programs.

As previously suggested, the issue is important, since if an APN is not available, most of the services she would have provided will have to be performed by a physician. Other things equal, assigning a physician to a task that could be done equally well by an APN involves a substantial marginal social cost, represented by the resources invested in the additional years of training of the physician (generally three or four years).

There is continuing controversy and political struggle over what the boundaries of practice between APNs and physicians should be; for example, the question whether the certified registered nurse anesthetist should be allowed to provide anesthesia in high-risk cases without supervision by an anesthesiologist, or whether the certified nurse midwife should be allowed to do a breached delivery.

Some have argued that the primary purpose of certification and licensing requirements is to restrict competition, rather than maintain an acceptable level of care quality. In a comprehensive survey, Gaumer (1984) states that

> "Research evidence does not inspire confidence that the wide-ranging systems for regulating health professionals have served the public interest . . . tighter controls do not lead to improvements in quality of service."

Paul (1984) argues that physicians were initially regulated to prevent entry into the profession and provide higher incomes to those already in practice, in accordance with the capture hypothesis of the economic theory of regulation (Stigler, 1971; Peltzman, 1976). He rejected the notion that physician regulation was driven by the public's demand for minimum quality standards.

To the extent that regulations create barriers to entry and restrict competition among providers, the quality-adjusted cost of health care will increase. In an era of cost containment, there has been an effort to increase the number of providers such as physicians in primary care, physician assistants, and APNs.[1]

The American Nurses Association argues that APNs can perform 60 to 80 percent of the primary and preventative care traditionally performed by physicians, at a substantially lower cost.[2] The turf battle between anesthesiologists and certified registered nurse anesthetists is especially contentious (Kalist, Molinari and Spurr, 2002). Nurse anesthetists have filed antitrust actions challenging contracts between anesthesiologist groups and hospitals as exclusive dealing or tying arrangements. There are similar conflicts between primary care physicians and nurse practitioners, and obstetrician/gynecologists and certified nurse-midwives.

The paper is organized as follows: Section 2 presents a brief review of the literature. Section 3 describes the data and econometric specification. Section 4 reports the empirical results, and Section 5 concludes.

2. Literature Review

While there are numerous studies of school enrollment, many of them are based on data that vary over time but not over a cross-section. For example, the pioneering work of Freeman (1971, 1972, 1975a, 1975b) used time-series data to analyze school admissions in a number of different fields: law, physics, psychology, mathematics, engineering, accounting, graduate business school, chemistry, and doctoral programs in general. The problem with an analysis based only on time-series is that if two or more factors affecting the demand for schooling change in the same year, it is difficult to determine which one caused the change in enrollment, even after controlling for other variables. Moreover, many of these studies were based on small samples that precluded a detailed econometric specification. We have avoided these problems by combining cross-sectional and time-series data. The use of fixed effects for States and years mitigates the problem of omitted variables by accounting for unobserved State heterogeneity and for national changes[3] that affected the decision to enter an advanced practice nursing program.

Sekscenski et al. (1994) estimate a number of correlations, and find that States with rules favorable to the professional independence of nurse practitioners and certified nurse midwives have more of these providers on a per capita basis. Similarly, Declerq et al. (1998) find a positive correlation between the supply of certified nurse-midwives and a measure indicating how much the State regulatory environment supports these providers in terms of their rights to be reimbursed, their authority to write prescriptions, hospital admitting privileges, and the like.

The aforementioned studies suggest, but do not prove, that a State can increase the supply of APNs by adopting more favorable rules on scope of practice. Since these studies are strictly cross-sectional, and do not control for other factors by using multiple regression analysis, they cannot determine whether a large supply of APNs leads to favorable legislation, or favorable legislation encourages entry into the profession. To avoid these endogeneity problems we use cross-sectional time-series analysis, which allows us to examine how nursing enrollments changed over time in States that amended their scope of practice laws.

Changes in enrollment in APN programs should provide an excellent approximation of the supply curve, when the lag between enrollment and graduation is taken into account. In principle, the response to changing wages or future prospects of APNs could include decisions by practicing APNs to work more or less, or retire sooner or later, etc., but in the aggregate these adjustments are likely to be much less elastic than the decision whether to enroll in a master's degree program. Most if not all of the supply response should be captured by changes in enrollment.

Dueker et al. (2002) found that the earnings of APNs are lower in States where they have greater professional autonomy. Their finding is consistent with the idea that the supply of APNs increases when a State adopts regulation favorable to their professional independence. However Dueker et al. suggested another possible reason for the decline in earnings: physicians may respond to such regulation by hiring physician's assistants (who are not nurses) instead of APNs. Unlike APNs, physician's assistants cannot work independently of physicians and thus do not pose the same competitive threat.

3. Data and Econometric Specification

Data on the State regulation of APNs are from January issues (1989–1995) of *The Nurse Practitioner.* Every year this journal publishes a report that classifies the laws of each State in terms of (1) how much authority an APN has to write prescriptions, and (2) the extent of an APN's general professional independence. We have used this report to construct variables that divide States into categories of high and low prescription authority, and high and low levels of professional independence. In States with high prescription authority, APNs can prescribe any drug, including controlled substances, although the State may require some degree of physician involvement in writing the prescription. In States with low prescription authority, APNs cannot prescribe controlled substances. In States with a high level of professional independence, the State formally recognizes the position of an APN, the Board of Nursing is the sole authority on the scope of nursing practice, and there are no requirements for physician collaboration or supervision. In States with a lower level of independence, there is either a requirement of physician supervision, or the Board of Medicine has a role in determining the scope of nursing practice. We use dummy variables to control for these characteristics of State law, to determine whether greater professional autonomy is associated with increased entry into master's degree programs in nursing.

Table 1 provides a breakdown of state laws on professional independence and prescription authority from 1989 through 1995. The table shows that the professional stature of APNs has increased over time; indeed, no State has passed more restrictive laws. There is also a clear trend to give APNs more prescription authority. While in 1989 APNs had a high level of prescription authority in only 16 states, by 1995 they did in 33 States. During this period the number of States in which APNs had a high level of general professional independence increased from 17 to 20, and the number in which APNs had high levels of both attributes increased from 6 to 16.[4]

The dependent variable is the number enrolled each year in master's degree nursing programs in the State. These data are taken from the *Data Review* and *Data Book* that was published by the National League for Nursing (NLN) until 1995.[5]

From 1989 to 1995, the total enrollment in master's degree programs in nursing increased from 22,587 to 35,707, an increase of 58 percent.[6] While there was a general increase in

Table 1. State laws on professional independence and prescription authority.

Number of States with	1989	1990	1991	1992	1993	1994	1995
High-professional independence	17	17	17	18	18	19	20
High-prescription authority	16	18	20	23	26	27	33
High prof.-independence & prescription authority	6	7	8	10	11	12	16

Notes: In States with a high level of professional independence, the State formally recognizes the position of an APN, the Board of Nursing is the sole authority on the scope of nursing practice, and there are no requirements for physician collaboration or supervision. In States with high prescription authority, APNs can prescribe any drug, including controlled substances, although the State may require some degree of physician involvement in writing the prescription.

enrollment in graduate and professional schools during this period, the increase in enrollment in APN programs was still 40 percent relative to this increase.[7]

One might question whether it is advisable to combine enrollments of the programs for nurse practitioners, certified nurse-midwives, certified registered nurse anesthetists, and clinical nurse specialists. We believe it is appropriate to do so, since (as explained below) the variables in our data set were constructed to measure the extent of professional independence and prescription authority of all APNs aggregated together; moreover, the great majority of State statutes and regulations in these areas apply equally to all APNs, not just to one group such as certified nurse-midwives. It could be argued that changes in prescription authority are likely to have a greater-than-average impact on nurse practitioners,[8] but they represent the majority of APNs; about 63 percent of students in master's degree nursing programs are in nurse practitioner programs.[9] Finally, there does not appear to be a data source that provides a breakdown of enrollments in different types of APN programs at the State level. Even if such a data set were available, for some programs, viz. teaching, administrative and management programs, it is not clear to which group the students should be assigned. Accordingly we felt that the best empirical strategy was to aggregate the enrollment of these APN programs, rather than attempt to deal with each type separately.

3.1. Model

Our model of the demand for education in master's degree nursing programs is

$$\ln(\text{Enrollment})_{st} = b_1 + b_2 Z_{st} + b_3 \text{Law}_{st} + b_4 \text{State}_s + b_5 \text{Year}_t + \mu_{st} \quad (1)$$

Here s denotes the State, t denotes the time period, and lnEnrollment is the log of enrollment in master's degree nursing programs in the State. Z is a vector of explanatory variables believed to have a possible influence on enrollment: the number of RNs in the State, per-capita income, annual outpatient visits, annual inpatient admissions, the unemployment rate, and average earnings of RNs. LAW is a vector representing three dummy variables, based on (1) whether APNs have a high level of prescription authority, (2) a high level of general professional independence, and (3) an interaction term representing high levels of both attributes, under the law of the State. The State variable controls for State effects, and Year controls for year effects. μ_{st} is a normally distributed error term with zero mean and constant variance.

Equation (1) is weighted by the state's population. All variables except the dummy variables have been transformed into natural logs. Table 2 shows the mean and standard deviation of all variables.

The number of RNs in the State of course represents the pool of those in the State who are eligible for APN programs. The State unemployment rate is likely to affect enrollments, but the expected sign of this variable is uncertain. A number of studies have found that unemployment has a positive effect on the supply of RNs (Buerhaus, 1993, 1995). As the unemployment rate increases, married RNs tend to spend more time in the labor market to compensate for an unemployed spouse—the added worker effect. Spetz (1999) finds that higher unemployment rates increase the supply of nurses and lead to lower wages for RNs.

Table 2. Means and standard deviations.

Variable	Mean	Std. dev.
Graduate enrollment	566.89	695.76
High-professional independence	0.353	0.479
High-prescriptive authority	0.457	0.499
RNs	36,663.97	38,221.75
Per capita income	23,671.85	3,773.83
Outpatient visits (millions)	7.34	8.07
Inpatient admissions (millions)	0.61	0.64
Unemployment rate	6.00	1.68
Nurse earnings	35,411.52	3,920.79
N	357	

Thus unemployment, by inducing RNs to work more, may reduce the likelihood that RNs enter a graduate program.

On the other hand, other studies have shown that college enrollments are inversely related to the business cycle, since the opportunity cost of attending school falls when finding a job is difficult—the discouraged worker effect (Mattila, 1982; Betts and McFarland, 1995).[10] The net effect of the unemployment rate is therefore ambiguous.

We expect the variable for per capita personal income to have a negative effect on graduate enrollments. Areas or States with relatively low income are likely to have lower quality health care and less access to care. Ratios of physicians to population are substantially lower in rural and inner city areas than elsewhere, and APNs may be an attractive alternative to physicians for primary care. In addition, APNs should experience less competition and opposition from physicians in these areas. Thus the demand for APNs should increase as personal income declines.[11]

The variable for earnings of RNs is another example of a variable that surely affects the demand for graduate nursing education, but whose sign is indeterminate. On the one hand, there is likely to be a positive correlation between the earnings of RNs and APNs; thus RN earnings, as a proxy for APN earnings, should have a positive effect on graduate enrollment. On the other hand, an increase in earnings of RNs directly increases the opportunity cost of graduate study. Thus we have no a priori prediction for the sign of this variable.[12]

The variables for the annual number of outpatient visits and inpatient admissions are designed to capture the demand for nursing. These data were collected from various issues of *Statistical Abstract of the U.S.* Freeman (1975a, 1975b) also used proxies for demand in modeling the supply of entrants, noting that, "Information about opportunities as well as salaries is likely to be useful in evaluating the current state of the market and in forecasting future possibilities" (Freeman, 1975b, p. 35). As with the variable for RN earnings, an increase in the demand for nursing could either increase or reduce enrollment in APN programs, depending on which effect is stronger, the increase in expected income of APNs or the increase in the opportunity cost of graduate study. It seems likely, however, that whatever the sign of this variable is, it will be the same as the sign for RN earnings.

There are two other measures that could conceivably be helpful to gauge the demand for advanced practice nurses: (1) a measure of market penetration by managed care organizations, and (2) the number of physicians per capita in the areas of medical practice that have a substantial overlap with the practice of APNs, i.e., general practice, obstetrics and gynecology, and anesthesiology. Managed care organizations might find it expedient to replace physicians with APNs in some situations where they bear the full cost of the services of each type of provider. However, there are serious difficulties with each of these variables. The problem with the variable for managed care penetration is that managed care is local; our observations are at the State level, and there is great variation in managed care coverage at different locations within a State.[13] The problem with the physicians per capita variable is that we could not obtain a breakdown of physician specialties for each State and year of our data; the only measure we could get was for all physicians per capita.[14] We included these two variables, their flaws notwithstanding, in additional regressions, but neither came close to statistical significance; moreover the results for our other variables were virtually unchanged.

Our data set has observations for 50 states and Washington, D.C. for the period from 1989 through 1995. An advantage of equation (1) is that it controls for unobserved heterogeneity—a problem inherent in cross-sectional data—through the use of State dummy variables. By controlling for State-specific heterogeneity, we can better estimate the effects of variables on enrollment in APN programs. The year dummy variables control for national trends that affect enrollment.

To test the sensitivity of our results, we modified equation (1) by deflating the dependent variable, Statewide enrollment in APN programs, by the number of RNs in the State, the pool of those eligible for such programs.[15] The results for both equation (1) and this alternative specification are reported in Table 3.

4. Results

Table 3 presents results of the ordinary least squares models, in which observations are weighted by State population. The models explain approximately 98 percent of the variation in levels of enrollments and about 77 percent of variation in enrollments per capita. We are especially interested in the variables for the laws on scope of practice. In both models the coefficient on professional independence is approximately 0.26 and significant. This indicates that enrollments are 30 percent higher, *ceteris paribus*, in States where the Board of Nursing has sole authority over the scope of nursing practice than in States where either the Board of Medicine has some authority over scope of practice, or there is a requirement of physician supervision.[16]

The coefficient on prescription authority is also positive, and consistent with the idea that greater professional autonomy induces entry into advanced practice nursing. In both models the coefficient is approximately 0.12 and significant. Hence, enrollments increase by 13 percent in States granting APNs greater prescription authority. As previously noted, the number of States granting APNs high-prescription authority increased from 16 to 33 between 1989 and 1995.

An interaction term between high-professional independence and high-prescription authority was also included in the regression models. The coefficient, however, is significant

Table 3. Least squares regressions.

	Log of enrollments		Log of per capita enrollments	
Variable	Estimate	Std. err	Estimate	Std. err
Intercept	−8.1217	8.3073	4.1783	9.350
High-prof. independence	0.2570	0.1284**	0.2611	0.1463*
High-prescriptive auth.	0.1251	0.0506**	0.1222	0.0577**
High-prof.independence × High-prescriptive auth.	−0.1590	0.0925*	−0.1488	0.1054
ln per capita income	0.1461	0.5876	−1.6638	0.6328***
ln inpatient admissions	0.1460	0.2627	0.0979	0.2994
ln outpatient visits	0.2818	0.1119**	0.4456	0.1261***
ln unemployment rate	−0.0872	0.0768	−0.0983	0.0875
ln nurse earnings	1.1413	0.6373*	0.8742	0.7257
ln RNs	−0.0455	0.1112		
Adjusted R^2	0.9793		0.771	
N	357		357	
F (all State law variables)	2.92** ($p = .0342$)		2.25* ($p = .0829$)	

Notes: In the first two columns the dependent variable is the log of annual enrollments in APN programs in the State. In the last two columns the dependent variable is the log of annual enrollments in APN programs divided by the total number of RNs in the State (the pool of those in the State eligible for such programs). Regressions are weighted by state population. State dummies and year dummies are not shown. T tests are two-tailed.
*Significant at 10% level.
**Significant at 5% level.
***Significant at 1% level.

(and negative) in only one of the models. An F-test of whether the coefficients on the three law variables are all zero was rejected in both models at about 3 and 8 percent, respectively.[17]

Overall, enrollments in States with high levels of professional independence and prescription authority are approximately 25 percent higher than in states with low levels of these attributes. The results suggest that States have succeeded in increasing the number of advanced practice nurses by simply improving their legal status. This method of increasing entry should be attractive because it does not directly involve subsidies to nursing graduate programs.[18]

One important question is whether the law variables are endogenous; that is, whether enrollment in nursing programs is a proxy for the number of nurses in the State, which would influence the enactment of statutes that broaden the scope of practice of APNs. To address this issue, we used Hausman's (1978) test for endogeneity. Specifically, we regressed each of the three law variables on all the exogenous variables in Table 3 (the log of enrollments equation) and three instrumental variables: the log of total HMOs in the State, the log of total physicians, and the log of total hospitals. We then obtained the residuals from these equations v_1, v_2 and v_3, and included them as explanatory variables in

the log of enrollments equation, along with the law and exogenous variables. An F-test of the joint significance of the residuals failed to reject the null hypothesis of no endogeneity (p-value = .258).

The coefficients for the other variables, which represent elasticities, are also reported in Table 3, except for the state and year fixed effects.[19] Some variables are insignificant in both specifications. However, the coefficient on the number of outpatient visits, a proxy for demand, is significant with estimated elasticities of 0.28 and 0.44. The coefficient on RN earnings is 1.14 and significant in the log of enrollments model, and the coefficient on per capita income is −1.66 and highly significant in the log of enrollments per capita model, suggesting that APNs serve as substitutes for physicians in low-income areas.

This study reinforces the findings of previous work that laws on the scope of practice of APNs are not mere exercises in public relations; they in fact have major consequences on supply and demand in this labor market. Dueker et al. (2002) found that the earnings of APNs decline, and those of physician's assistants increase, in States that enact laws enlarging the scope of practice of APNs. They suggested that physicians may respond to such laws by replacing APNs with physician's assistants. This paper finds that these laws are also quite effective in increasing entry into APN programs. This increase in enrollment will ultimately augment the supply of APNs, which would help explain the decline in wages; however this effect should lag the passage of the laws, since it takes 3–4 years for students to complete a master's degree in nursing and begin practice. Similarly, Sass and Nichols (1996) found that the wages of physical therapists declined after the passage of laws allowing physical therapists to treat patients without a referral from a physician. It appears that these laws, which were strongly supported by the physical therapists' national association, increased the supply of physical therapy services. One possible explanation for the support of the laws by the national association was that physical therapists knew the laws would reduce their wages, but were willing to pay this price to gain professional independence.

5. Conclusion

Using cross-sectional time-series data over the period 1989 through 1995, we estimated the effect of scope of practice laws on the demand for graduate nursing education. We find that enrollments are approximately 13 percent higher in states where APNs have more prescription authority and 30 percent higher in states where APNs have more professional independence. It appears that legislation creating a more favorable practice environment has achieved part of its desired goal: an increase in the number of primary care providers, such as nurse practitioners.

Notes

1. Many policy analysts and national organizations have expressed a concern that not enough medical school graduates are pursuing a career as a generalist. Indeed, many analysts advocate an increase in the number of primary care physicians to 50 percent of the physician workforce (see, e.g., Henderson (2002) at 236). Only about one-third of all active physicians are now engaged in primary care. In 2000 there were almost 200,000 APNs in the U.S., representing about 7.3 percent of the total registered nurse population.

2. The American Nurses Association. URL: http://www.nursingworld.org/readroom/fsadvprc.htm.
3. For example, a provision of the Omnibus Budget Reconciliation Act of 1990 provided for annual changes in the formula used to compensate CRNAs, so that by 1996 CRNAs and anesthesiologists received the same compensation when they were the sole anesthesia provider. United States General Accounting Office (1992), at 4.
4. These trends continued beyond the period of our data set. By 2000 the number of States with a high level of prescription authority had increased to 42, and the number with a high level of professional independence increased to 22.
5. Since 1953, the NLN has compiled data from all the nursing programs (diploma, associate degree, baccalaureate, and master's) within the United States.
6. During this period enrollments in all RN programs (diploma, associate, and bachelor's) increased, but by a smaller percentage, from 201,458 to 261,219. Note also that in the preceding six-year period, enrollments in master's degree nursing programs increased by only 25 percent.
7. In 1989 the enrollment in all types of graduate and professional education, in thousands, was 1522 and 274, respectively, while in 1995 the corresponding numbers were 1732 and 298.
8. However prescriptions are routinely requested or written by APNs in each of these groups. For example, clinical nurse specialists in mental health nursing prescribe and administer drugs used to treat psychiatric and behavioral disorders and the side effects of those drugs. See, e.g., Minnesota Statutes 148.235, Subdivision 4 (2002).
9. In 1995, 6654 of a total of 10,553 students enrolled full-time in master's degree nursing programs were in nurse practitioner programs. National League of Nursing (1996).
10. We might therefore expect the unemployment rate to have a more positive effect on graduate enrollment for single nurses than for married nurses. Unfortunately we cannot test for this differential effect since our observations are at the State level, given that there is little variation across States in the fraction of nurses who are married.
11. Data for this variable were obtained from the U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, State Annual Tables 1929–1999. This information is available from the Bureau of Economic Analysis web site: http://www.bea.doc.gov.
12. Earnings data for RNs (including all APNs) were obtained from the National Sample Survey of Registered Nurses (1977, 1980, 1984, 1988, 1992 and 1996), which is conducted by the U.S. Department of Health and Human Services. Each annual survey uses a random sample of approximately 30,000 RNs, and collects detailed information on education, employment, and earnings. Although APNs are included in the sample, we could not distinguish them from nurses without education beyond the RN, and APNs are only about seven percent of RNs.
13. Our variable for the extent of market penetration is the percentage of the State's population enrolled in health maintenance organizations, from Health Insurance Association of America (2001).
14. We obtained the data on nonfederal physicians per capita from American Medical Association (2001).
15. While some studies of occupational choice have modeled the supply to an occupation as the total number of entrants, others have used the proportion of an eligible group that enters the occupation, and some studies use both of these alternatives. Those using the proportion of an eligible group include Freeman (1972) (psychologists), Freeman (1975b) (physicists), Maurizi (1975) (dentists), and Ryoo and Rosen (1992) (engineers).
16. In a regression of a lognormal dependent variable Y on independent variables including X, a binary variable, the percentage change in the expected value of Y when X changes from 0 to 1 equals $\exp(B) - 1$, where B is the estimated coefficient of X.
17. We could not reject the null hypothesis that the effect of high-professional independence is identical to that of high-prescription authority.
18. As a further check on the robustness of our results, we estimated equation (1) with a Poisson regression, adjusting for overdispersion (the variance exceeding the mean) by the method of Agresti (1996). The results (not shown) were very similar to those of the models reported in Table 3; the coefficients on professional independence and prescription authority were 0.264 and 0.126, respectively, with corresponding p-values of .0294 and .0043.
19. The year dummies indicate a national trend of enrollments increasing over time.

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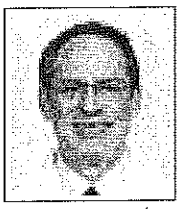
EDITORIAL

Jeff Susman, MD
Editor-in-Chief



It's time to collaborate—not compete—with NPs

It is time—time to abandon our damagingly divisive, politically Pyrrhic, and ultimately unsustainable struggle with advanced practice nurses (APNs). I urge my fellow family physicians to accept—actually, to *embrace*—a full partnership with APNs.

Why do I call for such a fundamental change in policy? First, because it's the reality. In 16 states, nurse practitioners already practice independently. And in many more states, there is a clear indication that both the public and politicians favor further erosion of barriers to independent nursing practice. Indeed, such independence is outlined in "The Future of Nursing: Leading Change, Advancing Health," published by the Institute of Medicine (IOM) in October 2010. Among the IOM's conclusions:

- Nurses should practice to the full extent of their education and training.
- Nurses should achieve higher levels of education and training through an improved education system that promotes seamless academic progression.
- Nurses should be full partners, with physicians and other health care professionals, in redesigning health care in the United States.

Second, I believe our arguments against such a shift in policy don't hold up. Despite the endless arguments about outcomes, training, and patient preferences, I honestly believe that most nursing professionals—just like most physicians—practice within the bounds of their experience and training.

Arguments FPs make against APNs sound like specialists' arguments against us.

Indeed, the arguments family physicians make against APNs sound suspiciously like specialists' arguments against us. (Surely, the gastroenterologists assert, their greater experience and expertise should favor colonoscopy privileges only for physicians within their specialty, not for lowly primary care practitioners.) Rather than repeating the cycle of oppression that we in family medicine battle as the oppressed, let's celebrate differences in practice, explore opportunities for collaboration, and develop diverse models of care.

Third, I call for a fundamental shift in policy because I fear that, from a political perspective, we have much to lose by continuing to do battle on this front. Fighting fractures our support and reduces our effectiveness with our legislative, business, and consumer advocates.

Finally, I'm convinced that joining forces with APNs to develop innovative models of team care will lead to the best health outcomes. In a world of accountable health care organizations, health innovation zones, and medical "neighborhoods," we gain far more from collaboration than from competition.

As we ring in the new year, let's stop clinging to the past—and redirect our energies toward envisioning the future of health care.

Jeff Susman, MD

jfp@neoucom.edu

tor synthesis by the incubated splenic lymphoid cells.

The present studies cannot determine whether the phagocytosis patterns observed in these studies reflect an effect of corticosteroids upon the in vitro antiplatelet antibody production, the ability of splenic cells to phagocytose sensitized platelets or a combination of these factors. However, the lack of correlation between total in vitro splenic IgG production and the degree of phagocytosis suggests that an effect on the phagocytic cells is the more likely possibility. Further studies will be required for clarification of this point.

These studies also indicate that the splenic reticuloendothelial system remains extremely active in patients who do not respond to steroids, in terms of the ability to phagocytose normal platelets, despite high-dose steroid therapy. This observation suggests that the preferential liver sequestration seen in some patients with severe idiopathic thrombocytopenic purpura, who presumably have more heavily sensitized platelets,[4-9] is due to the volume of blood flow through the various reticuloendothelial organs rather than their differential steroid sensitivity.

It is anticipated that the present in vitro method can be modified for use as an assay system for antiplatelet factor in idiopathic thrombocytopenic purpura. Such modifications should provide further insight into the pathogenesis of the disorder.

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Background Reading

References 4, 5 and 8

SPECIAL ARTICLE

THE BURLINGTON RANDOMIZED TRIAL OF THE NURSE PRACTITIONER

WALTER O. SPITZER, M.D., M.H.A., M.P.H., DAVID L. SACKETT, M.D., M.Sc. EPID., JOHN C. SIBLEY, M.D., F.R.C.P. (C), M.R.C.P., ROBIN S. ROBERTS, M. TECH., MICHAEL GENT, M.Sc., DOROTHY J. KERGIN, R.N., PH.D., BRENDA C. HACKETT, B.A., AND ANTHONY OLYNICH, C.A.

In Collaboration with W. I. Hay, M.B., B.S., G. Lefroy, R.N., G. Sweeny, M.D., C.M., I. Vandervlist, R.N., H.S. Nielsen, M.D., E. V. MacKrell, M.B., N. Prowse, R.N., A. Brame, R.N., E. Fedor, R.N., B.A., and K. Wright, B.N.

Abstract From July, 1971, to July, 1972, in a large suburban Ontario practice of two family physicians, a randomized controlled trial was conducted to assess the effects of substituting nurse practitioners for physicians in primary-care practice.

Before and after the trial, the health status of patients who received conventional care from family physicians was compared with the status of those who received care mainly from nurse practitioners. Both groups of patients had a similar mortality experience, and no differences were found in physical functional capacity, social function or emotional function. The quality of care rendered to the two groups seemed similar, as assessed by a quantitative "indicator-condition" approach. Satisfaction was high among both patients and professional personnel. Although cost effective from society's point of view, the new method of primary care was not financially profitable to doctors because of current restrictions on reimbursement for the nurse-practitioner services. (N Engl J Med 290:251-256, 1974)

THE concept of using nonphysicians to provide primary health service has seldom been accompanied by quantitative clinical evidence that this new form of patient care is both safe and effective. Our interest in testing the primary-care performance of nurse practitioners was stimulated by three distinctive features of the medical situation in Ontario: the delivery of primary health care is still oriented toward family physicians, who constitute 48 per cent of all registered physicians in the Province; the total number of family physicians is adequate (with an average ratio of 1:1723 per total population), but they are unevenly distributed so that many rural and small-town family physicians are overburdened[1]; and a surplus of well trained,

From the schools of Medicine and Nursing, McMaster University (address reprint requests to Dr. Spitzer of the Department of Clinical Epidemiology and Biostatistics, McMaster University, 1200 Main St. West, Hamilton, Ontario, Canada, L8S 4J9).

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experienced nurses has existed in the Province for several years.[2,3]

An opportunity to perform the desired test was presented in 1970, when two family physicians in Burlington, a middle-class suburban town of 85,000 just east of Hamilton, approached the Faculty of Medicine of McMaster University for possible help in introducing this innovation into their practice. For at least two years, their practice had been "saturated" — accepting no new patients or families because of inability to manage an increased case load. The physicians believed that their office nurses, with appropriate additional training, could assume a substantial portion of the responsibilities for primary care.

With this opportunity and with the offered co-operation of these and other participants, a collaborative group was formed, and two complementary randomized trials were designed. In one of these trials, reported elsewhere,[4,5] the major emphasis was on the way in which physicians and nurses were affected by the new form of practice. In the second trial, which is reported here, the principal concerns were with the effects on patients and on the practice itself.

Participating Personnel and Background

The two family practices under study had previously had no affiliation with a university or other institution. Patients in each practice were free to seek any desired source of primary care, and the costs of care, regardless of source, were completely covered by universal health insurance in Ontario.

One of the family physicians had received his medical degree in 1953 from the University of Durham and had practiced in Burlington for nine years; the other physician had graduated from McGill University in 1954 and had been practicing in Burlington for 14 years. One nurse had received her R.N. diploma in 1959, and the other nurse in 1948.

Before the study began, the nurses attended a special training program[6] conducted by the schools of nursing and medicine at McMaster University. The emphasis of this program is on decision making and clinical judgment, rather than on procedural skills. The graduating nurse practitioners are qualified to become not physicians' assistants, but *co-practitioners*, sharing the family physician's responsibility for continuing care of patients. The nurse practitioner learns to evaluate each patient's presenting problems, and to choose from three possible courses of action: providing specific treatment; providing reassurance alone, without specific treatment; or referring the patient to the associated family physician, to another clinician or to an appropriate service agency.

Methods

The research contained at least three major methodologic challenges: the development of appropriate technics for assessing the outcome as direct effects on the patients' state of health; the development of quantitative methods for evaluating the process of medical care and the dynamics of an experimental practice; and the complex administrative logistics of preparing the patients, training interviewers and other data gatherers, maintaining the protocol and co-ordinating data reduction and analysis.

In this paper, we report the general design, logistics, and data of the trial, together with a summary of the results obtained for patients' health status and quality of care.

The Investigated Patients

Because many clinical problems in primary care involve an entire family, families were chosen as the unit for randomization. A "family," which was defined as a person or group sharing a common provincial health-insurance number, typically encompasses a breadwinner, the spouse, and the dependent children. From the business records or clinical records of all families using the two practices, 1801 families, representing approximately 4850 people, were enumerated.

To be eligible for the trial, a family had to be established as having an ongoing medical relation with the practices. This relation was demonstrated if one of the family members had either made contact with one of the practices in the prior 18-month period or (during later interviews) identified the doctor as the family physician. The eligible people comprised 1598 families, containing 4325 members.

Randomization

Because a case load half that of a family physician's was considered manageable for a nurse practitioner, the eligible families were stratified by practice of origin, and randomly allocated in a ratio of 2:1. They formed a randomized conventional group, assigned to continuing primary clinical services from a family physician and a conventional nurse, and a randomized nurse-practitioner group, whose first-contact primary clinical services were to be provided by a nurse practitioner. The resulting conventional group contained 1058 families (2796 members) equally divided between the two doctors, and the nurse-practitioner group comprised 540 families (1529 members), equally divided between the two nurse practitioners.

After these assignments were completed, adult patients were sent a letter explaining their clinical allocation and the plans of the study. For subsequent medical care, after July 1, 1971, patients in the nurse-practitioner group were asked to make appointments with the named nurse, instead of with their customary doctor. All the families were given the opportunity to refuse their assignment and opt out of the trial.

Figure 1 shows the timing of these procedures and of subsequent events in the performance of the study.

Selection of Patients for Surveys before and at the End of the Experimental Period

After the letters were distributed, a household survey was performed in a sample of the enumerated families, *the interview cohort*. This cohort received interviews to acquire the data needed for "paired comparisons" of change in health status and medical utilization. The patients for the interview cohort were chosen randomly as a single member from eligible families participating in the trial and living within 32 km of the doctor's office. To ensure sufficient numbers of children in the surveys, one third of the families were randomly designated as "child priority." The member for the interview cohort was then randomly chosen from any children contained in these families or otherwise, from the adults.

The resulting cohort that was successfully interviewed in both years included 817 patients, with 296 in the experimental group and 521 in the conventional control group. The refusal rates in the surveys were 11 per cent in 1971 and 5 per cent in 1972.

Data Obtained before the Experimental Period

Measurements on patients. Trained household interviewers administered pretested standardized questionnaires* to the interview cohort to obtain demographic information, information on prior use of clinical services and data satisfaction with health care. Special questionnaire instruments, described elsewhere, were used for assessing health status in physical function.

Clinician activities. Time-and-motion studies of the physicians and conventional nurses were used to indicate the mixture of clinical and nonclinical activities in a representative week of family practice.

Activities of the practice: A "day-sheet journal' was maintained for all clinical activities in the practices. For each visit or encounter with any medical or nursing practitioner, a separate entry was made in

*For 228 pages of questionnaire instruments used in this project order NAPS Document 02178 from National Auxiliary Publications Service, c/o Microfiche Publications, 305 E. 46th St., New York, N.Y. 10017; remitting $1.50 for microfiche-copy reproduction or $34.70 for photocopies. Checks or money orders should be made payable to Microfiche Publications.

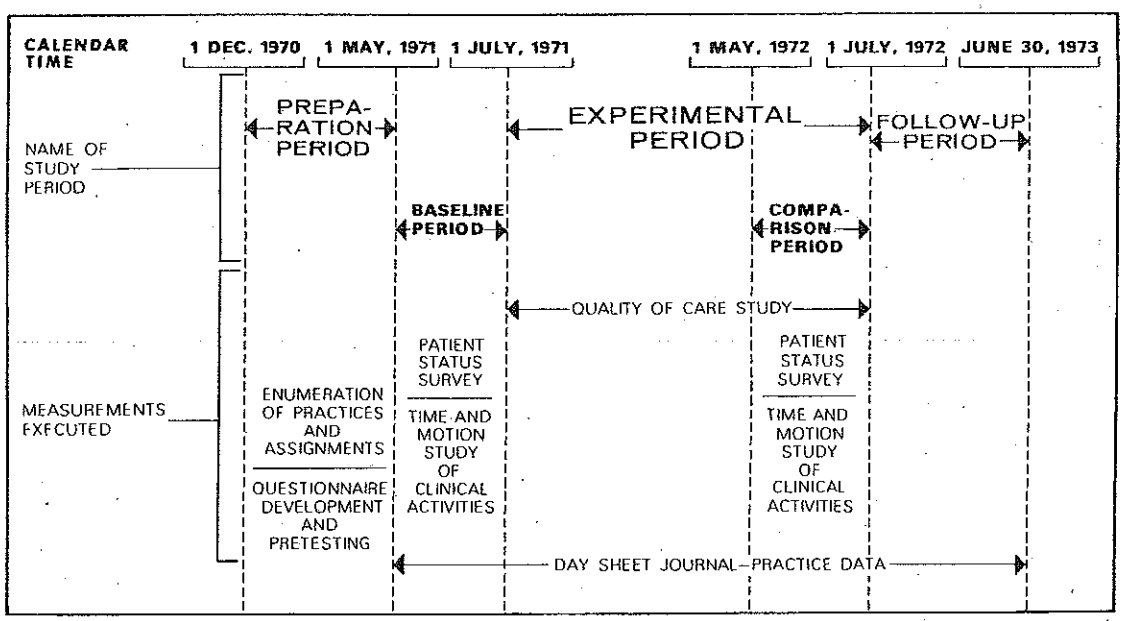

Figure 1. Schedule of Time and Events during Implementation of the Trial.

the journal, and included the following information: the patient's identification number; the date; the type of service; whether the patient was new to the practice; the presenting complaint (or complaints) or problems; diagnosis (or diagnoses); procedures (if any); the principal professional person who provided service at the particular visit; whether the doctor was involved in the visit or whether the nurse practitioner had provided the service alone without consultation; whether the patient was referred outside the practice; whether a prescription had been given to the patient; and the dollar value of service according to the provincial medical association's schedule of fees.*

In the eight-week base-line period, there were 2991 encounters for the groups who became the conventional and nurse-practitioner combined trial practice.

Data Obtained during the Experimental Period

Measurements on patients: In addition to the cited data on health status, "dropouts" were identified, and all deaths were recorded.

Clinician activities. The quality of care in "clinical judgment" used by the co-practitioners was assessed with two quantitative methods. One of these was based on identifying and assessing the manner in which the practitioners managed a series of 10 indicator conditions. As suggested in Kessner's concept of "tracers,"[7,8] an indicator condition is a distinct clinical entity (such as a disease, symptom, state or injury) occurring frequently in primary care, with an outcome that can be affected favorably or adversely by the choice of treatment. The second method for assessing the quality of medical care was to evaluate the manner in which 13 common drugs were prescribed. Explicit criteria for adequacy in the management of indicator conditions and prescription of drugs were established before the trial by a peer group of nonuniversity family physicians practicing in the same area. The selected conditions and drugs were not known to the Burlington co-practitioners during the trial. These approaches received a preliminary report, with details presented elsewhere.[9]

Practice activities. All clinical activities were monitored throughout the entire experimental period and recorded in the day-sheet journal. During the experimental year, data were obtained for 21,085 encounters.

*A service ordinarily given by a physician, but now given by an unsupervised nurse practitioner, was rated at the same dollar value as a doctor's service for purposes of financial analysis, but could not be reimbursed by governmental health insurance.

Data Obtained at the End of the Experimental Period

Measurements on patients. The household surveys of health status were repeated, with added questions on social and emotional function.

Clinician activities. The previous studies of clinical activities were repeated during the eight-week comparison period, one year after base line. Quality-of-care measurements were continued to the end of the trial.

Practice activities. The day-sheet journal surveillance was continued for a year after the trial to ascertain longer-term effects of this method of practice on profitability and cost effectiveness.

Results

Base-line Survey and Encounter Data

Measurements on patients (Fig. 2). As determined in the 1971 household survey, the patients in the conventional and nurse-practitioner groups had highly similar values for physical function, ability to carry out usual daily activities and freedom from bed disability. The base-line health status of the two groups of patients showed only minor differences that were not statistically significant (at an α level of 0.05).

Clinician activities. Physicians had been involved in 86 per cent of all visits to the practices, and the conventional nurses alone had dealt with the remaining 14 per cent of encounters.

Results during the Experimental Period

Of the 1598 families eligible for the trial, only seven families (two from the conventional group and five from the nurse-practitioner group) refused their assignments. Two families in the conventional group preferred care by nurse practitioners; two families in the

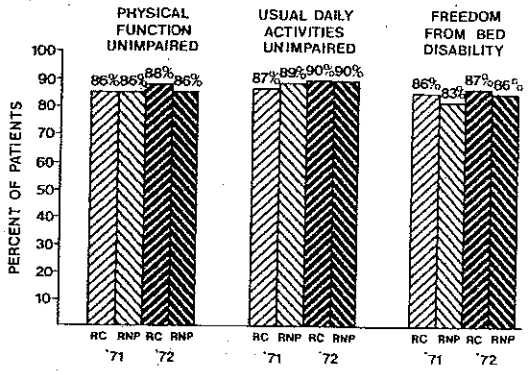

Figure 2. Physical Status of Patients in Surveys during Base-line ('71) and Comparison ('72) Periods.

These results are based on 521 subjects in the conventional (RC) group and 296 in the nurse-practitioner (RNP) group who were assessed in both 1971 and 1972.

nurse-practitioner group opposed the new concept, and three others had had a member under care by a doctor for a long-term problem.

Measurements on patients. During the year 0.9 per cent of families in the conventional and 0.7 per cent in the nurse-practitioner group left the practice because of dissatisfaction.

Clinical activities (Fig. 3). In 392 episodes of care for the 10 indicator conditions, the management was rated as adequate for 66 per cent of episodes in the conventional and for 69 per cent in the nurse-practitioner group. In 510 prescriptions similarly analyzed, an adequate rating was given to 75 per cent in the conventional group, and to 71 per cent in the nurse-practitioner group.*

Practice activities. The doctors in the conventional group continued to be involved in about 86 per cent of all patient visits throughout the trial. For visits of patients in the nurse-practitioner group, the doctors were involved in 45 per cent of visits during the first eight weeks. This proportion fell to 28 per cent by the 20th week, and rose from the 21st to the 44th week, when many new families were being seen for the first time. Starting with the final eight weeks of the trial the proportion of patient nurse-practitioner visits involving the doctor stabilized at 33 per cent. Subsequent follow-up study confirms that nurse practitioners handle two thirds of episodes without consulting a physician.

As noted from our enumerations and household interviews before the trial, the two original practices had provided care for an active roster of 1598 families who had an ongoing relation to the practitioners. Within eight weeks after the new form of practice was introduced, the physicians found that the demands on their own services had been reduced enough to allow new families to be accepted in the previously "saturated" practices. After one year, the practices had grown to 1952 active families, a net increase of 22 per cent.

*The differences are not statistically significant at an α level of 0.05. Since demonstration of "no difference" or "no deterioration" is of greater concern in an experiment where we have compared a new form of practice with a standard practice, we also calculated β levels. Given the results, the probabilities of real deterioration of at least 5 per cent in physical function went from 0.02 to 0.01. The probabilities of real deterioration of at least 10 per cent were 0.004 for indicator conditions and 0.08 for drugs.

Results at the End of the Experimental Period

Clinical outcomes. As shown in Figure 2, the levels of physical status remained closely similar in the patients in the two groups. In measurements performed at the end of the trial in the 1972 survey, the index of emotional function was 58.3 per cent in 521 patients in the conventional and 57.9 per cent in 296 in the nurse-practitioner group. Corresponding values for the index of social function were 83.2 per cent and 83.9 per cent.[19]

During the experimental period, there were 22 deaths — 18 in the conventional group and four in the nurse-practitioner group. The difference in crude death rates was not clinically or statistically significant.

In the follow-up survey, 97 per cent of patients in the conventional and 96 per cent in the nurse-practitioner group were found to be satisfied with health services received during the experimental period.

Clinician activities. Figure 4 shows the financial performance of the practices, as compared with the base-line-period level of 100 per cent. The drop of 5 per cent in actual gross practice revenue is explained by the absence of billing for clinical services provided by nurse practitioners. If reimbursement for these services had been permissible, the increased volume of services with a 22 per cent increase in number of families under care would have produced a 9 per cent rise in income. According to the dollar-weighting procedure for fees, services rendered by each nurse practitioner during the trial year were worth approximately $16,000, of which almost 50 per cent was for unsupervised service.

Together with other financial studies, these data indicate that the economic advantage that society attains

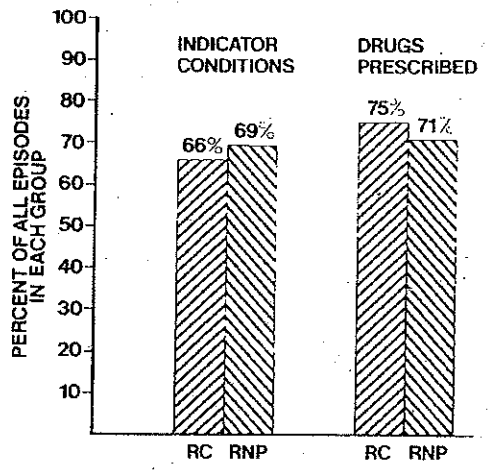

Figure 3. Percentage of Episodes of Care Rated as Adequate.

The denominators for these percentages were a total of 392 episodes for indicator conditions — 225 in the conventional (RC) and 167 in the nurse-practitioner (RNP) group — and 510 episodes for drugs (284 in the RC and 226 in the RNP group).

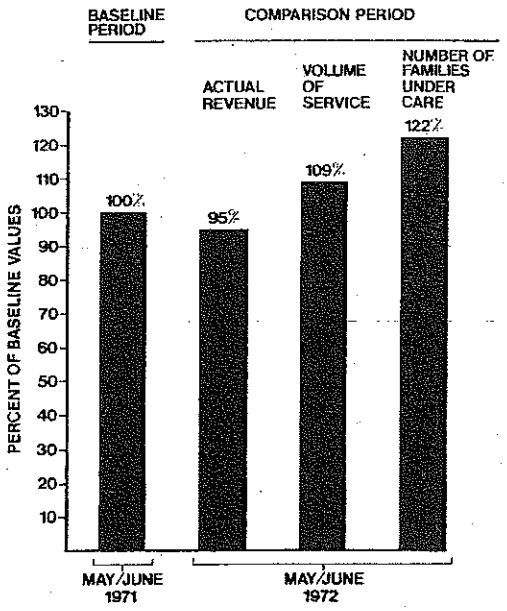

Figure 4. Performance of Practices.
The activities during the base-line period were given a value of 100 per cent for each of the three categories of performance assessed.

from the primary-care nurse practitioner is accompanied, under current Ontario regulations that prohibit billing for unsupervised nurse-practitioner services, by the physician's loss in net income of nearly $12,000 per year.

Practice activities (follow-up observations). One year after the experimental period had ended, the practitioners reported that they were at a new plateau of "saturation." As of June 30, 1973, 2256 registered families were under ongoing care, a 41 per cent increase from the 1598 families two years earlier.

Discussion

In recent years, a few health-care trials, some with an element of randomization, have been reported.[10-16] The current research adds further evidence that innovations in health care can be assessed with randomized controlled trials.

Neither the concept of the nurse practitioner nor the evaluation of this new concept is new. "Outpost nurses" have established an enviable record of clinical accomplishment in isolated areas in the Canadian North and Maritime provinces.[17] In the United States, Silver and his colleagues[18,19] pioneered many current concepts of the nurse practitioner's role in pediatrics. Yankauer et al.[20,21] dealt with other issues of education and the efficient deployment of nurses in pediatric ambulatory settings. Other investigators[22,23] have described the use of nurse practitioners in adult primary care.

Introduction of the nurse practitioner has often been accompanied by evaluative research, including descriptive studies,[18,24] surveys[25,26] and assessment of process.[23,27] Lewis and his colleagues[28] made a major contribution to the methods of assessing the effect of nurse practitioners by executing a randomized controlled study conducted in a hospital outpatient setting. Charney[29] later performed a similarly controlled trial of the nurse's work in well-child care, and Schlesinger et al.[30] used a matched design to test registered nurses in prenatal care.

The work reported here differs from earlier randomized controlled investigations of nurse practitioners, because of the following characteristics: to allow detection of small differences in the variables of interest, our study contained much larger numbers of patients than had previously been admitted to such trials; the role of "experimental subject," assumed by the collaborating physicians and nurses, was almost entirely divorced from the specially trained interviewers, abstractors and observers who acted as "data gatherers"; all the data, including base-line data, were gathered purposefully and prospectively; both traditional and new health-care measurements were incorporated into an experiment patterned after a clinical trial, with the attention directed primarily at changes in health status; the study was carried out in previously saturated practices that were non-university and non-institutional; and, finally, a unique characteristic of the setting was that patients, if dissatisfied, had complete freedom to seek care from another source. Not only were several family physicians in the community accepting new families, but Canadian universal insurance covers costs completely regardless of the chosen source of care.

The results demonstrate that a nurse practitioner can provide first-contact primary clinical care as safely and effectively, with as much satisfaction to patients, as a family physician. The successful ability of the nurse practitioners to function alone in 67 per cent of all patient visits and without demonstrable detriment to the patients has particularly important implications in planning of health-care delivery for regions where family physicians are in short supply.

The increased number of patients who could be added to the previously saturated practices is probably due mainly to the case load carried by the nurse practitioners, but cannot be attributed to their activities alone. The physicians involved in this trial believe that their own work became more efficient since they were forced to develop the rigor and clarity of thought needed to communicate with their co-practitioners.

The decreased gross revenue of the practices is attributable to current regulations that do not permit the governmental health-insurance plan to pay for services rendered by an unsupervised nurse. Since nurse practitioners can provide a major increase in total quantity of clinical service, without a reduction in quality, a suitable adjustment of these financial regulations would make the innovation more attractive to physicians, while allowing society to obtain the additional benefits in care at a net cost that is still less than that of conventional approaches. Several medical practitioners and officials of the provincial health-insurance plan

are now collaborating in an effort to develop appropriate new formulas for these financial arrangements.

We are indebted to Dr. John R. Evans, formerly dean of the Faculty of Medicine of McMaster University (now president of the University of Toronto), for encouragement and support during the preliminary phase of this study (his leadership made possible the environment and the resources required for large-scale health-care trials in the Hamilton region) and to Dr. Alvan R. Feinstein, of Yale University, for counsel and critical review during preparation of the manuscript.

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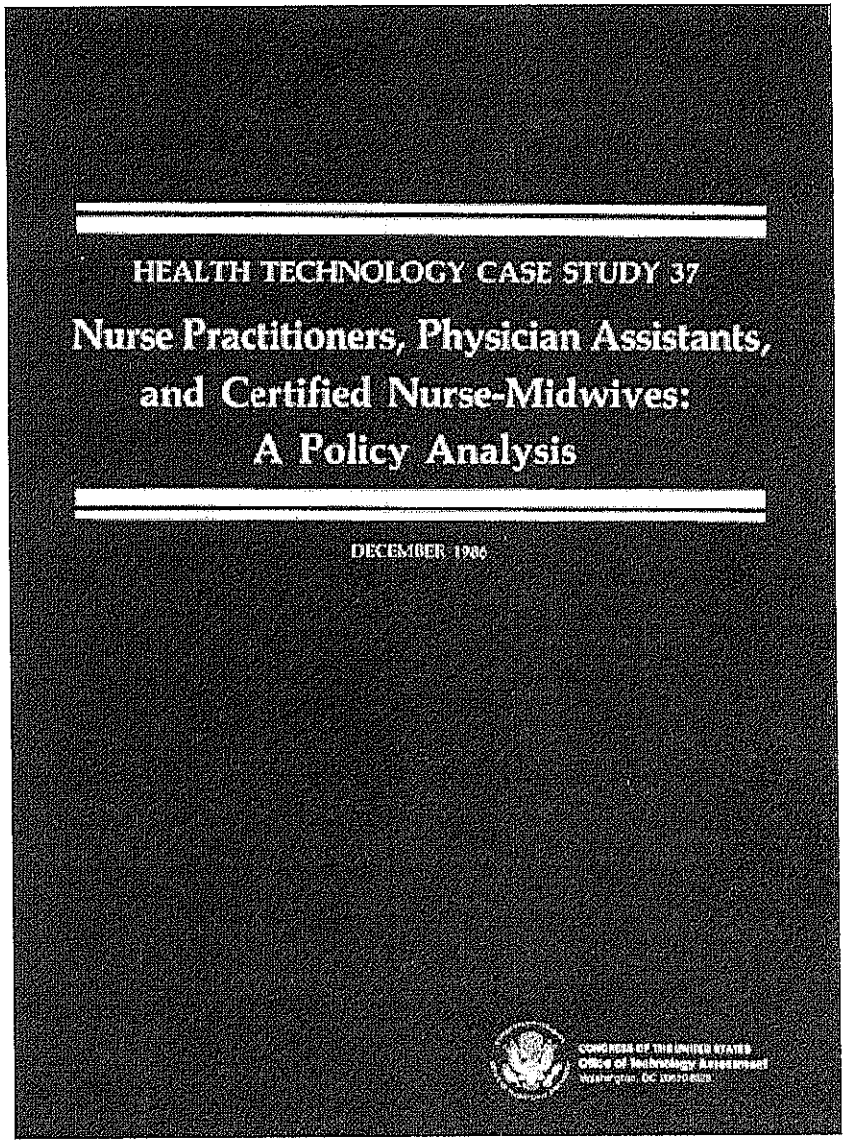
Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives: A Policy Analysis

December 1986

NTIS order #PB87-177465



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Preface

Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives: A Policy Analysis is Case Study 37 in OTA's Health Technology Case Study Series. This case study has been prepared in response to a request by the Senate Committee on Appropriations.

OTA case studies are designed to fulfill two functions. The primary purpose is to provide OTA with specific information that can be used in forming general conclusions regarding broader policy issues. The first 19 cases in the Health Technology Case Study Series, for example, were conducted in conjunction with OTA's overall project on *The Implications of Cost-Effectiveness Analysis of Medical Technology.* By examining the 19 cases as a group and looking for common problems or strengths in the techniques of cost-effectiveness or cost-benefit analysis, OTA was able to better analyze the potential contribution that those techniques might make to the management of medical technology and health care costs and quality.

The second function of the case studies is to provide useful information on the specific technologies covered. The design and the funding levels of most of the case studies are such that they should be read primarily in the context of the associated overall OTA projects. Nevertheless, in many instances, the case studies do represent extensive reviews of the literature on the efficacy, safety, and costs of the specific technologies and as such can stand on their own as a useful contribution to the field.

Case studies are prepared in some instances because they have been specifically requested by congressional committees and in others because they have been selected through an extensive review process involving OTA staff and consultations with the congressional staffs, advisory panel to the associated overall project, the Health Program Advisory Committee, and other experts in various fields. Selection criteria were developed to ensure that case studies provide the following:

- examples of types of technologies by function (preventive, diagnostic, therapeutic, and rehabilitative);
- examples of types of technologies by physical nature (drugs, devices, and procedures);
- examples of technologies in different stages of development and diffusion (new, emerging, and established);
- examples from different areas of medicine (e.g., general medical practice, pediatrics, radiology, and surgery);
- examples addressing medical problems that are important because of their high frequency or significant impacts (e. g., cost);
- examples of technologies with associated high costs either because of high volume (for low-cost technologies) or high individual costs;
- examples that could provide information material relating to the broader policy and methodological issues being examined in the particular overall project; and
- examples with sufficient scientific literature.

Case studies are either prepared by OTA staff, commissioned by OTA and performed under contract by experts (generally in academia), or written by OTA staff on the basis of contractors' papers.

OTA subjects each case study to an extensive review process. Initial drafts of cases are reviewed by OTA staff and by members of the advisory panel to the associated project. For commissioned cases, comments are provided to authors, along with OTA's suggestions for revisions. Subsequent drafts are sent by OTA to numerous experts for review and comment. Each case is seen by at least 30 reviewers, and sometimes by 80 or more outside reviewers. These individuals may be from relevant Government agencies, professional societies, consumer and public interest groups, medical practice, and academic medicine. Academicians such as economists, sociologists, decision analysts, biologists, and so forth, as appropriate, also review the cases.

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36	Effects of Federal Policies on Extracorporeal Shock Wave Lithotripsy Elaine J. Power (Office of Technology Assessment) (OTA-HCS-36)
37	Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives: A Policy Analysis; (O-I-A-I-EC-37)

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[b] Original publication numbers appear in parentheses.

[c] The first 17 cases in the series were 17 separately issued cases in Background *Paper #2: Case Studies of Medical Technologies*, prepared in conjunction with OTA's August 1980 report *The Implications of Cost-Effectiveness Analysis of Medical Technology.*

[d] Background paper #3 to *The Implications of Cost-Effectiveness Analysis of Medical Technology.*

[e] Background paper #s to *The Implications of Cost-Effectiveness Analysis of Medical Technology.*

[f] Background paper #1 to OTA's May *1982* report *Technology and Handicapped People.*

[g] Background *paper #2 to Technology and Handicapped People.*

OTA Project Staff for Case Study #37
Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives: A Policy Analysis

Roger C. Herdman, *Assistant Director, OTA*
Health and Life Sciences Division

Clyde J. Behney, *Health Program Manager*

Gloria Ruby, ***Project Director***

Steven Sisskind, *Research Assistant**

Virginia Cwalina, *Administrative Assistant*

Diann G. Hohenthaner, F'. C. *Specialist*

Carol A. Guntow, *Secretary/Word Processor Specialist*

Principal Contractor

Edward G. Brooks, University of North Carolina, Chapel Hill, NC

Contractors

Louis P. Garrison, The Project Hope Health Sciences Education Center, Millwood, VA

Anne Meadows, Washington, DC (Editing)

*From July to October 1986.

Advisory Panel—Nurse Practitioners, Physician Assistants, and Certified Nurse= Midwives: A Policy Analysis

Rosemary Stevens, *Chair*
Department of History and the Sociology of Science
University of Pennsylvania, Philadelphia, PA

Walter H. Caulfield
Kaiser Permanence
Oakland, CA

Philip D. Cleveland
Family Medicine Spokane
Spokane, WA

Lynn Etheredge
Health Policy Consultant
Washington, DC

Willis Goldbeck
Washington Business Group on Health
Washington, DC

Sandra Greene
Health Economics Research
Blue Cross/Blue Shield of North Carolina
Durham, NC

Hurdis Griffith
Robert Wood Johnson Fellow
Institute of Medicine
National Academy of Sciences
Washington, DC

Charles G. Huntington
Hermon Medical Group
Hermon, NY

Lauren LeRoy
Physician Payment Review Commission
Washington, 'DC

Kathy Lohr
The Rand Corp.
Washington, DC

Ruth Lubic
Maternity Center Association
New York, NY

Michael R. Pollard
Office of Policy Analysis
Pharmaceutical Manufacturers' Association
Washington, DC

Patricia A. Prescott
School of Nursing
University of Maryland
Baltimore, MD

Judith Rooks
Consultant
Portland, OR

George M. Ryan
Department of Obstetrics and Gynecology
College of Medicine
University of Tennessee
Memphis, TN

Richard M. Scheffler
Health Policy and Administration Program
School of Public Health
University of California
Berkeley, CA

Henry M. Seidel
School of Medicine
The Johns Hopkins University
Baltimore, MD

Gerry Shea
Health Care Division
Service Employees International Union
Washington, DC

Barbara Warden
National Consumers' League
Washington, DC

Ivan Williams
Kellogg Center
Montreal General Hospital
Montreal, Quebec

NOTE: OTA appreciates and is grateful for the valuable assistance and thoughtful critiques provided by the advisory panel members. The panel does not, however, necessarily approve, disapprove, or endorse this report. OTA assumes full responsibility for the report and the accuracy of its contents.

Contents

Contents—continued

Tables

Figure

Chapter 1

Summary and Policy Conclusions

Chapter 1

Summary and Policy Conclusions

INTRODUCTION

The use of nurse practitioners (NPs) and physician assistants (PAs) to provide primary health care traditionally provided only by physicians developed during the 1960s in response to a perceived shortage and maldistribution of physicians. Societal support for this innovation in the delivery of health-care was based on the potential for NPs and PAs to improve access and to lower costs while maintaining the quality of care. At about the same time the number of certified nurse-midwives (CNMs),[1] who had been providing health care for some 30 years, began to increase substantially.

In the past two decades, the ranks of NPs, PAs, and CNMs and their responsibilities for providing care to patients have increased, despite the resistance these practitioners have encountered in their attempts to assume more prominent or more independent roles in delivering health care. Today, approximately 15,400 NPs, 16,000 PAs, and 2,000 CNMs are practicing in the United States.

Changes in the health-care environment have altered the forces that spurred the development and growth of these groups of providers. The health-care sector has become increasingly competitive as the supply of physicians has grown and as the proportion of physicians practicing in the primary-care specialties has decreased. New forms of organization for the delivery of medical care have emerged. Concern over the rapidly rising costs of health care has grown, and new methods of paying for hospitals' inpatient services have been implemented. All of these changes have implications for the roles NPs, PAs, and CNMs will play in the future, and for the quality, accessibility, and costs of health care.

As the health-care delivery system evolves, NPs, PAs, and CNMs are exploring ways to overcome several obstacles, such as unsupportive physicians, restrictive State laws and regulations, and the inaccessibility and cost of malpractice insurance. Although these problems are significant (see box 1-A), they are beyond the scope of this study, which focuses on another major barrier—limited third-party payment for the services of NPs, PAs, and CNMs.

Background and Scope of the Case Study

This case study was prepared in response to a request by the Senate Committee on Appropriations to update a previous OTA case study, "The Cost and Effectiveness of Nurse Practitioners." The committee also requested that OTA address the extent to which various Federal health-care programs and private third-party payers pay for the services of NPs and CNMs. Of particular interest to the committee were the issues of coverage (i.e., authorization for payment) and direct payment (i.e., payment to NPs and CNMs) for their services.[2] The committee also requested that OTA review the evidence on the quality and costs of the care NPs and CNMs provide. The analysis also addresses PAs because their historical background and current roles are similar to that of NPs, and because information on NPs often overlaps with information on PAs.

In considering NPs and PAs, the study focuses on the large majority who provide primary care, although some attention is given to the roles of NPs and PAs in nonprimary-care settings. No distinction is made between primary-care PAs and PAs trained in Medex programs specifically to provide primary care to underserved populations.

[1] This case study uses the word *certified* to distinguish formally trained and certified nurse-midwives from lay midwives, who may or may not be nurses and who have informal training in midwifery.

[2] The Medicare program and other third-part y payers distinguish between coverage and payment. Coverage refers to benefits available to eligible beneficiaries or subscribers; payment refers to the amounts and methods of payment for covered services.

Box 1-A.—Selected Obstacles Faced by Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives

Physicians' Resistance

The limited acceptance and, in some cases, outright opposition with which some physicians have met NPs, PAs, and CNMs have restricted employment opportunities for these practitioners. Their use is determined by the settings and the supervisors. In some settings (e.g., health maintenance organizations), NPs, PAs, and CNMs are likely to perform the whole range of services for which they were trained. In other settings (e.g., private practices), however, some physicians are apparently reluctant to delegate primary-care tasks.

Legal Restrictions

The restrictions placed on NPs', PAs', and (to some extent) CNMs' practices by State laws and regulations discourage the integration of these providers into the health-care delivery system. Requirements vary widely from State to State with respect to such matters as physicians' supervision, drug prescription, and independent practice. The requirements are often ambiguous and prevent these providers from practicing at levels commensurate with their training. Furthermore, the lack of uniformity and clarity of the laws and regulations may discourage physicians from hiring these providers. The considerable variance reflects disagreement among the States about the competence levels and appropriate roles of NPs, PAs, and CNMs. During the past decade, however, States have generally lowered the legal barriers to NPs', PAs', and CNMs' practice. For example, between 1975 and 1980, 14 more States permitted NPs to prescribe medications; four States did so between 1975 and 1980; 14 more States have done so since 1980. The trend is not universal. An attempt made after 1980 to permit NPs to prescribe drugs was defeated in the California legislature (154).

Inaccessibility and Cost of Malpractice Insurance

The malpractice crisis has affected most health-care practitioners and providers. Insurers have significantly increased premiums, and many refused altogether to underwrite malpractice policies for some practitioners, including CNMs. As a result, an unknown number of CNMs were forced to close their practices, and about 30 (out of 140) birthing centers closed (130). Although progress is being made in obtaining liability insurance for some CNMs—e.g., a consortium has been formed to underwrite insurance for members of the American College of Nurse Midwives—increasing liability insurance premiums may lead CNMs, obstetricians, and other health professionals to change their practice patterns or to stop practicing entirely.

Limitations on Coverage and Payment for Interpersonal and Preventive Care

Most third-party payers provide little or no coverage for preventive services and interpersonal services, such as health education and counseling, which are integral to the activities of NPs, PAs, and CNMs. The problem affects all health-care providers and has received broader analysis elsewhere. A recently released OTA report, *Payment for Physician Services: Strategies for Medicare*, provides a detailed discussion of the differences in payments for nonprocedural and procedural services.

The central questions the study attempts to answer are:

- What contributions do NPs, PAs, and CNMs make in meeting the Nation's health-care needs?
- How would changing the method of payment for the services of NPs, PAs, and CNMs affect the roles these practitioners would play in the evolving health-care delivery system?
- How would changing the payment method affect health-care costs for patients, third-party payers, and society?

Organization of the Case Study

The case study is organized into five chapters and two appendixes. Chapter 1 presents a summary of the case study and in an addendum de-

fines and describes NPs, PAs, and CNMs. Chapters 2 through 4 discuss the contributions of NPs, PAs, and CNMs to health care. Chapter 2 addresses the quality of care, reviewing studies that compare the care provided by NPs, PAs, and CNMs with that provided by physicians and studies that gauge patients' satisfaction with and physicians' acceptance of the care provided by NPs, PAs, and CNMs. Chapter 3 considers access to health care; and chapter 4 focuses on productivity, costs, and employment. Chapter 5 analyzes what implications various payment modifications would have for the employment and practice of NPs, PAs, and CNMs and for health-care costs; examines the effects new developments in the health-care sector could have on NPs, PAs, and CNMs; and assesses how payment modifications in the context of a rapidly changing health-care system might influence the roles of these practitioners and the costs of health care.

Appendix A describes the method of the study and acknowledges the assistance of the individuals and organizations that reviewed this case study and provided valuable advice on its content. Appendix B presents a detailed description of payment for the services of NPs, PAs, and CNMs by third-party payers in the public and private sectors.

SUMMARY

Understanding how the use of NPs, PAs, and CNMs affects the quality of care, the access to care, the productivity of providers, and the costs of care is crucial for analyzing the effects of alternative policies regarding payment for the services of these providers. Drawing general conclusions is possible, despite the methodological limitations of many studies.

Contributions of NPs, PAs, and CNMs

Direct measurement of the quality of the care provided by NPs, PAs, and CNMs is not possible at this time. Instead, the quality must be gauged by comparing their care with the care provided by physicians; by examining the extent to which patients are satisfied with the care provided by NPs, PAs, and CNMs; and by assessing physicians' acceptance of such care. Many studies that analyze these relationships are methodologically flawed and almost none examine the quality of services provided without physician involvement.

The weight of the evidence indicates that, within their areas of competence, NPs, PAs, and CNMs provide care whose quality is equivalent to that of care provided by physicians.[3] Moreover, NPs and CNMs are more adept than phy-

[3]This study examined the quality of the care provided by NPs and PAs in primary-care ambulatory settings and the quality of care provided by CNMs in ambulatory and inpatient settings.

Photo credit: *American College of Nurse-Midwives*

CNM's improve quality of care and access to care by providing person-oriented services such as health education and counseling.

sicians at providing services that depend on communication with patients and preventive actions. The evidence indicates that PAs also perform better than many physicians in supportive-care and health-promotion activities. Patients are generally satisfied with the quality of care provided by NPs, PAs, and CNMs, particularly with the interpersonal aspects of care. Although most physicians who employ these practitioners are satisfied with their performance, physicians' willingness to delegate medical tasks is limited. Many physicians are more comfortable delegating the routine tasks related to primary care, such as taking histories, than the more technical procedures, such as physical examinations. Employment statistics also reflect physicians' acceptance of these practitioners.

Historically, NPs, PAs, and CNMs have been credited with improving the geographic distribution of care, because many of them have been willing to locate in underserved rural and inner-city areas. As a result of increases in the supply of physicians, some physicians are beginning to practice in smaller communities. Although some experts believe that the maldistribution of physician manpower will improve over time, access to primary care is still limited and may persist as a problem in certain geographic areas. How changing patterns in the distribution of primary-care physicians will affect the employment and the practice patterns of NPs, PAs, and CNMs is uncertain, but these practitioners will continue to play valuable roles in underserved areas.

In addition to improving access to care in rural areas, **NPs, PAs, and CNMs increase access to primary care in a wide variety of nongeographic settings and for populations not adequately served by physicians.** Studies have shown, for example, that NPs increase access to primary care for underserved children in school settings, and elderly patients in nursing homes. CNMs provide effective and low-cost maternity care to underserved, socioeconomically high-risk pregnant women and adolescents. NPs, PAs, and CNMs have also improved access by adding to the scope of primary-care services available to patients. NPs and PAs are competent in guiding individuals through today's complex health-care system and in caring for chronically ill adults and children. Preliminary reports indicate that NPs and PAs also increase access to primary care in other settings, such as, in the home and in correctional institutions, where needed medical care is not always available.

In principle, the scope of NPs' and PAs' practice encompasses most of the primary-care services provided by their physician counterparts. **Productivity studies indicate that NPs and PAs working under physicians' supervision can increase total practice output** by some **20** to **50** percent. Increases in productivity resulting from the use of NPs and PAs vary widely depending on the practice settings, on the responsibilities delegated to these practitioners, on the severity and stability of the patients' illnesses, and on how the physicians choose to use the free time that results from delegating tasks. Although much less information on productivity is available for CNMs than for NPs and PAs, **the degree to which CNMs can substitute for physicians appears to be considerable.**

Indirect evidence indicates these providers could decrease costs to employers and society. Employment levels for NPs, PAs, and CNMs suggest that health-care providers consider these practitioners to be cost-effective substitutes for physicians in delivering many services. From a societal standpoint, training NPs, PAs, and CNMs costs much less than training physicians. **Given that the quality of care provided by NPs, PAs, and CNMs within their areas of competence is equivalent to the quality of comparable services provided by physicians; using NPs, PAs, and CNMs rather than physicians to provide certain services would appear to be cost-effective from a societal perspective.**

Effects of Changing Payment Methods

Although the evidence indicates that NPs, PAs, and CNMs have made positive contributions to the delivery of health care, **these practitioners have not been used to their fullest potential. Major obstacles to the greater employment and appropriate use of NPs, PAs, and CNMs are that most third-party payers do not cover (authorize for payment) the provision by NPs, PAs, and CNMs of many services that are typically and characteristically provided by physicians, and, in those instances where third-party payers do cover**

the services of NPs, PAs, and CNMs, the payments are most often indirect (i.e., to the employing physicians or institutions) rather than direct (i.e., to the NPs or CNMs). PAs have not sought direct payment.

Most NPs, PAs, and CNMs are employed in organized settings where employment is usually not contingent upon coverage, However, the reluctance of some physicians in private practice to hire these practitioners stems partly from uncertainties about payment for their services. NPs and CNMs in independent practices must depend on patients' out-of-pocket payments. Some third-party payers in the public and private sectors cover the services of NPs, PAs, and CNMs (see table 1-1). Coverage and direct payment has been mandated most often for CNMs, and to some extent they have been able to operate with suitable physician collaboration.

The effects of extending coverage for the services of NPs, PAs, and CNMs and paying directly for the services of NPs and CNMs would undoubtedly be influenced by the markets for their services. The health-care system is currently undergoing substantial changes in the supply of physicians and in physicians' practice arrangements. Innovations in methods of paying other providers are multiplying. For example, some third-party payers are paying prospectively for hospitals' inpatient services (e.g., Medicare is paying on the basis of diagnosis related groups[4]), and cavitation[5] is a growing mode of payment. These changes, along with the fact that an increasing proportion of the population is aged 65 or older, and thus in need of significant amounts of health-care services, have major implications for the employment and use of NPs, PAs, and CNMs and for health-care costs. The uncertainty surrounding the markets for the services of NPs, PAs, and CNMs in a health-care system in a state of flux makes it difficult to predict the effect of payment changes.

[4]Diagnosis related groups are groupings of diagnostic categories drawn from the International Classification of Diseases and modified on the basis of surgical procedures, patients' age, significant comorbidities or complications, and other relevant criteria. DRGs are the case-mix measure mandated for Medicare's prospective hospital payment system by the Social Security Amendments of 1983 (Public Law 98-21).

[5]Cavitation payment is prospective payment of a per-capita amount for all services received by an enrollee or beneficiary during a given period.

Table 1-1.—Coverage and Direct Payment for Services[a] of Nurse Practitioners, Physician Assistants, and Certified Nurse. Midwives

	Nurse practitioners		Physician assistants		Certified nurse-midwives	
Third-party payer	Coverage	Direct payment	Coverage	Direct payment	Coverage	Direct payment
Medicare:						
Part A	No	No	No	No	No	No
Part B	No	No	No[b]	No	No	No
HMO s[c]	Yes	NA	Yes	NA	Yes	NA
State Medicaid programs[d]	Some programs	A few programs	Some programs	None	Almost all programs	Almost all programs
Medicare and Medicaid:						
Rural Health Clinics	Yes	No	Yes	No	Yes	No
CHAMPUS [e]	Yes	Yes	No	No	Yes	Yes
FEHBP [f]	7 plans	7 plans	6 plans	6 plans	20 plans	20 plans
Private insurance	In some States	In some States	No	No	In some States	In some States

NA = not available.
[a]Services that are typically and characteristically provided by physicians.
[b]During the publication of this case study, the Omnibus Reconciliation Act of 1986 (public Law 99-509) was enacted. The act modifies part B of Medicare and authorizes payment for (covers) services of physician assistants working under the supervision of physicians in hospitals, skilled nursing facilities, intermediate-care facilities, and as an assistant at surgery The payment is indirect and at levels lower than physicians would receive for providing comparable services.
[c]Health maintenance organizations
[d]State Medicaid programs have the option of including Np and PA Services in their State Medicaid Plans. Congress mandated coverage of CNMs' services in 1980. As of January 1985, all States in which CNMs practiced either were complying with the law (Public Law 96-499) or were considering changes in their Medical plans to comply with the law
[e]Civilian Health and Medical Program of the Uniformed Services.
[f]Federal Employees Health Benefit Program. FEHBP has 21 fee-for-service plans, some of which authorize PaYment to NPs, PAs, and CNMs.
[g]Whether State laws and regulations require or permit insurance coverage and direct payment for the services of NPs, PAs, and CNMs

SOURCE Office of Technology Assessment, 1986.

The effect of modifying the payment system to cover and allow direct payment for the service of NPs, PAs, and CNMs depends on their employment setting. Such changes could spur the growth of NPs' and CNMs' independent fee-for-service practices and joint practices with physicians, to the extent permitted under State laws and regulations. Because CNMs are currently less limited than NPs by payment limitations of third-party payers, NPs would benefit most from coverage and direct payment.

Even with coverage and direct payment, the number of NPs and CNMs engaging in independent practice should be expected to remain very small. In addition to the restriction imposed by State laws and regulations, there are many difficulties in undertaking such a practice, including high startup costs, obtaining malpractice insurance, and high premium malpractice insurance rates. NPs in independent practices also depend on physician referrals to establish a clientele. Concerns expressed by physicians and the current competitive market suggest that such referrals might not be forthcoming, Independent practices of CNMs are limited by physician concern with competition and difficulty in obtaining physician collaboration and hospital privileges. Although many patients might continue to prefer a physician, direct payment would give patients the choice of a wider range of providers.

One possible drawback of coverage and direct payment is that additional covered providers might increase the volume of services provided and increase costs to patients and third-party payers. Although the sparsity of conclusive data makes it difficult to allay this concern, the increasing emphasis most third-party payers place on monitoring the use of services might help control any increase in the volume of services provided.

Because of their potentially small number, NPs and CNMs in independent practice might not seriously affect costs. However, NPs and CNMs in administratively independent practices could potentially lower costs to third-party payers, patients, and society. If the provision of services by NPs, CNMs, and physicians did not increase,[7] and if NPs' and CNMs' payment level were lower than those of physicians for comparable services, lower costs for third-party payers would be likely. If the fees to patients reflected the lower payment levels, costs to patients' and society could be lower. For primary care services, such as office visits, savings to patients would be small, because the fee for the service is small, and because insurance usually covers most of the providers' fees. Savings for maternity care could be important, because the care itself is costly and insurance coverage is incomplete. Patients, third-party payers, and society could have lower costs if the total costs of care provided by these practitioners was lower than the total costs of care provided by physicians for similar medical conditions.

NPs and CNMs in independent practices would benefit by being able to offer lower prices as a competitive strategy. Individual practice association (IPA)-model health maintenance organizations (HMOs), which contract with individual physicians for services, might turn to NPs as contractors for primary-care services and CNMs as contractors for maternity services. Preferred provider organizations (PPOs), which contract with providers to supply services at discounted fees, might also consider NPs and CNMs as contractors. These developments, however, would be limited by the increasing availability of primary-care physicians (including obstetricians) and other barriers (see box 1-A). Moreover, physicians appear to be engaging in price competition as a result of the changing health-care market.

How coverage for NPs, PAs, and CNMs would affect their employment and appropriate use by fee-for-service physicians' practices is uncertain, because many variables affect physicians' decisions to employ these practitioners and to dele-

[6]Such practices would be administratively independent. Administratively independent practices are not clinically independent from physicians when NPs and CNMs are performing delegated medical tasks. In addition to the nursing profession's agreement to clinical collaboration with physicians, State laws and regulations that proscribe the scope of practice of NPs and CNMs and specify requirements for physician supervision serve as a more formal control on clinical independence. NPs and CNMs may legally be clinically independent from physicians when performing nursing tasks.

[7]No direct evidence is available as to how coverage and direct payment would affect the volume of services provided by NPs and CNMs. Although research on physicians' influence on the volume of services has been conducted for many years, none of the studies unequivocally proves the magnitude or even the existence of physicians' ability to control the volume of services (246).

gate tasks commensurate with the training of these providers. If NPs', PAs', and CNMs' services were authorized for payment, some physicians might be encouraged to employ and integrate these providers into their practices, knowing that practices that employ NPs and PAs are better able to offer competitive prices and broader ranges of services than are other practices (17). Some physicians might find it advantageous to hire new physicians, rather than NPs, PAs, or CNMs, because the rate at which physicians' income is growing is decreasing, and new physicians are expressing interest in salaried positions and are willing to work for less money than established physicians earn. Employing physicians, rather than NPs, PAs, or CNMs, might make some practices more competitive, because of the status patients often confer on physicians. Physicians with declining patient bases might not be able to justify taking on additional providers and expenses and might compete by increasing the time spent with individual patients.

The advantages of extending coverage for NPs', PAs', and CNMs' services in fee-for-service settings is apparent in certain settings, for certain populations and where there are demonstrated shortages of trained personnel. For example, rapid growth in the elderly population and in the use of nursing-home care has raised concerns about the quality and costs of such care. Not only has physicians' disinterest in visiting elderly residents of nursing homes (166) been established, but there are very few physicians trained in geriatrics (126). Furthermore the elderly institutionalized population is growing. Although more and better physician care for these patients may be available in the future, their ability to furnish all the health needs of this group is questionable. The geriatric component of many of the training programs of NPs and PAs has been increased and the 1- to 2-year length of NP and PA training programs makes NPs and PAs readily available for providing care. NPs and PAs have the demonstrated ability to provide care for a population with chronic problems and functional disabilities. Coverage would permit NPs and PAs[8] to legally provide the primary care services for which they are trained and licensed—services that many nursing homes find difficult to supply.

Photo credit: American Nurses Association

Extending coverage for NPs to provide primary care services to elderly nursing home residents would alleviate a demonstrated shortage of trained personnel for that population.

If coverage were extended, NPs and PAs would most likely provide nursing home visits as employees of physicians' practices or as team members in group practices to provide nursing-home visits. If NPs were paid directly, they could function as independent practitioners, supplying primary-care services to nursing homes. Except when more intensive care can be substantiated, the Medicare program currently limits the frequency of physicians' visits to nursing homes, so third-party payer costs in this setting might not be affected as long as payment levels were the same for NPs and PAs as for physicians. Total costs to third-party payers would probably decrease because visits to nursing homes by teams of physicians and NPs or PAs would decrease the use of hospital facilities (128,155,257).[9]

[8]During the publication of this case study, the Omnibus Reconciliation Act of 1986 (Public Law 99-509) was enacted. The act changes the Medicare law and authorizes the coverage of the services furnished by PAs under the supervision of physicians in skilled nursing facilities and intermediate care facilities in States where PAs are legally authorized to perform the services. This provision takes effect Jan. 1, 1987. Payments, which go to the employer are 85 percent of the prevailing charges of physician services for comparable services provided by nonspecialist physicians.

[9]As app. B describes, a number of other Medicare and Medicaid regulations specific to nursing homes limit the roles of NPs and PAs and specify services that must be performed by physicians in order for the nursing homes' services to be covered. In addition to permitting coverage under Medicare and Medicaid, amendments to these regulations would be required in order to encourage the employment and appropriate use of NPs' and PAs' services in this setting.

Coverage for the services of NPs and PAs could also be advantageous for home-bound elderly patients and for allowing pediatric NPs to care for chronically ill children at home. Medical teams of pediatricians and PNPs—with the PNPs providing routine care, teaching children at home, and monitoring the program—have been shown to be effective in minimizing the social and psychological consequences of chronic illness **(234).** CNMs could be covered for the maternity care of pregnant disabled women, in cases where the disabling condition did not complicate the pregnancy and birth process. Such women might benefit from the individualized care that CNMs typically provide.

Coverage would be advantageous in rural areas where the lack of medical personnel is a persisting problem. Although the Rural Health Clinics Services Act of 1977 extended coverage to NPs, PAs, and CNMs working in rural clinics, not all residents of such areas have access to clinics. Coverage for NPs, PAs, and CNMs might encourage their use by physicians in fee-for-service practices in rural areas who, because of fewer numbers, must see considerably more patients and work longer hours than their urban counterparts. Furthermore, direct payment might encourage qualified NPs and CNMs to move into unserved and underserved areas to expand access to heath care.

Competition among health-care organizations and the growth of HMOs—which have employed and used NPs, PAs, and CNMs extensively in the past—augurs larger roles for these providers in the health-care system as employees of HMOs. Cavitation, the method used to pay most HMOs, does not require providers to bill for specific services, and the services provided by NPs, PAs, and CNMs in such settings are, for the most part, already covered by public and private third-party payers. Thus, **coverage and direct payment for the services of these practitioners would not directly affect their employment by HMOs.**

Such employment might diminish, however, if competition leads physicians to accept salaries that are sufficiently low to entice HMOs to employ physicians instead of NPs, PAs, or CNMs. Another factor that might negatively affect HMOs' employment of these practitioners is the increase in the number of IPA-model HMOs. Because they are primarily organized around physicians who usually practice in private offices, IPA-model HMOs are less likely than are large group- or staff-model HMOs to employ these providers. Although the number of IPA-model HMOs has increased, the group- and staff-model HMOs have the greatest number of enrollees.

The data suggest that NPs, PAs, and CNMs offer financial savings to capitated HMOs. An increasingly competitive environment might encourage providers to pass on to consumers the savings generated by the employment and appropriate use of NPs, PAs, and CNMs, which would benefit society.

Providing **coverage or** direct payment for the services of NPs, **PAs, and CNMs would not necessarily affect their employment by hospitals for inpatient care.** NPs, PAs, and CNMs who work in hospitals are usually hospital employees, and the hospitals pay their salaries. Furthermore, there is no statutory permission or lack of permission under Medicare or Medicaid for payment of NPs', PAs', or CNM's services as inpatient hospital services when these providers are employed by hospitals. Most other third-party payers are also silent on this issue. With coverage, these services could be billed for as professional services.

POLICY CONCLUSIONS

NPs, PAs, and CNMs have made important contributions to meeting the Nation's health-care needs by:

- improving the quality and accessibility of health-care services; and
- increasing the productivity of medical practices and institutions.

These practitioners have been accepted in a wide range of settings under many different payment schemes, have the potential to reduce health-care

costs, and clearly play legitimate roles in the health-care system.

Although NPs, PAs, and CNMs are not employed and used to their fullest potential, many third-party payers in the public and private sectors are gradually lowering the barriers presented by current payment methods and coverage restrictions.

Although Federal third-party payers vary considerably in the extent of their coverage of and payment for the services of these providers, in general, coverage and direct payment is limited (see app. B). Federal third-party payers could be more in step with new and evolving payment practices by liberalizing coverage and payment restrictions for the services of NPs, PAs, and CNMs. A major policy question is the manner of liberalizing coverage and policy restrictions. Coverage could be extended for NPs', PAs', and CNMs' services in all settings or only in certain settings. Direct payment for the services of NPs and CNMs would further remove barriers to practice. (PAs have not sought direct payment.)

How extending coverage for the services of NPs, PAs, and CNMs in all settings would affect their employment and use varies on the setting:

- little change would occur in HMOs and inpatient hospital settings; and
- the effect in physician fee-for-service practice settings is unclear.

Coverage for the services of NPs, PAs, and CNMs by additional payers would have little effect on the employment and use of these providers by HMOs or by hospitals for inpatient care. While important changes in employment opportunities could occur in physician fee-for-service practices, the direction of change is not clear because of the large number of variables that affect physicians' decisions. Since the effect on costs is directly related to the extent of employment, this question also remains unanswered.

Extending coverage for NPs', PAs', and CNMs' services in all settings or limiting coverage for their services to certain settings where health-care services are currently inaccessible or inadequate would benefit certain individuals, such as:

- those in certain locales (geographically underserved rural and inner-city areas);
- those in certain settings (e.g., homes and nursing homes); and
- specific populations (e. g., some disabled pregnant women and some chronically ill patients, both adults and children).

Covering the services of NPs, PAs, and CNMs might encourage physician fee-for-service practices to employ these providers and use them in settings and for populations that are not receiving sufficient and adequate care. Because payment would be to employing physicians, physicians would have the final authority for the employment and the exact nature of NPs', PAs', and CNMs' responsibilities. Physicians would have to recognize the advantages of using NPs, PAs, and CNMs in their practices for providing care to unserved and underserved individuals.

Direct payment as well as coverage for services of NPs and CNMs might enable them to develop independent practices in competition with physician practices. Legal and financial restrictions could be expected to keep the numbers of NPs and CNMs in independent practice very small. Competition from an increasing supply of physicians might offset the gains direct payment would bring to the independent practice of NPs and CNMs.

How adding these practitioners, particularly as independent practitioners, to the health-care system, would affect costs cannot be resolved at this time. The suspicion exists that total costs would increase, but data are not available to answer the question. If costs increased due to an increase in the provision of services, volume controls could be instituted.

If the overall volume of services did not increase, and if the NPs' and CNMs' payment levels were lower than physicians' levels for comparable services, third-party payers' costs might decrease. Patients might realize savings from decreases in the fees for some services. The extent of any savings would depend on what payment levels were established. In any event, patients could choose from a wider range of providers and might have greater access to primary-care services.

Direct payment for the services of NPs and PAs could be limited to certain settings where there are demonstrated shortages of primary or maternity care services. For example, direct payment might be provided to NPs and CNMs who increase geographic access to care. NPs and CNMs in independent practice may prove a viable solution for meeting the health-care needs of sparsely populated areas that cannot support a physicians' practice. However, limiting direct payment to certain areas and populations may not be an efficient cost containment measure because of the potentially small number of independent practices.

It seems clear that coverage for the services of NPs, PAs, and CNMs in at least some settings could improve health care for segments of the population that are not being served adequately. How coverage would affect costs is unclear, but the long-term result could be notable savings. The effect of direct payment on costs is even less certain, but it might enable NPs and CNMs to practice in unserved and underserved areas to expand access to health care.

ADDENDUM: DEFINITIONS AND DESCRIPTIONS

Descriptions of the general roles of NPs, PAs, and CNMs indicate the similarities and differences of these three types of health practitioners. (See table 1-2 for a comparison of their general characteristics.)

> Today's nurse, operating in an expanded role as a professional nurse practitioner, provides direct patient care to individuals, families and other groups in a variety of settings. . . . The nurse practitioner engages in independent decisionmaking about the nursing needs of clients, and collaborates with other health professionals, such as the physician, social worker, and nutritionist in making decisions about other health needs. The nurse working in an expanded role practices in primary, acute, and chronic health care settings. As a member of the health care team, the nurse practitioner plans and institutes health care programs.
>
> —*GEMNAC, 1979*

> The purpose of the physician assistant in primary care is to help the physician provide personal health service to patients under his care. An assistant works with a supervising physician in performing clinical functions and tasks which prior to the mid-1960s were reserved principally if not solely for performance by the physician.
>
> —*Allied Health Education Directory,* 1985

> [Nurse-midwifery practice is] the independent management of care of essentially normal newborns and women, antepartally, intrapartally, postpartally and/or gynecologically [and] occurs within a health care system which provides for medical consultation, collaborative management, and referral.
>
> —*American College of Nurse-Midwives,* 1984

PAs differ from NPs and CNMs in their working relations with physicians. PAs always work under physicians' supervision, whereas NPs and CNMs work under physicians' supervision, or in collaborative relationships with physicians and other health professionals. Another major difference lies in the training these practitioners undergo. NPs and CNMs are licensed registered nurses[10] who have received advanced training beyond that of other registered nurses. NPs are trained as generalists in the provision of primary care services. They may choose to specialize at the graduate level and deal with specific populations, as do geriatric or pediatric NPs. CNMs receive advanced training in midwifery. PAs, however, are not required to be registered nurses, and the great majority are not. They come from a variety of backgrounds and experiences before training to become PAs. Most PAs have had 3 or more years of college-level education or several years

[10]Three types of nursing education lead to registered-nurse licenses: 2-year community-college programs; 3-year hospital-affiliated diploma programs; and 4-year baccalaureate-degree programs. The trend to make nursing education more academic and uniform is reflected in the discontinuation of many hospitals' diploma programs, although this has not resulted in an increased demand for baccalaureate education for nurses.

Table 1-2.—Comparison of Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives

	Nurse practitioners	Physician assistants	Certified nurse-midwives
Date of first educational program	1966	1965	1931
Approximate number trained	25,000 to 30,000[a]	18,116[b]	3,500[c]
Approximate number employed in field of training[d]	15,433[e]	16,000[f]	2,000[g]
Services	Provide medical services within limits of competence; provide counseling and health-promotion services	Provide medical services as assistants to physicians	Provide full range of prenatal, labor, delivery, and postpartum care; family-planning counseling, and gynecological services
Role	Provide advanced nursing services, including working with clients having complex or multiple needs; provide medical services in collaboration with physicians and other health providers	Provide medical care under supervision of physicians	Provide midwifery services in consultation with physicians, mainly serve low-risk women; increasingly work administratively independent of physicians
Settings	Mainly primary care; trend toward hospitals, long-term care facilities, and other settings	Mainly primary care; trend toward hospitals, long-term care facilities, and other	Hospitals, trend toward birthing centers, health departments, and family planning clinics
Education	Registered nurse with additional training, increasingly at masters level	Special academic and on-the-job training	Registered nurse with additional training, about half at masters level
Approximate average income	$25,975[h]	$27,560[i]	$25,000[j]

[a]Estimated by Denise Geiot, Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, Public Health Service U S Department of Health and Human Services, Rockville, MD, personal communication, Aug 20, 1966
[b]American Academy of Physician Assistants, "AAPA Membership Statistics by Graduation Date," Arlington, VA, May 13, 1986
[c]Estimated by American College of Nurse-Midwives, Washington, DC, personal communication Aug 20, 1986.
[d]The figures for NPs and CNMs are from 1980 Later data from the U S Department of Health and Human Services, Public Health Service Health Resources and Services Administration, Bureau of Health Professions, Division of Nursing, " 1984 National Sample Survey of Registered Nurses, " Rockville, MD Indicates that the aggregate number of employed NPs and CNMS is 18642
[e]National Sample Survey of Registered Nurses, November 1980, in "Registered NursePopulation and Overview, " U S Department of Health and Human Services Public Health Service, Health Research Services Administration. Publication No HRS-P-OD-83-1, November 1982
[f]Estimated by Gretchen Shafft, American Academy of Physician Assistants, Arlington, VA, personal communication, Sept 15, 1986
[g]Estimate from Kathy Michels Assistant Director, Congressional and Agency Relations, American Nurses' Association, Washington DC personal communication June 17, 1986
[h]U S Department of Health and Human Services Public Health Service, Health Resources and Services Administration, Bureau Of Health professions Division of Nursing, 1984 National Sample Survey of Registered Nurses, " Rockville, MD
[i]American Academy of Physician Assistants, 1984 *Physician Assistant Masterfile* Survey (Arlington, VA 1984)
[j]AmericanCollege of Nurse Midwives. Washington DC, personal communication Aug 20, 1986

SOURCE Off Ice of Technology Assessment 1986

of experience in health-related fields, although these are not entrance requirements for the training programs.

Certification is available to all three types of health practitioners and is required for CNMs. Certification is offered to registered nurses by the American Nurses Association, by nurse-specialty associations and by some academic nursing-education programs. An NP can be certified after completing either an NP-master's program or an NP-certificate program. Master's degree programs require applicants to have baccalaureate degrees and registered-nurse licenses, and such programs entail an average of more than a year of additional training. Certificate programs are generally a year long and require registered-nurse licenses. CNMs are certified according to the requirements of the American College of Nurse-Midwives. PAs are certified by the National Commission of Certification of PAs.

CNMs are trained to provide care for essentially normal expectant mothers and to handle abnormal cases by referring the patients to physicians or by consulting physicians or working jointly with them. Specific functions include providing prepartum care, managing normal deliveries, providing postpartum care, providing gynecological care, providing care to normal newborns and infants, and providing family-planning services.

NPs are taught to perform functions beyond those of traditional nursing and to assume responsibility for some of the care usually provided by physicians (see box I-B). PAs are also trained to provide some of the services typically provided by physicians (see box I-B). PAs are trained in

Box 1-B.—Functions of Nurse Practitioners and Physician Assistants

Nurse Practitioners

The nurse practitioner is the professional nurse trained to provide the full range of primary-care services in the community setting. The American Nurses Association described the NPs' functions referred to in the original Nurse Training Act of 1971 as:

> . . . obtaining a health history, assessing health-related status, entering a person into the health care system; sustaining and supporting persons who are impaired, infirm, or ill and during programs of diagnosis and therapy; managing a medical care regimen for acute and chronically ill patients within established standing orders; aiding in restoring persons to wellness and maximum function; teaching and counseling persons about health and illness; supervising and managing care regimens for normal pregnant women; helping parents in guidance of children with a view to their optimal physical and emotional development; counseling and supporting persons with regard to the aging process; and supervising assistants to nurses (46).

Physician Assistants

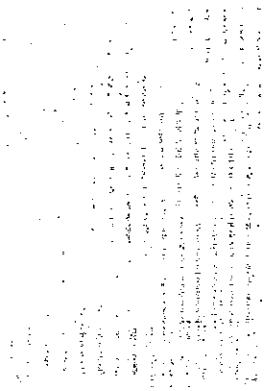
Physician assistants (PAs) are skilled members of the health-care team who, working dependently with physicians and under their supervision, provide diagnostic and therapeutic patient care (258). They are trained to obtain a patient's medical history, perform comprehensive physical examinations and minor surgical procedures, order and complete routine diagnostic tests, develop diagnostic and management plans, provide basic treatment for persons with common illnesses, and respond appropriately to life-threatening emergencies. PAs are also trained to counsel patients on preventive health-care topics and to facilitate the referral to the community's health and social service agencies when appropriate (20). The curricula of the surgeon's assistant programs are structurally similar to programs for primary care PAs, except they place greater emphasis on clinical and technical skills related to surgical patient care . . . Surgeon assistants (graduates of specialized training programs) and PAs with training in surgery often act as first or second assistants in major surgery (255).

interpersonal skills, but not to the extent that NPs and CNMs are. Indeed, counseling and health education are traditional dimensions of nursing practice. Although many PAs pursue medical and surgical subspecialties, this study focuses on those PAs who are primary-care practitioners in ambulatory settings.

The roles PAs and NPs play depend on their work settings. In some settings, no functional distinctions between NPs and PAs exist; in other settings the two types of providers function very differently. NPs, as registered nurses, perform the full scope of nursing practice in addition to performing medical tasks, whereas PAs only perform medical tasks. In reality, NPs and PAs often perform the same roles, and evaluations often focus on NPs and PAs collectively, rather than on either NPs or PAs alone.

Chapter 2

Quality of Care



Chapter 2

Quality of Care

Because health care encompasses both technical care and the art of care (146), the quality of both must be assessed in determining the quality of the care provided by nurse practitioners (NPs), physician assistants (PAs), and certified nurse-midwives (CNMs). Technical care comprises the diagnostic and therapeutic components of care; the art of care refers to the environment in which care is provided and the provider's manner and behavior in caring for and communicating with the patient (146).

INDICATORS OF QUALITY

Current methods of evaluating the quality of care provided by NPs, PAs, and CNMs are inexact. Structure, process, and outcome of care are traditionally used to measure the quality of care provided by physicians (70).[1] The quality of care provided by NPs, PAs, and CNMs is often evaluated by comparing the process and outcome[2] of the care they provide with the process and outcome of the care physicians deliver. Other accepted indicators of the quality of care provided by NPs, PAs, and CNMs are patients' satisfaction and, to a lesser extent, physicians' acceptance.[3]

Comparisons With Physicians

The quality of care provided by NPs, PAs, and CNMs can be compared to the quality of care provided by physicians with regard to only those functions that both physicians and NPs, PAs, and CNMs usually perform. Comparisons based on functions outside the scope of NPs', PAs', and CNMs' training and practice, or on functions that physicians do not usually perform are unreasonable.

Comparison studies are biased against NPs, PAs, and CNMs because the studies assume the medical model as the standard—physician care is considered the standard for care. This standard may be appropriate for measuring the technical quality of the tasks that NPs, PAs, CNMs, and physicians perform. But the medical model may be less suitable for measuring the interpersonal quality or art of care, which is more characteristic of care provided by NPs, PAs, and CNMs than of that provided by physicians. Indeed, health promotion, teaching, and counseling are the essence of nursing education and are also stressed in the curricula for training NPs and CNMs. PAs also receive training in interpersonal skills, but to a lesser extent. Physicians can legally provide health education and counseling, but the training in these skills varies among medical specialties and medical schools. Among physicians, only family practitioners and psychiatrists receive extensive training in interpersonal skills, although some physicians in all specialties provide personal care.

Some other comparison studies are biased in favor of NPs, PAs, and CNMs. In studies where patients are not randomly assigned, patients assigned to NPs, PAs, and CNMs are, on the whole, healthier than patients who see physicians exclusively; and either the practitioners or patients can decide to consult physicians at any time. Of those patients who consult physicians, those who choose to remain exclusively under the physicians' care

[1] Structural measures evaluate descriptive characteristics of facilities and providers, e.g., the soundness of a building and the board certification of a physician. Process measures evaluate what a provider does to and for a patient, e.g., order a cardiogram for a patient with chest pain. Outcome measures evaluate the result of patient care, i.e., health status. Although outcome measures are the most accurate available measure of quality, they are difficult to obtain. (For a discussion of the problems associated with measuring the outcome of care, see OTA's 1986 report, *Payment for Physician Services: Strategies for Medicare* (246).)

[2] The structural measures applicable to NPs, PAs, and CNMs include their certification, and the accreditation of their training programs and of their continuing education programs.

[3] Although acceptance and satisfaction are not synonymous, the literature uses the words interchangeably in describing positive responses to NPs, PAs, and CNMs and the care they provide.

most likely are less healthy than those who return to the NPs, PAs, or CNMs.

Patients' Satisfaction

Looking to patients' satisfaction as an indication of quality of care reflects an increasing sensitivity to patients' interests and concerns and a recognition that outcomes partly depend on patients' attitudes. Little evidence, however, suggests that patients' satisfaction positively correlates with favorable technical outcomes **(70).** Patients' judgments may be based less on the therapies' success than on the interpersonal aspects of care—for example, on how courteously patients felt they were treated, how they assessed the value of the advice they received, on how much time they spent with the providers, and on how their emotional states changed (267). Nonetheless, if patients are dissatisfied with the services they receive, part of the reason for their dissatisfaction may be that their expectations have not been fulfilled.

Malpractice insurance premium rates and malpractice claims can also be used to judge patients' satisfaction. The comparison between physicians and NPs, PAs, and CNMs is crude because the number and scope of services provided by physicians differ from those provided by NPs, PAs, and CNMs. The interpersonal aspects of care appear to influence malpractice cases: physicians who maintain good relations with their patients tend to be sued less frequently than physicians who lack rapport with their patients (185).

Physicians' Acceptance

Some authorities reject the notion that physicians' acceptance of NPs, PAs, and CNMs indicates that the care they provide is good. Other authorities believe that physicians' acceptance of such providers indicates good care to the extent that physicians evaluate the care given by the providers against the standard of physicians' care. Physicians' evaluations of the care provided by NPs, PAs, and CNMs in their employ, however, might be affected by the physicians' fiscal interests. Physicians pleased with the financial results of employing NPs, PAs, or CNMs might view these providers favorably, whereas physicians displeased with the financial results might show their displeasure in negative assessments of the work of these providers. Other subjective factors, such as gender or personal acquaintance, might influence the degree to which physicians accept NPs, PAs, and CNMs. Competition from NPs and CNMs in independent practice, for example, certainly influences physicians' acceptance of such practitioners.

METHODOLOGICAL PROBLEMS OF STUDIES

One or more common methodological problems affect most studies of the quality of care provialed by NPs, PAs, and CNMs. The problems include using small samples, focusing on short-term outcomes, using nonrandomized study populations, applying single evaluation criteria, using incomplete and unstandardized medical records data, and choosing nonrepresentative samples or sites. Some studies, because they were conducted by educators and other proponents of NPs, PAs, and CNMs, might be biased in favor of the care given by these providers.[4]

Study designs contain other weaknesses. Some studies compare the processes and outcomes of care provided by NPs, PAs, and CNMs with the processes and outcomes of care provided by house staff rather than by experienced physicians. Study designs that compare only medical tasks as performed by physicians with tasks performed by NPs and CNMs are incomplete because they ignore the advanced nursing responsibilities that NPs and CNMs also fulfill.

There are a few well-conducted, randomized, controlled trials that are valid within their own designs. The conclusions of these trials, as well as other less rigorous studies, can be generalized—applied to other populations and settings—but

[4]No bias against NPs, PAs, and CNMs was apparent in the studies examined for this review.

only in a limited way. Many studies report on only a few NPs, PAs, or CNMs in only one setting, which limits the applicability of the findings for other providers and other settings.

Some of the studies of patients' satisfaction and physicians' acceptance are opinion surveys that, depending on the rigor of design and execution, are more or less flawed. Problems include misinterpretation of questions by respondents, investigators' bias in framing questions, and reliance on the respondents' memories. Little attention has been given to the systematic development of the questionnaires or measuring scales used by investigators.

QUALITY OF NURSE PRACTITIONERS' CARE

Comparisons With Physicians

Reviews of comparison studies (230,242) and individual studies comparing NPs and physicians find that the quality of care provided by NPs functioning within their areas of training and expertise tends to be as good as or better than care provided by physicians (50,51,72,104, 186,199,231).

In some cases, the quality of NP care is equivalent to physician care (see table 2-1). For example, NPs generally resolve patients' acute problems as well as physicians (130,139), and the functional status of patients treated by NPs and physicians is equivalent (212). Spitzer (231) found no difference between NPs and physicians in the adequacy of their prescribing practices. Other researchers found that NPs prescribe and use medications less frequently than do physicians, and that NPs tend to prescribe only well-known and relatively simple drugs (29,204,225). The studies did not ascertain whether the differences in the prescribing habits of physicians and NPs stem from differences in patient mixes, prescribing philosophies, or other causes.

The quality of NPs' care differs from that of physicians' care in other instances (see table 2-2). NPs appear to have better communication, counseling, and interviewing skills than physicians have (84,104,178), a conclusion reinforced by one literature review citing a number of "variables for which nurse practitioners received higher scores than physicians." These variables include:

> . . . amount/depth of discussion regarding child health care, preventive health, and wellness; amount of advice, therapeutic listening, and support offered to patients; completeness of history, including the recording of previous problems and followup of problems and therapies; completeness of physical examinations and interviewing skills, and patient knowledge about the management plan given to them by the provider (187).

Table 2-2 also suggests that NPs are especially good at assisting ambulatory patients with chronic problems such as hypertension and obesity **(189, 211).** After clinic visits for chronic problems, NPs' patients are less likely than physicians' patients to report that their activities are limited or that they experience anxiety about their problems **(139).** Whether NPs' interpersonal skills contribute to their ability to care successfully for patients with chronic problems has not been determined. Physicians, however, appear to provide better care in managing problems that require technical solutions (104).

Patients' Satisfaction

Overall, patients are satisfied with the care they receive from NPs (25,41,80,82,139,141,145,207, 231,265). Moreover, patients appear to be more satisfied with the care they receive from NPs than with care from physicians, in regard to several factors: personal interest exhibited, reduction in the professional mystique of health-care delivery, amount of information conveyed, and cost of care (41,145,190),

A few studies, however, indicate patients' dissatisfaction with one or more aspects of NPs' care or show patient preference for physicians' care. Patients are concerned about long waits to see NPs (145),[5] about how well NPs communicate with pa-

[5]This finding was consistent across 10 settings, including solo practices, university student-health centers, public health-department clinics, private-hospital outpatient clinics, and a health maintenance organization.

Table 2-1 .–Equivalence in Quality of Care Provided by Nurse Practitioners (NPs) and Physicians (MDs)

Activity or measure	Setting	Study type	Source
Process measures:			
Adequacy of pediatric physical assessment	Health center, low-income neighborhood	Retrospective chart review	Duncan, et al., 1971
Adequacy of prescribing medication	Two MD family practice	Randomized controlled trial	Spitzer, et al., 1974
Adequacy of the management of episodes of care	HMO	Prospective; chart review, timing of segments of patient visits	Spitzer, et al., 1974; Salkever, et al., 1982
Management of hypertensive patients	Rural primary care center	Retrospective chart review	Watkins and Wagner, 1982
Similarity of treatment plans for pediatric patients	Military outpatient clinic	Retrospective evaluation of NPs' and MDs' treatment plans	DiGirol and Parry, 1983
Short- and long-term compliance by patients	Emergency room	Prospective study with data collection at emergency room visit, short-term followup, and long-term followup	Powers, et al., 1984
Outcome measures:			
Patient's physical, emotional, and social functional status	Two MD family practice	Randomized controlled trial	Sackett, et al., 1974
Resolution of acute problems	Hospital ambulatory care clinics	Record review	Komaroff, et al., 1976
Resolution of acute problems	Prepaid group practice	Survey of providers and patients with telephone followup of patients at 1 week	Levine, et al., 1976
Reductions in pain or discomfort among pediatric patients.	Prepaid group practice	Survey of providers and patients with telephone followup of patients at 1 week	Levine, et al., 1976

SOURCE Process **measures:** M.T. DiGirol and W.H Parry, "Consultation to the Pediatric Automated Military Outpatient Systems Specialist (AMOSIST): A Comparison of Consultation by a Pediatric Clinical Nurse Specialist and by a Pediatrician, " *Military* Med. 148(4):364-367, April 1963; B. Duncan, A.N. Smith, and H.K. Silver, "Comparison of the Physical Assessment of Children by Pediatric Nurse Practitioners and Pediatricians, " *Am. J. Public Health* 60(6):1 170-1176, June 1971; M J. Powers, A Jalowiec, and P.A. Reichert, "Nurse Practitioner and Physician Care Compared for Nonsurgery Emergency Room Patients," *Nurse Practitioner* 9(2):39-52, February 1984; W O Spitzer, D L. Sackett, J.C Sibley, et al , "The Burlington Randomized Trial of the Nurse Practitioner," *N. Engl. J.* Med. 290(5):251-256, Jan. 31, 1974; L.O. Watkins and E.H. Wagner, "Nurse Practitioner and Physician Adherence to Standing Orders Criteria for Consultation or Referral," Am. *J Public Health* 72(1):22-29, January 1982.
Outcome measures: D.M. Levine, L.L. Morlock, Al. Mushlin, et al., "The Role of New Health Practitioners in a Prepaid Group Practice: Provider Differences in Process and Outcomes of Medical Care, " Med. Care 14(4):326-347, April 1976; A.L. Komaroff, K. Sawyer, M. Flately, et al., "Nurse Practitioner Management of Common Respiratory and Genitourinary Infections, Using Protocols, " *Nurs. Research* 25(2) '64-89, March-April 1976; D.L. Sackett, "The Burlington Randomized Trial of the Nurse Practitioner: Health Outcomes of Patients," *Annals Int* Med. 80(2):137-142, February 1974, D.S. Salkever, E A. Skinner, D.M. Steinwachs, et al., "Episode-Based Efficiency Comparisons for Physicians and Nurse Practitioners, " Med Care 20(2):143-153, February 1982.

tients (139), and about whether NPs can care for what patients perceive to be serious medical problems (131). Patients are dissatisfied with NPs who do not consult with physicians about diagnostic and treatment decisions (80,198). Some of these findings, particularly those having to do with waiting time and communication, contradict those of other studies (41,71,104,178,195), suggesting that some aspects of NPs' care may require further research.

Additional research on patients' satisfaction would be especially timely now, when the Nation's supply of physicians is growing, and more physicians seem to be locating in small towns (36,39,68,174,264), where a relatively large proportion of NPs have been providing health services. Any factors that might contribute to patients' dissatisfaction with NPs' care are likely to limit the employment and use of NPs as the growing supply of physicians allows more consumers to choose between NPs and physicians.

Malpractice insurance premiums and the incidence of malpractice claims indicate that patients are satisfied with NP care. Although insurance premiums for NPs are increasing, successful malpractice suits against them remain extremely rare. Not surprisingly, most of the estimated $1.4 billion in malpractice claims paid in the United States in 1984 (62) resulted from suits against physicians, particularly physicians in the surgical subspecialties. Physicians, however, far outnumber other types of providers, generally deal with the most complex cases, and have more financial resources than other providers.

Table 2-2.—Difference in Quality of Care Provided by Nurse Practitioners (NPs) and Physicians (MDs)

Activity or measure	Relative quality of care by NPs and MDs	Setting	Study type	Source
Process measure:				
Number of diagnostic tests	NP > MD	Hospital outpatient clinic	Random assignment of patients record review, time and motion studies, patient interviews	Flynn 1974
Number of diagnostic tests	NP > MD	HMO	Prospective, chart review timing of segments of patient visits	Salkever et al 1982
Thoroughness of documentation of diagnosis and treatment information	NP > MD	Preventive medicine department of a multispecialty clinic	Cross sectional Patient survey and chart review	Brown et al 1979
Adequacy of a telephone management of common pediatric problems	NP > MD	University pediatric clinic	Programed calls from a trained person about selected pediatric problems, calls recorded and analyzed	Perrin and Goodman 1978
Effectiveness of Interpersonal management skills (Interviewing, communicating)	NP > MD	University pediatric clinic	Programmed calls from a trained person about selected pediatric problems calls recorded and content analyzed	Perrin and Goodman, 1978 Hastings et al 1980
Management of problems requiring technical solutions	NP < MD	Jail health service	Record review and audit	Hastings et al 1980
Outcome measures:				
Rate of patient return to employment	NP > MD	University hospital medical clinic	Random patient assignment interviews, chart reviews	Lewis et al 1969
Reduction in number of symptoms in patients	NP > MD	University hospital medical clinic	Random patient assignment interviews, chart reviews	Lewis et al 1969
Level of patient awareness of provider orders	NP > MD	University hospital medical clinic	Random patient assignment interviews, chart reviews	Flynn 1974
Level of control of blood pressure in patients with hypertension	NP > MD	City hospital and health department clinics	Record review	Runyon 1975 Ramsay, et al 1982
Level of control of blood pressure in patients with hypertension	NP > MD	University hospital hypertension clinic	Prospective record review	Ramsay et al 1982
Level of activity limitation and anxiety m patients with chronic problems	NP < MD	Prepaid group practice	Survey of providers and patients with telephone followup of patients at 1 week	Levine, et al 1976
Amount of reduction in pain or discomfort in adult patients	NP > MD	Prepaid group practice	Survey of providers and patients with telephone followup of patients at 1 week	Levine et al 1976
Amount of weight reduction in obese patients	NP > MD	University hospital hypertension clinic	Prospective record review	Ramsay et al 1982

SOURCE Process measures: J D Brown, M I Brown, and F. Jones, "Evaluation of a Nurse Practit loner. Staffed Preventive Medicine Program in a Fee.for.Service Multispecialty Clinic." *Prev Med* 8(1) 53-64, January 1979, B C Flynn, "The Effectiveness of Nurse Clinicians' Service Delivery, " Am *J Public Health* 64(6) 604-611, June 1974, G E Hastings, L Vick, G Lee, et al "Nurse Practitioners in a Jailhouse Clinic, " *Med Care* 18(7) 731.744, July 1980, E C Perrin and H C Goodman, ' Telephone Management of Acute Pediatric Illnesses, " *N Engl J* Med 298(3)130-135, Jan 19, 1978
Outcome measures: B C Flynn, "The Effectiveness of Nurse Clinicians' Service Delivery, " Am *J Public Health* 64(6)"604.611, June 1974; D M Levine, L L Morlock, A I Mushlin, et al., "The Role of New Health Practitioners in a Prepaid Group Practice Provider Differences in Process and Outcomes of Medical Care, ' *Med* Care 14(4) 326-347 April 1976, C E Lewis, B A Resnick, G Schmidt, et al , "Activities, Events and Outcomes in Ambulatory Patient Care," *N Engl J* Med 280(12) 645-649 Mar 20, 1969, J A Ramsay, J K McKenzie, and D G Fish, "Physicians and Nurse Practitioners: Do They Provide Equivalent Health Care?" *Am J Public Health* 72(1)'55.57, January 1982, J W Runyon, "The Memphis Chronic Disease Program Comparisons in Outcome and the Nurse's Extended Roles, *J A M A* 231(3)"264-270, Jan 20, 1975 D S Salkever, E A Skinner, D M Steinwachs, et al , "Episode-Based Efficiency Comparisons for Physicians and Nurse Practitioners Med *Care* 20(2) 143.153 February 1982

Physicians' Acceptance

A variety of factors affect physicians' opinions of NPs. For example, physicians are more inclined to approve NPs' performance of relatively simple tasks, such as history-taking, than to approve NPs' performance of more challenging clinical tasks (84,108). Another major factor influencing physicians' opinions of NPs is personal contact. Physicians who work with NPs express more satisfaction with NPs' performance and more willingness to delegate higher level tasks than do physicians whose contact is indirect or nonexistent (21,134,223). This finding might indicate quality, but it might also reflect physicians' opinions about such non-quality-of-care factors as the relatively low cost of NP care or the freeing of time for physicians to see more patients or to spend in leisure.

Physicians in group practices and in institutional settings are more supportive of NPs than are solo practitioners. The level of physicians' satisfaction increases with the degree of their control over the activities of NPs (21).

Many physicians who approve of the concept of NPs have expressed only limited interest in actually employing them **(134,223)**, although NPs and PAs were introduced and established in the United States largely because a minority of physicians chose to support, train, and hire them. About 65 percent of the NPs in the United States were employed as NPs in 1982, compared with 69 percent in 1974 (237).[6] No documented reason is available for the decrease in the employment rate, although some observers have attributed the slight downward trend to lack of acceptance by physicians, restrictive State licensing, and unfavorable reimbursement practices (135).[7] Furthermore, the validity of these statistics is questionable, because they are based on a very small number of NPs.

[6]More recent longitudinal, nationwide data on NP employment are not available.

[7]Many other factors may also contribute to the lower employment rate. The number of Master's programs preparing nurse practitioners has grown substantially (from 74 in 1977 to 124 in 1981), and the number of certificate programs has decreased (from 124 to 84 during the same period) (262). The decrease in employment may also partly reflect the increased number of NPs removing themselves from the work force and seeking doctoral degrees.

QUALITY OF PHYSICIAN ASSISTANTS' CARE

Comparisons With Physicians

Within the limits of their expertise, PAs provide care that is equivalent in quality to the care provided by physicians (73,92,129,230,242). What little evidence is available about how the quality of PAs' care differs from the quality of physicians' care indicates that PAs provide more counseling of obese patients than physicians provide (129), that PAs spend more time educating patients than physicians spend **(159)**, and that PAs' patients generally are better able to resume their usual level of functioning than are patients of physicians **(226)**.

Patients' Satisfaction

The few available studies that directly address patients' satisfaction indicate that patients generally are as highly satisfied with the care they receive from PAs as with the care received from NPs (127,173,179,207). One study found that patients' satisfaction is tempered by the desire to see PAs perform routine functions rather than make independent diagnostic and treatment decisions (227).

Photo credit: American Academy of Physician Assistants

The care provided by PAs functioning within their areas of training and expertise tends to be equivalent in quality to the care provided by physicians for comparable services.

Physicians' Acceptance

Physicians initiated and developed the concept of PAs and serve as instructors in PA training programs. PAs function as their name implies—as assistants to physicians. Thus, it is not surprising that many physicians accept PAs and are satisfied with their work (125,129,179,208).

Physicians' confidence in PAs extends beyond routine care. One recent study found that although physicians generally delegate routine, uncomplicated cases to PAs, physicians also permit PAs to treat walk-in patients with urgent problems if the physicians cannot treat those patients and honor previously scheduled appointments (57). Perry and Breitner (182) found that supervising physicians rate PAs higher than NPs on tasks involving educating, counseling, or instructing patients.

The high level of physicians' satisfaction with PAs may help account for their continued high employment rate. Employment rates provide the most consequential expression of physicians' acceptance, and nearly 86 percent of the Nation's PAs were employed as PAs in 1981 (45). By 1984, the employment rate had increased slightly to approximately 88 percent; only 8.4 percent had not been employed as PAs for more than a year (219).

QUALITY OF CERTIFIED NURSE-MIDWIVES' CARE

Comparisons With Physicians

CNMs can manage normal pregnancies safely and can manage them as well as, if not better than, physicians (65,148,190,193,226). Studies show that, in accordance with their training, CNMs recognize deviations from the norm and seek medical consultation promptly (65,210). The fact that CNMs provide standard care has been documented in a variety of settings, including hospital inpatient services, hospital clinics, migrant health centers, neighborhood health centers, and private practices (67).

As measured by such short-term indicators as Apgar scores (a numerical expression of the condition of a newborn infant) and birthweight, comparable outcomes of normal, low-risk pregnancies result from care by CNMs and care by physicians (65,196,226). CNMs' care and physicians' care also compare with regard to birth outcomes measured by fetal, perinatal, neonatal, and maternal mortality **(65,181).** A randomized clinical trial of uncomplicated deliveries showed no significant difference in the outcome of care whether provided by CNMs or by the obstetric house staff, except that CNMs kept more appointments and performed fewer forceps deliveries (226).

Data on birth outcomes reveal that proportionately fewer low-birth-weight infants result from deliveries managed by CNMs than from those managed by physicians (253). Although this might seem to indicate that CNMs provide better care than physicians, it might reflect CNMs' referral of high-risk pregnancies to physicians. In one recent study, the low-birth-weight rate for CNM-managed deliveries was 28 percent less than the control group's rate; the CNMs had also provided prenatal care, whereas the control group received prenatal care from State-supported maternal and child-care clinics (184).

CNMs appear to differ from obstetricians in some processes of care. CNMs order medications less frequently than do obstetricians (65), low-risk patients of CNMs have shorter inpatient stays for labor and delivery than do low-risk patients of obstetricians (65), more obstetrical patients of CNMs are tested for urinary tract infections and diabetes than are patients of house staff physicians (226), and CNMs communicate and interact more with their clients than do physicians **(66,181,190, 265).** The care given by CNMs differs from the usual care given by the physicians in the personal attention patients receive throughout labor and delivery. Most physicians' care is episodic, which may contribute to the fact that they rely more heavily than CNMs do on technology, such as fetal monitoring (265).

Although CNMs are trained to provide normal, low-risk maternity services, some of them collaborate with physicians to participate in the care

of high-risk women during labor and delivery. These CNMs perform such tasks as:

> . . . applying internal uterine pressure monitoring devices or fetal scalp electrodes, obtaining fetal scalp blood samples, managing breech or multiple gestation deliveries, utilizing low or outlet forceps, or utilizing vacuum extractors (10).

Little evidence exists about CNMs' effectiveness in performing these tasks, although one researcher concluded that CNMs "can render safe, effective services to about one-third of the high-risk obstetric population" (210). Rooks and Fischman (203) found that most CNMs working in collaboration with physicians manage the care "of prenatal patients with some complications."

Patients' Satisfaction

Women served by CNMs are satisfied with the care they receive (65,181,190,209).8 Although obstetric patients from all socioeconomic strata are satisfied with CNMs' care, favorable feelings toward CNMs increase with patients' age, educational background, and number of births (59). Patients' satisfaction has been recorded for a wide range of family planning services and normal maternity care provided by CNMs in a variety of ambulatory care and hospital settings (209). CNMs also appear to be readily accepted by new patients—90 percent of the patients seeking obstetric services from a group practice of obstetricians accepted services from a CNM the practice had recently employed (190).

When comparing their satisfaction with services provided by CNMs and obstetricians, patients of CNMs express preferences for the greater ease of communicating with CNMs and the chance CNMs allow them to exercise more control during delivery (209). Perry found that none of the patients whose babies had been delivered by CNMs would have preferred to have had them delivered by obstetricians, although some of the physicians' patients said that in retrospect they would rather have been cared for by CNMs (181). Patients in a large health maintenance organization expressed satisfaction with the care they received from both obstetricians and CNMs, but the CNMs' patients were significantly more likely to express great satisfaction with, and great confidence in, their providers (65). This study also found that patients of CNMs were more satisfied than those of physicians with the promptness with which they could obtain their first prenatal care visit and with the relatively short time they spent waiting in reception rooms (65).

CNMs differ markedly from obstetricians with respect to frequency of malpractice suits, a crude gauge of patients' acceptance. The number of CNMs who obtained malpractice insurance under the auspices of the American College of Nurse-Midwives (ACNM) grew from 625 in 1976 to 1,400 in 1983. Between 1977 and 1982, 20 claims (not all successful) were made against ACNM group policyholders (55). A 1982 national survey of CNMs found that 5.2 percent (55 of 1,065 respondents) had been named in malpractice suits during their careers (55). By contrast, of the 1,915 members of the American College of Obstetricians and Gynecologists responding to a recent survey, 31 percent said they had been sued once, 16 percent had been sued twice, and 20 percent had been sued at least three times (55). Interpreting these figures, however, is difficult, partly because they do not reflect case-mix differences. CNMs send patients with complicated or high-risk problems to physicians, especially in emergencies. That relatively more obstetricians than CNMs are sued may not reflect performance as much as the fact that obstetricians deliver many more babies than do CNMs and have higher incomes than CNMs.

Physicians' Acceptance

CNMs may practice administratively and physically apart from obstetricians and gynecologists, but by functioning "interdependently with" these physicians, the CNMs retain the formal support of the American College of Obstetricians and Gynecologists. The American College of Obstetri-

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'Perhaps the main problem with most studies of CNMs is the possible bias resulting from nonrandom assignment of patients to different types of providers. Self-selection suggests that those women who accept care from CNMs are inclined to be satisfied with CNMs' care (just as it suggests that those women who choose care from an obstetrician are inclined to be more satisfied with physicians' services). Nevertheless, studies consistently find patient acceptance of CNMs and some studies find that patients express relatively greater satisfaction with CNMs' care than with obstetrician's care.

cians and Gynecologists has agreed with the American College of Nurse-Midwives that:

> . . . the appropriate practice of the certified nurse-midwife includes the participation and involvement of the obstetrician/gynecologist as mutually agreed upon in written medical guideline/protocols (13).

The two colleges further agree that:

> Quality of care is enhanced by the interdependent practice of the obstetrician/gynecologist and the certified nurse-midwife working in a relationship of mutual respect, trust and professional responsibility. This does not necessarily imply the physical presence of the physician when care is being delivered by the certified nurse-midwife (13).

Nonetheless, CNMs have had difficulty in obtaining acceptance by practicing physicians, medical societies, hospital departments of obstetrics and pediatrics, companies that provide malpractice insurance, State boards of health, and—not infrequently—nurses, themselves (196). Obstetricians and gynecologists are thought to find competition from CNMs threatening to physicians' position as the sole providers of a special type of medical care (43,190). Opposition may also reflect the tightening market conditions facing obstetricians and gynecologists in urban areas (196). In addition, other physicians, particularly general and family practitioners, have resisted CNMs (258).

Despite the reservations of many physicians as to whether CNMs are needed, their employment rate has been increasing in recent years. In 1976 and 1977, only about half of the Nation's CNMs were employed in clinical midwifery practice (9), but by 1982, approximately two-thirds (67.2 percent) of the CNMs in the United States were employed in nurse-midwifery practice (10). The CNMs' employment settings may better reflect the extent of physicians' acceptance. Although the percentage of CNMs employed in private practice with physicians increased from 13 percent in 1976 and 1977 to 20 percent in 1982, most CNMs in 1982 were employed in organizational settings or in private nurse-midwifery practice (see table 2-3).

Table 2-3.—Percentage of U.S. Resident Certified Nurse-Midwives by Type of Organization, 1976-77 and 1982

Type of organization	1976-77	1982
Hospital	45.6%	35.8%
Private practice with physicians	12.9	19.8
Private nurse-midwifery practice	2.4	14.4
Public health agency	13.8	8.6
Maternity service operated predominantly by nurse-midwives	7.6	7.7
Branch of the U.S. military	8.2	6.2
Prepaid health plan	3.4	6.0
University health service	5.0	1.8

SOURCES: American College of Nurse-Midwives, *Nurse+ Midwivery in the United States' 1976-77* (Washington, DC: 1978); and American College of Nurse-M idwives, *Nurse-&f idwivery in the United States: 1982* (Washington, DC: 1964)

SUMMARY

Within their defined areas of competence, NPs, PAs, and CNMs generally provide care that is equivalent in quality to the care provided by physicians for similar problems. Considerable evidence exists, particularly for NPs and CNMs, that they are more adept than many physicians at communicating effectively with patients and managing patients who require long-term and continuous care. Such patients include chronically ill patients and patients undergoing labor and delivery. Although the evidence is less voluminous concerning PAs' supportive-care and health-promoting activities, data indicate they overlap with NPs' activities of that nature.

The findings for NPs and PAs apply primarily to care provided in ambulatory settings, and the activities of CNMs have been documented in a variety of settings with favorable results. Although the findings are qualified by the methodological limitations of the techniques used to indicate quality, the weight of the evidence seems to show that the health-care services provided by these practitioners are equivalent in quality to comparable services provided by physicians.

Although patients are generally very accepting of care provided by NPs, PAs, and CNMs, patients are most satisfied with the services that re-

quire interpersonal skills. Patients seem to require what might be called technical reassurance for serious conditions and to prefer that NPs, PAs, and CNMs consult with physicians when technical care is required.

Patients' satisfaction with NP, PA, and CNM care is affected by factors external to the actual care provided. Satisfying a particular patient depends partly on the physician's conveying to the patient a sense of approval of the NP, PA, or CNM (113). Patients' judgments may also reflect their past experiences with medical care and their socioeconomic status. One study, for example, found that an upper-middle-class population accustomed to receiving care from fee-for-service physicians evaluated providers mainly on the basis of technical competence (35). Patients' age, sex, and race also affect their opinions. Middle-aged people, males, and blacks are more accepting of NPs (80); whites are more accepting of CNMs than are blacks, who are more likely to associate the word midwife with untrained lay midwives (201). The American Nurses' Association (21) concluded that trust in NPs and PAs varies with the options available to patients, and that satisfaction with NPs and PAs tends to be highest when access to other sources of care, particularly physicians, is limited. Patients' satisfaction with CNMs, however, appears to be independent of access to other sources of obstetrical care (201).

Based on historical data, physicians accept the concept of NPs and PAs but remain concerned about their practicing independently. Physicians have been reluctant to accept CNMs, especially those practicing independently. Physicians' willingness to delegate tasks depends on the particular tasks. Most physicians who hire NPs, PAs, or CNMs are satisfied with their performance. Employment status, the most relevant indicator of whether physicians accept NPs, PAs, and CNMs, is satisfactory; PAs, in particular, apparently enjoy a high level of appreciation by physicians. Increasingly, CNMs' employment is independent of physicians. A growing supply of physicians and potentially heightened competition may decrease physicians' acceptance of these health practitioners. Indeed, the American Medical Association resolved in 1985 to "oppose new legislation extending medical practice to nonphysician providers" (136).

Chapter 3

Access to Care

Chapter 3

Access to Care

In the late 1960s and the 1970s, health policy focused on making health care accessible to all Americans; much effort went toward helping people enter the health care system (1). A particular concern was geographic access to primary care, because the geographic maldistribution of physicians and their patterns of specialization had left many of the Nation's inhabitants without adequate access to primary care.

Indeed, the creation and development of nurse practitioners (NPs) and physician assistants (PAs) occurred in large part in response to the limited accessibility of basic medical services, especially in rural and inner-city areas, where physicians were disinclined to practice (74,169,183).[1] The stated purpose of the early training programs for NPs was to improve access to primary care for people in areas without enough physicians (236). Similarly, PAs were intended to "help remedy the shortage of primary care physicians, particularly in medically underserved areas" (180). Much of the impetus for the growth in the number of certified nurse-midwives (CNMs) during the 1970s can be attributed to concern about the limited supply of obstetricians in the United States (180).

The various barriers to providing care must be considered in assessing the success of NPs and PAs in improving health care in medically underserved areas. Legislation and regulations vary widely from State to State but generally tie medical practice by NPs, PAs, and, to some extent, CNMs to associations with physicians and limit such practice where physicians are not present. Although NPs may provide nursing services independently, for the most part neither NPs nor PAs can provide medical services unless local physicians are willing to hire them. Medicare and Medicaid rules regarding payment also significantly impede NPs, PAs, and CNMs by restricting payment for medical services to the supervising physician or institution. The Rural Health Clinic Services Act (Public Law 95-210) waived the restriction for direct supervision of NPs, PAs, and CNMs practicing in certified rural health clinics located in designated underserved areas (see app. B).

Whether NPs, PAs, and CNMs are needed to improve access to primary medical care in underserved areas remains an issue, even though the supply of physicians has increased, and some physicians have moved away from urban areas (174, 264). Some experts believe that competitive pressures will eventually remedy the maldistribution of medical manpower (222) but, the proportions of physicians in urban and rural areas have remained fairly constant since 1970 (255).

Furthermore, large overall increases in physician supply in a State may still leave some areas in the State without adequate access to medical care (112). The situation may worsen in those areas as older physicians are not replaced by younger ones. Indeed, the Bureau of Health Professions has predicted that unmet needs for primary care will persist in many currently designated shortage areas. Although the dispersal of young primary-care physicians is expected to reduce overall shortages, reducing shortages in all underserved areas may take an extensive period of time **(250).**

Although the need remains for NPs, PAs, and CNMs to provide care to underserved populations and in underserved areas, interest has increasingly focused on these providers' abilities to deliver good medical care in certain institutional settings, such as jails, and to specific populations, such as elderly people and poor women and their infants. In addition, by functioning as case managers, these providers can help patients find appropriate care in our increasingly complex health-care system. (The effect of NPs, PAs, and CNMs on access to specific services, such as health education, counseling, and health promotion, is addressed more completely in chapter 2.)

[1]Other factors, including improved integration of nursing and medicine, bolstered the NP movement, which signified a deliberate move to expand the nursing role and to meet the health-care needs of many underserved populations. Other factors that contributed to the success of NPs, PAs, and CNMs are the consumers' and women's movements, the new focus on self-help and self-care, and other pushes for social and personal change that emerged during the late 1960s and continue today (229).

NURSE PRACTITIONERS' CONTRIBUTIONS TO ACCESS TO CARE

Although legal constraints (such as requirements for supervision by physicians[1]) have hindered NPs' dispersal to isolated settings, NPs have helped improve geographic access to primary care (31,86,160,168,261). In 1977, 23 percent of NPs worked in inner-city settings and 22 percent in rural areas (238)—the geographic areas of greatest need (120). In 1980, the proportion of NPs working in these settings had increased to 47.3 percent in inner cities but decreased to 9.4 percent in rural areas (255). In both inner cities and rural areas, more than half of NPs' patients had annual incomes of less than $10,000 (255).

NPs alone cannot entirely resolve the problem of provider maldistribution, because the professional, social, and cultural attractions of the suburbs and cities that appeal to many physicians also appeal to many NPs. An early survey of NPs in six States found that generally they "do not work in the inner city or in rural areas" (81), but a Pennsylvania NP-training program surveyed its graduates through 1982 and found that 70 of the 102 graduates worked in urban programs with low-income people (151).

NPs tend to view themselves as being able to function effectively and appropriately not only in settings with physicians, but also in practices without physicians on the premises. Starting in the mid-1960s a significant minority of NPs worked in satellite settings as the sole providers of services; they received medical supervision from physicians working in other communities. Often, the backup physicians would be available for telephone consultations, would visit the satellite settings, and would be responsible for ensuring that the NPs adhered to the protocols guiding the provision of medical services. These NPs increased access to care by working in places where physicians had not located.

NPs' extension role is no longer as significant as it was in the 1960s and 1970s. A national sample of 44 rural communities identified in 1975 as having satellite practices (most of which were staffed by NPs; some by PAs) illustrates this decline. By 1979, only 24 of the centers were staffed by NPs or PAs alone (37). By 1984, 18 were staffed only by NPs or PAs, 8 were staffed only by physicians, and 6 were staffed by a combination of physicians and NPs or PAs. In all but 4 of the remaining 12 communities, where satellite clinics had ceased functioning, physicians' practices had been established (38).

More recently, NPs' contribution to access has been in nongeographic settings where not enough physicians have been available. Case studies report the satisfactory performance of NPs in a wide variety of settings. NPs act as team members in home health and nursing home care for elderly patients (220) and in correctional institutions (104), and in home health care for children with chronic illness (234). NPs also provide terminal care in patients' homes (268); ambulatory care in large municipal teaching hospital units (30); and primary care in inpatient units (224), in normal newborn nurseries (188), and in occupational health settings (26). NPs also deliver preventive care in the workplace (216), in retirement communities (109), and in industrial settings (47,162). These descriptive reports are only a beginning; larger scale studies are needed to evaluate the quality of care NPs provide in these settings.

Whether NPs can improve access to health care in schools has been carefully examined. A large-scale study, involving 18 school districts in 5 States, reports that NPs working as part of health-care teams in schools can have highly favorable effects on school children's health (197). NPs are especially valuable in improving access to primary care and supplementary care in rural areas and in health programs for the poor, minorities, and people without health insurance.

People over 65, a growing segment of the population, suffer serious gaps in their ability to obtain health care. Many physicians lack the expertise or time required for managing all aspects of elderly patients' health problems. Although private attending physicians provide most of the medical care in nursing homes, many physicians are unwilling to care for patients in nursing homes (166).

[1]Requirements for physicians' supervision of NPs vary from State to State. In many States, physicians must be on the premises but not necessarily in the same rooms as the NPs providing the services.

[2]The communities had populations of less than 10,000, with an average population of less than 2,000, and were at least ½ hour in travel time from communities that had populations of more than 10,000.

NPs are trained to care for the older population. Indeed, 40 of the approximately 200 NP-training programs focus on geriatrics, and 31 other NP programs have gerontological components (254). Furthermore, much of the care that institutionalized elderly people need is the kind that NPs can best give—health maintenance, personal assistance, chronic-disease management, recognition of acute or exacerbating chronic conditions, ongoing accurate and comprehensive health assessment, appropriate and expeditious referral to other team members, medication management and review, coordination of daily services, family and patient education and counseling, and so on. NPs have the assessment skills to recognize complicated acute illnesses or serious exacerbations of chronic diseases and to make medical referrals (157).

The few available studies show that NPs have the professional ability to assist with the care of institutionalized elderly patients **(124,220,262).** But of the more than 23,600 nursing homes in the United States, only approximately 250 have geriatric NPs on their staffs providing patient care (76). Interest in the effectiveness of NPs in nursing homes is growing rapidly, however, as evinced by the number and size of current studies of the issue.[1]

NPs improve access for the general population by acting as case managers, matching the needs of patients with appropriate services (88). NPs are effective in coordinating the care of many other health professionals, interservice transfers, and continuity of care, and in mobilizing family, institutional, and community resources (77).

NPs also are particularly effective in improving access to care for groups that, for a variety of reasons, have difficulty in obtaining the care they need. For example, NPs and PAs work well as members of multidisciplinary teams in improving access for chronically ill elderly people, whose needs for health services are great and whose abilities to manage the health-care system are limited (155). The NPs and PAs facilitate linkages between the community and the nursing home. NPs, working as members of teams with physicians, are also effective in educating couples about the nature of treatment for infertility and in providing emotional support to people seeking such treatment (175).

In general, NPs appear to improve continuity of care. In institutional settings, their patients miss fewer appointments than do physicians' patients **(30).** Studies have generally shown that patients of NPs in fee-for-service settings (34,84), as well as in clinics and health maintenance organizations (225), have higher rates of completed followup visits than do patients of physicians (213). These findings may explain the special success NPs have in caring for chronically ill patients and may reflect the adequacy (or inadequacy) of relationships between the practitioners providing care and the patients.

NPs affect access by expanding the scope of care for their patients into dimensions that physicians might ignore. For example, some studies show that NPs provide greater amounts of health education than do physicians. NPs are more likely than physicians to explain why medications are administered and what side effects are possible, and to discuss health-promoting behaviors with patients (34,84). Unfortunately, these studies do not say whether the need for health education is greater among the patients seen by NPs or among those seen by physicians.

NPs spend about 50 percent more time than physicians spend on each encounter with a patient (143). The time an NP spends over the course of an illness, especially a chronic illness, may be less than that spent by a physician, however, because the NP has fewer encounters with the pa-

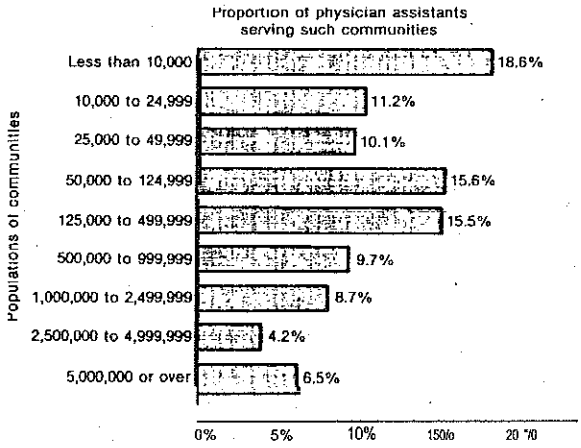
[1]Ongoing studies include a large-scale research project measuring how geriatric NPs employed in nursing homes affect the quality and costs of care. This project is being conducted by the Mountain States Health Corp., the Rand Corp., and the University of Minnesota School of Health Sciences and funded by the Health Care Financing Administration and the R.W. Johnson and the W.K. Kellogg Foundations. The faculties of the Geriatric Nursing Programs at the University of Arizona, the University of California at San Francisco, the University of Colorado, and the Univeristy of Washington are examining the role of the geriatric NP in concert with the study, and the Group Health Cooperative of Puget Sound has received funding from the Fred Meyer Charitable Trust to evaluate NPs employed by the health maintenance organization to serve elderly enrollees living in nursing homes—if a Medicare waiver of mandatory physician visits can be obtained (157). In addition, the Health Care Financing Administration has granted a waiver under Medicare and Medicaid to permit fee-for-service reimbursement for the provision of medical services to residents of nursing homes by physician-supervised NPs and PAs. A cost and utilization evaluation is being carried out by the Health Care Financing Administration's Policy Center at Rand.

tient (143). The fact that NPs provide a more personal kind of care may account for the greater time they spend with patients. One study found that pediatric NPs are as efficient as physicians in gathering historical data and suggesting therapy, and attributed the NPs' greater time per encounter to greater communication with patients—gathering more information from patients and offering more advice to them (178). However, evidence from other studies is insufficient to support or refute this study's finding, and other factors may play a role. For example, the greater amount of time NPs spend with patients might be due in part to management. When NPs are used efficiently in practices, physicians might be able to spend less time with patients.

PHYSICIAN ASSISTANTS' CONTRIBUTIONS TO ACCESS TO CARE

PAs have also contributed notably to improving geographic access to care. A number of studies have shown that they are more interested than physicians in locating in nonaffluent, medically underserved areas with high percentages of nonwhite populations (90,137,147,169). This willingness is reflected in statistics on where PAs practice in the United States. Whereas about 27 percent of the general population and 14 percent of the Nation's physicians are located outside standard metropolitan statistical areas (SMSAs), 32 percent of PAs practice outside SMSAs (49). And the percentage of PAs working in communities with populations of 10,000 or less has remained constant from 1974 to 1981 (45). The 1984 Masterfile Survey of Physician Assistants reports that 6.5 percent of PA respondents were located in rural areas of fewer than 10,000 people and that 40 percent were in communities of fewer than 50,000 people (6) (see figure 3-1).

Figure 3-1.—Distribution of Physician Assistants by Size of Community



Average community population = 980,235

SOURCE American Academy of Physician Assistants, 1984 *Physician Assistant Masterfile Survey* (Arlington, VA 1984).

More NPs than PAs have staffed rural satellite health centers (38), perhaps because some NP-training programs recruited students from rural areas hoping they would return there as NPs. Nonetheless, in States that permit satellite clinics and permit PAs to practice apart from physicians, a significant minority of PAs work in such settings (45),

As members of health-care teams, PAs have improved access to care in settings where sufficient physician care is not always available. PAs are employed in industrial organizations; community clinics; drug and alcohol abuse clinics; nursing homes and extended-care facilities; and Federal, State, county, and city prisons (25).

Few physicians are trained in geriatric medicine (126), and the inadequacy of physician services for the growing population of institutionalized elderly patients is especially serious (122). Although more and better physician care for these patients may be available in the future (122), whether physicians can satisfy all the health-care needs of this group is questionable.

The potential of PAs in providing care for the elderly has been discussed in the literature (160, 215,218). Nearly 5 percent of PAs now provide care in nursing homes—the same proportion as in 1981 (6). The Federal Government has recognized this potential and requires an increased ger-

iatric content in the curricula of federally funded PA-training programs. A survey of 34 federally funded programs' curricula, in fiscal year 1983, reported that three-fourths had varying degrees of geriatric content (254). Furthermore, the Federal Government (through the Administration on Aging of the Office of Human Development Services of the U.S. Department of Health and Human Services) partly supported the American Association of Physician Assistants in its report on the assessment and improvement of PAs' knowledge and skills in geriatrics (215). The report found a fivefold increase in the number of required and elective experiences in geriatrics among PA programs since 1980, which appear related to the Federal funding rules. However, the report noted the need for more uniform teaching of geriatric medicine in training programs. (The report includes guidelines for standardizing geriatric curricula during the training period and in continuing education programs for PAs.)

PAs have also expanded the scope of care that most patients receive. PA training programs require competence in interviewing, educating, and counseling patients **(93).** Although research is limited as to the interpersonal components of care that PAs provide, they appear to expand access to patient education and counseling by mixing competence in technical care with interpersonal skills (182).

CERTIFIED NURSE-MIDWIVES' CONTRIBUTIONS TO ACCESS TO CARE

Modern nurse-midwifery started in this country in 1925, when Mary Breckenridge established the Frontier Nursing Service to serve rural Kentucky. As of 1977, 10 percent of CNMs worked in communities with populations below 10,000 **(9).** CNMs still practice extensively in underserved areas, such as the rural South, Indian reservations, and inner cities, and significantly improve access to health care in those areas. For example, in Holmes County, Mississippi, the infant mortality rates dropped from approximately 38 per 1,000 live births to 20 per 1,000 live births 2 years after CNMs began providing primary care to pregnant women as part of a communitywide focus on the health problems of mothers and babies (158).

CNMs have also reduced financial barriers to access by providing care at relatively low cost, particularly in short-stay, out-of-hospital births. Many such births occur in birth centers not affiliated with hospitals. The number of these centers increased from 3 in 1975 to more than 100 in 1982 (33). They have made prenatal, labor and delivery, and postnatal services increasingly accessible to poor patients (65,149,193). For example, 15 birth centers are accessible to families in New York's Lower East Side, a low-income area (150). The relatively low cost of CNMs' services may result from shorter inpatient stays as well as lower fees **(53,65).** One study, however, found that CNMs' fees exceeded physicians' fees in urban locations **(200),** but nearly a year had clasped between the measurement of physicians' fees and the measurement of CNMs' fees, which may account for the finding. Also, a disproportionately large number of CNMs practice in academic medical centers, which have higher costs than community hospitals **(200).**

CNMs affect access (as well as quality) by providing person-oriented services, such as communicating thoroughly with patients, counseling, promoting self-help, and attending to patients' emotional needs (196). CNMs interact with patients more than physicians do (66,190,265). Patients feel more comfortable about asking questions of CNMs than of physicians (181,190). In addition, CNMs' patients obtain care relatively early in their pregnancies and continue to receive prenatal care relatively frequently (140,193,226). CNMs tend to increase the amount of prenatal care their patients receive.

In general, then, CNMs continue not only to lower financial barriers to care, but to offer a considerable amount of care that includes both health advisory and health-promotion services. This expertise is reflected in the valuable care CNMs on

Photo credit American College of Nurse-Midwives

CNMs are particularly effective in managing the care of pregnant women who are not at risk of having low-weight babies.

multidisciplinary teams provide for high-risk pregnant adolescents (184), especially in clinic settings (42). Indeed, the Institute of Medicine's report on preventing low birthweight calls for:

> . . . more reliance . . . on nurse-midwives . . . to increase access to prenatal care for hard-to-reach, often high risk, groups. This recommendation is based on the studies that indicate that CNMs can be particularly effective in managing the care of pregnant women who, because of social and economic factors are more likely to deliver low weight babies (121).

SUMMARY

NPs and PAs have long been recognized for increasing geographic access to primary health care, particularly for residents of inner cities and rural communities. Although indications are that physicians are migrating to smaller communities (174), the growing supply of physicians appears to be affecting different communities differently (250). Overall increases in the supply of physicians in a State may still leave some areas in need of primary care services (112). In those areas where access to physicians' services remains inadequate to serve the population or has decreased (112), NPs and PAs can continue to serve as a source of primary care. In areas where access to physicians' services has increased, employment opportunities for NPs and PAs might decrease. But the employment of NPs and PAs in rural areas has previously been limited by the scarcity of physicians willing both to practice in rural areas and to supervise NPs and PAs. Thus, the growing numbers of physicians in previously underserved areas may well increase employment opportunities for NPs and PAs. The physicians moving into smaller communities are mainly young physicians, who are more likely than older physicians to accept the team approach to health care and to use the services of NPs and PAs. Furthermore, a small town might be able to support a physician-NP or a physician-PA team but not two physicians. Whether these factors or others reduce the role NPs and PAs play in improving geographic access to care, these practitioners will continue to be valuable, especially in rural areas.

The evidence (primarily from case studies) is that NPs and PAs are improving access to primary health-care services in settings not adequately served by physicians. For example, NPs and PAs are trained to provide primary care for elderly patients in nursing homes, a growing population with poor access to standard health care. The effectiveness of NPs and PAs in this role is under scrutiny. They are also helping people to obtain primary care in an increasingly complex health-care system.

Studies have shown that NPs are especially valuable in providing primary care in school settings to previously unserved or underserved children,

and in expanding the content of available care to include interpersonal and preventive care for all patients.

CNMs have not only made care more accessible in underserved areas, they have also contributed to making care financially available and have contributed to social and psychological access to care by the personal orientation of their services. Studies have shown that CNMs' communication skills and attention to the social and psychological needs of pregnant adolescents, as well as the technical care CNMs provide, have reduced the rate of low-birth-weight babies among this high-risk population.

Chapter 4

Productivity, Costs, and Employment

Chapter 4

Productivity, Costs, and Employment

Several studies have examined the scope of practice and productivity of nurse practitioners (NPs), physician assistants (PAs), and certified nurse-midwives (CNMs); how that scope relates to the tasks usually undertaken by physicians; and the implications of this evidence for the employment of these providers and for the costs of medical care.

Questions related to productivity include the nature and size of the contributions NPs, PAs, and CNMs make to medical practices' outputs (e.g., encounters between providers and patients). Questions related to costs include how much a practice must spend to employ an NP, PA, or CNM and how much society must spend to train these types of practitioners. Questions related to employment compare productivity with the costs of employment to ascertain whether medical practices could gain from employing more NPs, PAs, or CNMs, and whether society could gain from training more NPs, PAs, and CNMs. Because of the complexity of the issues involved and the lack of data, these questions are seldom addressed together. The literature does, however, permit the piecing together of some parts of this puzzle.

SCOPE OF PROFESSIONAL PRACTICE

Services Provided by Nurse Practitioners and Physician Assistants

The tasks NPs and PAs are trained to perform encompass a broad spectrum of *primary* care activities involving diagnosis and therapy (see ch. 1). Distinguishing between NPs and PAs on the basis of task descriptions is difficult. NP training may emphasize counseling and health promotion activities to a greater degree than PA training does, but the major difference lies in the practitioners' relationships with physicians. By definition, PAs work under physicians' supervision, whereas NPs have collaborative relationships with physicians and other health professionals.

Photo credit" American Nurses Association

NPs are trained to perform a broad spectrum of primary-care activities.

Most observers conclude that most primary care traditionally provided by physicians can be delivered by NPs and PAs. Hausner and others (105) conclude that 60 to 80 percent of the tasks normally performed by primary care physicians can be provided by NPs and PAs without consultation. Record and others (192) estimated that 90 percent of pediatric care can be provided by NPs and PAs, and that NPs and PAs can substitute for physicians in providing 50 to 75 percent of all primary care services. Hausner and others (105) argue that NPs and PAs can safely perform enough of the primary care responsibilities to be considered viable alternatives in providing primary care, even where direct supervision is unavailable.

What NPs and PAs are trained to do and what they do in practice maybe different. Their actual roles depend on the settings in which they work. Limited information exists as to how practicing

NPs and PAs actually spend their time. A 1979 review cites four reports indicating that "nurse practitioners, in particular, emphasize preventive services," including one report concluding that NPs can provide as much as 75 percent of the well-person care for both adults and children (218). Other studies have found that NPs engage more often than physicians in providing interpersonal care (221) and chronic care (32). However, beyond these sorts of indications and references to the NP orientation to health education, counseling, and preventive and chronic care, accurate descriptions of the actual specific tasks performed by NPs do not exist. Indeed, such information would be difficult to obtain, because the range of primary care services provided by NPs in outpatient settings is so broad.

Little information exists concerning trends in the freedom of NPs to function independently of physicians. Nearly two-thirds of the pediatric NPs responding to a national survey in 1978 said that a physician was always physically present when they worked. Only 39 percent of the respondents to a similar survey in 1983 noted that a physician was always present (44). These findings suggest some movement toward administrative independence, but more data on other types of NPs working in a variety of settings are required in order to establish whether the trend is significant.

Although PA training programs also include health education and counseling, relatively little empirical evidence exists on how much health-promotion and disease-prevention services PAs actually provide. In general, PAs tend to focus more than NPs on providing acute care services (138). PAs place less emphasis on preventive services (218) and "provide selective patient services," whereas NPs are oriented more "toward treatment of the 'whole patient' " (160). These generalized characterizations do not apply universally, but they illustrate an important distinction between PAs and NPs: PAs tend to function primarily as substitutes for physicians, generally providing only services that physicians provide, whereas NPs are likely to provide both services usually provided by physicians as well as services generally provided by nurses.

Services Provided by Certified Nurse-Midwives

In 1982, the American College of Nurse-Midwives (ACNM) (10) conducted a survey of its members which obtained detailed information about the specific tasks performed by CNMs in clinical practice. Of the approximately 1,000 CNMs responding, over 75 percent delivered prenatal, labor, delivery, and postpartum care as well as family planning and normal gynecological services. The CNMs' responses to detailed questions about tasks showed that they provide the full range of services within their areas of expertise and they assume specific responsibility for many of the tasks which they perform without physician direction and supervision. CNMs clearly can substitute for physicians in performing a significant share of the tasks normally carried out by physicians. A major difference between CNM care and physician care is that CNMs are less likely than physicians to prescribe drug treatments, which may reflect both philosophical differences and legal restrictions. CNMs also tend to use less high-priced technology than physicians, and CNMs do not perform major surgery. In collaboration with physicians, however, CNMs manage high-risk patients during the prenatal, labor, and delivery stages.

PRODUCTIVITY

If the tasks performed by NPs, PAs, and CNMs overlap substantially with those performed by physicians, an obvious potential exists for these providers to substitute for physicians in the sense of performing tasks typically and characteristically carried out only by physicians. NPs, PAs, and CNMs can also complement physician care by providing some services, such as counseling or health education, not currently provided by many physicians or not carried out to the same extent.

Whether a service is a substitute or a complementary service is often difficult to determine.

Technically, empirical measurement of substitutability is complicated by the need for large amounts of accurate data on the prices and utilization levels of resources used in the production process as well as on the output of the production process. Therefore, studies of the role of NPs, PAs, and CNMs have taken the more straightforward approach of productivity analyses based on small samples, case studies, or simulations.

Productivity, simply stated, is output per unit of input. The productivity of medical practitioners is frequently expressed in terms of the number of patients seen per week or per hour of the practitioners' time. In comparing physicians with NPs, PAs, and CNMs, the appropriate method of measuring productivity depends on whether the NPs, PAs, or CNMs are working under direct supervision by physicians or working interdependently with physicians. For example, studies of PAs directly supervised by physicians examine how employing PAs marginally affects total practice output (e. g., the additional number of patients seen per week). Or time-and-motion studies of the production process might examine the tasks performed by PAs and how long they take, as compared with the time physicians would take. To evaluate the productivity of practitioners working in collaboration with physicians, as CNMs work, studies could compare the number of patients seen per week in collaborative practice with the number of patients seen for the same service by an obstetrician. Physicians could also be compared with NPs, PAs, or CNMs with regard to the number of minutes required per encounter for a particular type of patient or medical service. This approach attempts to control for case mix.

Comparing the productivity of physicians and PAs is facilitated by the fact that the tasks they perform overlap significantly. Indeed, PAs tend to provide essentially the same services physicians perform. The need to understand differences in content of care, therefore, is not as great in comparing physicians with PAs as in comparing physicians with NPs, who generally provide a much wider range of services.

Nurse Practitioners' and Physician Assistants' Productivity

Studies of NPs' and PAs' productivity have generally taken one of three approaches:

1. time per visit (comparing how much time physicians and NPs or PAs take to complete office visits);
2. average number of visits per unit of time (comparing how many visits different types of providers handle in a given period of time); and
3. marginal product (assessing the effect of adding an NP or PA on a practice's total number of patient visits).

Most studies of NPs and PAs indicate that these providers spend more time per office visit than do physicians **(242).** For example, Mendenhall and others (160) found in a national survey of physician practices that NPs averaged 19.4 minutes per direct encounter with a patient, PAs averaged 13.3 minutes per encounter, and physicians spent slightly more than 11 minutes per encounter. A study by Charney and Kitzman (52) yielded similar results, but studies are not unanimous on this issue. In a large health maintenance organization (HMO) —a special setting—Record and others (191) reported that PAs spent less time per routine visit (an average of 7.1 minutes) than physicians did (8.9 minutes). The study noted, however, that:

> . . . a sampling of medical charts revealed that even where the presenting morbidity was the same, physicians tended to get somewhat older patients with a greater number of associated morbidities, including chronic diseases, which might easily explain the time difference.

Also, Kane and others (129) found little difference in the amount of time physicians and physician assistants spent per visit. These data support the conclusion reached by Record and her colleagues (192) in a review of more than a decade of experience and studies, that "there is more of a tendency for NPs than for PAs to vary from physicians in the average amount of time spent on an office visit. "

The shorter average time physicians, as compared with NPs and PAs, spend with patients translate into greater productivity over time. In other words, the number of encounters with patients per hour or per work week is higher for physicians than for NPs or PAs. Mendenhall and others (160) reported the following:

- NPs average 7.9 direct encounters and 2.4 telephone encounters with patients per day;
- PAs average 14.2 direct encounters and 2.6 telephone encounters with patients per day;
- physicians who supervise NPs or PAs average 18.9 direct encounters and 3.4 telephone encounters with patients per day; and
- physicians who do not supervise NPs or PAs average 21.4 direct encounters and 5.7 telephone encounters with patients per day.

Data from a recently completed national survey of rural health care delivery organizations indicated that primary care physicians saw an average of 105.6 patients per week and worked 48.6 hours per week, whereas NPs and PAs saw an average of 75.0 patients per week and worked 40.7 hours per week (107). On the average, then, these physicians, saw 2.2 patients per hour, compared with 1.8 patients per hour for NPs and PAs. Romm and others (199) found that, compared with PAs, NPs spent more time per patient and, therefore, saw fewer patients per week. Because physicians work more hours per week than do PAs and NPs, these productivity comparisons are best made on a per-hour basis, i.e., adjusting for the number of hours worked per week. Overall, the findings indicate that, in terms of patients seen per unit of time, NPs are less productive than PAs, who, are less productive than physicians. However, this result does not adjust well for severity of illness (i.e., case mix), nor does it necessarily mean that physicians are relatively cost-effective. For example, physicians might be three times more productive than NPs and PAs are, but cost six times as much as they do.

The extent to which hiring an NP or PA increases the output of a practice has been the subject of some debate (110,111,153). LeRoy (138) reported increases of between 20 and 90 percent in the productivity of physicians' practices that added NPs. Hershey and Kropp (110) used a model to estimate that the productivity gain maybe only 20 percent after calculating the "offsetting changes in measures such as provider time available for nondirect patient care activities, patients' waiting time, waiting room congestion, practice hours, and supervisory requirements." The findings of Mendenhall and others (160) indicate that even though direct encounters between patients and the supervising physician decline when an NP or PA is hired, the practice's total output increases. Record and others (192) reported "greatly varying results" in studies of how adding an NP or a PA to a practice affected its productivity. Some studies found NPs and PAs to have greatly increased productivity, and other studies found that adding PAs or NPs actually decreased the number of patients seen. The one fact about which researchers appear to agree is that the potential for increasing productivity is greater in large practices than in small ones (111,192).

Three major problems arise in assessing productivity in terms of length of encounter or number of patients seen per unit of time. First, these units of measure do not reflect the content of the care provided or the severity of the patients' illnesses. Because some visits require more skill than other visits Holmes and others (114) applied a relative-value measure of productivity, considering both the number of visits and the complexity of those visits. The researchers found that although physician-NP teams handled only 5.7 patient visits more than physician-nurse teams handled each day, the teams with NPs were 26 percent more productive in terms of total value-weighted services (114). The difference in content of care is an important consideration because NPs provide more time-consuming services, such as health education and counseling, than do physicians and physicians are capable of providing some medical services that NPs cannot provide. Measures unadjusted for content and complexity of work may yield biased estimates of relative productivity.

The second major problem in basing productivity estimates on numbers of patients or lengths of visits is that these measures inadequately reflect the ultimate objective of medical care. The purpose of medical care is to treat and prevent health problems rather than to provide individ-

ual services. Recognizing this fact, Salkever and others (213) examined the productivity of physicians and NPs in terms of episodes of care, because episode-based assessments account for differences in referral, and because "the episode is also a more appropriate unit for measuring differences in effectiveness of care, since the outcome of the care process may be causally related not only to a service received at a single visit, but to any services received over the course of the episode." The researchers found that the per-episode costs were about 20 percent lower when NPs were the initial providers than when physicians were the initial providers.

A third major problem in ascertaining productivity is that existing studies reflect current substitution practices, which may not fully exploit the potential for using NPs and PAs cost-effectively. The fact that NPs and PAs can safely perform numerous medical-care services suggests that these practitioners have the capacity to be highly productive as individuals and to contribute substantially to the productivity of the organizations in which they work. But a key factor affecting the productivity of NPs and PAs is the extent to which their employers—often physicians—are willing to delegate tasks to them.

The evidence about what physicians actually delegate as opposed to what they can safely delegate is limited. A recent study of physicians in a large HMO (125) found that physicians did not delegate as many tasks as they thought NPs and PAs could handle safely. General internists, pediatricians, and obstetrician/gynecologists indicated that 49, 46, and 29 percent, respectively, of their total office visits could be shifted safely to PAs and NPs. The internists and pediatricians, however, were willing to shift only about 28.5 percent of their visits to NPs and PAs, and obstetrician/gynecologists were willing to shift only about 14 percent of their visits. Most pediatricians and obstetrician/gynecologists cited their patients' preferences for being treated by physicians and the physicians' own needs to maintain overall proficiency by seeing a full range of patients as the primary reasons for not delegating more. The primary reasons most internists cited for not delegating more were that seeing only complex cases would be too demanding and that patients preferred to receive care from physicians (125).

In addition to reflecting physicians' willingness or unwillingness to delegate responsibilities, the productivity of NPs and PAs depends on many factors, including practice type (solo or group), practice setting and size, case mix, how long the NPs or PAs have been practicing, practice regulations, and how much autonomy the NPs or PAs have. Many of these factors are beyond the control of NPs and PAs, however, which means that the potential or capacity of NPs and PAs has a limited effect on their productivity and, consequently, on their ability to affect the cost of care. Indeed, most productivity analyses consider NPs and PAs as part of physicians' practices. Little evidence exists as to the productivity and cost-effectiveness of NPs and PAs as autonomous practitioners.

In sum, the studies of the productivity of NPs and PAs suggest that:

- physicians can substantially increase their practices' output by employing NPs or PAs who operate under the supervision of physicians;
- although PAs, and, especially, NPs see fewer patients per hour than physicians see, these practitioners are capable of carrying substantial proportions of the workloads of primary-care physicians; and
- practice setting may be an important factor in NPs' and PAs' productivity, as evidenced by the differences in the use and productivity of NPs and PAs in HMOs and traditional settings.

The potential suggested by these studies is limited by the reluctance of physicians to delegate tasks. Evidence shows that physicians are reluctant to use NPs or PAs even to the extent that physicians think feasible and safe, basing their reluctance on patient preferences.

Certified Nurse= Midwives' Productivity

Compared to the many studies of NPs and PAs, much less information is available on the productivity on CNMs. Furthermore, "it is characteris-

tic of the nurse-midwifery studies that they concentrate on outcome" (67). This almost exclusive focus on outcome rather than process limits information about CNMs' involvement in producing services.

One study **(253)** indicated that CNMs were only "about 23 percent as productive as obstetricians when the number of deliveries was used as the output measure." But the same study reported when the volume of patient visits was used as the output measure, CNMs were 98 percent as productive as obstetricians.

As with NPs, the content of care provided by CNMs must be understood because they stress the interpersonal aspects of care, such as counseling, health education, and patient interaction (103, 184). Such an understanding is necessary in order to specify what facet of the care provided by CNMs contributes to the positive outcomes their patients experience **(226).**

Data from the ACNM survey (1984) suggest substantial possibilities for CNMs to substitute for physician care. Many CNMs are already assuming responsibility for a wide variety of complex tasks in prenatal, labor, delivery, and postpartum care.

COSTS AND EMPLOYMENT

Although considerable scope exists for substituting of NPs, PAs, and CNMs in providing some of the care traditionally provided by physicians, the resulting increases in productivity are not enough, by themselves, to justify greater employment of these practitioners in private practices. From the standpoint of a private firm, the marginal value (as measured by the amount patients would pay for the additional output) must compare favorably with the marginal cost (i.e., the salary and related expenses) of hiring an NP, PA, or CNM. From the perspective of a long-run investment in training, either by society or by the trainees, the value (i.e., compensation) placed on the output of the NPs, PAs, or CNMs must compare favorably with the costs of training to justify expending the resources.

In 1983, annual salaries for NPs, PAs, and CNMs averaged about $25,000, compared with the $60,000 to $80,000 median salaries of primary-care physicians **(18).** This wage gap raises several questions. What are the costs and benefits to society of using NPs, PAs, and CNMs rather than physicians? And if NPs, PAs, and CNMs are cost-effective substitutes, why isn't their employment increasing relative to the employment of physicians?

NPs, PAs, and CNMs, clearly could not completely replace physicians, because the scope of the NPs', PAs', and CNMs' professional activities is constrained by their more limited training, reimbursement policies, legal barriers, and practice setting characteristics. Furthermore, NPs, PAs, and CNMs sometimes compete with professionals other than physicians or operate independent practices. Nonetheless, given the large overlap of their practices, primary care physicians provide an appropriate comparison group for considering the employment of NPs, PAs, and CNMs. Although some information is available about salaries, the figures are imprecise enough that the discussion must be carried out in approximate and qualitative terms.

Costs and Benefits of Training Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives

Estimates of the social and private rates of return to investments in training and education indicate the value placed on these investments by society and private individuals, respectively. The best of such computations require large amounts of data on earnings over the career of the individual. However, some conceptual issues can be addressed qualitatively. In theory, the rate of return on investment in the training of NPs, PAs, or CNMs can be calculated without reference to the training or earnings of physicians. Society must expend a certain amount to train a person to be an NP, for example, and this investment yields a return of about **$25,000** per year (plus

fringe benefits) minus what the person would have earned otherwise.

An alternative approach would be to consider the costs and benefits of training someone to be an NP, PA, or CNM instead of training the person to be a physician. The costs to society of training an NP, PA, or CNM are much less than the costs of training a physician. The direct costs related to education such as payments for instructors, supplies, and facilities, are greater for physicians than for NPs, PAs, and CNMs, probably on a yearly as well as overall basis. The indirect costs, primarily what the individual would have earned during the time spent in training, are also greater for physicians, because more years of schooling are required.

Differences between the social and private rates of return primarily reflect differences in the costs of education. The more that government subsidizes training, the higher will be the private rate of return, compared with the social rate. Little evidence exists as to what either rate of return is or what the differential between the two is, but educational subsidies over the years have been considerable. Scheffler (217) provides an estimate of the private rate of return as of the early 1970s, arguing that ". . . the private rate of return is sufficient to produce a relatively strong demand for PA training; therefore, an increase in government support is unwarranted." He finds high rates of return—over 20 percent—comparable to those received by physicians. The available data are probably insufficient to allow distinctions between these two types of investment, but thinking about them qualitatively is useful.

Nurse Practitioners and Physician Assistants

The most recent estimates of the costs of educating physicians and NPs, PAs, and CNMs were made in 1979 by the Congressional Budget Office (CBO). CBO estimated the mean total costs of educating NPs and physicians at that time to be $10,300 and $60,700, respectively. Assuming, conservatively, that these costs increased at an average annual rate of 6 percent, the total educational costs would have been $14,600 for NPs and $86,100 for physicians as of 1985.

A substantial portion of these direct costs are borne by taxpayers, rather than by the trainees. Society, through government support, has invested heavily in the training of NPs as well as physicians. For example, between 1975 and 1982, the Federal Government spent $65.9 million on educating NPs. These funds supported approximately half the NP training programs in the United States (251).

The indirect costs—primarily foregone earnings—are substantial, but they are difficult to estimate with any precision. Because a physician spends about 6 more years in training than does an NP, the indirect costs an individual must pay to become a physician are much greater. Determining the value of the foregone earnings for those individuals who become doctors versus those who become NPs is a more complex empirical task. Clearly, however, several NPs could be trained for the cost of educating one physician.

Extrapolating from' CBO's estimates of PA-training costs (242), the total direct costs of training a physician assistant would have been $16,900, compared with $86,100 for training a physician as of 1985. The indirect costs for PAs are about the same as for NPs. Thus, the total costs of training are higher for PAs than for NPs, but the average earnings of PAs are higher than those of NPs ($24,500 versus **$23,500) (44,237).** Although, a more precise comparison would require some adjustment for the sex compositions of the two groups, the chief implication of the studies is that PAs, like NPs, are much less costly to train than physicians.

Certified Nurse-Midwives

The tuition charges for nurse-midwifery education vary considerably among programs, but an estimated average of the annual cost of educating a nurse-midwifery student is approximately $12,000 (78). The total cost of training is increasing with the growing trend toward master's degree programs, which last 2 years and are usually twice as long as certificate programs. Approximately 40 percent of the Nation's CNMs have graduated from master's degree programs. The average total training cost for certificate and

master's programs combined is about $16,800, compared to the $86,100 cost of physician training as of 1985.

Costs and Benefits of Private Employment of NPs, PAs, and CNMs

Because physicians or group practices sometimes must choose between hiring additional physicians and hiring NPs, PAs, or CNMs, the perspective of the physician as employer should be considered in any attempt to understand the employment levels of these nonphysicians. Using NPs, PAs, and CNMs to provide services that would otherwise be provided by physicians can benefit society with lower fees if the cost of providing services by the nonphysicians is less than that of providing services by physicians and if the savings are passed on to patients. The costs of employing an NP, PA, or CNM include salary, fringe benefits, supervisory expenses, costs of any expansion necessitated by adding another provider to the staff and costs of resources used by the additional provider. These costs must be compared with the costs that would be incurred if a physician were added to the practice, The benefits a practice receives by hiring an additional provider are the additional fees the provider's services generate for the practice.

Nurse Practitioners

How employing a nurse practitioner would affect the cost of a practice cannot be determined with any precision, but the following simple calculation provides a rough picture of the effect. The median salary of NPs in clinical practice in **1983** was approximately **$23,500.** If fringe benefits averaged 25 percent of salaries, total costs would be about $29,500 per year. This is far below the $82,000 net income of young physicians (19). Hiring a nurse practitioner or another physician might also result in indirect costs for such things as new office space, new equipment, additional support staff, and additional resources.

Total practice costs would change in composition because physicians would spend some time supervising the NP instead of providing visits, or the NP might order more or fewer lab tests than the physician would have. However, the basic question is whether the total value of the practice output increases enough (i.e., would there be enough additional revenue) to cover the additional cost of the NP?

Denton and others (61) examined the effect of the additional costs in a hypothetical calculation of the savings that would have resulted in Canada in 1980 "had nurse practitioner time been substituted for physician time in the provision of all services for which such substitution has been demonstrated to be safe and feasible. " The researchers concluded that the savings from this widespread use of NPs would have been from 10 to 15 percent for all medical costs (or from $300 million to $450 million) and that the savings would have amounted to between 16 and 24 percent of the total costs for ambulatory care. Furthermore, the researchers determined that their "estimates are quite insensitive to demographic changes and will be as valid in the future as they are today. "

These findings are supported somewhat by the findings of Salkever and others (213), who compared patterns of treatment for otitis media and sore throat by three types of prepaid group practices—NP only, NP-physician team, and physician only. With respect to otitis media, the findings support the contention that NPs' services are less expensive than those of physicians. Services provided by NPs alone are less costly than those provided by physicians alone or by NP-physician teams. The researchers found no difference, however, between the cost of treatments for otitis media by physicians alone and NP-physician teams. The findings were similar for care of sore throats. These results confirm earlier studies (81,141) comparing the costs of specific medical tasks conducted by nurse practitioners with the costs of the same tasks conducted by physicians.

Physician Assistants

The average salary of a PA is $24,500 and fringe benefits probably amount to about 25 percent of their salaries, making the average direct cost of employing a PA approximately $30,600 per year a sum much lower than the average income of young primary-care physicians.

Accurately estimating the relative cost of employing a PA versus that of employing a physi-

cian requires an examination of the indirect costs that result from the resources expended by the additional employees. Little information exists about the extent of the costs PAs generate by using a practice's resources. For example, Wright and others (266) found that PAs generate more laboratory costs than medical residents but fewer than medical faculty. The calculations that Denton and others (61) employed for determining that using NPs would save 10 to 15 percent of the total cost for medical care in Canada could apply to using PAs, as well, because the researchers used the term *nurse practitioner* in a broad sense to encompass "several different types of intermediate health professionals."

Certified Nurse-Midwives

The average salary of CNMs was **$24,800** in 1983. If their fringe benefits were 25 percent of their salaries, the average direct cost of employing a CNM was approximately $31,000 that year. The mean net income of obstetricians in 1983 was $119,900 (before fringe benefits) but because most CNMs have been practicing fewer than 15 years, the most appropriate figure for comparison would be the average salary of young—rather than all—obstetricians. The average income of young obstetrician/gynecologists is $100,000 per year plus $25,000 or more for fringe benefits.

As with the other types of health-care providers, the indirect costs a CNM generates by using a practice's resources need to be calculated to determine the full costs of employment. Evidence exists that clients of CNMs have shorter hospital stays than do clients of obstetricians (53,65). But Dickstein **(53)** found that clinic prenatal and postpartum costs in a large HMO were higher for CNMs than for obstetricians, "primarily because midwifery visits are longer and more frequent, use more RN educational time, and include the cost of OB consultations and referrals." Generally, although existing data do not allow precise quantification of the costs of CNM care and physician care, the salary differential probably ensures that the total costs are considerably less for CNMs than for physicians.

Costs Versus Benefits of Private Employment

The private physician's firm that employs an NP, PA, or CNM incurs extra costs for salary, fringe benefits, capital improvements, and other items. Productivity studies have shown that the time a physician spends supervising the NP, PA, or CNM reduces the number of patients the physician sees, although the reduction is more than offset by the overall increases in practice volume generated by the additional provider. Studies have not, however, directly addressed whether the value of the additional output exceeds the additional cost. In terms of rough magnitudes, the comparison is between a $25,000 salary (plus other costs) and a 20- to 50-percent increase in the practice's revenues, from a base of $150,000 to $200,000 annually. In view of the uncertainty about the extent to which an NP, PA, or CNM would increase marginal revenues, the marginal revenues do not clearly exceed the marginal costs. But the careful accounting by Denton and others (61) in Canada suggests that significant savings are possible for private practices that hire an NP, PA, or CNM rather than an additional physician.

CURRENT EMPLOYMENT: SETTINGS AND TRENDS

The productivity studies suggest that hiring NPs, PAs, and CNMs may provide private practices a cost-effective alternative to hiring additional physicians. And although private markets may be functioning as expected under existing legal and market institutions, unexploited social benefits may be available from the greater employment of NPs, PAs, and CNMs.

Nurse Practitioners' and Physician Assistants' Employment

Most of the pertinent studies have addressed the employment of NPs and PAs in primary-care settings, although NPs and PAs work at all levels of health care in a wide variety of settings (154). A 1982 national survey of pediatric NPs, for ex-

ample, revealed that 22 percent of the respondents worked in hospitals, 20 percent in community-health agencies, 17 percent in private pediatricians' offices, 10 percent in specialty clinics, 8 percent in schools, 6 percent in HMOs, and the rest mainly in nursing schools and military clinics (167).

NPs are increasingly being employed in home health agencies (155,196,220,268), and finding work in nursing homes (87,262). NPs are also working in industrial settings (216), correctional institutions (104), and schools (156,228).

Different types of practice settings have different implications for any economic analysis of the benefits of hiring NPs or PAs. For example, comparing NPs with other nurses might be more appropriate than comparing NPs with physicians in such settings as home health agencies, HMOs, schools, and businesses, where NPs might be employed instead of, or in addition to, registered or licensed nurses. In these settings, the NPs—the more costly alternative—might be selected because they could provide a wider range of services. NPs employed in schools, for example, can serve as liaisons among the various health-care providers serving schools; NPs can also provide backup support and in-house education to school nurses and provide educational services to teachers, parents, and students (228).

Because of increases in the variety of settings in which NPs work, their employment rates might reasonably be expected to be higher than ever. But, proportionately fewer NPs are working as nurse practitioners in the 1980s than were doing so in the 1970s (237). The extent to which this decrease reflects increased competition from the growing supply of physicians is unknown.

PAs also work in a wide variety of settings and in every level of health care from primary to tertiary. Of all the Nation's PAs, about one-third work in office-based practices (about half of these PAs work with physicians in solo practices); another one-third or so are based in hospitals; and the remaining one-third work in prepaid groups, public health departments, drug and alcohol rehabilitation centers, industrial settings, nursing homes, prisons and jails, and military facilities (45). Considerable change has occurred in the proportion of PAs employed in various settings. For example, the proportion of PAs employed in hospitals grew from about 10 percent in 1974 to more than 30 percent today.

Increasing numbers of NPs, as well as PAs, are finding work in hospitals. This development may not be due to the implementation of prospective payment for hospitals based on diagnosis-related groups (DRGs) and, in fact, maybe occurring despite DRGs. Instead, the trend is probably related in part to the growth in the supply of physicians.

> As the number of physicians increases in certain specialties, e.g., surgery, residency positions are being decreased to contain the numbers and PAs [are being] employed as 'junior house staff' to supplement patient care (262).

New employment opportunities for NPs and PAs may also stem from the trend for hospitals to establish community-based, ambulatory-care centers in order to broaden their patient bases and to assure themselves of solid sources of inpatient referrals. Hospital managers recognize that their best interests are served by providing these services as efficiently as possible and, consequently, by employing NPs and PAs.

Certified Nurse= Midwives' Employment

According to the 1982 ACNM survey, 36 percent of the Nation's CNMs worked in hospitals, 20 percent were in private practice with one or more physicians, 14 percent were in private nurse-midwifery practice, and the remainder worked in public-health agencies, prepaid groups, and other settings (10). Nearly 35 percent of the respondents to this survey revealed that they were not working as nurse-midwives, and about half of these said the reason was that "no nurse-midwifery positions are available in my community."

The data in table 2-3 indicate the changes that have taken place in how CNMs are distributed among the types of organizations in which they work. In general, the shift has been away from employment in hospitals, public health departments, and university health services and toward private practice (9,10). In contrast to NPs and PAs, proportionately fewer CNMs practice in hospitals now than did so in the 1970s: in 1984, only 6.7 percent of the Nation's hospitals had CNMs

on staff (171). More than 14 percent of the Nation's CNMs worked in private nurse-midwifery practice in 1982, compared with 2.4 percent in 1976 to 1977 (9,10).

CNMs are finding increased employment where they are not administratively responsible to physicians. Administrative independence must not be confused with clinical independence, because CNMs do not aspire to clinical independence. They highly value their professional interdependence and collaboration with physicians (13).

Although most NPs and PAs in primary care are supervised directly by physicians, only 48 percent of the CNMs practicing in the United States who responded to the 1982 ACNM survey indicated that their immediate supervisors were physicians. All the responding CNMs, however, collaborated on clinical matters with physicians (10). The proportion varied considerably depending on the type of practice. For example, about 9 of every 10 CNMs in private practice with physicians were supervised directly by physicians, whereas approximately one-third of hospital-based CNMs were under the supervision of physicians. Almost half the CNMs in private nurse-midwifery practice were not administratively responsible to anyone other than themselves, and an additional 22 percent reported to other nurse-midwives. In all, nearly 36 percent of the respondents noted that they were supervised directly by other CNMs (10).

The evidence suggests that CNMs—especially those in private nurse-midwifery practice—tend to function organizationally more independently of physicians than do NPs or PAs. Because of the sixfold increase in the percentage of CNMs working in private nurse-midwifery practices between 1976-77 and 1982, the organizational independence of CNMs has increased markedly. This trend shows no signs of slowing down, although all obstetrics-related care may be decreased by the liability-insurance crisis.

SUMMARY

Studies show that NPs, PAs, and CNMs can provide services that both substitute for and complement physicians' services, depending on the particular service or type of practice. Moreover, hiring an NP, PA, or CNM increases a practice's total output and costs less than employing an additional physician. Because training is less costly for these practitioners than for physicians, using NPs, PAs, and CNMs rather than physicians for certain services would presumably be cost-effective from a societal point of view, given that the quality of care is equivalent to that provided by physicians for comparable services (see ch. 2). Although additional cost savings might result from greater employment of these providers, the evidence suggests that current employment levels and practices more or less reflect existing market conditions.

The abilities and cost-effectiveness of NPs, PAs, and CNMs raise a question as to why their ranks have not grown and diffused to a greater extent. Although the private markets for NPs, PAs, and CNMs as employees in physicians' practices do not suggest a current shortage, the removal of payment barriers and limitations could greatly increase the demand for these alternative practitioners. Unless the barriers are altered, the potential savings from a greater use of NPs, PAs, and CNMs will probably remain unexploited.

Continuing research and analysis is needed to ascertain the cost savings that would result from increased employment of NPs, PAs, and CNMs. Many productivity studies have been conducted, but few attempts have been made to compare how NPs, PAs, or CNMs affect the revenues of individual practices with how they affect the practices' costs. Changing market circumstances create a need for both types of studies, but those that compare revenues and costs are especially important.

Chapter 5

Payment Issues

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In their areas of expertise, nurse practitioners (NPs), physician assistants (PAs), and certified nurse-midwives (CNMs) can provide safe care that meets generally recognized standards of quality, care that emphasizes personal and preventive dimensions often underemphasized by physicians, and care that would otherwise be unavailable in inner cities, remote areas, and certain settings where demand or ability to pay are insufficient to support physicians' practices. NPs, PAs, and CNMs could also reduce costs in certain settings.

Nonetheless, professional attitudes and restrictive statutes, regulations, and policies have hindered the ability of NPs, PAs, and CNMs to obtain employment in some settings and to practice at levels commensurate with their training (see box I-A). One major constraint is that *many third-party payers,* including many Federal programs, *do not cover (authorize payment for) services provided by NPs, PAs, and CNMs in certain settings, if the services are typically and characteristically provided by physicians nor do they pay them directly for such services (see* app. B). Although most third-party payers usually do not look beyond a physician's claim for payment as to whether the physician or NP, PA, or CNM have provided a particular service, uncertainties about coverage are partly responsible for some physicians' reluctance to hire NPs, PAs, or CNMs. Lack of direct payment limits the independent practice of NPs and CNMs. Third-party payers have been more generous in covering and directly paying for the services of CNMs than NPs. Although PAs, as well as NPs and CNMs, have actively sought coverage for their services, they differ from NPs and CNMs in not wanting direct payment.

Observers have suggested modifying the current rules for payment of such services by requiring coverage for NP, PA, and CNM services and by paying NPs and CNMs directly and not through the employing physician. Requiring coverage would be both an independent modification and a preliminary step toward direct payment. A third modification —establishing a payment level—could apply even if payment were indirect, i.e., to the NPs', PAs', or CNMs' employer.] These modifications would have several implications for employment and the scope of practice of these practitioners[2] and for the costs borne by third parties, patients, and society.

Some Federal health programs and private insurers provide coverage and direct payment for the services of NPs, PAs, and CNMs in some settings (see app. B). For purposes of analysis, this case study assumes that coverage and direct payment for such services would be offered by *all* the programs and insurers and that any new Federal legislation would not override State laws or regulations governing the licensing and practice of NPs, PAs, and CNMs.

The effect of the modifications would vary, depending on the setting in which the provider practiced and on the method of payment. Because these two factors are interdependent—in that payment method is usually typical of a type of practice setting—they are considered together.

The effect of these modifications also depends on the health-care environment, which is changing. The supply of physicians and the organization and financing of health care are changing in ways that are likely to bring about a more competitive market for health-care services.[3] These trends have implications for the future of NPs,

[1] During the publication of this case study, the Omnibus Reconciliation Act of 1986 (Public Law 99-509) was enacted. The act modifies Medicare and authorizes payment for (covers) services of physician assistants working under the supervision of physicians in hospitals, skilled nursing facilities, intermediate-care facilities, and as an assistant at surgery. The payment is indirect and at levels lower than physicians would receive for providing comparable services.

[2] Many other factors affect the employment and practice patterns of NPs, PAs, and CNMs. Several issues, especially *malpractice insurance,* are *critical,* but a discussion of them would be beyond the scope of this case study.

[3] The fact that the U.S. population is aging and consequently needing more health-care services would also affect the employment of NPs and PAs and, to the extent that the provide gynecological services, CNMs. The aging of the population has been discussed in detail in a number of previous OTA reports, notably in *Technology and Aging in America (245).*

PAs, and CNMs, regardless of whether payment for their services changes. Modifying payment for the services of NPs, PAs, and CNMs in a changing health-care environment, however, would certainly affect their employment and use and might alter the costs of health care.

EFFECTS OF MODIFYING PAYMENT FOR SERVICES OF NURSE PRACTITIONERS, PHYSICIAN ASSISTANTS, AND CERTIFIED NURSE-MIDWIVES

Modifying the method of payment could be expected to have varying effects on the employment and scope of practice of NPs, PAs, and CNMs, depending on whether they were in independent practices or worked in physicians' practices, health maintenance organizations, hospitals, nursing homes, or other settings. Modifying the method of payment might also affect costs.

Effects on Independent Practices of Nurse Practitioners and Certified Nurse-Midwives

Mandated coverage and direct payment to NPs and CNMs for providing services typically and characteristically performed by physicians would dramatically increase NPs' and CNMs' ability to establish fee-for-service practices that were administratively independent from physicians. Indeed, direct payment would be the most advantageous payment method for NPs or CNMs in independent practices. As autonomous providers, NPs and CNMs could provide the full range of services for which they were trained and licensed.

Such practices would be *administratively* independent but according to current modes of practice, they would not be *clinically* independent from physicians when NPs and CNMs were performing delegated medical tasks.[4] The nursing profession has agreed to clinical collaboration. For example, a joint statement of "practice relationships" calls for obstetrician/gynecologists and CNMs to adhere to clinical-practice arrangements that include the participation and involvement of obstetrician/gynecologists with CNMs as mutually agreed on in written medical guidelines or protocols. CNMs in administratively independent practice believe that they are adhering to the joint statement, because it permits interdependent practice without calling for physicians to be present whenever CNMs are caring for patients (13). In addition, the American College of Nurse Midwives requires that CNMs agree to work in clinical collaboration with physicians in order to obtain certification.

In addition to professional restraints, State laws and regulations that limit NPs' and CNMs' scope of practice and specify requirements for supervision by physicians serve as a formal control on clinical independence. NPs and CNMs in independent practice are also accountable for their mode of practice by the malpractice insurance they carry.

Although a few NPs have attempted to establish administratively independent practices, most NPs in such practices provide traditional nursing care rather than primary medical care (138). Among the barriers NPs face in undertaking independent practices are the necessity of making substantial financial investments and the lack of coverage and direct reimbursement for their services. The American Nurses Association (ANA) believes that many NPs would establish such practices if coverage and direct payment were more widely available (256).

CNMs are highly interested in administratively independent practice. Indeed, the proportion of CNMs in private midwifery practices increased from 2.4 percent in 1976 to 1977, to 14 percent in 1982 (9,10). During that period, the number of third-party payers that provided coverage and direct payment for CNMs' services increased. If additional third-party payers were to cover and pay for these services, more CNMs probably would be interested in independent practices

[4]NPs and CNMs may legally be clinically independent from physicians when performing nursing tasks.

[5]Problems with obtaining malpractice insurance coverage and high malpractice premium costs are significant limitations on independent practice by CNMs.

How coverage and direct payment for NPs' services would affect the establishment of administratively independent fee-for-service practices by NPs partly depends on the extent to which NPs seek and obtain direct payment. The impetus for direct third-party payment of nurses, an ANA priority since 1948, increased for organized nursing with the establishment of NPs as health practitioners (22). Indeed, the ANA has been actively involved in seeking and sometimes obtaining such payment at the State and national levels **(23,232).**

Little information is available as to how many practicing NPs receive direct payment. A 1983 survey of NPs, conducted 4 years after the passage of a Maryland law providing direct third-party payment for services not directly supervised by physicians, found that fewer than 1 percent were paid directly (99). In 1986, however, 7 years after the passage of similar legislation in Oregon, a survey of NPs in that State found that 25 percent were receiving direct third-party payment; 42 percent had been issued provider numbers; and **38** percent were signing the claims forms for the services they provided (102). The researcher who conducted both surveys suggests that the disparate findings might reflect the fact that more time had elapsed between the passage of the legislation and the survey in Oregon than had elapsed in Maryland (101).

The establishment of independent fee-for-service practices by NPs and CNMs could affect the costs of third-party payers. If the total volume of services by all providers did not increase, setting payment levels for services provided by NPs and CNMs lower than levels for comparable services provided by physicians might decrease the costs of third-party payers. Of course, the size of any savings to third-party payers would depend on the size of the gap between payment levels for physicians and payment levels for NPs and CNMs. Paying NPs and CNMs 10 percent less than physicians are paid would have a minimal effect on third-party costs in the immediate future, in part because the number of NPs and CNMs is so much smaller than the number of physicians. Savings to third-party payers would also depend on the extent to which patients chose to patronize NPs and CNMs in independent practices.

Patients' costs might be lower if the NPs and CNMs charged their patients lower fees than physicians charged for comparable services. For most primary care services, e.g., office visits, savings to most patients would be small, because fees for such services are not high and third-party payments cover a large part of them. Savings for maternity care could be appreciable however, because charges and patient liability for such services are high. Coverage and direct payment would allow patients to choose NPs and CNMs as providers without being penalized financially by lack of reimbursement.

Any savings to third parties and patients might be decreased or negated by duplicative visits. Patients who sought care from NPs or CNMs in independent practices might also see physicians for the same or related care, on their own initiative or on referral by NPs or CNMs. Seeing both physicians and nonphysicians could result in duplication of examination and laboratory procedures.

Although NPs and CNMs in independent practices could lower societal costs for health care, the extent of the savings is difficult to estimate. Societal costs would reflect, among other things, any decreases in program costs and beneficiary costs and any savings resulting from NPs' and CNMs' care that reduced the need for care in the future. For example, although CNMs might not find it feasible to charge patients lower fees than physicians charge (because CNMs spend so much more time with patients than physicians spend), CNMs might lower societal costs by decreasing the need for expensive neonatal intensive care for infants of women whose socioeconomic status puts them and their infants at high risk **(193).**

Scant evidence is available as to how much NPs in independent practices charge their patients. In an exploratory phase of a survey of Maryland NPs, Griffith **(99)** found that the median fees charged by NPs in independent practice were lower than the median fees charged by physicians for most services. However, 59 percent of NPs' fees were the same as physicians' fees for all types of visits (99). Charging lower fees than physicians charge for similar services appears to be the norm for NPs in many types of settings other than independent practice. Brooks (36) reported that the

fees charged by NPs in rural satellite settings are lower than those charged by a sample of rural physicians. Several national studies of NPs in organized settings confirm this finding **(256).** Patients were generally charged less for visits to Oregon NPs who received direct payment either in independent practices or in physicians' fee-for-service practices than for visits to salaried NPs (102). The difference between the charges for short initial visits and brief followup visits was statistically significant. Furthermore, charges for visits to NPs were lower than for visits to physicians in both Oregon and Maryland. The difference between charges for NPs and those for physicians was greater in Oregon than in Maryland, perhaps because the proportion of NPs receiving direct payment was greater in Oregon than in Maryland (102).

Whether NPs would increase their fees if they were in independent practice and received direct payment is unclear, although some evidence indicates that other groups that provide services typically provided by physicians have gradually increased their fees to the level of physicians' fees after receiving direct payment. The American Psychiatric Association (APA) has reported two studies that found this phenomenon to be true of psychologists and clinical social workers (256).

Some private insurers report that their total costs from CNMs for maternity care are lower than those from physicians. Of course, physicians' care includes care for complex cases that require more resources than normal maternity care. However, Mutual of Omaha has noted that CNMs provide a "valuable service at a reduction in costs from that charged by medical doctors or osteopaths," and the Blue Cross and Blue Shield Association found that CNMs were less costly than physicians in normal maternity care (256). Indeed, based on the current status of direct payment for services, insurers of CNMs appear to be less resistant to coverage and direct payment than do insurers of NPs (see table B-l). Insurers, such as Mutual of Omaha and Blue Cross, perceive that NPs would provide services in addition to those normally provided by a physician, whereas CNMs provide services that substitute for physicians' services (256).

Charges for CNM services in independent practice appear to vary by region—in some areas their fees are lower than those of physicians, and in other areas they are about the same (79). CNMs charge slightly less than obstetricians for normal maternity care **(98)** when services are provided in independent birthing centers **(103,149).** The total costs of maternity care by CNMs may also be less than total costs for care by physicians for similar cases, not necessarily because CNMs have lower fees, but because the care they provide is usually technologically less complex than physician care (98,201).

Costs to patients, third-party payers, and society would also be influenced by changes in the volume of services provided as a result of coverage and direct reimbursement for new providers. Historically, insurance companies have contended that covering and directly paying additional provider groups in fee-for-service settings increases the volume of services provided by the new providers, the physicians, or both and, consequently, increases costs for third-party payers, beneficiaries, and society. The evidence to prove or refute this argument is equivocal **(246).** The recent emphasis that public and private third-party payers have placed on monitoring the volume of healthcare services may help to control potential increases in volume.

Direct evidence is unavailable as to how coverage and direct payment would affect the volume of services provided by NPs and CNMs. Indirect information, which consists only of anecdotal reports of private insurers' experiences with other groups, is conflicting. Mutual of Omaha and other insurers report that chiropractors increased their provision of services to consumers after being authorized for direct reimbursement but that psychiatric social workers did not increase theirs (256).

Whether coverage and direct payment for services by NPs and CNMs would increase the provision of services by physicians is unclear. Physicians might change their behavior in response to competitive providers. If NPs and CNMs charged their patients lower fees, some physicians might decrease their fees in order to compete but, to maintain their incomes, might increase the number of services they provided to their patients (in-

ducing demand for services). Although research on physicians' influence on the volume of services has been conducted for many years, none of the studies positively proves the magnitude or even the existence of induced demand for services (246). In the past, however, physicians in the United States and Canada have maintained their income level even with substantial increases in the supply of physicians (28).

Effects on Physicians' Practices

In the 1970s, a major reason cited by physicians as a disincentive to employing NPs, PAs, and CNMs was that Federal payment policies did not authorize payment for services provided by NPs, PAs, and CNMs (138). Whether mandating coverage for such services would increase incentives for physicians in fee-for-service practices to employ these practitioners and delegate more services to them depends on several factors, including physicians' billing practices and the payment levels for NPs', PAs', and CNMs' services. The higher the payment level, the greater the monetary incentive a physician would have to employ an NP, PA, or CNM, but simultaneously the cost-saving potential to the third-party payer would decline.

Providing coverage and payment for the services of NPs, PAs, and CNMs (at any level) would increase practice incomes for physicians who have employed these practitioners without billing for their services. Such physicians might increase the range of services they delegate to NPs, PAs, and CNMs. Third-party payers' costs would probably increase, regardless of whether the practices' volumes of services increased. Whether increases in practice income would be passed on to patients in the form of lower fees is unclear.

If services by NPs, PAs, and CNMs were authorized for payment, physicians' practices that currently do not employ such practitioners might be more inclined to employ them rather than hire additional primary-care physicians. If the payment level was 100 percent of what a physician would receive for providing a comparable service, third-party payers probably would incur higher costs for such practices regardless of whether the new employees were NPs, PAs, CNMs, or physicians. If the payment levels set for NPs', PAs', or CNMs' services were lower than those set for physicians' services, the costs to third-party payers would be lower if NPs, PAs, or CNMs, rather than physicians, were employed.[1]

However, authorizing payment for NPs', PAs', and CNMs' services would not necessarily increase the opportunities for these providers to become salaried employees in physicians' practices. Allegations have been made that many physicians' practices, knowingly or unknowingly, submit bills under the physicians' provider numbers for uncovered NPs', PAs', and CNMs' services. The bills are seldom challenged by third-party payers. If the payment levels were the same for the services of NPs, PAs, and CNMs as for the employing physicians, coverage of NPs', PAs', and CNMs' services would not affect the revenues of physicians' practices that were already billing for such services. In these practices, coverage probably would affect neither the employment opportunities for NPs, PAs, and CNMs nor the services physicians delegated to such practitioners.

The revenues of these practices would decrease, however, if the payment levels were significantly lower for NPs', PAs', and CNMs' services than for physicians' services, if the volumes of services remained the same for the practices, and if the physicians billed for the services of NPs, PAs, or CNMs under the NPs', PAs', or CNMs' provider numbers. How physicians would respond to decreases in their practices' revenues is unclear, but employment opportunities for NPs, PAs, and CNMs might be jeopardized. The physicians might increase the volumes of services provided by their practices.

Coverage of NPs', PAs', and CNMs' services would not affect third-party costs if the number of services provided by practices remained stable; i.e., if the practices had billed for services under the physicians' provider numbers before coverage was expanded, and if the payment levels were the same for NPs, PAs, and CNMs as for the employing physicians. If the payment levels were lower for NPs, PAs, and CNMs than for

[1] It is not clear whether or not NPs would accept payment levels lower than those of physicians. As noted earlier, PAs are willing to accept levels of compensation lower than those of physicians.

physicians, third-party payers' costs for such practices might decrease. For physicians' practices, as for NPs' and CNMs' independent practices, the size of the difference between the payment levels for services provided by NPs, PAs, and CNMs and for comparable services provided by physicians would partly determine how lowering the payment level would affect the costs of third-party payers.

Because data do not exist as to how physicians bill for the services of NPs, PAs, and CNMs, the overall effect that required coverage would have on NPs', PAs', and CNMs' employment opportunities in physicians' fee-for-service practices is uncertain. Coverage might influence employment indirectly. NPs have argued that coverage establishes a collegial professional relationship. Furthermore, they claim that coverage can cause physicians to see that NPs', PAs', and CNMs' services generate revenue as well as costs **(98).** This perspective might increase the employment potential of these practitioners **(98).**

Direct payment would only indirectly affect the employment of NPs and CNMs as salaried employees of physicians. Direct payment would allow NPs and CNMs to choose to work as salaried employees, to undertake independent practices, or to enter into joint practices with physicians (i.e., partnership arrangements by NPs or CNMs with physicians). Paying NPs in physicians' practices directly, rather than indirectly, could be expected to decrease the fees for patients' visits to NPs (102).

Effects on Health Maintenance Organizations

Because most third-party payers in the public and private sectors currently provide coverage for the services of these practitioners in health maintenance organizations (HMOs) (see table 1-l), extending coverage is largely irrelevant to their employment in this setting. Also, most HMOs pay NPs, PAs, and CNMs a direct salary, which makes the issue of direct payment of little importance in the HMO setting.

The data suggest that NPs, PAs, and CNMs save costs for HMOs:

> It is to their [HMOs] financial advantage to produce services with the most efficient combination of inputs, substituting lower priced physician extenders for higher priced physicians whenever possible (138).

Furthermore, past experience with HMOs has shown that:

> . . . capitation[7] plans do care for [non-Medicare] enrollees at lower costs while maintaining quality at levels equal to or better than comparison practices (246).

Effects on Hospitals

Payment for services delivered in inpatient hospital settings by NPs, PAs, and CNMs who are hospital employees is most commonly made either retrospectively on the basis of cost or prospectively on the basis of diagnosis-related groups (DRGs). There is no statutory permission or lack of permission under Medicare or Medicaid for payment of NPs', PAs', and CNMs' services as inpatient hospital services when the providers are employed by the hospitals. Most other third-part, payers are also silent on this issue. Moreover, hospitals usually pay a salary to NPs, PAs, and CNMs that they employ.

Medicare, Medicaid, and most other third-party payers pay hospitals for total operating costs, and most hospitals' accounting systems simply lump the costs of NPs', PAs', and CNMs' services together with other types of operating costs. Nurses contend that coverage and direct payment as well as the identification of the services that coverage and direct payment would require, would influence hospitals interest in them as employees. Delineating the costs of these services might facilitate internal management decisions. Nurses have advocated the identification of the costs of nursing services in institutional settings, believing that identification would increase nurses' autonomy, encourage economic decisionmaking, enhance nursing efficiency, and spur hospital administrators to recognize that nurses generate revenue as

[7]Cavitation is a method of paying for medical care, in which a per capita amount is paid prospectively for all services received by an enrollee or beneficiary during a given period of time. The payment is not related to the quantity of service provided. Cavitation payment provides financial incentives to use resources more efficiently and even to underuse services.

well as costs (22,98,162). Nurses believe that recognition of their revenue-producing abilities could increase their employment opportunities in hospitals (161).

Extending coverage and direct payment for the services of NPs, PAs, and CNMs as hospital employees in the inpatient hospital setting most likely would require that the costs of the services be paid for as professional services, the category under which Medicare and other third-party payers currently pay for physicians' services. Such a move would run counter to most current thinking, espoused in both the public and private sectors, which is focused on containing costs by aggregating services. For example, some observers have expressed interest in aggregating physician services by adapting the DRG approach,[8] particularly for hospital-based physicians (63,165). The Omnibus Reconciliation Act of 1986 (Public Law 99-509), however, has extended direct payment for anesthetic services rendered by certified registered nurse anesthetists in hospitals. These services were originally to be paid for under Medicare as a component of a DRG but were passed through as a hospital cost.

Coverage of their services would affect the employment of PAs who are employees of physicians or physicians' practices but who work as surgical assistants in hospitals.[9] PAs assist in performing surgical procedures and also provide preoperative and postoperative care (7). Medicare does not cover PAs' provision of such procedures and care, although Medicare currently covers and pays at amounts equivalent to 20 percent of the surgeons' fees for the services of physicians who act as assistants at surgery. Some observers have

Photo credit: Geisinger Medical Center and the American Academy of Physician Assistants

PAs provide post-operative care as well as pre-operative care and assisting in performing surgical procedures.

expressed concern that the lack of coverage has restricted PAs' employment and the delegation of appropriate services to PAs at surgery. Using PAs rather than physicians as surgical assistants reduces practices' costs, but whether the savings are passed on to patients is unclear.

Effects on Nursing Homes

Because virtually all NPs and PAs working in nursing homes are salaried employees, their employment would not be necessarily affected by coverage of their provision of services typically provided by physicians.[10] With coverage, NPs and PAs could supply primary-care services in nursing homes as employees of physicians' practices or as team members in group practices provid-

[8]Under the DRG approach, Medicare pays a fixed amount for the operating costs associated with treating patients in each diagnostic category. In applying the DRG approach to physicians, the payment unit would be a bundle of services rather than an individual service. This approach could control both costs and utilization by reducing the number of service units billed and encouraging the judicious use of services within packages.

[9]During the publication of this case study, the Omnibus Reconciliation Act (Public Law 99-509) was enacted. The act modifies Medicare and authorizes coverage of a physician assistant services furnished under the supervision of a physician as an assistant at surgery. The payment to the employer will be 65 percent of the reasonable charge for a physician when acting as an assistant at surgery and will be effective after Jan. 1, 1987.

[10]Several other Medicare and Medicaid regulations specific to nursing homes limit the role of NPs and PAs and specify services that must be performed by physicians in order for the nursing homes' services to be covered (see app. B). Many States have passed laws to "permit the delegation of these services b, a physician to a physician assistant or nurse practitioner" (116). However, strict interpretation of these and similar rules prohibits the appropriate use of NPs and PAs in nursing homes. In addition to permitting coverage under Medicare and Medicaid, amendments to these regulations would be required in order for NPs and PAs to be used appropriately.

ing visits to nursing homes.[1] If NPs were paid directly, they could supply primary-care services to nursing homes as independent practitioners, similar to physical therapists.

Many nursing homes have difficulty supplying primary-care services because few physicians are interested in visiting patients in nursing homes to provide services **(166)**. Furthermore, most physicians are poorly prepared to care for seriously ill elderly patients. The growing number of elderly people in our society, particularly those over **85** who most frequently need nursing-home care, has increased concerns about the quality and costs of such care. Many residents are medically stable but functionally impaired by chronic physical or mental conditions. Other residents are admitted from hospitals for recuperation and rehabilitation following surgery, or are terminally ill and do not require hospital care **(245)**. NPs and PAs are uniquely suited to provide the types of care needed by nursing home residents with chronic conditions and their associated disabilities (see chs. 2 and 3).

[1] During the publication of this case study, the Medicare law was changed as a result of the enactment of the Omnibus Reconciliation Act of 1986 (Public Law 99-509) during October 1986. The act authorizes the coverage of the services of PAs furnished under the supervision of a physician in skilled nursing facilities and intermediate-care facilities in States where the physician assistant is legally authorized to perform the services. The payment to the employer is to be at 85 percent of the prevailing charge of physician services for comparable services provided by a nonspecialist physician.

Except when more intensive care can be substantiated, the number of physician visits to nursing homes is limited under the Medicare program. Extending coverage, therefore, might not increase the costs attributable to nursing-home visits for third-party payers, assuming payment levels were the same, or lower, for the NPs and PAs as for the physicians. When physician-NP teams, rather than physicians alone, visited nursing homes, however, total costs to third-party payers were shown to decrease, mainly because of lower rates of hospitalization and fewer visits to physicians or clinics **(128)**. A 1980 and 1982 study found that, as compared with physicians alone, a group practice of salaried physicians, NPs, and PAs showed substantially lower overall medical costs for nursing home residents even though the number of visits to the homes were not limited. Savings were realized from decreases in expensive hospital-based emergency and outpatient services and in the numbers of hospital days used (155,257). Furthermore, the quality of care increased, and the NPs acted as patients' advocates.

Although payment changes are a necessary step, innovative approaches to improving the care and reducing the costs associated with nursing homes need to include modifications of regulations concerning visit limitations and changes in other Medicare and Medicaid regulations that limit the role of NPs and PAs in nursing homes.

THE CHANGING CONTEXT OF HEALTH CARE

Financing

A growing trend is to set payment rates for health services before, rather than after, they are delivered. Prospective payment has been adopted in response to rapidly rising health-care costs and the recognition that cost increases have been partly caused by retrospective reimbursement. One of the most innovative approaches is Medicare's method of paying for beneficiaries' inpatient care on the basis of DRGs.

The other major trend is increased interest in the use of cavitation, in which a per capita amount is set prospectively for all medical services received by an enrollee or beneficiary during a given period. The health-care organization receives its payment, the amount of which is not related to the quantity of services provided, and must then pay physicians and other providers. Cavitation payment provides financial incentives to prevent high-cost problems and to deliver services at low cost. Acceptable standards of care, or at least patient satisfaction, are essential if capitated plans are to maintain enrollment at sufficiently high levels to maintain financial viability (246).

Supply of Physicians

In the mid-1960s, public policy in the United States began to focus on counteracting the short-

age and maldistribution of physicians. As a result, the number of medical schools increased from 89 in 1965 to 127 in 1984 (255), and the number of first-year medical students nearly doubled (240,255). Expected increases in the numbers of graduates from U.S. medical schools, combined with graduates of foreign medical schools, are resulting in physician surpluses, which the Graduate Medical Education National Advisory Committee predicts will be significant by 1990. Since 1982, enrollment in medical schools has declined slightly, as the Federal Government has reduced both its funding of subsidized loans for medical students and its support of medical schools (58). The growth rate in the supply of foreign medical graduates also is expected to decrease (255), but the effect of past efforts to increase the supply of physicians will be felt well into the next century.

Observers expect increases in the number of physicians to significantly outpace population growth. For every 100,000 people in the United States, there were 148 physicians in 1970 and 218 in 1983 (255). Estimates for 1990 range from 215 **(240) to 224.4 (255)** per 100,000. Estimates for the year 2000 range from 240 (240) to 245.2 (255) per 100,000. '2 From 1981 levels, the numbers of physicians in primary-care specialties, including obstetrics and gynecology, are expected to have increased 28 percent by 1990 and 53 percent by 2000, outpacing the growth in the total supply of physicians (255). Although the need for physicians is expected to increase, the supply of physicians is expected to exceed the need by 1990, according to all estimates (94,240,251,255).

Delivery Sites and Organizations

In 1983, for the first time, the main practice arrangement of less than half (48.9 percent) of all physicians in the United States was solo practice. Only 8 years previously, more than 54 percent of the Nation's physicians practiced individually. In 1984, the number of group practices (three or more physicians) was over 15,000—up 44 percent since 1980 (16). The number of physicians in group practices during the same period increased from 88,290 in 1980 to 140,213 in 1984 (4). Some physicians join group practices because the practices are established, they entail less financial risk than solo practices, and they provide access to the capital required for purchasing and using sophisticated medical technology (16). Group practices may be even more attractive to physicians in the future for a number of reasons including the capital required to purchase expensive technology and increased competition.

The types of organizations in which physicians practice—with or without other health-care providers—have also increased. HMOs have been growing rapidly in recent years. Enrollment in HMOs grew by 25.7 percent in 1985 to a total enrollment of 21 million (123). Although Individual Practice Association (IPA) models outnumbered all other kinds of HMOs combined, group-model plans retained the lead in enrollment (123). That enrollment is expected to increase rapidly in the next 5 years. Estimates of total enrollment in HMOs range between 25 and 50 million for 1990 (241). Part of the growth in HMOs has been attributed to the increased willingness of physicians to be employed in them (240). Recent changes that might affect the employment and use of NPs, PAs, and CNMs in HMOs are the increasing involvement of for-profit corporations in HMOs, and the joint purchasing and other cost-saving ventures undertaken by groups of HMOs (246).

Preferred-provider organizations (PPOs) include several types of arrangements between third-party payers and health-care providers, including physicians, hospitals, or both. In these arrangements, providers contract with insurers or employers to deliver care at reduced prices. The first PPO was organized in 1978; by June 1985, 334 had been organized and 229 were operating (118). Although PPOs were designed to reduce expenditures, no evidence currently exists that the care they deliver costs less than that delivered by other types of organizations.

The delivery of health services is also affected by the growth of the multihospital system—two or more hospitals owned, leased, controlled, or managed by a single for-profit or not-for-profit corporation. Indeed, the multihospital system has become an important component in the changing health-care-delivery system. Some 35 percent

[2]The total number of physicians in *1970* was *334,028* and in 1983 was 519,546 (255). Estimates for 1990 range from 537,750 (240) to 555,300 physicians (255). Estimates for 2000 range from 642,950 (240) to 655,920 physicians (255),

of the Nation's hospitals and 38 percent of all community hospital beds are now in multihospital systems (14). Since 1976, the number of multihospital systems has increased by more than 60 percent (2). A few observers believe that the growth of the for-profit component will eventually result in most services being provided by a few nationwide suppliers that might appropriately be labeled "megacorporate health care delivery systems" (85).

Another trend is toward increasingly diverse sites for providing care (see table 5-1).[13] For example, the first free-standing center was established in Delaware in 1973. By July 1984, there were an estimated 1,800 such centers in the United States and the total is projected to grow to approximately 4,500 by 1990 (152). In late 1983, about 9 percent of the Nation's physicians worked an average of about 13 hours per week in free-standing centers providing primary or emergency care. Some of these centers were operated by hospitals or chains and others operated independently (16).

[13] See *Medical Technology and Costs of the Medicare Program* (244) for a more detailed description of alternative sites of care.

Table 5-1.—Selected Alternatives to Traditional Health-Care Delivery

1. Alternative sites:
Alcohol and drug abuse centers
Ambulatory care centers
Ambulatory surgical centers
Birthing centers
Diagnostic imaging centers
Freestanding emergency centers
Hospices
Mammography centers
Nurse-managed centers
Nutritional dietary centers
Oncology centers
Pain management centers
Psychiatric centers
Rehabilitation centers
Sports rehabilitation centers
Student health centers
Wellness programs
II. ***Alternative organizations:***
Competitive medical plans
Extensive provider organizations
Health maintenance organizations
Independent practice associations
Preferred provider organizations
Social health maintenance organizations

SOURCE: Office of Technology Assessment, 1986

Effects of Changes in the Health-Care Environment on Nurse Practitioners, Physician Assistants, and Certified Nurse= Midwives

How changes in the health-care environment will affect the integration of NPs, PAs, and CNMs in the health-care system is unclear. The changes, which generally reflect trends toward cost-containment and increased competition, are interdependent. For example, the increasing supply of physicians has heightened competition among medical-care providers (19,176,205,206), leading many young physicians to accept salaried positions and to enter into contractual arrangements with third-party payers (19,240). The number of physicians in salaried positions is twice as great for those in practice 5 years or less as for those in practice 6 years or more (18). In effect, the increasing supply of physicians is an important factor in changing medical practice arrangements in the United States and in fostering a willingness to practice in fee-for-service groups and in capitated and institutional settings, which many physicians avoided only a few years ago.

Competition in the health-care system could either limit or expand employment opportunities for NPs, PAs, and CNMs. Competition resulting from the growing supply of medical-care providers might reduce such opportunities, especially in physicians' office-based, fee-for-service practices. Physicians with declining patient bases might not have enough patients to justify employing additional providers (97). However, the American Medical Association (15) notes that, faced with increasing competition, rising practice costs, and cost-conscious patients, physicians are concerned about the cost-effectiveness of their practices and might attempt to improve the practices' productivity and increase the practices' income by employing NPs, PAs, and CNMs. Compared with practices that do not employ NPs and PAs, physicians' practices that do employ NPs and PAs have higher numbers of patient visits per hour and per week and higher incomes for the employing physicians (17). Because such practices charge lower fees per office visit (17), they might be more competitive with other practices. Physicians might also attempt to attract more patients by expanding the range of the services provided by their

offices, which could enable NPs and PAs to practice the full range of services for which they were trained.

Some physicians, however, might find it economically more advantageous to hire new physicians rather than NPs, PAs, or CNMs. The rate of growth in physicians' incomes has started to decline, a trend that is expected to continue **(20).** If new physicians' incomes decline sufficiently, and if their interest in salaried positions continue to increase, they might be more attractive than NPs, PAs, or CNMs to established physicians who want to expand their practices.

Competition among different types of health-care organizations might increase the employment and responsibilities of NPs, PAs, and CNMs (15, 143,144). For example, the growth of risk-sharing HMOs—which have used the services of NPs, PAs, and CNMs extensively in the past—would seem to ensure a larger role for these providers in the health-care system. But like physicians' practices, HMOs could turn instead to physicians, if their incomes are reduced enough. Anecdotal reports from California note "that clinics that had intended to employ NPs and PAs were having physicians arrive on their doorsteps saying they would work for **$30,000** or $40,000" (263). Clinic administrators, then, must consider whether to hire NPs or PAs at **$25,000** or to hire physicians for only $10,000 more. In addition to salary, however, other factors might enter into such decisions. NPs, PAs, and CNMs save costs for capitated entities and provide the types of services—health education, counseling, and preventive care—that HMOs emphasize. Indeed, observers generally agree that the opportunities for employment and full use of NPs, PAs, and CNMs are highest in capitated systems.

The increase in the numbers of IPA-model HMOs is another trend that might adversely affect the employment and use of NPs, PAs, and CNMs. Large group- and staff-model HMOs usually provide care at primary HMO sites and employ NPs, PAs, and CNMs because they are cost-saving, and because they provide health education and preventive services that meet standard levels of quality. The IPA model is less likely than other models to employ these practitioners, because the "plan is primarily organized around solo/single specialty group practices, " (123) which do not benefit as much from employing and using NPs, PAs, and CNMs as do larger practices.

The trend toward alternative providers, most of whom are profit-making entities, suggests possible new sources of employment. Anecdotal evidence indicates that ambulatory care centers are employing PAs and NPs. A survey of 250 individual ambulatory care centers, owned by 142 private organizations, found that PAs' salaries ranged from **$20,784** to $35,000, with an average of $25,946 (172). Humana, Inc., owns 150 ambulatory care centers (Medfirst) and employs NPs only in its high-volume centers, about 5 percent of the total (163). NPs, who receive salaries or hourly wages, have been found to provide standard care and to cost Humana one-third as much as physicians. Nonetheless, the organization perceives a demand from its clients for physician care and does not intend to change its staffing patterns.

The effects of payment changes, such as the DRG approach, on the employment and use of NPs, PAs, and CNMs in hospitals have not yet been well documented. From individual reports, the effects appear to vary among hospitals. Some hospitals have reportedly cut their nursing staffs and reduced the nurses' work schedules because of DRGs (163). Other hospitals reportedly have hired PAs to increase efficiency **(48).** The different responses were to be expected and might be attributed to differences in patient mix (and thus differences in DRGs), in the costs of the hospitals with respect to specific DRGs, and in DRG rates (based on geographic location—urban or rural). The aggregate effect on the employment and use of NPs, PAs, and CNMs is thus difficult to ascertain.

Reports also indicate that, as a result of DRG payment, some hospitals are dismissing NPs and PAs and shifting portions of their operations to their outpatient departments, where fee-for-service physicians deliver care (117). PAs' advocates suggest that eventually hospitals might seek more efficient outpatient operations and use PAs in an attempt to contain their costs (48). New roles could also emerge for PAs as utilization review specialists or DRG coordinators (48).

Nurses expect that prospective payment and its related cost management will bring about increasing attention to the contribution of nursing services in critical care and transplant units and will result in a much more realistic allocation of dollars for nursing services (233). Also, because prospective payment may result in the early discharge of patients into the community, followup services for patients after they are discharged are assuming increasing importance. Nurse-managed and nurse-owned organizations are emerging to provide nursing services in the community, and nurses are attempting to establish a mechanism of payment for community nursing services (233). NPs are also assuming new roles in managing cases and reviewing the use of hospital services (96).

Studies are not available to show how the growth of investor-owned hospitals and multi-hospital systems has affected the employment and use of NPs, PAs, and CNMs. Studies on the differences in economic performance based on ownership (investor-owned or not-for profit) and system affiliation (affiliated or free-standing) found no significant difference in costs for delivering comparable care to patients (260). Compared with other types of hospitals, investor-owned chain-hospitals had fewer employees per bed, but paid employees—except nurses—more (260). The years studied were 1978 and 1980, when payment methods created incentives for maximizing the costs of providing services. The adoption of prospective payment by Medicare, some Blue Cross plans, and some State Medicaid programs has created incentives for minimizing such costs. In addition, private sector groups—HMOs, PPOs, employers, and insurers—are contracting with selected hospitals on the basis of price.

Hospitals, especially investor-owned hospitals, will need to lower their costs of production in response to the increasingly competitive new environment (194), but investor-owned hospitals are not hiring lower priced personnel, such as NPs, PAs, and CNMs, to substitute for physicians in inpatient settings (95). Indeed, investor-owned hospitals are not employing many physicians, either (170). Investor-owned chains are using department managers, who for fixed-price contracts provide services, including personnel, for hospital departments (95). Because the managers are at risk financially, however, they have incentives to save costs and, therefore, might employ appropriately trained NPs and PAs.

The growth of investor-owned hospitals might signal fewer opportunities for CNMs to be employed in hospital settings. Both system-affiliated and free-standing hospitals treated proportionately fewer maternity patients than not-for-profit hospitals treated (260).

SUMMARY

The employment and use of NPs, PAs, and CNMs would be affected by changes in the methods of payment for their services and by other changes in the health-care system. Examining how particular changes in payment would interact with the other changes provides some indication of what roles NPs, PAs, and CNMs might play in particular health-care settings and how costs might change for health-care providers, patients, and society.

Despite anticipated changes in the methods of paying for physicians' services, fee-for-service will probably remain a major form of payment in the foreseeable future. Allowing coverage and direct payment for the services of NPs and CNMs would significantly help them in administratively independent practices, could stimulate the growth of such practices to the extent permitted by State laws and regulations, and would increase opportunities for NPs and CNMs to provide the full range of services for which they are trained and licensed.

As independent providers, IPA-model HMOs might engage NPs as contractors for primary-care services (100) and CNMs as contractors for maternity services, PPOs also might treat these practitioners as contractors who agreed to provide services at a discounted fee. The opportunities for NPs

and CNMs to become contractors might be limited, however, by the increasing supply of primary-care physicians, including obstetricians, and by competition from physicians, who are lowering the amounts for which they are willing to work.

NPs' and CNMs' employment and the full use of their skills in administratively independent practices could decrease costs for programs, beneficiaries, and society. If the numbers of services NPs and CNMs and physicians provided did not greatly expand, and if the payment levels for NP and CNM services remained lower than those of physicians for comparable services, lower program costs would be likely, Furthermore, if the fees to patients reflected the lower payment level, costs to beneficiaries and society might be lower.

In any fee-for-service practice, including one operated by NPs or CNMs, the degree to which costs would decrease would depend on how much lower the level of payment was for these practitioners than for physicians and on the particular service. For example, the Congressional Budget Office found that covering the services of PAs at rates 10 percent below those of physicians would have negligible effects on costs or savings for the Medicare program or for society (177). Even if the savings occasioned by the lower payment level were passed on to beneficiaries, they would have only small incentives to seek treatment from lower priced PAs. At the margin, patients would pay coinsurance of 'only 20 percent. A reduction in the charge for an office visit from $30.00 to $27 .00 would save a Medicare patient only **$0.60,** an amount that might well be paid by Medicaid or a private Medi-Gap policy and would not provide an incentive to use such services. Similarly, most of the services provided by NPs are primary care services, such as visits, and would likely not provide much saving for a patient. Maternity care, however, is costly and patients' out-of-pocket costs could be high. If CNMs would accept lower payment levels than those of physicians, any savings passed on to the expectant mother would be considerable.

How covering their services would affect the employment and use of NPs, PAs, and CNMs in physicians' fee-for-service practices is unclear. Numerous variables could affect physicians' decision to employ and appropriately use these providers. Such variables include the physicians' billing practices; the payment levels for services of NPs, PAs, and CNMs; the cost differentials between hiring physicians or hiring NPs, PAs, or CNMs; the competitive position of the physicians' practices; the practices' interests in expanding the range of services they provide in order to improve their competitive positions; the abilities—as well as the physicians' perceptions of the abilities—of NPs, PAs, and CNMs to improve the practices' productivity and income, and the physicians' perceptions of the noneconomic benefits these providers could bring to the practices.

Coverage might encourage fee-for-service practices, particularly group practices to use NPs and PAs in settings and for certain populations and settings where appropriate care currently is unavailable or inadequate. For example, physicians have been reluctant to make nursing home visits, and there is no evidence that an increased supply of physicians will decrease their reluctance. The increases in the elderly population and the growth of nursing homes have exacerbated an unmet need for services in this setting. Not only does the training of NPs and PAs enable them to provide the older population with care whose quality is comparable to that of the care provided by physicians, but evidence shows that teams of physician, NPs, and PAs visiting patients in nursing homes provide standard care and reduce total expenditures. 14 Elderly people and children with disabling conditions and other individuals with chronic conditions would also benefit from NP and PA care in the home setting.

The employment practices of HMOs, the healthcare setting with significant growth potential, would not be directly influenced by changes in the current methods of paying for the services of NPs, PAs, and CNMs because most public and private third-party payers cover such services in HMO settings. Furthermore, whether payments were direct or indirect to the NP, PA, and CNM,

[14]The Omnibus Reconciliation Act (Public Law 99-509) enacted during the publication of this case study provides coverage for services of PAs provided in nursing homes under Medicare.

would not be an issue for organizations paid prospectively by a capitated amount.

However, the increase in the number of IPA-model HMOs does affect the employment of NPs, PAs, and CNMs. In 1985, although group model HMO plans retained the lead in total enrollment, IPA model plans outnumbered all other kinds of HMO plans for the first time (123). Because they are primarily solo or single-specialty practices, IPAs are less likely than group model HMOs to employ these practitioners.

The data suggest that NPs, PAs, and CNMs save costs for HMOs. In an increasingly competitive environment, the financial incentives promote passing onto consumers the savings generated by the employment and full use of NPs, PAs, and CNMs. Thus, as the environment becomes more competitive, the employment of these providers in capitated HMOs could benefit society financially. To the extent these providers are used to provide interpersonal care and preventive services, the types of services traditionally incorporated into the practice of these providers and of HMOs, the quality of care will also benefit.

Third-party payers pay hospitals an aggregate sum for operating costs, and the hospitals are responsible for paying salaried employees. Therefore, coverage and direct payment for inpatient hospital services provided by NPs, PAs, and CNMs would not directly affect their employment possibilities. This is especially applicable to Medicare, which pays for inpatient services on a DRG-rate basis. This payment method creates incentives for lowering the cost of resources, and the costs of NPs, PAs, and CNMs are included in calculating the costs of resources. Although coverage and separate billing for their services could clarify their revenue-producing abilities as well as their costs to the employing hospital, the use of these practitioners to provide patient care as hospital employees is likely to decline under DRG-based payment. PAs and NPs could be used in new roles, such as DRG coordinators.

In order for coverage and direct payment to affect the employment of NPs, PAs, and CNMs by hospitals for providing inpatient services, the costs of their services would be billed as professional services. If the payment levels for the services they provided were lower than those for physician's services, and if the volume of services were not increased, savings might be likely for Medicare and—if fees were lowered accordingly—for society. However, if Medicare paid NPs or CNMs for providing services for which hospitals were also paid under the DRG rate, paying for them separately might increase program costs, if DRG payment rates were not changed. Reducing DRG rates to account for eliminating the costs associated with the NPs' or CNMs' services would be extremely difficult because of the lack of data. In any case, because the proportion of the DRG rate ascribed to nursing costs is unknown, the effects of direct payment on organizational, program, or societal costs cannot be determined.

A major change in health-care delivery is the growth of investor-owned hospitals, particularly investor-owned chains of hospitals. These organizations are currently focusing their efforts on attracting medical specialists to their staffs and have evinced no interest in employing NPs, PAs, and CNMs. The advantages of coverage for the services of these providers do not appear to be sufficiently significant to spark such interest.

In the final analysis, it seems that extending coverage for the services of NPs, PAs, and CNMs in at least some settings could benefit the health status of certain segments of the population currently not receiving appropriate care. The immediate effects on third-party costs are unclear, although long-term effects could be a decrease in total costs. The advantages of direct payment for the services of NPs and CNMs are less obvious. Direct payment might encourage qualified NPs and CNMs to move into unserved and underserved areas to expand access to health care.

Appendixes

Appendix A

Methods and Acknowledgments

The study is based on an analysis of information obtained from an extensive review of the literature and from individuals and organizations with relevant experience. An advisory panel of experts with backgrounds in health policy, medical economics, health insurance, medicine, nursing and consumer advocacy defined the goals for the study and suggested source material, subject areas, and perspectives to consider in presenting the material. The drafts of the report were revised to reflect the thoughtful comments of the panel. OTA thanks the panel for its assistance and the following people and organizations for supplying information and reviewing drafts.

Joel J. Alpert
Boston City Hospital
Boston, MA

American Nurses Association
Washington, DC

American College of Nurse-Midwives
Washington, DC

American Academy of Physician Assistants
Arlington, VA

David Banta
The Netherlands

James D. Campbell
University of Missouri
Columbia, MO

James F. Cawley
George Washington University Medical Center
Washington, DC

Katherine H. Chavigny
American Medical Association
Chicago, IL

James Crouch
Utah Department of Health
Salt Lake, City, UT

M.L. Detmer
American Medical Association
Chicago, IL

Karen Ehrnman
American College of Nurse-Midwives
Washington, DC

E. Havey Estes, Jr.,
Duke University Medical Center
Durham, NC

Claire M. Fagin,
University of Pennsylvania
Philadelphia, PA

Carl Fasser
Baylor University
Houston, TX

William Finefrock
American Academy of Physician Assistants
Arlington, VA

Loretta C. Ford
University of Rochester Medical Center
Rochester, NY

Louis P. Garrison
Project HOPE
Millwood, VA

Archie Golden
Chesapeake Health Plan–South Side
Baltimore, MD

Linda Golodner
National Consumers League
Washington, DC

Bradford Gray
Institute of Medicine
Washington, DC

Marie Hawk
Harvard Community Health Plan
Boston, MA

Anita Hegster
Health Care Financing Administration
Baltimore, MD

Martha Hill
Johns Hopkins School of Nursing
Baltimore, MD

Ada Jacox
University of Maryland
Baltimore, MD

Jean Johnson
George Washington University
Washington, DC

Kerry Kemp
Office of Technology Assessment
Washington, DC

Cynthia P. King
American Medical Association
Chicago, IL

Karl Kronebusch
Office of Technology Assessment
Washington, DC

William Larson
Health Care Financing Administration
Baltimore, MD

Kenneth Lease
U.S. Office of Personnel Management
Washington, DC

Charles E. Lewis
University of California
Los Angeles, CA

Joan Lynaugh
University of Pennsylvania
Philadelphia, PA

Nancy March
American College of Nurse-Midwives
Washington DC

Lynn May
American Academy of Physician Assistants
Arlington, VA

Kathy Michels
American Nurses Association
Washington, DC

Evelyn Moses
Health Resources and Services Administration
Rockville, MD

Norbert Nelson
New York University Medical School
New York, NY

Ronald Nelson
American Academy of Physician Assistants
Arlington, VA

Robert Oseasohn
University of Texas
San Antonio, TX

Henry B. Perry
Mountain Medical Center
Clyde, NC

Elaine Power
Office of Technology Assessment
Washington, DC

Robert Ranney
National Rural Health Care Association
Kansas City, MO

Ginette Rodger
Canadian Nurses Association
Ottawa, ON

Gretchen Schafft
American Academy of Physician Assistants
Arlington, VA

Sherry Shamansky
Yale University
New Haven, CT

Jane Sisk
Office of Technology Assessment
Washington, DC

Julie Sochalski
Ann Arbor, MI

Sally Solomon
National League for Nursing
New York, NY

Brenda Splitz
George Washington University
Washington, DC

Margetta Styles
American Nurses Association
Kansas City, MO

Dan Thomas
Health Insurance Association of America
Washington, DC

Marlent Ventura
Veterans Administration Hospital
Buffalo, NY

Judith Wagner
Office of Technology Assessment
Washington, DC

Jerry Weston
National Center for Health Services Research
Rockville, MD

Judith Willis
Health Care Financing Administration
Baltimore, MD

Sidney Wolfe
Health Research Group
Washington, DC

Susan Yates
American College of Nurse-Midwives
Washington, DC

Appendix B

Payment for the Services of Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives

Health-care services are paid for by individuals and by third-party payers. Third-party payers in the private sector include commercial insurance companies; hospital and medical plans, such as Blue Cross and Blue Shield; prepaid group medical plans, such as health maintenance organizations (HMOs); and others, such as labor unions or employers of insured individuals (106). Specific benefits, exclusions, and limitations on financial coverage vary from one third-party payer to another and differ even among the policies and plans offered by a particular payer. However, State and, to a lesser extent, Federal laws and regulations require private third-party payers to offer some benefits and do not permit them to offer others.

The Federal Government plays a significant role in paying for health-care services under four primary health-care programs. The government acts as a third-party payer for health care under the Medicare and the Medicaid programs. Although the Health Care Financing Administration (HCFA) is the Federal agency responsible for both Medicare and Medicaid, the two programs differ considerably in their payment practices and covered populations. Medicare is a nationwide health insurance program for the *27.5* million Americans who are at least **65** years of age and for **2.9** million disabled Americans. Part A, the Hospital Insurance Program helps pay for hospital services, related institutional services, and other services. Part B, the Supplementary Medical Insurance Program covers physicians' services and many other medical services. Medicaid is a joint Federal-State program for **22** million low-income persons. The program is administered by individual States under general Federal guidelines, which include mandatory minimum benefits that all States must provide to eligible recipients and optional benefits that individual States may elect to provide to recipients.

The Civilian Health and Medical Program of the Uniformed Services (CHAMPUS), the third medical-benefits program provided by the Federal Government, is administered by the Department of Defense (DOD) (245). CHAMPUS covers nearly 8 million dependents of military personnel, retirees, and dependents of retirees inside and outside the United States (60).

The fourth medical-benefits program provided by the Federal Government is the Federal Employees Health Benefits Program (FEHBP), a voluntary health-care program that provides health insurance for approximately 10 million Federal employees and their dependents. Enrollees receive health-insurance services from more than 300 health-benefit plans under *contracts* negotiated with the Office of Personnel Management of the U.S. Government **(256).**

As table B-1 shows, payment for the services of nurse practitioners (NPs), physician assistants (PAs), and certified nurse-midwives (CNMs) varies considerably, in part because of variations in the State laws and regulations that govern these providers' practices and payment. Table B-1 provides a generalized overview of the payment practices of the major third-party payers in the public and private sectors. These practices are described in greater detail below.

Nurse Practitioners and Physician Assistants

Government-Sponsored Programs

Medicare.—Under Part B of the Medicare program, coverage and payment for NPs' and PAs' services are restricted to services not traditionally performed by physicians, to services normally delegated by physicians, and to services performed under the direct supervision of physicians. This provision is commonly termed the "incident to" provisional

> Under this provision, services of nonphysicians may be covered where they are of types which are commonly performed by physicians' office personnel, and are performed by employees of the physician under his or her direct supervision, e.g., giving injections, taking temperatures and blood pressures, performing blood tests, etc. Payment cannot be made, however, for services performed by nonphysicians where the services are of

[1]The relevant Medicare Part B regulation prohibits payment for medical services rendered by someone other than a physician except for services that are "furnished as an incident to a physician's professional services of kinds which are commonly furnished in physicians' offices and are commonly either rendered without charge or included in physician's bills." Sec. 1861(s)(2)(A) of the Social Security Act, 42 U, S.C. Sec. 1395(s)(2)(A), 20 CFR 405-231(b).

Table B-1.—Coverage and Direct Payment for Services[a] of Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives

Third-party payer	Nurse practitioners		Physician assistants		Certified nurse-midwives	
	Coverage	Direct payment	Coverage	Direct payment	Coverage	Direct payment
Medicare:						
Part A	No	No	No	No	No	No
Part B	No	No	No[b]	No	No	No
HMOs[c]	Yes	NA	Yes	NA	Yes	NA
State Medicaid programs[d]	Some programs	A few programs	Some programs	None	Almost all programs	Almost all programs
Medicare and Medicaid:						
Rural Health Clinics	Yes	No	Yes	No	Yes	No
CHAMPUS[e]	Yes	Yes	No	No	Yes	Yes
FEHBP[f]	7 plans	7 plans	6 plans	6 plans	20 plans	20 plans
Private insurance	In some States	In some States	No	No	In some States	In some States

NA = not available
[a]Services that are typically and characteristically provided by Physicians.
[b]During the publication of this case study, the Omnibus Reconciliation Act of 1986 (Public Law 99.509) was enacted The act modifies part B Of Medicare and authorizes payment for (covers) services of physician assistants working under the supervision of physicians in hospitals, skilled nursing facilities, intermediate-care facilities, and as an assistant at surgery. The payment is indirect and at levels lower than physicians would receive for providing comparable services
[c]Health maintenance organizations.
[d]State Medicaid programs have the option of including NP and PA services in their State Medicaid Plans. *Congress* mandated coverage Of CNMs' services in 1980 As of January 1985, all States in which CNMs practiced either were complying with the law (Public Law 96-499) or were considering changes in their Medical plans to comply with the law.
[e]Civilian Health and Medical Program of the Uniformed Services
[f]Federal Employees Health Benefit Program. FEHBP has 21 fee-f or-service plans, some of which authorize PaYment to *NPs* PAs, and CNM *S*
[g]Whether State laws and regulations require or permit insurance *coverage* and direct payment for the services of NPs, PAs, and CNMs

SOURCE Office of Technology Assessment, 1986

the kinds which are typically and characteristically rendered by physicians, e.g., prescribing medications, setting casts on fractures, assisting at surgery, and other activities that involve an independent evaluation or treatment of the patient's condition even if the attending physician is directly supervising these services (64).

The "incident to" provision was partly intended to reduce the possibility of physicians' making excessive profits by employing large numbers of assistants **(162).** The provision has been refined over time, and its complexity has led to varied interpretation by physicians. Strictly interpreted, the provision means that Medicare only pays for physicians' typical services when they are actually provided by physicians. Knowingly or unknowingly, however, some physicians bill for services irrespective of who performs the service. Unless audits are performed, Medicare contractors have difficulty determining who has rendered services from the Medicare billing form. One of the "incident to" provision's effects has been to sharply limit the administratively independent practice of NPs who cannot bill Medicare for medical services.

This provision was modified in **1980 (248)** to permit generally supervised nurses and other paramedical personnel—such as NPs and PAs—to provide certain services to the homebound in some medically underserved areas. The "incident to" provision is waived only in areas that do not have certified home-health agencies. In 1984, there were **5,247** Medicare certified home-health agencies (164), and the number is growing (115). Presumably, therefore, NPs and PAs provide services to homebound patients only to a limited extent and only in areas where home-health agencies do not find it economical to function.

The Tax Equity and Fiscal Responsibility Act of 1982 (Public Law 97-248) allows for Medicare coverage of NPs' and PAs' services in HMOs and competitive medical plans (CMPs) that have entered into certain contractual risk-sharing arrangements with HCFA.[2] The implementing regulations permit NPs and PAs in HMOs and CMPs to furnish services without the direct personal supervision of physicians.[3] The NPs and PAs essentially can provide whatever services State law authorizes, including supervising or ordering services and supplies incidental to the services.

During the publication of this case study, the Omnibus Reconciliation Act of 1986 (Public Law 99-509)

[1]Calculations of cavitation rates do not include NPs' or PAs' salaries but are determined by the average adjusted per capita costs which are based on the costs of past services received by beneficiaries who fall into particular sets governed by such factors as geographic location, age, sex, and eligibility.
[2]*Federal Register, vol. 50, No. 7,* Thursday Jan. 10, 1985, p. 1351.

was enacted. The act modifies Medicare and authorizes payment for (covers) services of PAs working under the supervision of physicians in hospitals, skilled nursing facilities, intermediate-care facilities, and as an assistant at surgery. The payment is indirect and at levels lower than physicians would receive for providing comparable services.

Medicare's payment for inpatient hospital services under Part A does not specify coverage or payment for NPs' and PAs' services, either under Medicare's former cost-based reimbursement method or the current prospective-payment system. Hospitals usually pay for NPs' and PAs' services by salaries; the salaries and other costs of employing or contracting with NPs and PAs are included in the hospitals' formulas for calculating operating costs. Under cost-based reimbursement, Medicare pays the hospital the total operating costs associated with Medicare beneficiaries. Under the prospective-payment system, Medicare pays a fixed amount for each patient admitted; the aggregated amount is intended to cover the hospitals' total operating costs for Medicare beneficiaries.

Medicaid.—Under Medicaid, each State has considerable discretion to design its program within broad Federal guidelines. Covering and paying for the services provided by NPs and PAs is one of the benefits a State may choose to include in its Medicaid Plan. Data on the number of State Medicaid programs that cover NPs' services are not collected by HCFA's central office. Although the available data conflict, they indicate that State Medicaid programs are cautious about extending payment to NPs. A 1985 study noted that NPs were authorized to receive direct payment or indirect payment—i.e., to bill directly or through physicians—in 21 State Medicaid programs (60). An earlier study found that of the 26 State Medicaid programs that covered NPs' services, most paid indirectly. Nineteen of the twenty-six States adopted the Medicare approach of allowing payment only for NPs' services that were incidental to physicians' services (22).

A preliminary survey of State Medicaid programs found that 26 of the 36 State Medicaid programs covered PAs' services (5). Of those 26 programs, 18 reimbursed for PAs' services at the same rates as physicians', 4 reimbursed at lower rates, 2 reimbursed on a cost basis, and the remainder did not respond to the question. Most of the State Medicaid programs' requirements for supervision by physicians were similar to the requirements contained in State laws governing PAs' practice. (In most States, the scope of PAs' practice is controlled under medical-practice acts and regulations.) Other State Medicaid programs require that physicians review patients' charts every 7 days, that physicians be onsite, or that physicians be present. The scope of services covered for PAs also varied from the general (e.g., all the services cited in the PA law governing scope of services) to the specific (e.g., examinations under the program Early and Periodic Screening, Diagnosis, and Treatment; services in community health centers; and services in family planning agencies). Three States specified that only "incident to" services (i.e., services not traditionally performed by physicians) were covered for payment *(25)*.

Medicaid payment for inpatient hospital services differs by State. Although 41 State Medicaid programs paid for hospital inpatient services on a retrospective cost basis at the beginning of 1980, 34 State Medicaid programs had some form of prospective-payment system as of December 1985 (133). Each State Medicaid program pays for operating costs—including salaries and other costs associated with NPs and PAs—according to its unique payment method for inpatient services (40).

Rural Health Clinics.—Access to primary-care services by NPs and PAs in satellite settings in isolated areas was hindered by the fact that payment for such services was available under Medicare and Medicaid only if a physician was on the premises when the services were delivered. The Rural Health Clinic Services Act of 1977 (Public Law 95-210) waived such restrictions for NPs and PAs practicing in certified rural health clinics located in designated underserved areas. The act permits payment for the services of NPs and PAs even when they are not directly supervised by physicians at all times. This allows rural clinics staffed only by NPs and PAs backed up by physicians to provide reimbursable primary care typically provided by physicians, so long as written plans of treatment are periodically reviewed and approved by physicians. Payment, which is based on reasonable costs, is made to the employing clinic, not to the NP or PA, and is restricted to services that State legislation authorizes NPs and PAs to perform.

Nursing Homes.—Various Medicare and Medicaid regulations, in addition to coverage and payment provisions, limit the provision of certain services by PAs and NPs in nursing homes. In some States, the laws permit physicians to delegate such services to NPs and PAs.

Only physicians can provide certain services if a facility is to:

1. be certified as a skilled nursing facility (SNF) in the Medicare and Medicaid programs (42 CFR 405.1123,1124,1125,1126, and 1128);
2. be certified as an intermediate-care facility (ICF) in the Medicaid program (42 CFR 311, 334, 343, and 346);
3. obtain certification and recertification of a patient's need for care in an SNF in the Medicare program *(42* CFR 456.260, 270, and 280); or

4. obtain certification of a patient's need for care in an SNF and ICF in the Medicaid program (42 CFR 456.360, and 380).

The specific services that must be performed by physicians vary according to the type of certification and the program. Under the Medicare and Medicaid programs, for example, patients can be admitted to SNFs based only on physicians' medical findings, diagnosis, and orders. Patients' care must be supervised by physicians, and patients must be seen by physicians at least every 30 days for the first 90 days after admission. Only physicians can prescribe drugs and order diagnostic and specialized rehabilitative services and therapeutic diets.

Unlike Medicare, Medicaid allows NPs and PAs to recertify patients' needs for institutional care. NPs and PAs are authorized to recertify the necessity of continuing medical care in SNFs (42 CFR 456.260) and ICFs (42 CFR 456.360) where general supervision is provided by physicians.

Civilian Health and Medical Program of the Uniformed Services. -The Federal Government, through the Department of Defense's CHAMPUS, has taken the lead in treating NPs as autonomous and independent providers of care for payment purposes. CHAMPUS began billing and paying for NPs' services on an experimental basis in fiscal year 1980. When the experiment ended 2 years later, CHAMPUS continued coverage and direct fee-for-service payment of NPs, thereby recognizing them as a distinct group of providers deserving direct compensation for services (60). Although CHAMPUS does not cover PAs' services, PAs are not seeking coverage under CHAMPUS, because DOD has indicated that CHAMPUS will begin contracting out its services and cease paying on a fee-for-service basis (83).

Federal Employees Health Benefit Program.—Like CHAMPUS, FEHBP experimented with direct payment and required that all FEHBP plans directly pay health practitioners, including NPs and PAs, who were licensed under applicable State law in those States where at least 25 percent of the population was located in formally designated primary-medical-care manpower -shortage areas (60). After the experimental period of January 1980 to December 1984, FEHBP did not require plans to compensate NPs and PAs directly.

Payment to providers of covered services currently depends on the terms of the FEHBP's contract with each health-benefit plan and thus varies among the plans. There is no statutory requirement that all plans offer payment to NPs and PAs, but some plans currently authorize NPs and PAs to receive direct payment or reimbursement for covered services without referral or supervision (see table B-1). Of the 21 fee-for-service plans participating in FEHBP for the contract year 1986, 7 cover and offer direct payment for services of NPs and 6 cover and offer direct payment for the services of PAs[4] (256). Only 14 percent of enrollees in FEHBP are enrolled in plans that cover NPs' services and 11 percent of enrollees in FEHBP are enrolled in plans that that cover PAs' services. Direct payment for NPs and other providers is now under consideration by Congress.[5]

Private Insurance

Private third-party payment for NPs' and PAs' services is subject to State laws and health insurance regulations. Increasing numbers of States have passed laws and regulations concerning payment for the services of NPs and PAs. Such laws and regulations must accord with the States' requirements governing the scope of practice of these providers and, in some cases, of physicians.

The State payment laws vary in a number of dimensions, including the types of insurers affected (for-profit, nonprofit, or both) and the types of insurance policy (22). Some laws affect the services of all nurses; others affect only special groups of nurses, such as NPs. Some States require insurers to include nurses' services as a reimbursable benefit (mandatory benefit), whereas other States require insurers to offer reimbursement for nurses' services as an option in their policies (mandatory option) (232).

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[4]The numbers do not include the more than 300 prepaid comprehensive medical plans in the FEHBP, because the organization of medical delivery systems under these plans makes the issues of direct access, payment, supervision, and referral largely irrelevant.

[5]In early 1986, President Reagan vetoed H. R. 3384 which contained a provision requiring direct reimbursements to nurses and nurse-midwives who provide services to employees covered by the FEHBP. Congress then passed new legislation, Public Law 99-251, directing the Office of Personnel Management (OPM) to study and report to Congress on the advisability of amending the law governing FEHBP to provide mandatory recognition of additional health-care practitioners, such as nurse-midwives, nurse practitioners, chiropractors, and clinical social workers. The legislation extended direct reimbursement for nonphysician providers in medically underserved areas, which are determined by the Department of Health and Human Services to have at least 25 percent of the population living in areas with inadequate numbers of medical providers. OPM's study advised against mandatory coverage on grounds specific to FEHBP (e.g., mandating coverage would not increase the choice of practitioners available to plan members, nor would it necessarily increase competition among the plans). Nonetheless, the Subcommittee on Compensation and Employee Benefits of the House Committee on Post Office and Civil Service remains interested in the topic. The subcommittee held hearings on direct reimbursement for nonphysicians on Apr. 15, 1986, and indicated its intention to continue studying the issue. H.R. 4825, introduced on May 14, 1986, would authorize direct payment for services performed by NPs and CNMs and other health-care providers. As of June 1986, the bill had been reported favorably by the House Committee on Post Office and Civil Service and was awaiting floor action. The bill did not pass the 99th Congress.

Although direct third-party payment is the exception rather than the rule, 13 States currently permit direct payment for NPs' services (24). The wide variation in conditions for payment of NPs' services is apparent in the laws of Mississippi, Maryland, and Oregon regarding supervision by physicians. In all three States, insurers must pay for any service that is within NPs' lawful scope of practice, but Mississippi requires the NPs to work under the supervision of physicians, whereas Maryland prohibits direct payment to NPs who work under the direct supervision of physicians (101). In Oregon, supervision by physicians is not a condition for reimbursement **(2 l).**

No State laws mandate coverage of PAs' services. Except in Wisconsin, State laws are silent even about optional coverage of PAs' services **(83).** None of the States mandate direct reimbursement for PAs' services; indeed, 16 States explicitly prohibit it. Although there is anecdotal information concerning third-party payers who cover PAs' services, sometimes under physicians' billing, information concerning the extent of coverage is not available.

Businesses in the United States are beginning to provide insurance that pays directly for NPs and PAs (as well as CNMs). The Washington Business Group on Health recently conducted a national survey of its member organizations, all of which are large firms. Of the approximately 200 respondents, 43 percent are paying directly for the services of NPs, and 39 percent are doing so for PAs (91). The proportion of member companies reimbursing NPs and PAs (and CNMs) has increased steadily over the past decade (91).

In many States, NPs' and PAs' services still must be "incident to" physicians' services, for payment purposes, and compensation for NPs' and PAs' services must be made to their employing physicians or organizations. Nevertheless, the recent changes in some States' laws and in the policies of major corporations suggest a movement away from requirements for direct supervision by physicians. Increasingly, NPs and PAs can function administratively independently of physicians and qualify for direct payment. Also, more States are likely to pass legislation providing for the direct compensation of NPs and PAs.

Certified Nurse-Midwives

Government-Sponsored Programs

Medicare and Medicaid.—Medicare's policies concerning payment are the same for the services of CNMs as for the services of NPs and PAs. Medicaid's payment policies are much more permissive for CNMs' services than for NPs' and PAs' services. In 1980, Congress enacted legislation (Public Law **96-499)** to require that CNMs' services be a mandatory benefit under Medicaid. The Federal statute recognizes CNMs' autonomous practice expressly stating that the mandated benefit shall be provided "whether or not he is under the supervision of, or associated with, a physician or other health care provider" (60). HCFA issued the regulations that implemented this law in May 1982. As of January 1985, all States in which CNMs practiced either were complying with the statute and the regulations or were considering changing their Medicaid plans to bring them into compliance. Currently only four States and the District of Columbia do not provide for direct Medicaid payment to CNMs, and HCFA's regional offices are working with these jurisdictions to bring them into compliance **(235).** Furthermore, the Medicaid statute was amended by Public Law **98-369** to ensure that birthing centers operated by CNMs need not be administered by physicians to be eligible for coverage as Medicaid clinic services.

Rural Health Clinics.--CNMs are treated differently from NPs and PAs under the Rural Health Clinics Act. Only rural clinics employing NPs or PAs are eligible for certification under the act (Title **42,** Section 481.4). Once a clinic is certified, however, it can receive payment for the services of the CNMs it employs.

Civilian Health and Medical Program of the Uniformed Services.—CHAMPUS singled out CNMs for special consideration before it experimented with direct payment for NPs' services starting in 1980. The Defense Appropriations Act of 1979 (Public Law 95-457) was the first Federal law to pay directly for services provided by CNMs without either referrals or direct supervision by physicians.

Federal Employees Health Benefit Program.—Of the 21 FEHBP fee-for-service plans, 20 cover CNMs without a contractual requirement for physicians' referrals or supervision. In addition, many prepaid plans in the FEHBP employ CNMs. Roughly **90** percent of all Federal enrollees are in plans that cover CNMs **(256).** Many of the insurance companies in the FEHBP offer the same coverage of CNMs for their private sector business.

Private Insurance

Private third-party payment for CNMs' services has also been mandated in a growing number of jurisdictions. As of 1983, 14 States had mandated direct reimbursement by private insurers for CNMs' care (55), By April 1986, the number of States had increased to 17 (11). In most States, direct supervision by physicians is not a condition of reimbursement (22). In addition, "in many other States insurers voluntarily have chosen to pay for nurse-midwifery care" (55). Fifty-seven percent of the large corporations surveyed by the Washington Business Group on Health provide direct reimbursement to CNMs **(91).**

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Primary Care Outcomes in Patients Treated by Nurse Practitioners or Physicians

A Randomized Trial

Mary O. Mundinger, DrPH
Robert L. Kane, MD
Elizabeth R. Lenz, PhD
Annette M. Totten, MPA
Wei-Yann Tsai, PhD
Paul D. Cleary, PhD
William T. Friedewald, MD
Albert L. Siu, MD, MSPH
Michael L. Shelanski, MD, PhD

Context Studies have suggested that the quality of primary care delivered by nurse practitioners is equal to that of physicians. However, these studies did not measure nurse practitioner practices that had the same degree of independence as the comparison physician practices, nor did previous studies provide direct comparison of outcomes for patients with nurse practitioner or physician providers.

Objective To compare outcomes for patients randomly assigned to nurse practitioners or physicians for primary care follow-up and ongoing care after an emergency department or urgent care visit.

Design Randomized trial conducted between August 1995 and October 1997, with patient interviews at 6 months after initial appointment and health services utilization data recorded at 6 months and 1 year after initial appointment.

Setting Four community-based primary care clinics (17 physicians) and 1 primary care clinic (7 nurse practitioners) at an urban academic medical center.

Patients Of 3397 adults originally screened, 1316 patients (mean age, 45.9 years; 76.8% female; 90.3% Hispanic) who had no regular source of care and kept their initial primary care appointment were enrolled and randomized with either a nurse practitioner (n = 806) or physician (n = 510).

Main Outcome Measures Patient satisfaction after initial appointment (based on 15-item questionnaire); health status (Medical Outcomes Study Short-Form 36), satisfaction, and physiologic test results 6 months later; and service utilization (obtained from computer records) for 1 year after initial appointment, compared by type of provider.

Results No significant differences were found in patients' health status (nurse practitioners vs physicians) at 6 months ($P = .92$). Physiologic test results for patients with diabetes ($P = .82$) or asthma ($P = .77$) were not different. For patients with hypertension, the diastolic value was statistically significantly lower for nurse practitioner patients (82 vs 85 mm Hg; $P = .04$). No significant differences were found in health services utilization after either 6 months or 1 year. There were no differences in satisfaction ratings following the initial appointment ($P = .88$ for overall satisfaction). Satisfaction ratings at 6 months differed for 1 of 4 dimensions measured (provider attributes), with physicians rated higher (4.2 vs 4.1 on a scale where 5 = excellent; $P = .05$).

Conclusions In an ambulatory care situation in which patients were randomly assigned to either nurse practitioners or physicians, and where nurse practitioners had the same authority, responsibilities, productivity and administrative requirements, and patient population as primary care physicians, patients' outcomes were comparable.

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THE MANY PRESSURES ON THE US health care system and greater focus on health promotion and prevention have prompted debates about primary care workforce needs and the roles of various types of health care professionals. As nurse practitioners seek to define their niche in this environment, questions are often raised about their effectiveness and appropriate scope of practice. Several studies conducted during the last 2 decades[1-4] suggest the quality of primary care delivered by nurse practitioners is equal to that of physicians. However, these earlier studies did not directly compare nurse practitioners and physicians in primary care practices that were similar both in terms of responsibilities and patient panels.

Over time, payment policies and state nurse practice acts that constrained the roles of nurse practitioners have changed. In more than half the states, nurse practitioners now practice with-

For editorial comment see p 106.

Author Affiliations: School of Nursing (Drs Mundinger and Lenz and Ms Totten), Joseph L. Mailman School of Public Health (Dr Tsai), and College of Physicians and Surgeons (Dr Shelanski), Columbia University, New York, NY; University of Minnesota School of Public Health, Minneapolis (Dr Kane); Department of Health Care Policy, Harvard Medical School, Boston, Mass (Dr Cleary); Metropolitan Life Insurance Company, New York, NY (Dr Friedewald); and The Mount Sinai Medical Center, New York, NY (Dr Siu).
Corresponding Author and Reprints: Mary O. Mundinger, DrPH, Columbia University School of Nursing, 630 W 168th St, New York, NY 10032 (e-mail: mm44@columbia.edu).

out any requirement for physician supervision or collaboration, and in all states nurse practitioners have some level of independent authority to prescribe drugs.[5] Additionally, nurse practitioners are now eligible for direct Medicaid reimbursement in every state, direct reimbursement for Medicare Part B services as part of the 1997 Balanced Budget Act,[6] and commercial insurance reimbursement for primary care services within limits of state law. Finally, state law determines whether nurse practitioners are eligible for hospital admitting privileges, either by regulating access at the state level or by allowing local hospital boards to decide. The combination of authority to prescribe drugs, direct reimbursement from most payers, and hospital admitting privileges creates a situation in which nurse practitioners and primary care physicians can have equivalent responsibilities. The present study is a large randomized trial designed to compare patient outcomes for nurse practitioners and physicians functioning equally as primary care providers.

The opportunity to compare the 2 types of providers was made possible by several practice and policy innovations at the Columbia Presbyterian Center of New York Presbyterian Hospital in New York City. In 1993 when the medical center sought to establish new primary care satellite clinics in the community, the nurse practitioner faculty were asked to staff 1 site independently for adult primary care. This exclusively nurse practitioner practice was to be similar to the clinics staffed by physicians. All are located in the same neighborhood, serve primarily families from the Dominican Republic who are eligible for Medicaid, and follow the policies and procedures of the medical center. The nurse practitioner practice, the Center for Advanced Practice, opened in the fall of 1994.

New York State law allows nurse practitioners to practice with a collaboration agreement that requires the physician to respond when the nurse practitioner seeks consultation. Collaboration does not require the collaborating physician to be on site and requires only quarterly meetings to review cases selected by the nurse practitioner and the physician. The state also grants nurse practitioners full authority to prescribe medications, as well as reimbursement by Medicaid at the same rate as physicians. The medical board granted nurse practitioners who were faculty members in the school of nursing hospital admitting privileges, thereby making the basic outpatient services, payment, and provider responsibilities the same in the nurse practitioner and physician primary care practices. Additionally, nurse practitioners and physicians in the study were subject to the same hospital policy on productivity and coverage, and a similar number of patients were scheduled per session in each clinic.

While it has been posited that nurse practitioners have a differentiated practice pattern focused on prevention with lengthier visits,[7] this study was purposely designed to compare nurse practitioners and physicians as primary care providers within a conventional medical care framework in the same medical center, where all other elements of care were identical. Nurse practitioners provided all ambulatory primary care, including 24-hour call, and made independent decisions for referrals to specialists and hospitalizations. The Spanish language ability of the nurse practitioners and physicians was similar, although the physicians had somewhat better Spanish facility on average. All of the nurse practitioners (n = 7) and most of the physicians (n = 11) had limited knowledge of Spanish, and 6 physicians were either fluent or bilingual. Staff who served as interpreters were available at each study site. The central hypothesis was that the selected outcomes would not differ between the patients of nurse practitioners and physicians.

METHODS

Participants and Randomization

Between August 1995 and October 1997, adult patients were recruited consecutively at 1 urgent care center and 2 emergency departments that are part of the medical center. Patients who reported a previous diagnosis of asthma, diabetes, and/or hypertension, regardless of the reason for the urgent visit, were oversampled to create a cohort of patients for whom primary care would have an impact on patient outcomes, as has been postulated in previous studies.[8,9] Patients were screened by bilingual patient recruiters and asked to participate if they had no current primary care provider at the time of recruitment and planned to be in the area for the next 6 months. The study was approved by the institutional review board of Columbia Presbyterian Medical Center. After an oral explanation of the consent form, written informed consent was obtained from each patient (both English and Spanish explanations and forms were available).

Those who provided informed consent were randomly and blindly assigned to either the nurse practitioner or 1 of the physician practices. Different assignment ratios were used during the recruitment period. Initially the ratio was 2:1, with more patients assigned to the nurse practitioner practice, because it opened after the physician practices and was able to accept more new patients. Subsequently, the ratio was changed to 1:1 as the nurse practitioner practice's patient panel increased. Despite this change, the mean number of days between the urgent visit at which patients were recruited and the follow-up appointments was similar (8.6 days for patients assigned to nurse practitioners compared with 8.9 days for patients assigned to physicians).

Recruited patients were then offered the next available appointments at the assigned clinic, and project staff made reminder calls the day before the appointments. Patients who missed their appointment were offered another appointment at the assigned practice. After patients kept their initial appointments, they were considered enrolled in the study and eligible for follow-up data collection.

Patients were told which provider group they were assigned to after randomization, and the type of provider could not be masked during the course of care. Patients who refused to partici-

pate or were deemed ineligible for the study were given follow-up primary care appointments by the study recruiters to the same practices. Additionally, during the study period, all practices received new patients from usual sources such as hospital discharges, recommendations from friends and family, referrals from other physicians, direct access by the patients themselves, and advertising. The study did not require a different process of care or documentation for enrolled patients.

At the initial visit, the patients became a part of the nurse practitioner or physician practices' regular patient panel, and all subsequent appointments, care, and treatments were arranged through the practice site of the assigned primary care nurse practitioner or physician. The primary care nurse practitioners and physicians had the same authority to prescribe, consult, refer, and admit patients. Furthermore, they used the same pool of specialists, inpatient units, and emergency departments. No attempt was made to differentiate study patients from other patients in the practice or to influence the practice patterns of the participating nurse practitioners and physicians. However, patients were free to change their source of medical care during the study. Medicaid in New York is currently fee-for-service and patients could go to other providers, go to a specialist directly, or use the emergency department without notifying their primary care provider. Approximately 3% of patients (n = 43) went to another clinic after keeping the first randomly assigned appointment, and 9% (n = 116) went to multiple primary care clinics during the 6-month period.

Data Collection

At the time of recruitment, patients provided demographic and contact information and completed the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36). After the initial primary care visit, interviewers contacted the enrolled patients either by telephone or in person, if necessary, to administer a satisfaction questionnaire. Six months after this initial appointment, the enrolled patients were again contacted and asked to complete a second, longer interview. The decision to interview patients 6 months after the initial primary care visit was based on prior survey experience with this patient population.[10] The primary care patients served by the medical center are primarily immigrants and frequently change residences, travel between New York and their countries of origin, and have interruptions in telephone service. Attempts were made to locate all enrolled patients for this follow-up, including those who could not be located for the initial satisfaction interview. At the 6-month interview, the SF-36 and the satisfaction questionnaire were repeated, and additional questions were asked about health services utilization. A research nurse accompanied the interviewers, and for patients who reported a diagnosis of asthma, diabetes, or hypertension, physiologic data were collected.

Data on all health services utilization at the assigned practice and all other medical center sites were obtained from the medical center computer records for both the 6 months prior to recruitment and for 6 months and 1 year after the initial primary care appointment. These data were collected for all patients who were enrolled, including those who could not be located for the 6-month follow-up interview. Utilization data were also available for patients who were recruited but who did not keep their initial primary care appointment and therefore were not enrolled in the study. For these patients, the data were collected for the 6 months prior to recruitment and 6 months and 1 year after the date of the missed appointment they were given at recruitment.

Main Outcome Measures

The SF-36 was used as a baseline and follow-up measure of health status. This instrument elicits patient responses to 36 questions designed to measure 8 health concepts (general health, physical function, role-physical, role-emotional, social function, bodily pain, vitality, and mental health)[11] or to create 2 summary scores (physical component summary and mental component summary).[12] The origin and logic of the item selection, as well as the psychometrics and tests of clinical validity, have been reported by the survey's developers.[13,14] Additionally, the survey's utility for monitoring general and specific populations, measuring treatment benefits, and comparing the burden of different diseases has been documented in 371 studies published between 1988 and 1996.[15,16] For example, the SF-36 has been used to measure differences in function between chronically ill patients with and without comorbid anxiety disorder[17]; has demonstrated that it can detect changes in health status that correspond to clinical profiles for 4 common conditions[18]; and has shown that it reflects changes in health status that correspond to a predicted clinical course for elective surgery patients.[19]

Patient satisfaction was measured by using "provider-specific" items from a 15-item satisfaction questionnaire used in the Medical Outcomes Study.[20] Three items related to clinic management were included in the survey to provide the medical center administration with information about patients' perceptions of the clinic, but those items were not intended for use in the comparison of providers.

The survey instruments used in the study were written in English and then translated into Spanish. The bilingual members of the study team reviewed the Spanish versions to ensure that the meaning had not been changed. Approximately 80% (78.8% at recruitment and 83.7% at 6 months) of the interviews were conducted in Spanish.

Physiologic measures included disease-specific clinical measurements taken by a research nurse at the time of the 6-month follow-up interview. Blood pressure was determined for patients with hypertension, peak flow for those with asthma, and glycosylated hemoglobin for those with diabetes.

Utilization data included hospitalizations, emergency department visits, urgent care center visits, visits to specialists, and primary care visits within the Columbia Presbyterian Medical Center

system. Only visits with a nurse practitioner or physician at a primary care site were counted as primary care. Specialty visits were defined as visits to a medical specialty clinic or specialist physician office. Emergency department and urgent care center visits were combined before analysis.

Sample Size

Recruitment and enrollment goals were established based on estimates of the sample size needed to detect a difference of 5 points on a 100-point scale for the SF-36 scores on all scales when comparing 2 groups with repeated measures. As the randomization ratio was projected to change during the course of the study with availability of appointments, it was projected that the final ratio between the 2 groups would be 1 patient in the physician group for every 1.5 patients in the nurse practitioner group. The sample size estimates for unequal groups were extrapolated from those presented by the instrument's developer for equal groups, assuming $\alpha = .05$, 2-tailed t test, and power of 80%. Differences of more than 5 points are considered clinically and socially relevant, according to the guidelines for the interpretation of the survey.[11]

Analysis

Baseline demographics and health status for the nurse practitioner and physician groups at randomization and following enrollment were compared using χ^2 and t tests. Ten of the 12 satisfaction questions were factor analyzed (the 11th question that asks whether the patient would recommend the clinic to family and friends was left as a separate item; an item about medication instructions was dropped, as it was not applicable to the majority of respondents who were not prescribed any medications at their first visit). There were 3 factors with eigenvalues greater than 1, indicating that they represented reasonable constructs. The first, "provider attributes" (Cronbach $\alpha = .80$) rated the provider on technical skills, personal manner, and time spent with the patient on a 5-point scale from poor to excellent. "Overall satisfaction" (Cronbach $\alpha = .86$) was the factor created from 2 items addressing the quality of care received and overall satisfaction with the visit. The "communications" factor (Cronbach $\alpha = .59$) combined 5 areas in which patients may have had problems understanding the provider's assessment and advice. Mean scores were computed for each factor.

Using the data collected at recruitment, mean baseline scores on the SF-36 for the scales and summary scores were used to establish the comparability of the nurse practitioner and physician groups in terms of health status. Four types of analyses were conducted using the SF-36 as an outcome measure. The first 2 included t tests to compare mean scores for nurse practitioner and physician patients at 6-month follow-up (both unadjusted and adjusted for baseline demographics and health status) and baseline to 6-month change scores. The third was a subgroup analysis designed to compare the sickest patients. Patients whose baseline score on the physical component summary of the SF-36 was in the bottom quartile (sickest) of the study sample were selected, and 6-month follow-up SF-36 scores were compared using the same analyses used for the total sample.

The fourth analysis classified patients into categories according to the change from baseline to follow-up in each patient's individual scores on the summary measures. This analysis was modeled on a comparison of patients treated in health maintenance organization and fee-for-service systems.[21] The SE of measurement was used to create 3 categories: "same" (change not greater than what would be expected by chance), "better" (improved more than expected), and "worse" (declined more than expected).[12] While these definitions are based on a statistical construct, they provide results that may be more clinically relevant than mean scores or mean change in scores over time. A χ^2 test was then used to compare the distribution of the nurse practitioner and physician patients among these groups. In addition, the change from baseline to follow-up for the entire sample was compared using paired t tests.

Ranges and mean values for the physiologic measures were obtained, and mean values for the 2 groups were compared using t tests.

For the analyses of health services utilization, data were obtained for 6 months prior to the date of recruitment, 6 months after, and 1 year after the first primary care visit. Neither the recruitment visit nor the assigned primary care visit was included. Comparisons between the nurse practitioner and physician patients' health services utilization after enrollment were made using χ^2 tests (unadjusted) and Poisson regression (adjusted). To compare the utilization prior to recruitment with that following, signed rank tests were used.

The 159 patients (12.1%) who, after the first visit, either went to a clinic other than the one assigned or to multiple primary care clinics were maintained in the initially assigned group for the analyses, consistent with an intent-to-treat analysis. All analyses were repeated without these 159 patients, and the results were the same.

RESULTS

Recruitment, Enrollment, and Loss to Follow-up

Of the 3397 patients screened and given follow-up appointments, 41.6% were not randomized because they either refused to participate (11.2%) or did not meet the screening criteria (30.4%). Of the 1981 patients who were randomized, 1181 (59.6%) were assigned to the nurse practitioner clinic and 800 (40.4%) to the physician clinics. The average age of the randomized patients was 44.4 years and 74.6% were female; 84.9% were Hispanic, 8.8% were black, and 1.1% were white. There were no statistically significant differences in the demographics or health status of the patients randomized to nurse practitioners or physicians (TABLE 1).

The 1316 patients (66.4%) who kept their initial primary care appointments following randomization were considered enrolled in the study. This rate is comparable to the normal rate of appointments (65%) kept at the participating clinics (P. Craig, MA, RN,

e-mail message, August 4, 1999). Compared with the 665 patients (32.4%) who did not keep their appointments, those who did (the enrolled patients) differed significantly at baseline in several respects. Enrolled patients were older (45.9 vs 41.3 years); a higher proportion were female (76.8% vs 70.2%) and Hispanic (90.3% vs 82.9%); a higher percentage reported a history of 1 or more of the selected chronic conditions (53.7% vs 45.0%); and they had to wait fewer days for their follow-up appointments (7.8 vs 10.7). These findings are consistent with other studies of patient behavior relative to keeping or missing appointments.[22-24]

Our analysis of the data available on patients who did not keep their primary care appointments found no differences in health services utilization after 1 year among the patients assigned to the nurse practitioner group and physician group.

The difference in the retention rates between recruitment and enrollment for the nurse practitioner group (68.2%) and the physician group (63.8%) was statistically significant ($\chi^2_1 = 4.3$, $P = .04$). However, neither the patients who enrolled nor those who failed to keep their appointments differed significantly between the nurse practitioner and physician groups in terms of baseline demographics, SF-36 scores, or patient-reported prior diagnosis of the selected chronic conditions (Table 1).

Among the nurse practitioner patients, 59% saw the same provider for all primary care visits in the first year after the initial visits compared with 54% of the physician patients, and this difference was not statistically significant ($\chi^2_1 = 2.7$, $P = .11$).

Initial satisfaction interviews were completed for 90.3% (n = 1188) of all patients who made a first clinic visit (90.8% of the nurse practitioner group and 89.4% of the physician group). Almost 92% of all completed interviews took place within 6 weeks of the initial appointment.

Six-month interviews were completed for 79% of all enrolled patients (80.5% of the nurse practitioner group and 76.7% the physician group). This completion rate is considered high for a transient immigrant population and is comparable to or better than that achieved by other studies in the area served by the medical center. The majority of completed interviews (91.4%) took place between 180 and 240 days after the initial appointment. The most common reasons for loss to follow-up were the inability to locate the patient

Table 1. Randomized and Enrolled Patient Characteristics at Baseline*

	Randomized Patients				Enrolled Patients			
	Nurse Practitioner Group (n = 1181)	Physician Group (n = 800)	Comparison	P Value	Nurse Practitioner Group (n = 806)	Physician Group (n = 510)	Comparison	P Value
Mean age, y	44.0	44.9	$t = 1.347$	.18	45.5	46.7	$t = 1.324$	.19
Female sex, %	74.2	75.3	$\chi^2 = 0.291$	.59	75.9	78.2	0.932	.33
Race, %								
Hispanic	88.2	87.3			91.0	89.3		
Black	8.3	10.4			5.5	8.1		
White	1.3	0.9	$\chi^2 = 6.853$	.14	1.5	0.8	$\chi^2 = 5.675$	.23
Other	1.8	1.4			1.7	1.8		
Unknown	0.4	0.0			0.3	0.0		
Mean No. of days between recruitment and initial appointment	8.6	8.9	$t = 0.478$	.63	7.9	7.5	$t = -0.709$	.48
Prevalence of selected chronic conditions, % of patients reporting each condition								
Asthma	20.2	17.6	$\chi^2 = 2.10$	.15	17.9	16.1	$\chi^2 = 0.702$	.40
Diabetes	10.2	11.8	$\chi^2 = 1.25$	.26	11.5	14.3	$\chi^2 = 2.183$	.14
Hypertension	30.0	34.1	$\chi^2 = 3.79$	.05	33.9	38.0	$\chi^2 = 2.371$	.12
MOS SF-36 subscale scores, mean								
Physical functioning	63.1	61.5	$t = -1.27$	.21	61.4	59.2	$t = -1.347$	.18
Role-physical	40.1	39.0	$t = -0.554$	.58	38.0	34.5	$t = -1.402$	.16
Bodily pain	44.5	44.6	$t = 0.032$	.98	44.0	43.2	$t = -0.416$	.68
General health	44.5	45.8	$t = 1.097$	.27	43.7	43.4	$t = -0.211$	.83
Vitality	48.4	48.3	$t = -0.016$	.99	47.8	46.7	$t = -0.827$	.41
Social functioning	60.0	60.0	$t = -0.074$	.94	59.3	57.8	$t = -0.979$	.33
Role-emotional	48.5	47.4	$t = -0.505$	.61	46.9	42.3	$t = -1.694$	.09
Mental health	55.0	55.7	$t = 0.603$	.55	54.6	53.7	$t = -0.608$	.54
Summary scores								
Physical component	38.4	38.0	$t = -0.637$	.52	37.9	37.2	$t = -1.041$	.30
Mental component	41.3	41.4	$t = 0.222$	.83	41.1	40.2	$t = -1.135$	.26

*MOS SF-36 indicates Medical Outcomes Study Short-Form 36.

(65.9%) or that the patient had moved out of the area (17%). A small number of patients (23 [2.8%] in the nurse practitioner group and 16 [3.1%] in the physician group) refused to complete the interview when they were contacted. Five patients (2.9%) were located but were unable to complete the interview due to physical limitations or mental illness, and 3 patients (1.1%) were deceased. The FIGURE summarizes the participation rates at each major stage in the study.

Satisfaction

There were no significant differences in the scores between nurse practitioners and physicians for any of the satisfaction factors after the first visit (TABLE 2). At the 6-month interview there were no statistically significant differences in "overall satisfaction" or "communications" factors or in willingness to refer the clinic to others. The difference in mean score for the "provider attributes" factor, however, was significant, with the physician group rating providers higher than the nurse practitioner group (4.22 vs 4.12 out of a possible 5; $P = .05$). The provider attribute consists of patients' ratings of the providers' technical skill, personal manner, and time spent with the patient. The clinical significance of a 0.1 difference on a 5.0 scale is unlikely.

Self-reported Health Status

Overall, the health status of the study group improved from baseline to follow-up, and the improvement was statistically significant on every scale (TABLE 3).

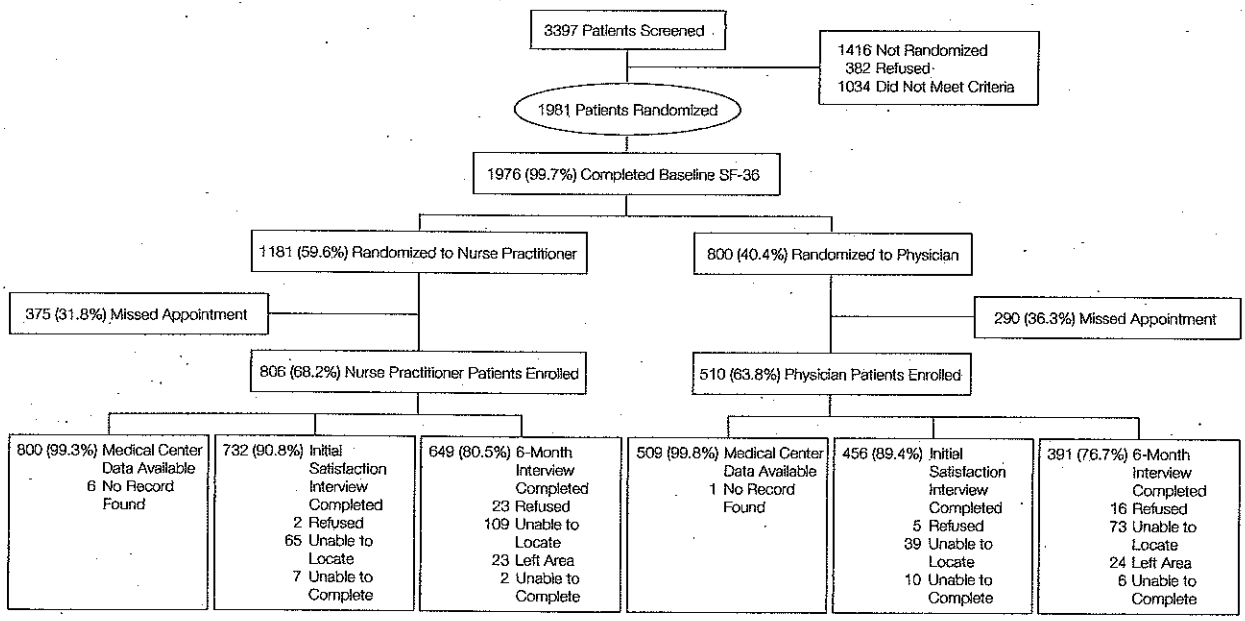
There were no significant differences between the nurse practitioner and physician patients on any scale or summary score at 6 months. This is true for both the unadjusted scores and scores adjusted for demographics and baseline health status. The additional analysis (not shown) of the summary scores, using the change categories of "same," "better," and "worse" to characterize the clinical course of each patient, also revealed no significant differences between provider types.

Finally, 152 nurse practitioner patients and 103 physician patients were defined as the sickest (health status scores in the bottom quartile of the sample at baseline) and their scores analyzed separately. Again, there were no differences between nurse practitioner and physician patients in scale scores or summary measures at 6 months (both unadjusted and adjusted), nor did the change in scores from baseline to follow-up differ between nurse practitioner and physician patient groups.

Physiologic Measures

The physiologic measures taken at the time of the interview for patients who reported 1 of the selected chronic illnesses were not statistically significantly different between the nurse practitioner and physician patients for asthma and hypertension. The mean peak flow measurements for the 64 physician patients with asthma was 292 L/min, compared with 297 L/min for the 107 nurse practitioner patients (t test = −0.29, $P = .77$). Glycosylated hemoglobin mean value for the 46 physician patients with diabetes was 9.4% vs 9.5% for the 58 nurse practitioner patients (t test = −0.22, $P = .82$).

Figure. Study Profile



SF-36 indicates Medical Outcomes Study 36-Item Short-Form Health Survey.

For patients with hypertension, there was no statistically significant difference in the systolic reading: 139 mm Hg for the 145 physician patients and 137 mm Hg for the 211 nurse practitioner patients (t test = 1.08, P = .28). The mean diastolic reading, however, was statistically significantly lower for the nurse practitioner patients at 82 mm Hg compared with 85 mm Hg for the physician patients (t test = 2.09, P = .04).

Utilization

For our comparison of outcomes we analyzed utilization of health care services for nurse practitioner and physician patients who enrolled in the study by keeping their initial primary care appointment. There were no statistically significant differences between the nurse practitioner and physician patients for any category of service during either the first 6 months or the first year after the initial primary care visit for either unadjusted or adjusted use rates (TABLE 4). When the utilization analyses were repeated for the subsets of "sickest" patients as defined in the "Self-reported Health Status" section

Table 2. Patient Satisfaction: Initial Visit and 6-Month Follow-up Interviews

	Initial Visit				6-Month Follow-up			
	Nurse Practitioner Group (n = 726)	Physician Group (n = 453)	Comparison	P Value	Nurse Practitioner Group (n = 644)	Physician Group (n = 389)	Comparison	P Value
Provider attributes mean score*	4.16	4.19	t = 0.815	.42	4.12	4.22	t = 1.963	.05
Overall satisfaction mean score*	4.59	4.60	t = 0.144	.89	4.45	4.46	t = 0.161	.87
Problems, % of patients reporting†								
0	74.4	70.2	χ^2 = 2.605	.46	59.1	62.7	χ^2 = 2.146	.54
1	15.4	18.7			25.1	23.5		
2	6.5	7.2			10.2	7.8		
3-5	3.7	3.9			5.6	5.9		
% of patients who would recommend clinic to others	98.7	98.2	χ^2 = 0.544	.46	95.0	95.1	χ^2 = 0.000	.99

*Calculated from items rated on a 5-point scale, in which 5 is the most positive response.
†Percentages may not add to 100% due to rounding.

Table 3. Health Status Based on MOS SF-36 Results*

	Comparison of Baseline and 6-Month Scores for Entire Sample (n = 1040)			6-Month Scores for Nurse Practitioner Group (n = 649) and Physician Group (n = 391)					
				Unadjusted Mean Scores			Adjusted Mean Scores†		
	Baseline	6 mo	Change (Paired t tests)‡	Nurse Practitioner Group	Physician Group	Comparison	Nurse Practitioner Group	Physician Group	Comparison§
Physical functioning	60.30	64.26	t = 4.631	64.94	62.90	t = −1.126 P = .26	64.21	63.78	t = 0.394 P = .77
Role-physical	36.06	53.31	t = 10.519	53.74	52.62	t = −0.375 P = .71	52.92	53.38	t = −0.192 P = .85
Bodily pain	42.74	53.01	t = 9.133	53.66	52.07	t = −0.748 P = .45	52.91	52.73	t = 0.092 P = .93
General health	42.94	48.75	t = 7.662	48.79	48.67	t = −0.070 P = .95	48.42	49.04	t = −0.454 P = .65
Vitality	47.02	53.45	t = −7.771	53.86	52.79	t = −0.635 P = .53	53.27	53.38	t = −0.072 P = .94
Social functioning	58.51	70.47	t = 12.507	70.39	70.59	t = 0.114 P = .91	70.25	70.70	t = −0.279 P = .78
Role-emotional	44.70	56.26	t = 7.105	56.71	55.24	t = −0.488 P = .63	55.81	56.34	t = −0.192 P = .85
Mental health	53.51	60.17	t = 8.177	60.75	59.45	t = −0.742 P = .46	60.37	59.63	t = 0.491 P = .62
Physical component summary	37.46	40.63	t = 8.706	40.83	40.29	t = −0.728 P = .47	40.53	40.60	t = −0.102 P = .92
Mental component summary	40.56	44.58	t = 9.438	44.64	44.29	t = −0.398 P = .69	44.55	44.48	t = 0.103 P = .92

*MOS SF-36 indicates Medical Outcomes Study Short-Form 36.
†Adjusted for age, sex, baseline MOS subscale scores, and each selected chronic condition.
‡P values for change are all <.001.
§Adjusted t test is based on a regression model, with age, sex, baseline MOS subscale scores, and each condition entered as covariates.

above, no differences were found in the health care services utilization between the nurse practitioner and physician patients (TABLE 5). In the 6 months and 1 year after the initial primary care visit, enrolled patients in both groups made significantly more primary care and specialty visits and fewer emergency/urgent visits than in the 6 months prior to recruitment. The percentage of enrolled patients hospitalized was not significantly different for either 6 months or 1 year after the initial primary care appointment.

COMMENT

This study was designed to compare the effectiveness of nurse practitioners with physicians where both were serving as primary care providers in the same environment with the same authority. The hypothesis predicting similar patient outcomes was strongly supported by the findings of no significant differences in self-reported health status, 2 of the 3 disease-specific physiologic measures, all but 1 of the patient satisfaction factors after 6 months of primary care, and in health services utilization at 6 months and 1 year.

The difference between the nurse practitioner and physician patients' mean ratings of satisfaction with provider attributes was small but statistically significant. It may be attributable to the fact that the nurse practitioner practice was moved to a new site after 2 years and before recruitment and data collection were completed; the physician practices were not moved during the study period. When the "provider attribute" subscale scores for the nurse practitioner and physician patients whose 6-month follow-up period overlapped this move were compared, the ratings by nurse practitioner patients were significantly lower than those of the corresponding physician patients (4.16 vs 4.36; $P = .04$). There was no significant difference in ratings among patients not affected by the move. Additional research will be needed to determine whether this is a persistent difference or if it results from conditions unique to this study.

A statistically significant, but small, difference was discerned in the mean diastolic blood pressure of patients with hypertension, with the nurse practitioner group having a slightly lower average reading at 6 months. Given the size of this change and the lack of differences in self-reported health status, there does not seem to be an obvious reason for this difference.

Although insufficient statistical power to discern differences has been a problem in much of the previous research comparing nurse practitioners and physicians, the sample size in this study was adequate to test the hypothesized similarity of nurse practitioner and physician groups. At the end of the study, power calculations were repeated using final sample size and the means and SDs from these data. These revealed that the sample size was adequate to detect differences from baseline to follow-up between the 2 patient groups of less than 5 points for 6 of the 8 scales

Table 4. Health Services Utilization*

	Change for Entire Sample, %			6 Months After Initial Primary Care Visit, %			1 Year After Initial Primary Care Visit, %		
	6 mo Prior (N = 1309)	6 mo After (N = 1309)	Change, z Score†	Nurse Practitioner Group (n = 800)	Physician Group (n = 509)	Comparison	Nurse Practitioner Group (n = 800)	Physician Group (n = 509)	Comparison
Primary care visits									
0	88.8	21.2	−26.809	20.6	22.2	$\chi^2 = 0.059$, $P = .81$	18.0	19.1	$\chi^2 = 1.033$, $P = .31$
1	5.7	22.4		22.6	22.0		18.4	16.1	
2	2.9	17.3		18.0	16.3		13.8	13.4	
3	2.6	13.8		14.5	12.8		10.3	8.8	
4	0	9.8		9.6	10.0		9.3	8.8	
5	0	6.1		5.3	7.5		7.5	6.1	
≥6	0	9.3		9.4	9.2		22.9	27.7	
Specialty visits									
0	89.1	62.3	−15.578	61.8	63.1	$\chi^2 = 0.678$, $P = .41$	54.5	54.8	$\chi^2 = 0.265$, $P = .61$
1	5.6	14.2		13.3	15.7		13.9	16.5	
2	2.3	9.3		10.8	7.1		8.9	6.3	
≥3	3.1	14.2		14.3	14.1		22.8	22.4	
ED and urgent care									
0	58.1	76.5	−12.937	77.4	75.0	$\chi^2 = 0.428$, $P = .51$	65.8	66.2	$\chi^2 = 0.286$, $P = .59$
1	16.4	16.2		15.3	17.7		20.4	17.7	
2	16.4	4.0		4.3	3.7		7.4	8.6	
≥3	9.1	3.3		3.1	3.5		6.5	7.5	
Hospitalizations									
0	94.5	95.3	−0.884, $P = .38$	95.9	94.3	$\chi^2 = 1.703$, $P = .19$	91.5	90.2	$\chi^2 = 0.664$, $P = .42$
≥1	5.5	4.7		4.1	5.7		8.5	9.8	

*Percentages may not add to 100% due to rounding. ED indicates emergency department.
†Except for hospitalizations, $P < .001$ for column.

(3.2 for general health; 3.3 for vitality; 3.4 for mental health; 3.4 for social function; and 4.2 for bodily pain) and less than 6 points on 2 scales (5.9 on role-physical and role-emotional). This magnitude of difference is similar to differences commonly reported in studies comparing groups[21,25] and in studies of change over time within 1 group.[17,26]

There is evidence that the outcome measures chosen were sensitive enough to discern any important differences. The SF-36 is a widely used outcome measure and its sensitivity has been documented in several studies.[11,18,27] In this study, there were sizable and statistically significant changes for both nurse practitioner and physician patients in all scale scores and summary measures from baseline to follow-up. Some improvement would be expected, even over a 6-month period with or without primary care, following the urgent care visits at which subject recruitment occurred; the SF-36 did detect improvement. The utilization indicators are in widespread use in cross-sectional and longitudinal studies. With the exception of number of hospitalizations, which stayed the same in both groups, these measures also changed significantly over time.

Strengths of this study included adequate sample size and the ability to randomize patients to equivalent clinical settings and to providers with equal responsibilities. However, there were also several limitations.

Patients could not be randomized at the point of initial contact with the provider. Because the nurse practitioner and physician practice sites were geographically separate, patients had to be randomized when they were recruited in the emergency department or urgent care center to give them follow-up appointments at various locations with different appointment schedules. This time and location gap likely contributed to the loss of almost one third of the sample between randomization and enrollment. Although this is substantial, it is within the range reported in similar randomized trials.[28]

While the loss rate was significantly different for the nurse practitioner and physician groups, there is no reason to suspect that this represents a systematic violation of the protocol or any compromise of randomization. Patients dropped out before receiving care, and the dropout rate was higher for those assigned to the traditional model of physician care. This suggests that assignment to the new model of nurse practitioner care did not negatively influence patient behavior. There is no evidence of selection bias in that there were no significant differences in demographics, baseline health status, or prerecruitment health services utilization patterns between nurse practitioner and physician randomized patients, for either those who enrolled or those who did not keep their appointments.

Table 5. Subgroup Analyses*

SF-36 Subscales	Nurse Practitioner Group (n = 152)	Physician Group (n = 103)	Comparison
6-Month MOS SF-36 Scores for the Sickest Patients, Mean (SD)†			
Physical functioning	46.69 (27.05)	48.17 (27.46)	$t = 0.425$ $P = .67$
Role-physical	33.55 (42.88)	32.28 (43.53)	$t = -0.231$ $P = .82$
Bodily pain	38.10 (29.72)	39.25 (29.36)	$t = 0.306$ $P = .76$
General health	38.06 (23.02)	37.08 (23.48)	$t = -0.333$ $P = .74$
Vitality	43.06 (25.21)	42.43 (25.14)	$t = -0.197$ $P = .84$
Social functioning	62.67 (28.87)	60.56 (29.33)	$t = -0.568$ $P = .57$
Role-emotional	42.39 (47.25)	43.04 (47.06)	$t = 0.109$ $P = .91$
Mental health	52.56 (28.11)	50.92 (52.47)	$t = -4.77$ $P = .63$
Physical component summary	23.71 (3.12)	23.84 (3.58)	$t = 0.293$ $P = .77$
Mental component summary	39.57 (13.35)	40.39 (12.70)	$t = 0.490$ $P = .63$
Health Services Utilization for the Subgroup of "Sicker Patients," No. (%)			
	(n = 151)	(n = 101)	
Primary care visits			
0	30 (19.9)	17 (16.8)	$\chi^2 = 0.144$ $P = .71$
1	31 (20.5)	21 (20.8)	
2	27 (17.9)	21 (20.8)	
≥3	63 (41.7)	42 (41.6)	
Specialty visits			
0	82 (54.3)	56 (55.4)	$\chi^2 = 0.390$ $P = .53$
1	23 (15.2)	21 (20.8)	
2	20 (13.2)	8 (7.9)	
≥3	26 (17.2)	16 (15.8)	
ED and urgent care center visits			
0	108 (71.5)	79 (78.2)	$\chi^2 = 1.81$ $P = .18$
1	28 (18.5)	17 (16.8)	
2	9 (6.0)	2 (2.0)	
≥3	6 (4.0)	3 (3.0)	
Hospitalizations			
0	142 (94.0)	99 (96.1)	$\chi^2 = 0.542$ $P = .46$
1	7 (4.6)	3 (2.9)	
2	1 (0.7)	1 (1.0)	
3	1 (0.7)	0 (0)	

*Percentages may not add to 100% due to rounding. MOS SF-36 indicates Medical Outcomes Study Short-Form 36; ED, emergency department.
†Selection of "sickest patients" was determined using MOS SF-36 scores using the bottom quartile of the baseline physical component summary. Patients with a score below 28.16 were included.

A 1-year follow-up for SF-36 and patient satisfaction would have been more useful than taking these measures at 6 months. In part, we believed a population with limited access to health care would show changes in these measures in 6 months. But more influential in the decision regarding follow-up was the knowledge that this population is difficult to track because of changing addresses, changing eligibility for Medicaid, and frequent extended trips out of the country. Although we do have service utilization data for both 6 months and 1 year, data on satisfaction and self-perceived health status were not collected for 1 year.

Finally, the study had some characteristics that limit the generalizability of results. It was conducted in medical center–affiliated, community-based primary care clinics, which may differ from individual providers or small group practices. The providers were faculty from a university medical center, hence were not necessarily typical of those in nonacademic practice settings. The patients were predominantly immigrants from the Dominican Republic who were eligible for Medicaid and many did not speak English. This differs from the setting in which many commercially insured patients receive primary care but does resemble other academic, public and safety net providers, and the Medicaid populations they serve. While the setting and patient population are limitations, they are also what permitted randomized assignment and an environment in which nurse practitioners and physicians were able to function equally as primary care providers. The ability to do this type of study, even in a setting atypical for some patients, adds significant weight to the results from prior studies that have demonstrated the competence of nurse practitioners.

Who provides primary care is an important policy question. As nurse practitioners gain in authority nationally with commercially insured and Medicare populations now accessing nurse practitioner care, additional research should include these populations. As cost and quality issues pervade the public debate on managed care, those who are the first-line health care providers become pivotal resources in the emerging health care system. Nurse practitioners have been evaluated as primary care providers for more than 25 years, but until now no evaluations studied nurse practitioners and physicians in comparable practices using a large-scale, randomized design. The results of this study strongly support the hypothesis that, using the traditional medical model of primary care, patient outcomes for nurse practitioner and physician delivery of primary care do not differ.

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Primary Care Outcomes in Patients treated by Nurse Practitioners or Physicians: Two-Year Follow-Up

Elizabeth R. Lenz, Mary O'Neil Mundinger, Robert L. Kane, Sarah C. Hopkins and Susan X. Lin

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Primary Care Outcomes in Patients Treated by Nurse Practitioners or Physicians: Two-Year Follow-Up

Elizabeth R. Lenz
Ohio State University
Mary O'Neil Mundinger
Columbia University
Robert L. Kane
University of Minnesota
Sarah C. Hopkins
Columbia University
Susan X. Lin
Columbia University

This study reports results of the 2-year follow-up phase of a randomized study comparing outcomes of patients assigned to a nurse practitioner or a physician primary care practice. In the sample of 406 adults, no differences were found between the groups in health status, disease-specific physiologic measures, satisfaction or use of specialist, emergency room or inpatient services. Physician patients averaged more primary care visits than nurse practitioner patients. The results are consistent with the 6-month findings and with a growing body of evidence that the quality of primary care delivered by nurse practitioners is equivalent to that by physicians.

Keywords: *comparative study; health services research; nurse practitioner; outcomes assessment; primary health care/standards*

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BACKGROUND

During the past three decades, mounting evidence has supported the assertion that the quality of primary care delivered by nurse practitioners is equal to that by physicians. The landmark 1974 Burlington randomized trial assessed 1-year health outcomes of patients treated by nurse practitioners or physicians and found the results to be comparable with respect to physical, emotional, and social function; mortality; satisfaction; and quality of care (Sackett et al. 1974; Spitzer et al. 1974). In 1979, Sox examined 40 evaluation studies of nurse practitioner or physician assistant-delivered office-based care and found their care to be indistinguishable from physician care. Simborg, Starfield, and Horn (1978) conducted chart reviews of physicians and nurse practitioners in six primary care practices and found nurse practitioners were more likely than physicians to identify symptoms and signs in their patients, to prescribe nondrug therapies, and to document follow-up of problems and therapies. Patients attending a hypertension clinic were examined by Ramsay, McKenzie, and Fish (1982) and were shown to have more success in managing obesity and hypertension control if they were under the care of a nurse practitioner versus a physician. Attrition and appointment keeping, however, were comparable among nurse practitioner and physician patients. Appointment keeping among nurse practitioner and physician patients was also shown to be comparable for nurse practitioners' and physicians' patients in a 1984 study, along with compliance, knowledge, recall of health counseling, and resolution of health problems. However, nurse practitioner patients were more likely to be "completely" satisfied with their care (Powers, Jalowiec, and Reichelt 1984). Using case vignettes posed to nurse practitioners and physicians, Avorn, Everitt, and Baker (1991) found that nurse practitioners were more thorough in history taking and prescribed few medications. One retrospective review of nurse practitioner-physician comparative studies found that nurse practitioners prescribe fewer drugs, order less expensive tests, and use lower cost treatments, at comparable quality (Safriet 1992). Another retrospective review found that nurse practitioners provide high-quality care and that patients exhibit high satisfaction under their care (Carrino and Garfield 1995).

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A 1995 meta-analysis indicated that randomized studies showed greater compliance for nurse practitioner patients, while nonrandomized trials found greater patient satisfaction and resolution of pathological conditions (Brown and Grimes 1995). Three studies using National Ambulatory Medical Care Survey data showed that nurse practitioners tended to perform fewer office surgical procedures (Moody, Smith, and Glenn 1999) and provide more health teaching, counseling, and emphasize therapeutic or preventive care (Moody, Smith, and Glenn 1999; Aparasu and Hegge 2001; Hooker and McCaig 2001). Nurse practitioners providing primary care to patients with diabetes have been found to be more likely than physicians to perform certain tests and to provide education about nutrition, weight, exercise, and medications (Lenz et al. 2002). No differences were found, however, in patient outcomes.

Our recent study of 1,316 patients randomly assigned to either a nurse practitioner-run or a physician-run primary care practice revealed no clinically significant differences in patient outcomes (health status, satisfaction, health service utilization, and selected physiological indicators of chronic illness status) 6 months following the initial visit to the assigned provider (Mundinger et al. 2000). While supplying compelling evidence for the quality of nurse practitioner practice because of its methodological rigor and the equivalence of the scope and authority of providers in the two types of practices, this study addressed only relatively short-term outcomes. The decision to examine outcomes at 6 months post–initial visit was based on the transient nature of the population served by the practices and the assumption that the measured outcomes would be sensitive to the short-term receipt of primary care. Nevertheless, a longer follow-up period was deemed desirable to ascertain whether differences in outcomes emerge after more sustained receipt of primary care from the designated type of provider.

The purpose of the follow-up (Phase 2) study was to compare the outcomes of patients randomly assigned to nurse practitioner and physician primary care practices 2 years following their initial visit to the practice. The analysis reported here includes the 406 patients who made an initial and at least one follow-up visit to the practice to which they were randomized and who did not receive primary care from any other medical center–affiliated practice during the 2-year follow-up period. Consistent with Phase 1 of the study, the following hypothesis was tested: in an ambulatory primary care environment in which nurse practitioners have the same authority, responsibilities, productivity requirements, and patient population as physicians, the outcomes (health status, satisfaction with care, utilization of health services, and selected disease-specific clinical indicators) will not differ for the two provider groups.

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Table 3 Incremental costs and cost-effectiveness ratios of nurse case management versus usual care

	NURS			EUC			Incremental cost (NURS − EUC)
	1–6 months	7–12 months	1 year	1–6 months	7–12 months	1 year	1 year
Incremental costs							
Nurse salary, $	135.03	69.56	204.59	0	0	0	204.59
Lab tests, $	49.24	32.19	81.43	0	0	0	81.43
Lipid-lowering medication, $	609.60	677.69	1,287.29	595.14	587.67	1,182.81	104.48
Total incremental costs, $	793.87	779.44	1,573.31	595.14	587.67	1,182.81	390.50
Cost-effectiveness ratios	1 year						
Cost per mg/dL reduction in LDL cholesterol, $	26.03						
Cost per % reduction in LDL cholesterol, $	39.05						

on therapy and less of the nurse's time was required to manage the patient. Although less nursing time was required to manage the patient, the reduction was offset by the increase in incremental costs of drug treatment as the nurse titrated the patient to higher drug dosages that were more costly. The benefit of titration, in conjunction with lifestyle diet and exercise counseling, was that a greater percent of NURS patients achieved lipid management goals.

Drug compliance is an important factor that was not considered in the calculation of cost-effectiveness. Patients in the NURS group reported a 16% higher compliance rate than patients in the EUC group (83% vs 67%). If compliance had been considered in the cost-effectiveness calculations, the difference in drug costs between the NURS and EUC groups would have been greater. The control group patients and their physicians received reports on the patients' lipid levels at 6 months and 12 months, which may have influenced the control group's drug compliance rates to be higher than what is commonly reported in the literature.

Statins were the lipid-lowering drugs prescribed for most patients in the NURS and EUC groups. A number of studies have documented that statin therapy is clearly cost-effective in the management of hyperlipidemia among patients with known CHD (Johannesson et al., 1997; Prosser et al., 2000; Ganz, Kuntz, Jacobson, & Avorn, 2000; Third Report of the National Cholesterol Education Program [NCEP] Expert Panel, 2001a, 2001b). The cost-effectiveness of lipid management in patients with CHD can be attributed to the avoidance of cardiovascular related events. The Cholesterol and Recurrent Events trial found that nurse case management of patients with a history of myocardial infarction over a 5-year period reduced CHD mortality and nonfatal myocardial infarction by 24%, fatal or confirmed nonfatal myocardial infarction by 28%, and unstable angina by 13% and stroke by 31%, compared to a placebo group (Sacks et al., 1996). Further, the rate of CABG was 26% lower and angioplasty 23% lower than in the treatment group than in the placebo group.

Comprehensive management of cholesterol in high-risk patients by an NP that includes drug titration, promotion of compliance, and life style modification is an effective strategy to achieving targeted lipid levels. The costs of nurse management are relatively nominal when compared to the medical and disability-related costs associated with treating major cardiovascular catastrophic events and living with the consequences. This 1-year study did not allow for a comprehensive CEA as described by the Panel on Cost-Effectiveness in Health and Medicine that considers the savings associated with the prevention of cardiovascular events and assumes the societal perspective (Weinstein, Siegel, Gold, Kamlet, & Russell, 1996). It does, however, provide a basic understanding of the cost-effectiveness of NP management of hypercholesterolemia in a high-risk population over the short term from the perspective of a managed care organization. Incorporating nurse case management of cardiovascular disease risk factors into primary care settings is an efficacious and cost-effective strategy to help patients achieve their cholesterol goals and improve outcomes.

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Table 2 Cholesterol outcomes

	NURS group (n = 115)	EUC group (n = 113)	p^b
TC, mmol/L (mg/dL)			
Baseline	5.7 ± .8 (220.8 ± 32.6)	5.8 ± 1.2 (225.3 ± 44.5)	.008
12 months	4.1 ± .7 (156.4 ± 26.7)	4.6 ± .6 (17.6 ± 23.7)	
Change[a]	−1.7 ± 1.0 (−64.2 ± 38.5)	−1.3 ± 1.2 (−49.1 ± 46.7)	
LDL-C, mmol/L (mg/dL)			
Baseline	3.5 ± .6 (145.2 ± 25.9)	3.7 ± .7 (143.7 ± 27.9)	.001
12 months	2.2 ± .6 (86.2 ± 21.9)	2.7 ± .6 (103.1 ± 22.1)	
Change[a]	−1.5 ± .8 (−57.2 ± 31.6)	−1.1 ± .8 (−42.2 ± 31.2)	

[a]The average change score is calculated from individual changes and may differ slightly from change scores from subtracting group means.
[b]Comparing changes in NURS versus EUC group.

the nurse's time was $204.59 per patient with the greatest cost concentrated in the first 6 months ($135.03), and decreasing to almost half in the second 6-month period ($69.56), once the patient was established in the treatment program. The per patient cost of lipid-lowering drug treatment for the NURS group was estimated to be $1244.38 for the year, with drug costs increasing by $68.09 per patient in the second half of the year as adjustments in drugs and drug dosages were made by the nurse to optimize management. Annual per patient drug costs for the EUC group were estimated to be $1182.81, 8% ($104.48) less than in the NURS group for the 1-year period. Average per patient drug costs for the EUC group were $7.47 per patient lower over the second 6 months compared to the first 6 months. A number of EUC patients who had not been treated with lipid-lowering medications in the first 6 months were started on drug therapy at lower and less costly dosages in the second half of the year, reducing the average per person drug costs for the EUC group for this latter period. Among patients on pharmacotherapy, 97% in both groups were taking a single statin agent (3-hydroxy-3-methylglutary coenzyme A reductase inhibitor). Neither group experienced adverse events as a result of taking lipid-lowering drugs.

Cost-effectiveness

Cost-effectiveness ratios were calculated per unit reduction in LDL-C and per percent reduction in LDL-C. The 12-month incremental cost per unit (mg/dL) reduction in LDL-C for nurse case management including the nurse's time, lipid-lowering drug costs, and lab monitoring costs was $26.03 (see Table 3). Cost-effectiveness as a percent reduction in LDL-C was $39.05 for the 12-month period.

Discussion

Our findings demonstrated that a nurse case management model staffed by an NP can improve cholesterol management in patients with known cardiovascular disease. One year after hospital discharge, patient LDL-C levels had fallen significantly more in the NURS group than in the EUC group. A significantly greater proportion of patients in NURS group had reached LDL-C goal levels than patients in the EUC group. The annual incremental costs of nurse case management were $26.03 per mg/dL and $39.05 per percent reduction in LDL-C.

It was anticipated that the cost-effectiveness of NP management would increase once the patient was established

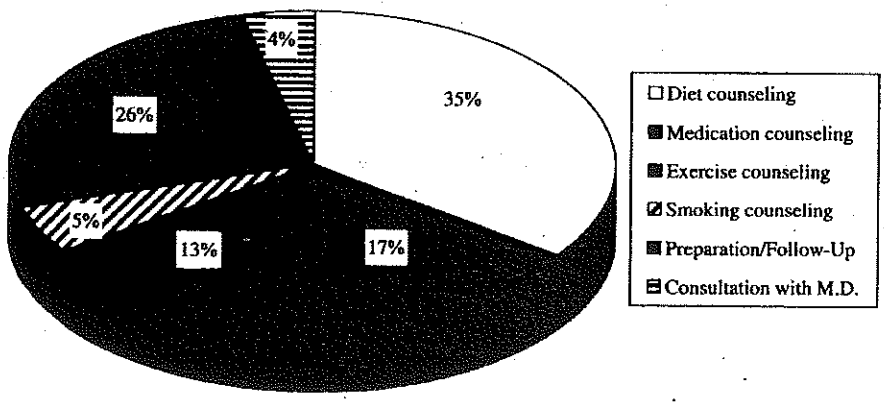


Figure 3 Percentage of nurse time by task.

guideline at the time (ATP II) called for a trial of diet management for 6 weeks prior to initiating drug therapy. Once lipid levels were within the targeted range, patients were retested every 3 months. NURS group patients were estimated to have received three FLP tests and two LFTs over the 12-month study period. Hemoglobin A1c (HgbA1c) tests ($13.00 per test) were conducted on patients with diabetes on enrollment in the program, then at approximately 6 months.

Statistical methods

Lipoprotein outcome data were analyzed by use of an intention to treat analysis, whereby patients were analyzed in the group they were assigned to regardless if they complied with the treatment they were assigned to or not. A conservative approach was used for missing data by assigning mean values of the control group for lipids to all individuals who failed to return for the 12-month follow-up examination. A CEA was conducted to determine if the incremental costs of nurse case management were worth the higher costs of care relative to the reduction of lipid levels. The numerator of the cost-effectiveness calculation consisted of estimated incremental costs of nurse-supervised lipid management beyond the costs of usual care. Incremental costs included nurse time, lipid-lowering drug use, and associated lab tests. The costs of usual physician care and lab monitoring by physicians were assumed to be equal between the groups. The denominator of the ratio was figured in two ways: the difference in the absolute LDL-C reduction and the percent LDL-C reduction of the NURS and EUC groups from baseline to 12 months.

Results

Sample characteristics

The NURS (n = 115) and EUC (n = 113) patients were similar in baseline demographic and clinical characteristics (see Table 1). Overall, 28% were women, 82% were white, and the mean age was 60 ± 9 years. Most patients had at least a high school education. The incidence of diabetes was higher in the NURS group than in the EUC group (29% vs 23%). Most of the participants (64%) had coronary artery bypass graft (CABG) during the current hospitalization. There were no significant differences in baseline levels of lipids and the average LDL-C level was 3.68 mmol/L (142 mg/dL). At the time of discharge from the hospital, before the intervention began, a lipid-lowering medication had been prescribed in 53% of the NURS patients and 64% of the EUC patients. At 12 months, the percent of patients that reported taking lipid-lowering medications was not significantly different between the NURS group (87%) and the EUC group (79%). The NURS group reported taking their lipid-lowering medication 83% of the time, while the EUC group's drug adherence rate was estimated by self-report to be 67%.

Table 1 Patient characteristics

	NURS group (n = 115)	EUC group (n = 113)	p
Age, years ± SD	61.1 ± 10.3	59.6 ± 9.6	.27
Male, n (%)	81 (70)	83 (73)	.61
Race, n (%)			
White	93 (81)	93 (82)	.78
Other	22 (19)	20 (18)	
Education, years ± SD	13.8 ± 3.7	13.3 ± 3.4	.27
Diabetes, n (%)	33 (28.7)	26 (23.0)	.33
Type of revascularization, n (%)			
CABG	75 (6.2)	70 (62.0)	.61
PCI	40 (34.8)	43 (38.0)	

Note. CABG = coronary artery bypass graft; EUC = usual care group; NURS = nurse management group; PCI = percutaneous coronary intervention.

Effectiveness of treatment

After 1 year of intervention, the average LDL-C and TC levels were significantly lower in the NURS group than the EUC group (see Table 2). LDL-C levels for the NURS group were lowered an average of 39% (145.2–86.2 mg/dL), while the EUC group reduced their LDL-C level an average of 29% (143.7–103.1 mg/dL). In addition, significantly more patients in the NURS group (65%) than patients in the EUC group (35%) achieved LDL-C levels <2.59 mmol/L (100 mg/dL), the NCEP-ATP II goal for patients with CHD (p = .001). The mean HDL-C and TG levels did not change significantly. A detailed account of changes in physical activity and dietary intake can be found elsewhere (Allen et al., 2002).

Including the initial outpatient visit, the nurse spent an average of 5.0 h total per patient in 1 year delivering the case management intervention. Nurse management was most intensive in the first 6 months; an average of 3.3 h was needed to manage each patient versus 1.7 h in the last 6 months. Each patient received an average of six telephone contacts for feedback and counseling in addition to the initial face-to-face assessment visit. The detailed time log maintained by the nurse revealed that the largest percentage of nurse time (70%) was devoted to counseling the patient on diet, medication, exercise, and smoking cessation at the outpatient visit and by telephone follow-up (see Figure 3).

Costs of cholesterol management

The total annual cost per patient of lipid management by the NP was estimated to be $1573.31 (see Table 3). Cost of

pre-and postintervention for the case management group compared to the usual care group (the denominator of the cost-effectiveness ratio) (see Figure 2). Per patient incremental cost for the nurse case management intervention was calculated using a healthcare cost resource use analysis that included costs for the NP's time, lipid-lowering drugs, and lab monitoring. The assumption was made that if a healthcare organization were to add lipid management services, existing office space and equipment would be used, rather than renting or purchasing additional space or equipment. In this care delivery model, all that was required was a desk, chair, telephone, computer, and a private space to meet with patients upon enrollment in the program.

NP costs

The nurse's time included counseling patients, preparing for and following up from a patient contact, and consulting with the patient's physician. NP time spent delivering the case management intervention was collected for a sample of 30% of the patients for 1 year. Patients were selected that were consecutively enrolled in the study, beginning with a randomly selected patient. The nurse maintained a daily log in which the time, to the closest minute, was recorded for each type of intervention and task. Because the first 6 months when patients first entered the program required more extensive effort counseling the patient, ordering and reviewing lab results and adjusting medications than the last 6 months of management when patients' lipid levels were more apt to be stabilized, the average nurse's time per patient was calculated for the first half of the year, second half of the year, and for the entire 1 year period. Lab and drug associated costs were also calculated for each of these three time periods.

The NP's salary was based upon the 2000 National Sample Survey of Registered Nurses, which identified an hourly rate of $29.10 for NPs (U.S. Department of Health and Human Services & Health Resources and Service Administration, 2000). Adjustments to the hourly rate were made to account for the cost of benefits (estimated to be 23% of the hourly rate) and to update to 2004 costs using the Centers for Medicare and Medicaid Services (CMS) market basket annual percent change for professional services: 2001, 3.7%; 2002, 3.0%; 2003, 2.9%; 2004, 4.0% (CMS, 2005). With adjustments, the final NP hourly rate, including benefits, was estimated to be $40.92.

Lipid-lowering drug costs

An annual per patient average estimate of drug costs was made for each group. Lipid-lowering drugs were identified by patient interview at 6 and 12 months. The assumption was made that the patient was on the same drugs for the previous 6-month period that was reported by the patient at the 6th- and 12th-month interviews. In situations where the patient completed one but not both of the two interviews, the data for the entire 12-month period were based upon patient self-report at 6 or 12 months, whichever data were available. For example, if a patient reported taking Atorvastatin 10 mg daily at 6 months and he/she did not complete the 12-month interview, that patient was assumed to be taking Atorvastatin 10 mg for the entire 12-month study period. The cost of a 1-month supply of each medication was determined from the *2004 Drug Topics Red Book* average national wholesale price then multiplied by 6 (months) for each of the two time periods.

Lab costs

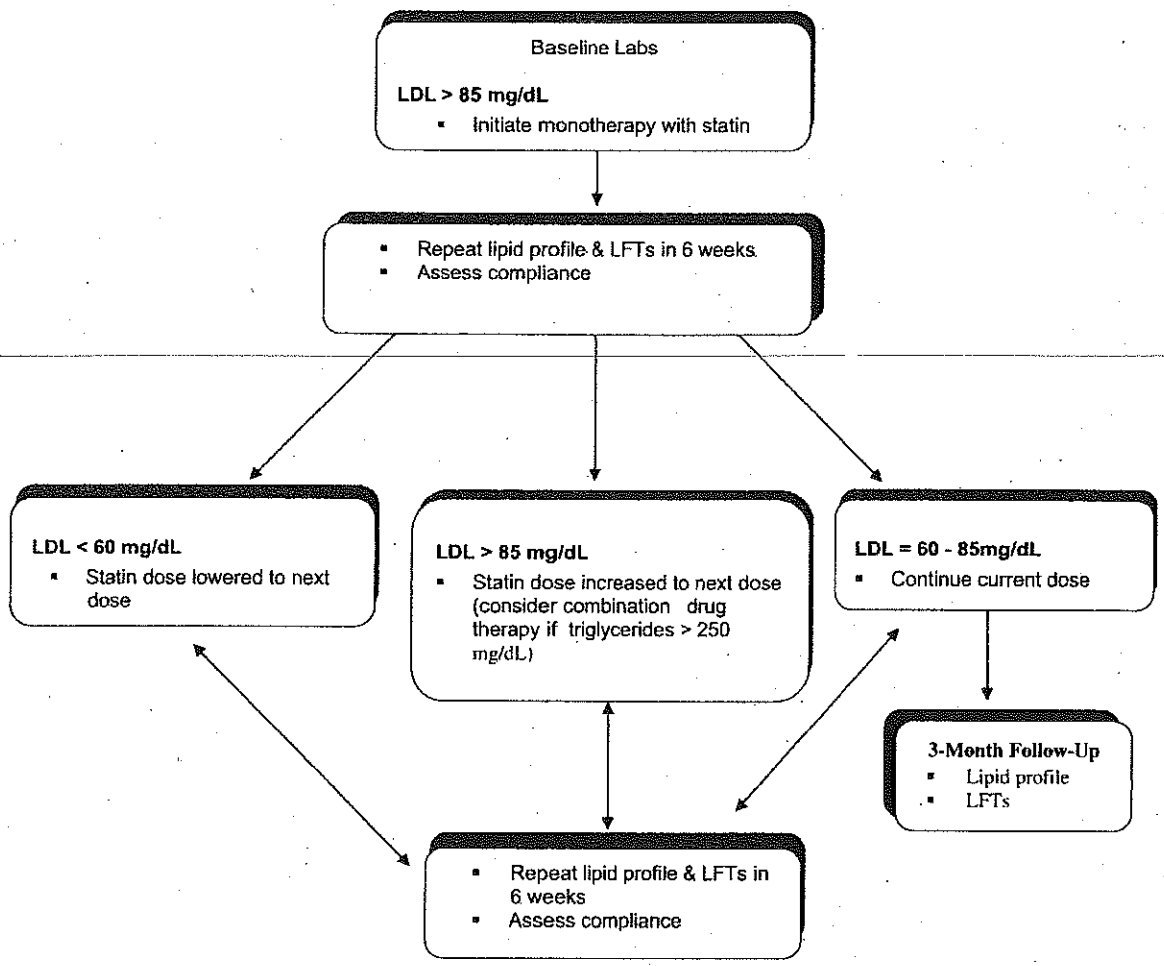
The costs for laboratory tests ordered by the NP to manage and monitor lipid levels and lipid-lowering drugs in the NURS group were included in the incremental cost calculations. A conservative assumption was made that the NURS group and the EUC group would continue to be followed by their primary care physician and cardiologist, and undergo an equal number of tests to monitor lipid levels and lipid-lowering drug treatment under his or her management. Laboratory costs were obtained from the 2004 Medicare Clinical Lab Fee Schedule. A fasting lipid profile (FLP), estimated to cost $17.05 per test, and liver function test (LFT), estimated to cost $11.41 per test, were conducted at 6 weeks following the initiation of a lipid-lowering drug or the adjustment of a drug dosage. Drug therapy was not initiated or modified by the NP until the sixth week of enrollment in the NURS group. The ATP

$$\text{Cost Effectiveness Ratio} = \frac{C_i - C_c}{B_i - B_c}$$

C_i = cost associated with the intervention (cost of nurse salary, lipid-lowering drugs, and lab monitoring)
C_c = cost associated with the control group (cost of lipid-lowering drugs and lab monitoring)
B_i = clinical benefit associated with the intervention (NURS group reduction in LDL-C)
B_c = clinical benefit associated with the control group (EUC group reduction in LDL-C)

Note: The benefit (B) is calculated two ways: (1) percent reduction of LDL-C, and (2) per unit (mmol/L)

Figure 2 Cost effectiveness ratio.
Note. The benefit (B) is calculated two ways (a) percent reduction of LDL-C and (b) per unit (mmol/L).



LDL = low density lipoprotein; LFT = liver function tests

Figure 1 Medication algorithm.

pocket. Laboratory tests ordered by the NP were paid for as part of the study costs.

Lipid measurement

Serum total cholesterol (TC), triglyceride (TG), and high-density lipoprotein cholesterol (HDL-C) levels were measured after a 12-h overnight fast at the 6-week visit and for subsequent monitoring. Assays were performed by use of methods described by the Lipid Research Clinics Program (Bachorik & Ross, 1995; Bachorik, Cloey, Finney, Lowry, & Becker, 1991). The LDL-C level was estimated with the equation by Friedman et al. (Friedewald, Levy, & Fredrickson, 1972) (LDL-C = TC − HDL-C − TG/5). When TG levels exceeded 400 mg/dL, ultracentrifugation was used as a means of measuring LCL-C levels. All lipid levels were measured in the same central standardized laboratory. Coefficients of variation for this laboratory were 1.65% for TC, 1.52% for TG, 3.7% for LDL-C, and 4.58% for HDL-C levels

Resource use measurement and cost assignment

A CEA was performed by determining the ratio of the incremental program costs per unit (mmol/L) change in LDL-C and per percent reduction in LDL-C for 1 year at 2004 dollar values. This approach is referred to as an "incremental" CEA because the additional costs of nurse case management above usual care are calculated and serve as the numerator of the cost-effectiveness ratio. The incremental costs of the nurse case management are compared to the difference in the change in LDL-C

Inadequate cholesterol control is multifactoral and can in part be attributed to poor adherence by patients to recommended lifestyle changes and drug therapy, and failure by physicians to prescribe appropriate drug therapy, adjust drug dosages, and monitor cholesterol levels. One strategy for improving lipid control is to utilize specially trained nurses to monitor lipid levels, prescribe and titrate lipid-lowering drug therapy based upon standardized protocols, and counsel patients on lifestyle modification. Earlier studies have shown that nurses with a concentrated focus on reduction of cardiac risk factors are able to address patient concerns; tailor drug therapy, diet, and exercise regimens to the patient's needs; motivate patients; and reinforce education (Becker et al., 1998; DeBusk et al., 1994; Hoogwerf, Frolkis, & Pearce, 1999; Stuart-Shor et al., 1999; West et al., 1997). In addition, nurses can facilitate communication between the patient and physician ensuring that important issues are addressed and resolved.

As healthcare expenditures have become a growing concern among employers, third party payers, and consumers, it is worthwhile to quantify the costs and benefits associated with adding a nurse practitioner (NP) to manage lipids and cardiac risk factors to a primary care system. Our study of nurse case management following coronary revascularization demonstrated that nurses can improve the control of hypercholesterolemia in patients who have undergone coronary revascularization (Allen et al., 2002). In this study, a cost-effectiveness analysis (CEA) is presented from the perspective of a managed care organization to determine if the reduction in low-density lipoprotein cholesterol (LDL-C) levels sufficiently justifies the additional costs associated with case management of cholesterol by an NP, as compared to usual care by the primary care provider. A CEA is one form of economic evaluation where the costs and consequences of a healthcare intervention are studied using a ratio of the costs of the intervention (the numerator) as compared to the health change (the denominator) (Drummond, O'Brien, Stoddart, & Torrance, 2004). The health change that is selected depends on the health condition that is studied. The change selected might be very specific, such as points of blood pressure reduction or a broader measure of health status such as life years gained. In this study, the health change evaluated is LDL-C level.

Design and methods

This study was a randomized controlled trial in adults with hypercholesterolemia and CHD who underwent coronary revascularization at a large tertiary medical center. Patients were randomized with a computerized schema to receive follow-up by an NP in addition to their usual care (NURS) or to usual care enhanced with feedback on lipids to their primary care provider and/or cardiologist (EUC). The protocol was approved by the Joint Committee on Clinical Investigation, the Institution's internal review board.

Study population

Consecutive patients with hypercholesterolemia, defined as an LDL-C level >2.59 mmol/L (100 mg/dL), who underwent coronary artery bypass grafting or percutaneous coronary intervention (PCI), were approached during hospitalization for consent to participate. Patients were excluded from the study when they lived greater than 75 miles from the hospital, had a severe, noncardiac life-threatening illness, major psychiatric or substance abuse morbidity, or severe cardiac disease with a poor prognosis (New York Heart Association Classification IV or preoperative ejection fraction <30%), were aged >75 years, had a body mass index >40, were participating in another conflicting research study, were unable to speak English, or when the attending or referring physician objected to their participation.

Intervention

Patients randomized to the NURS group received case management from an NP for 1 year after hospital discharge. During this period, the NP and the primary care physician and/or cardiologist participated in a partnership for managing the patient's lipids. Physicians gave permission for the NP to prescribe and monitor lipid-lowering drug therapy.

The NP augmented the provider's cardiac care by providing one outpatient visit 4–6 weeks after discharge to initiate a plan for lipid management in accordance with an algorithm that was developed based upon the National Cholesterol Education Program Adult Treatment Panel II (ATP II) report and the Post CABG Clinical Trial and other trials (see Figure 1) (Knatterud et al., 2000; Pitt et al., 1999; Plehn et al., 1999; Schwartz et al., 2001; The Post Coronary Artery Bypass Graft Trial Investigators, 1997). The plan included counseling for lifestyle modifications and prescription or adjustment of lipid-lowering medications. Drug therapy was initiated using atorvastatin. Follow-up telephone calls to the patient reinforced counseling and recommended adjustments in medications on the basis of follow-up blood tests. The nurse case management intervention is described in more detail elsewhere (Allen et al., 2002). The management plan, results of lipid testing, and adjustments of medication were communicated by letter to the physician on a regular basis.

Patients who were prescribed lipid-lowering medication were responsible for purchasing their own medications either as a covered health insurance benefit or out of

RESEARCH

Cost-effectiveness of nurse practitioner management of hypercholesterolemia following coronary revascularization

Kathryn A. Paez, RN, MSN, MBA (Doctoral Student) & Jerilyn K. Allen, RN, ScD, FAAN
(Associate Dean for Research, Professor)

The Johns Hopkins University School of Nursing, Baltimore, Maryland

Keywords
Hypercholesterolemia; cost-effectiveness; nurse case management; coronary heart disease.

Correspondence
Kathryn A. Paez, RN, MSN, MBA, The Johns Hopkins University School of Nursing, 525 North Wolfe Street, Baltimore, MD 21205-2223.
Tel: 410 772 1367; Fax: 410 614 1446;
E-mail: kpaez1@son.jhmi.edu

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Abstract

Purpose: To evaluate the cost-effectiveness of case management by a nurse practitioner (NP) to lower blood lipids in patients with coronary heart disease (CHD) from a managed care perspective.

Data sources: A total of 228 consecutive, eligible adults with hypercholesterolemia and CHD were recruited during hospitalization after coronary revascularization. Patients were randomized to receive lipid management, including individualized lifestyle modification and pharmacologic intervention from an NP for 1 year after discharge in addition to their usual care (NURS) or to receive usual care (EUC) enhanced with feedback on lipids to their primary provider and/or cardiologist. A cost-effectiveness ratio was calculated using incremental costs of the NURS group per unit change and percent change in low-density lipoprotein cholesterol (LDL-C) for 1 year at 2004 values.

Conclusions: The annual incremental cost-effectiveness of NP case management was $26.03 per mg/dL and $39.05 per percent reduction in LDL-C. When costs of NURS care for the second 6 months of management were compared to the first 6 months of management, nursing salary costs were lower as patients were established on cholesterol management regimens, but the reduction in costs was offset by the increase in incremental costs of drug treatment as the NP titrated the patient to higher drug dosages that were more costly.

Implications for practice: The findings suggest that case management by an NP is a cost-effective approach for a managed care organization to consider in improving the care of patients with cardiovascular disease.

Introduction

Reduction of cholesterol levels is a critical component to improving clinical outcomes for people with coronary heart disease (CHD). The risk of major coronary events for patients with CHD is over 20% per 10 years (Third Report of the National Cholesterol Education Program (NCEP) Expert Panel, 2001a, 2001b). Clinical trials have demonstrated that lowering cholesterol levels reduces the risk of coronary death by 18%–35% (Heart Protection Study Collaborative Group, 2002; Pedersen et al., 2004; Sacks et al., 1996; Shepherd et al., 1995; Shepherd et al., 2002; The Long-Term Intervention with Pravastatin in Ischemic Disease (LIPID) Study Group, 1998). Despite compelling evidence of the benefits of cholesterol lowering therapy, the failure to lower cholesterol levels is widespread. Less than 50% of persons at high risk for coronary events receive lipid-lowering medication (Frolkis, Zyzanski, Schwartz, & Suhan, 1998; Harnick, Cohen, Schechter, Fuster, & Smith, 1998; Hoerger, Bala, Bray, Wilcosky, & LaRosa, 1998; Miller, Byington, Hunninghake, Pitt, & Furberg, 2000; Pearson, Laurora, Chu, & Kafonek, 2000). Among those receiving medication, only about one third achieve their low-density lipoprotein goal. Compliance with therapy declines progressively with time; only 40%–60% of patients prescribed lipid-lowering drugs continue to take medication at 12 months (Avorn et al., 1998; Benner et al., 2002; Jackevicius, Mamdani, & Tu, 2002; Simons, Levis, & Simons, 1996).

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A cost analysis comparing the cost of providing services at an NP managed center for homeless clients with other community alternatives showed earlier and less costly interventions by the NP managed center (Hunter, Ventura, and Keams, 1999). Coddington and Sands (2009) reviewed the literature regarding cost and quality of care for nurse managed centers where APNs, namely NPs, were responsible for patient care. Well-established NMCs with higher patient volumes operated at per patient cost lower than other options, with significant savings. The patients had fewer emergency visits and hospitalizations in several of the reports reviewed, further contributing to cost-effectiveness.

Chen, McNeese-Smith, Cowan, Upenieks, and Afifi (2009) found that NP-led care was associated with lower overall drug costs for inpatients. When Paez and Allen (2006) compared NP and physician management of hypercholesterolemia following revascularization, they found patients in the NP-managed group had lower drug costs, while being more likely to achieve their goals and comply with prescribed regimen.

A number of studies have documented the cost-effectiveness of NPs in managing the health of older adults. When comparing the cost of physician-only teams with the cost of a physician-NP team in one long term care facility, the physician-NP team's cost were 42% lower for the intermediate and skilled care residents and 26% lower for those with long-term stays. The physician-NP teams also had significantly lower rates of emergency department transfers, shorter hospital lengths of stay, and fewer specialty visits (Hummel and Pirzada, 1994). Intrator (2004) found that residents in nursing homes with NPs were less likely to develop ambulatory care-sensitive diagnoses that would then result in hospitalizations. In fact, the odds ratio for preventable ambulatory care-sensitive hospitalizations of long-stay residents was lower (0.83) for facilities with NPs than for facilities with more physicians on staff (odds ratio 1.14). Bakerjian (2008) reviewed articles regarding NP care of nursing home residents. She summarizes a review of 17 studies comparing nursing home residents who are patients of NPs with others, demonstrating lower rates of hospitalization for the NP patients. Seven studies of cost outcomes of NP care consistently demonstrated lower cost of care than control or comparison groups. The potential for NPs to control costs associated with the healthcare of older adults has been recognized by United Health (2009), which recommended that by providing NPs to manage nursing home patients, $166 billion in healthcare savings could be realized.

A collaborative NP/physician team was associated with decreased length of stay and costs and higher hospital profit, with similar readmission and mortality rates (Cowan et al., 2006; Ettner et al., 2006). Larkin (2003) cites a number of studies supporting decreased costs, complication rates, and lengths of stay associated with NP-managed care. For instance, he cites University of Virginia Health System's 1999 introduction of an NP model in the area of neuroscience, resulting in over $2.4 million savings the first year and a return on investment of 1600 percent. The NP model has been expanded in this system, with similar savings and improved outcomes documented. A one-year retrospective study of 1077 HMO enrollees residing in 45 long term care settings demonstrated a $72 monthly gain per resident, compared with a monthly $197 loss for residents seen by physicians alone (Burl, Bonner, Rao, and Kan, 1998). Boling (2009) cites outcomes documented by Smigelski et al. for an intensive short-term transitional care NP program, through which healthcare costs were decreased by 65% or more after enrollment. Another example cited includes an NP model introduced at Loyola University Health System's cardiovascular area, with a decrease in mortality from 3.7% to 0.6% and over 9% decreased cost per case (from $27,037 to $24,511).

In addition to absolute cost, other factors are important to health care cost-effectiveness. These include illness prevention, health promotion, and outcomes. See Documentation of Quality of Nurse Practitioner Practice (AANP, 2010) for further discussion.

Cost-Effectiveness

Nurse Practitioners (NPs) are a proven response to the evolving trend towards wellness and preventive health care driven by consumer demand. For 45 years, the body of evidence has supported NPs as cost-effective providers of high-quality care.

Nearly three decades ago, the Office of Technology Assessment (OTA) (1981) conducted an extensive case analysis of NP practice and reported that NPs provided equivalent or improved medical care at a lower total cost than physicians. The authors determined that NPs could manage up to 80% of adult primary care and 90% of pediatric primary care needs at that time. NPs in a physician practice were found to have the potential to decrease the cost per patient visit by as much as one third, particularly when seeing patients in an independent, rather than complementary, manner. Since 1981, continued reports have supported ongoing cost-effectiveness of NP practice. When OTA later re-examined the role of NP practice, the positive analysis was confirmed (OTA, 1986).

In 1981, the hourly cost of an NP was one-third to one-half the cost of a physician (OTA). In 2009, the median total compensation for primary care physicians ranged from $198,000 (family) to $205,000 (internal medicine) (American Medical Group Association, 2009). The mean 2009 total salary for NPs across all specialties who practiced full-time was $90,200 (American Academy of Nurse Practitioners [AANP], 2009). NP preparation currently costs 20-25% that of physician preparation (American Association of Colleges of Nursing, 2000). A recent study of 26 capitated primary care practices with approximately two million visits by 206 providers determined that the practitioner labor costs per visit and total labor costs per visit were lower in practices where NPs and physician assistants (PAs) were used to a greater extent (Roblin, Howard, Becker, Adams, and Roberts, 2004). When productivity measures, salaries, and costs of education are considered, NPs are cost effective providers of health services.

NPs practicing in Tennessee's state-managed MCO, TennCare, delivered health care at 23% below the average cost of other primary care providers with a 21% reduction in hospital inpatient rates and 24% lower lab utilization rates compared to physicians (Spitzer, 1997). Jenkins and Torrisi (1995) performed a one-year study comparing a family practice physician-managed practice with an NP-managed practice within the same managed care organization. The NP-managed practice had 43% of the total emergency department visits, 38% of the inpatient days, and a total annualized per member monthly cost that was 50% that of the physician practice.

A study conducted in a large HMO setting found that adding an NP to the practice could virtually double the typical panel of patients seen by a physician. The projected increase in revenue was $1.28 per member per month, or approximately $1.65 million per 100,000 enrollees per year (Burl, Bonner, and Rao, 1994).

Chenowith, Martin, Pankowski, and Raymond (2005) analyzed the health care costs associated with an innovative on-site NP practice for over 4000 employees and their dependents. Compared with claims from earlier years, the NP care resulted in significant savings of $ .8 to 1.5 million, with a benefit-to-cost ratio of up to 15 to 1. In a later analysis, Chenowith, Martin, Panowski, and Raymond (2008) tested two additional benefit-to-cost models, using 2004-2006 data for patients receiving occupational health care from an NP. The later models further supported cost savings for NP care, demonstrating a benefit to cost ratio ranging from 2.0-8.7 to 1, depending on the method. Time lost from work was lower for workers managed by NPs, compared to physicians, as another aspect of cost-savings (Sears, Wickizer, Franklin, Cheadle, and Berkowitz, 2007).

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Administration
P.O. Box 12846 • Austin, TX 78711
p 512.442.4262 • *f* 512.442.6469
www.aanp.org

Office of Health Policy
P.O. Box 40130 • Washington, DC 20016
p 202.966.6414 • *f* 202.966.2856

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RESEARCH BRIEF • JANUARY 2010

Title: **Nurse Managed Health Centers (NMHCs)**

Authors: Christine Kovner and Salimah Walani

Purpose: To describe NMHCs as a source of primary care.

Background:

- Providing health insurance to an additional 30 million people will likely make access to care a problem because of inadequate availability of primary care providers to meet the expected increase in demand. Nurse managed health centers (NMHCs) (a.k.a. nursing practice arrangements) are a well established model that could be expanded, especially in underserved areas.

Key Findings:

- NMHCs are community based primary healthcare services, under the leadership of an advanced practice nurse. They emphasize health education, health promotion, and disease prevention, and their target population is usually the underserved. Unlike "Minute Clinics," which are also led by nurse practitioners, these centers are not-for-profit and usually have sliding scales for payment. A few NMHCs are Federally Qualified Health Centers.
- The National Nursing Centers Consortium is a member organization of NMHCs. Of the members, most (74%) are associated with academic nursing programs and in addition to meeting the healthcare needs of under-served populations, these centers serve as training facilities for student nurses.
- There are at least 200 NMHCs currently operating in 37 states with an estimated 2 million patient encounters per year.
- About 60% of patients seen in these centers are either uninsured or have Medicaid.
- There is some evidence that if NMHCs operated at full capacity, the cost of care per visit would be less expensive than medical care in the same geographic area.
- There is some evidence that NMHCs had higher rates of generic medication fill and lower rates of hospitalizations than like providers such as community health centers.
- A major barrier to sustaining NMHCs is many managed care organizations' unwillingness to credential nurse practitioners as primary care providers, limiting the ability of these centers to get reimbursement from private insurers. In a recent study only 53% of managed care responders (66% response rate) credentialed nurse practitioners and of these only 56% reimburse primary care NPs at the rate as primary care physician.

Table: **Table 1.** Examples of Nurse Managed Health Centers

This research brief was produced by the Robert Wood Johnson Foundation Nursing Research Network to summarize RWJF-funded research on key issues related to the field of nursing.

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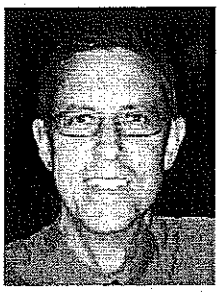
ABOUT THE AUTHORS: MICHAEL J. DILL, STACIE PANKOW, CLESE ERIKSON & SCOTT SHIPMAN



Michael J. Dill is a senior data analyst at the Center for Workforce Studies, Association of American Medical Colleges.

In this month's *Health Affairs*, Michael Dill and coauthors examine the willingness of consumers to seek care from a physician assistant or nurse practitioner instead of from a physician.

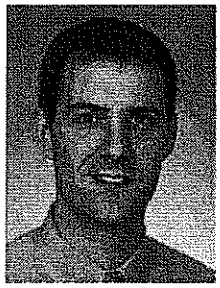
Dill is a senior data analyst at the Center for Workforce Studies, Association of American Medical Colleges (AAMC). He is the lead investigator and principal data analyst on several projects focused on access to care, consumer perspectives on health care demand, development of new workforce projection models, and physician workforce diversity. Dill received a master's degree in public affairs and policy from Rockefeller College, and he is pursuing a doctorate in sociology from the University at Albany, State University of New York.

Stacie Pankow is a research analyst at the AAMC Center for Workforce Studies.

Stacie Pankow is a research analyst at the AAMC Center for Workforce Studies. In addition to work on consumer perspectives on health care access and provider preferences, she does both qualitative and quantitative research on new care delivery models and issues surrounding required clinical rotations within medical education. Pankow earned a master's degree in applied experimental psychology from Augusta State University.

Clese Erikson is the director of the AAMC Center for Workforce Studies.

Clese Erikson is the director of the AAMC Center for Workforce Studies. She has conducted national studies on workforce supply and demand, specialty choice, and work-life balance and is currently focusing on the workforce implications of new care delivery models. Erikson is a past chair of the Health Workforce Interest Group Advisory Committee at AcademyHealth and served on the advisory boards for the Health Workforce Information Center and the International Health Workforce Collaborative. She received a master's degree in public affairs from the University of Texas at Austin.



Scott Shipman is the director of primary care initiatives and workforce analysis at the AAMC.

Scott Shipman is the director of primary care initiatives and workforce analysis at the AAMC. He studies the impact of innovations in primary care delivery on the productivity and efficiency of the workforce. He maintains a faculty role at the Geisel School of Medicine at Dartmouth and works in the Dartmouth Institute for Health Policy and Clinical Practice. Shipman has held several appointments at the American Academy of Pediatrics, and he recently ended his tenure as a commissioner on the Accreditation Review Commission on Education for the Physician Assistant. He earned a master's degree in public health from the Johns Hopkins University, where he was also a Robert Wood Johnson Foundation Clinical Scholar, and received a medical degree from the University of Nebraska.

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to quality issues, including perceptions of more personalized and compassionate care, greater comfort levels in communicating, and good experiences receiving care from one in the past.

Respondents most likely to have seen a physician assistant or nurse practitioner or to indicate a preference for one of those clinicians when presented with our primary care provider selection scenario were younger, nonwhite, and lower income. Medicaid recipients and the uninsured were the least likely to select a physician. Expanding the role of physician assistants and nurse practitioners might thus disproportionately benefit those facing the greatest health care access barriers.[39] The Affordable Care Act's expansion of health insurance coverage targets these same groups. This suggests that successful implementation of the law could include an increased prominence for physician assistants and nurse practitioners in meeting the health care needs of Americans who have historically had the greatest difficulty getting care.

Numerous studies comparing experiences with different patient provider types have looked at satisfaction.[18–20,24,26,30] However, few before our study have explicitly inquired about provider-type trade-offs in order to assess the circumstances under which those in need of care would choose one type of provider over another. One Australian study that did examine hypothetical trade-off scenarios found that for several acute injury scenarios in children (such as ankle sprain or lacerations), 223 of 225 women would be willing to see a physician assistant instead of waiting a longer period of time for a physician.[40]

Our findings, based on less urgent clinical care scenarios, reinforce the notion that many patients may prefer to see physician assistants and nurse practitioners more quickly than to wait for a physician. Given that higher percentages of respondents reported a willingness to see another provider sooner rather than a physician later for certain medical care needs, and prior exposure was associated with a greater likelihood of preferring to see another provider, it follows that increased episodic acute care exposure to these other providers could lead to increased willingness to be seen by them, and hence an increased role for them in primary care. Further research into these relationships seems warranted.

State regulations limiting scope of practice for physician assistants and nurse practitioners present a major practical barrier to these clinicians' expanded role in care. However, evidence to date has consistently demonstrated that quality of care is not compromised when services are delivered by one of these clinicians.[30,41–43] Efforts to standardize scope of practice for physician assistants and nurse practitioners at a level that enables them to take full advantage of their training and skills have the potential to improve access, especially for underserved populations.[16]

In less restrictive markets, nurse-managed health centers, whose expansion is supported by the Affordable Care Act, and retail clinics have expanded access to care.[35] Ateev Mehrotra and Judith Lave found that retail clinic usage is increasing, accounting for 5.97 million patient visits (although still less than 1 percent of all visits for the year) in 2009, 44.4 percent of which were on weekends and during weekday hours when physician offices are typically closed.[44]

Conclusion

If the United States is going to rely more heavily on physician assistants and nurse practitioners, it is necessary to understand the patients' perspective on receiving treatment from them. The type of care needed, how urgently it is needed, patients' characteristics, and prior experiences with physician assistants and nurse practitioners all affect a patient's willingness to see these types of providers. Meanwhile, as scope-of-practice battles continue to be waged and new reforms for care delivery and reimbursement roll out, our findings provide early evidence that health care consumers in the United States are open to the idea of seeing physician assistants and nurse practitioners in the future—and in many cases prefer it. ■

The authors thank Shana F. Sandberg, Roderick Hooker, and Perri Morgan for their thoughtful comments on early drafts of this work.

NOTES

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EXHIBIT 4

Characteristics Of Respondents In The Scenario Of Finding A New Primary Care Provider

Characteristic	Strongly prefer to see a PA or NP		Somewhat prefer to see a PA or NP		No preference		Somewhat prefer to see a physician		Strongly prefer to see a physician		Don't know	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
SEX												
Male	169	13.9	125	10.3	304	25.0	311	25.5	296	24.3	13	1.1
Female	141	13.8	141	7.4	141	27.1	141	24.1	141	26.8	141	0.8
AGE (YEARS)												
18–34	174	25.5	107	15.7	202	29.5	106	15.5	83	12.2	11	1.5
35–64	114	10.9	84	8.0	294	28.0	271	25.8	277	26.4	10	0.9
65+	21	4.1	9	1.7	85	16.8	179	35.6	209	41.4	2	0.3
RACE/ETHNICITY												
Asian	18	22.1	24	28.2	15	18.4	14	16.3	10	11.9	3	3.1
Black/African American	48	22.1	24	11.0	40	18.1	40	18.4	65	29.8	2	0.7
Hispanic/Latino	57	21.7	47	17.6	71	27.0	49	18.4	39	14.8	1	0.6
White/Caucasian	127	8.8	80	5.5	391	27.2	417	29.0	410	28.5	15	1.0
ANNUAL HOUSEHOLD INCOME												
Under $50k	148	13.5	83	7.6	328	29.9	242	22.0	277	25.2	19	1.7
$50k–$99.9K	95	13.8	65	9.4	155	22.4	195	28.1	180	26.1	2	0.3
$100k+	65	14.8	51	11.7	96	22.0	117	26.8	108	24.7	0	0.0
INSURANCE STATUS												
Private insurance	145	14.9	88	9.0	250	25.7	257	26.4	230	23.6	4	0.4
Medicare only	42	14.7	33	11.7	47	16.4	70	24.7	88	30.9	5	1.6
Medicareplus Medigap	19	7.0	15	5.7	57	21.3	88	32.7	88	32.9	1	0.3
Medicaid only	42	23.0	11	5.7	44	24.0	31	17.1	52	28.5	3	1.6
Other public	18	12.3	10	6.9	39	26.2	40	26.7	41	27.2	1	0.7
No insurance	39	10.9	42	11.7	137	38.0	67	18.6	68	18.7	7	2.0

SOURCE Association of American Medical Colleges Consumer Survey. **NOTES** Percentages are weighted; see text for details. For all findings except sex, the chi-square statistic is significant ($p < 0.05$). The scenario was presented as follows: "You need to find a new primary care provider. The practice you found has physicians, physician assistants (PAs), and nurse practitioners (NPs) that are all accepting new patients. Which type of provider would you prefer to see?"

The prevalence of the physician assistant and nurse practitioner professions in the provision of US health care has been growing since the 1960s, with their roles beginning to expand appreciably during the 1980s.[9,16,21,34] Growth rates for this workforce are now outstripping that for physicians.[35] It is therefore not surprising that our study suggests that most US adults seeking medical care are familiar with physician assistants and nurse practitioners and have, indeed, relied on them at some point for their care. Independent of prior exposure to these clinicians, our data show that although 50.3 percent of our respondents would prefer a physician as their primary care provider, 22.8 percent would choose the other provider, and 25.9 percent have no preference. This finding suggests some potential for even more growth in the role that physician assistants and nurse practitioners play in providing primary care.

The Agency for Healthcare Research and Quality estimated that physician assistants and nurse practitioners constitute 30 percent of all primary care providers.[36,37] Perri Morgan and colleagues recently found that within the Veterans Health Administration system, 29 percent of primary care encounters are with physician assistants and nurse practitioners.[38] These figures are well below the 48.7 percent of our respondents who indicated in response to our theoretical scenario about selecting a new primary care provider that they would choose a physician assistant or nurse practitioner or had no preference. Moreover, it appears that exposure to physician assistants and nurse practitioners is associated with an increased affinity for them: Respondents with previous exposure to these health care professionals were more likely than others to select them in each of the scenarios presented.

In an open-ended follow-up question to the scenario about finding a new provider, respondents were asked why they chose as they did. Those who indicated a preference for a physician assistant or nurse practitioner often gave reasons related to access, including ability to get in to see them faster, their lower cost, and their generally greater accessibility. Other reasons most often provided for preferring a physician assistant or nurse practitioner were related

EXHIBIT 3

Treatment By A Physician Assistant (PA) Or Nurse Practitioner (NP) For Most Recent Medical Care Or Ever, By Respondent Characteristics

	Saw PA or NP							
	During most recent medical care visit		During a prior visit		Has never seen PA or NP		Don't know if has ever seen PA or NP	
Characteristic	No.	%	No.	%	No.	%	No.	%
SEX								
Male	488	40.1	473	38.8	166	13.6	91	7.5
Female	373	36.6	468	46.0	117	11.5	61	6.0
AGE (YEARS)								
18–34	369	54.1	216	31.6	40	5.8	58	8.5
35–64	368	35.0	464	44.2	149	14.1	70	6.7
65+	124	24.7	261	51.9	95	18.8	24	4.7
RACE/ETHNICITY								
Asian	39	46.8	30	35.9	7	8.5	7	8.8
Black/African American	108	49.4	72	32.9	22	10.1	17	7.5
Hispanic/Latino	122	46.2	101	38.1	28	10.4	14	5.3
White/Caucasian	459	31.9	677	47.1	211	14.6	92	6.4
ANNUAL HOUSEHOLD INCOME								
Under $50k	459	41.9	437	39.8	128	11.7	73	6.6
$50k–$99.9k	248	35.9	308	44.5	96	13.9	39	5.7
$100k+	149	34.1	193	44.3	57	13.0	38	8.6
INSURANCE STATUS								
Private insurance	353	36.2	422	43.3	140	14.4	60	6.1
Medicare only	107	37.7	118	41.6	36	12.5	23	8.1
Medicare plus Medigap	76	28.1	138	51.2	47	17.5	9	3.2
Medicaid only	93	50.8	55	29.7	21	11.5	15	8.0
Other public	68	45.2	67	44.9	9	5.9	6	3.9
No insurance	158	43.7	137	38.1	28	7.9	37	10.3

SOURCE Association of American Medical Colleges Consumer Survey. **NOTES** Percentages are weighted; see text for details. For all findings, the chi-square statistic is significant ($p < 0.05$).

most recent medical care, and the most likely to have never seen one.

Respondents in the lowest income groups (annual household incomes under $50,000) were the most likely to report seeing a physician assistant or nurse practitioner for their most recent medical care. By type of health insurance, respondents with Medicare plus Medigap were least likely to report having seen a physician assistant or nurse practitioner during their most recent medical care visit, while Medicaid recipients were the most likely to report seeing one during their most recent visit.

In response to the scenario about finding a new provider, younger adults were more likely than others to prefer a physician assistant or nurse practitioner or to have no preference at all (Exhibit 4). Whites were significantly less likely than all other groups to indicate that they would prefer to see a physician assistant or nurse practitioner. Respondents with the lowest incomes were slightly less likely than others to prefer to see a physician assistant or nurse practitioner and also less likely to prefer to see a physician but were most likely to indicate "no preference." Respondents with Medicare plus Medigap were much less likely than those with other insurance types to report a preference for a physician assistant or nurse practitioner, while Medicaid recipients were the most likely to indicate a physician assistant or nurse practitioner preference. The uninsured most often indicated "no preference."

Discussion

Projected physician shortages,[1-4] coupled with changes in health care delivery in the United States aimed at improved efficiency and innovations in team-based approaches to care delivery, have led many to call for an increased reliance on physician assistants and nurse practitioners.[1,7,10,12,13,33] Growth in the numbers and roles of these professionals in providing health care services suggests that an important shift is already taking place.[9,16,21,34] Whether these changes will be welcomed or resisted by patients is an important consideration in our society, where patient choice remains a priority across the political spectrum.

EXHIBIT 1

Consumers' Provider Preferences In Two Clinical Scenarios

	Scenario 1: worsening cough (see PA or NP today or physician tomorrow)		Scenario 2: frequent, severe headaches (see PA or NP in 1 day or physician in 3 days)	
Respondent's preference	Number	Percent	Number	Percent
To be seen by PA/NP	1,334	59.6	1,489	66.6
To be seen by physician	565	25.3	495	22.1
No preference	304	13.6	193	8.6
Don't know	34	1.5	59	2.7
Total	2,237	100.0	2,237	100.0

SOURCE Association of American Medical Colleges Consumer Survey. **NOTES** Counts and percentages were weighted; see text for details. The scenarios were presented as follows: "Now imagine you have developed 1) a worsening cough or 2) frequent severe headaches over the past several weeks and decide that you need to seek medical care. You call the clinic and are told you can see a nurse practitioner or physician assistant today or tomorrow, or you can see a physician in 1 or 3 days. Which would you choose?" PA is physician assistant. NP is nurse practitioner.

physician assistant or nurse practitioner were more likely to want to see one again than to wait a day for the physician. Those who had never seen one showed a slight preference for waiting for the physician visit, 43.0 percent, compared to 39.5 percent who preferred a physician assistant or nurse practitioner. All others preferred to see the physician assistant or nurse practitioner today (Exhibit 2).

Similar results were seen in the second clinical scenario, in which respondents were given a choice between a visit with a physician assistant or nurse practitioner in one day or with a physician in three days for frequent severe headaches. Preferences for the physician assistant or nurse practitioner were more pronounced in this scenario: Two out of three preferred to see one of these providers in a day instead of waiting three days to see the physician. In this scenario, even those with no prior visits with a physician assistant or nurse practitioner more often wanted to see one sooner (48.0 percent) rather than the physician later (38.3 percent).

We also looked at variation in exposure to physician assistants or nurse practitioners by respondent characteristics (Exhibit 3). Women were more likely than men to have ever seen a physician assistant or nurse practitioner. Younger adults (under age thirty-five) were significantly more likely than others to have seen a physician assistant or nurse practitioner for their most recent care and the least likely to have never seen a physician assistant or nurse practitioner. Whites were less likely than other racial or ethnic groups to have reported seeing a physician assistant or nurse practitioner for their

EXHIBIT 2

Respondents' Level Of Exposure To Treatment By Physician Assistants (PAs) And Nurse Practitioners (NPs), By Responses To Clinical Scenarios

	Saw PA or NP							
	During most recent medical care visit		During a prior visit		Has never seen PA or NP		Don't know if has ever seen PA or NP	
Preference	No.	%	No.	%	No.	%	No.	%
SCENARIO 1: WORSENING COUGH								
To be seen by PA/NP today	581	67.5	568	60.3	112	39.5	73	48.4
To be seen by physician tomorrow	162	18.8	239	25.4	122	43.0	43	28.2
No preference	114	13.3	125	13.3	41	14.6	24	15.7
Don't know	4	0.4	10	1.1	8	2.9	12	7.7
Total	861	100.0	941	100.0	283	100.0	151	100.0
SCENARIO 2: FREQUENT, SEVERE HEADACHES								
To be seen by PA/NP in 1 day	609	70.7	642	68.1	136	48.0	103	67.8
To be seen by physician in 3 days	164	19.0	204	21.7	108	38.3	18	12.2
No preference	76	8.9	74	7.8	26	9.2	17	11.5
Don't know	12	1.4	22	2.3	13	4.5	13	8.6
Total	861	100.0	941	100.0	283	100.0	151	100.0

SOURCE Association of American Medical Colleges Consumer Survey. **NOTES** Counts and percentages are weighted; see text for details. Scenarios are described in greater detail in the text. For all findings, the chi-square statistic is significant ($p < 0.05$).

regard to care received from physician assistants and nurse practitioners.

Study Data And Methods

DATA SOURCE Data for this study came from the December 2011–January 2012 round of the Association of American Medical Colleges (AAMC) Consumer Survey, an online survey conducted for the AAMC Center for Workforce Studies. The survey has been conducted since December 2010 by an external firm that maintains an active panel of more than 670,000 people. Panelists were recruited for this survey via e-mail from the company with a link to the survey. Respondents were rewarded through the survey firm's point-based incentive program, where points can be redeemed for cash or other rewards.[28] To better represent the US adult population, data were weighted by sex, age, race and ethnicity, employment status, and household income, taking into account that the sample was stratified by age and insurance status (quotas were set for age-insurance combinations).

A total of 5,533 people answered an initial filter question: "In the last 12 months, did you or a physician believe you needed any medical care?" Only those who indicated that they had needed care (unweighted $n = 2,053$) were asked to continue with the survey. Following a series of questions on access to care, the survey ended with questions about consumers' experiences and preferences of health care providers.

LIMITATIONS Our study had several limitations. First, although the data were weighted to be representative of the adult US population for the analyses, the underlying unweighted sample was not representative in all respects. The total sample ($N = 5,533$) was similar to the US adult population for employment status, age, and census region, but women were overrepresented, and higher-income groups (over $100,000) were underrepresented. The latter observation is not surprising, given our oversample of the uninsured population and those receiving public health insurance. The racial and ethnic composition of our unweighted sample was similar to that for the nation, except that Hispanics and Latinos were underrepresented (8.0 percent versus 13.7 percent of the US adult population).[29]

Second, our analytical sample ($n = 2,053$) included only adults who indicated that they or a physician believed they needed medical care at least once in the past twelve months. This study should therefore not be extrapolated to children seeking care or adults seeking care for their dependents. Our total sample was representative of the US adult population (with the exceptions noted). However, lacking comparable demographic data on the population of US adults needing care, we remain uncertain of how representative our analytic sample of those who reported needing care may be.

Third, although a brief description of physician assistants' and nurse practitioners' roles was provided, respondents (like some patients) may have struggled to differentiate between provider types.[21,30] Also, physician assistants and nurse practitioners were not presented as separate options for participants, so our data do not provide insight into participants' preference between the two provider types. Respondents' exposure to physician assistants and nurse practitioners could not be controlled, so previous exposure may have affected preference.

Furthermore, given our limited sample size, we could not control for state-level effects of variation in physician assistants' and nurse practitioners' scope of practice. Finally, self-reported behavior in response to written clinical vignettes may not accurately represent behavior in real-world care-seeking situations.

Study Results

The vast majority of respondents (82.5 percent) indicated that they knew what either a physician assistant or nurse practitioner was prior to taking the survey.[31] Most (81.4 percent) had seen a physician assistant or a nurse practitioner for their care at some point in time, and 39.6 percent reported seeing one during their most recent medical care visit.

Respondents were first presented with a theoretical scenario wherein they needed to find a new primary care provider. They were then asked: "The practice you found has physicians, physician assistants (PAs), and nurse practitioners (NPs) that are all accepting new patients. Which type of provider would you prefer to see?" Roughly half (50.3 percent) opted for a physician (25.4 percent "strongly" and 24.9 percent "somewhat" preferred to see a physician). Just over one-fifth (22.8 percent) expressed a preference for a physician assistant or nurse practitioner (13.9 percent "strongly" and 8.9 percent "somewhat"), and a quarter (25.9 percent) indicated no preference.

Patients' clinician preferences were also assessed in two additional, more clinically specific scenarios (Exhibits 1 and 2).[32] In the first scenario, respondents were given a choice between seeing a physician assistant or nurse practitioner today or a physician tomorrow for a worsening cough. Nearly 60 percent preferred the physician assistant or nurse practitioner today, with only 25 percent preferring to wait a day to see a physician (Exhibit 1). Those with recent exposure to a

By Michael J. Dill, Stacie Pankow, Clese Erikson, and Scott Shipman

Survey Shows Consumers Open To A Greater Role For Physician Assistants And Nurse Practitioners

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ABSTRACT **Impending physician shortages in the United States will necessitate greater reliance on physician assistants and nurse practitioners, particularly in primary care. But how willing are Americans to accept that change? This study examines provider preferences from patients' perspective, using data from the Association of American Medical Colleges' Consumer Survey. We found that about half of the respondents preferred to have a physician as their primary care provider. However, when presented with scenarios wherein they could see a physician assistant or a nurse practitioner sooner than a physician, most elected to see one of the other health care professionals instead of waiting. Although our findings provide evidence that US consumers are open to the idea of receiving care from physician assistants and nurse practitioners, it is important to consider barriers to more widespread use, such as scope-of-practice regulations. Policy makers should incorporate such evidence into solutions for the physician shortage.**

Michael J. Dill (mdill@aamc.org) is a senior data analyst at the Center for Workforce Studies, Association of American Medical Colleges (AAMC), in Washington, D.C.

Stacie Pankow is a research analyst at the AAMC Center for Workforce Studies.

Clese Erikson is the director of the AAMC Center for Workforce Studies.

Scott Shipman is the director of primary care initiatives and workforce analysis at the AAMC.

The United States faces a physician shortage,[1–5] and the implementation of the Affordable Care Act is expected to exacerbate the problem.[6,7] Impending physician shortages cannot quickly or efficiently be overcome purely by producing more physicians.[2,8–10] Policy analysts have proposed using other professionals, such as physician assistants and nurse practitioners, to help meet the gap between physician supply and patient demand for care, particularly in primary care.[1,7,11–16]

Given their shorter training period and the flexibility to shift specialties throughout their careers, physician assistants and nurse practitioners may be uniquely positioned to fill this gap. Yet largely absent from the discussion of greater reliance on these professionals have been the voices of those who seek care.

Physician assistants and nurse practitioners are already an integral part of the country's health care delivery system.[11,17] Some evidence indicates that quality of care and patient satisfaction do not suffer when these provider types are seen.[18–20] However, other research suggests that such conclusions may be oversimplified by asking questions that lack specificity in terms of which patients prefer different provider types, when, and why.[21–26] The likelihood that a patient will seek care from a physician assistant or nurse practitioner depends on many factors, such as the model of care provision and the complexity of the patient's health problem.[21,27] For instance, Gregory Larkin and Roderick Hooker[21] found that in emergency departments, patients were less willing to be seen by physician assistants, nurse practitioners, and residents than by physicians. The public's willingness to be seen by a physician assistant or nurse practitioner thus becomes one of the key factors in selecting the best solutions for meeting the nation's health care needs.

In this study we sought to better understand the public's experiences and preferences with

Nurse Practitioner Facts

American Academy of Nurse Practitioners

There are over 155,000 nurse practitioners (NPs) practicing in the U.S.

- Over 11,000 new NPs completed their academic programs in 2010-2011
- 93% of NPs have graduate degrees
- 97% of NPs maintain national certification
- 18% of NPs practice in rural or frontier settings
- 88% of NPs are prepared in primary care; 68% of NPs practice in at least one primary care site
- 87% of NPs see patients covered by Medicare and 84% by Medicaid
- 43% of NPs hold hospital privileges; 15% have long term care privileges
- 96.5% of NPs prescribe medications, averaging 20 prescriptions/day
- NPs hold prescriptive privilege in all 50 states, with controlled substances in 48
- The early-2011 mean full-time NP base salary was $91,310, with average full-time NP total income $98,760
- 60% of NPs see three to four patients per hour; 7% see over five patients per hour
- Malpractice rates remain low; only 2% have been named as primary defendant in a malpractice case
- Average NP is female (96%) and 48 years old; she has been in practice for 12.8 years as a family NP (49%)

Distribution, Mean Years of Practice, Mean Age by Population Focus

Population	Percent of NPs	Years of Practice	Age
Acute Care	5.6	7.0	45
Adult+	19.3	10.9	50
Family+	48.3	9.5	48
Gerontological+	3.2	11.6	52
Neonatal	2.0	12.3	47
Oncology	1.0	8.3	47
Pediatric+	8.5	13.3	49
Psych/Mental Health	3.0	8.5	52
Women's Health+	9.0	14.7	49

+Primary care focus

Sources:
AANP National NP Database, 2010-2011
2011 AANP National NP Compensation Survey
2010 AANP National Practice Site Survey
2009-2010 AANP NP Sample Survey

Additional information is available at the AANP website www.aanp.org.

National Administrative Office:
PO Box 12846
Austin, TX 78711
Phone 512 442-4262
Fax 512 442-6469
Email admin@aanp.org
Website www.aanp.org

Office of Health Policy:
PO Box 40130
Washington, DC 20016
Phone 202 966-6414
Fax 202 966-2856
Email dcoffice@aanp.org

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Bios

Robin P. Newhouse, PhD, RN, NEA-BC, FAAN received a PhD from University of Maryland School of Nursing. She is chair and professor, organizational systems and adult health, University of Maryland School of Nursing.

Jonathan P. Weiner, DrPH, received a DrPH—Doctor of Public Health from Johns Hopkins University, School of Hygiene and Public Health, Department of Health Services Administration, Baltimore, MD, Health Services Research. He is professor, Department of Health Policy and Management, Johns Hopkins University, Bloomberg School of Public Health, Baltimore Maryland.

Julie Stanik-Hutt, PhD, ACNP, CCNS, FAAN, received a PhD from University of Maryland School of Nursing. She is an associate professor at Johns Hopkins University School of Nursing. She is a certified as both a nurse practitioner--acute care and a clinical nurse specialist.

Kathleen M. White, PhD, RN, NEA-BC, FAAN, received a PhD from University of Maryland Baltimore County an associate Professor, Department of Acute and Chronic Care, The Johns Hopkins University School of Nursing and Senior Advisor, Health Resources and Services Administration, National Center for Health Workforce Analysis.

Meg Johantgen, PhD, RN, received a PhD in Health Services Organization and Research from Virginia Commonwealth University Medical College of Virginia. She is associate professor, University of Maryland School of Nursing.

Don Steinwachs, PhD, received a PhD from The Johns Hopkins University in Operations Research (minor: Economics). He is director of the Health Services Research and Development Center, and professor, Department of Health Policy and Management at the Bloomberg School of Public Health, The Johns Hopkins University

George Zangaro, PhD, RN, received a PhD from University of Maryland School of Nursing. He is associate professor and director of research, The Catholic University of America School of Nursing.

Jillian Aldebron, JD, received a JD from the University of California, Berkeley School of Law and an MA in journalism from New York University. She currently chairs Maryland's Community Services Reimbursement Rate Commission, which seeks to ensure that reimbursement for community-based mental health and developmental disability services incentivizes quality care and provider retention sufficient to meet demand.

Eric B. Bass, MPH, MD, received an MD from Duke University School of Medicine and MPH from University of Pittsburgh, Graduate School of Public Health, Department of Epidemiology. He is professor of medicine, division of general internal medicine, The Johns Hopkins University School of Medicine and holds joint appointments, Department of Epidemiology, and Department of Health Policy and Management, The Johns Hopkins University Bloomberg School of Public Health.

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regulatory, and reimbursement barriers to their practice are eliminated (Cronenwett & Dzau, 2010).

As we proceed to transform our health care system over the coming decades, it is essential that workforce policy assessment, planning, and investment be guided by scientific evidence on staffing approaches that offer the greatest value to patients and communities. This, rather than provider-centric politics or parochialism, should serve as framework and guideposts. Accordingly, we have grounded our recommendations on just such evidence, derived from decades of comparative effectiveness research. We offer them here in the hope and expectation that they will move the national workforce policy discourse in a similar direction.

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Avoid professional protectionism. As others have suggested, we need to avoid workforce policy that is unduly influenced by professional protectionism and instead base policy decisions on individual and community welfare and system performance (Phillips, Harper, Wakefield, Green, & Fryer, 2002). Public and private policy should sustain such goals. The American College of Physicians recently issued statements supporting incorporation of NPs into health care teams (American College of Physicians, 2009). Such policy positions open the door to discourse among multiple parties, with the goal of creating optimal systems of care. To create these optimal systems, regulatory barriers for APRN practice will need to be eliminated.

Educate an interprofessional workforce. Future health care workforce policy must reject practice "silos." Likewise, university and clinical settings need to incorporate collaboration across professions as part of their education process. Core competencies of this interprofessional education are teamwork, evidence-based practice, quality improvement, informatics, and patient-centered care (Committee on the Health Professions Education Summit, 2003; Interprofessional Education Collaborative Expert Panel, 2011). Continuing education, which is often conducted in an interprofessional environment, can be used effectively to foster collaboration and improve care quality (Hager, Russell, & Fletcher, 2008). We must continue to invest in and test model systems of interprofessional education, continuing education, safety, and quality monitoring.

There will be many barriers to providing interprofessional education, not the least of which are incompatible curriculum schedules. Furthermore, professional schools will need to negotiate how workload will be distributed for faculty and how each school will be reimbursed for student tuition. Interprofessional faculty will need to consider options where no best practices or evidence exists to guide decisions. For example, they will need to evaluate how important is it for medical students and nursing students to be together for learning activities. Is it sufficient to have medical students learning from nursing faculty, and nursing students learning from medical faculty?

Within nursing, progress could be gained by fostering common definitions and scope of practice for APRNs. State policy should adopt licensing requirements that reflect standard definitions for APRNs, with concomitant licensing requirements (APRN Consensus Work Group & the National Council of State Boards of Nursing APRN Advisory Committee, 2008).

Reform provider reimbursement. We need to design reimbursement systems that maximize efficiency and provide appropriate incentives for good care and good workforce policy. This includes structuring payment models that support the use of interdisciplinary teams and, as appropriate, independent APRN practice. Medicare and Medicaid reimbursement for NP services historically has been lower than reimbursement for physician services. Payments by private payers vary widely (Chapman, Wides, & Spetz, 2010), and reimbursement to physicians for APRN visits are billed under "incident services," further obscuring the actual scope and extent of APRNs' contribution to care (Chapman et al., 2010). These incident services are delivered by APRNs in physician practices (or where there is a common employer). Under some circumstances, they may be billed as services "incident to" those of a physician, in which case they are paid at 100%.

Changes in reimbursement policy could provide an incentive to better use APRNs in primary care (Chapman et al., 2010). The American College of Nurse-Midwives worked from 1988 when CNMs were first recognized under Medicare to secure passage of legislation providing for equitable reimbursement at 100% of the Part B fee schedule for midwifery services. Such a provision was finally incorporated in the ACA, and went into effect on January 1, 2011 [American College of Nurse-Midwives (ACNM), 2010].

Improve workforce data. Data collection related to provider practice must improve. This will be key to setting future health care workforce policy. Provider categories for APRNs should be included among the data collected by federal databases, and the databases made available for research so that the distribution and practice contributions of APRNs can be better assessed. Currently, important public and private data collection efforts such as the National Ambulatory Medical Care Survey, the Center Studying Health Systems Change surveys, and the Area Resource File (which is the basis for health professional shortage area identifications) do not collect sufficiently granular data on APRNs.

Conclusion

Many critical workforce gaps will have major implications for the health care delivery system and, ultimately, the health of the U.S. population. Present challenges and recent evidence support the premise that health care reform should embrace APRNs to the full extent of their knowledge, skills, and competencies, and that these highly trained nurses represent one very important solution for addressing workforce needs over the coming decades. Indeed, the IOM has strongly recommended elimination of regulatory barriers to APRN practice, in particular singling out restrictive physician-nurse practitioner collaborative agreements for needlessly reducing access to primary care (Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing, at the Institute of Medicine, 2011).

APRNs must be fully integrated into emerging models of care that foster collaboration among health care providers from appropriate disciplines to meet the patient's health care needs. This team approach does not mean that professional disciplines merge boundaries in a transdisciplinary way, but rather that each discipline contributes in a unique way to achieve a shared goal in the care of the patient. APRNs will not be able to function effectively in teams unless the legal,

of preventive services were similar across care settings (Mehrotra et al., 2009). Patient satisfaction with the care they receive at retail clinics is high (Weinick et al., 2010). Given the popularity of care provided by NPs in these clinics, it is likely that NPs will continue to be found well suited to meet patient's needs and improve care access by practicing in these and other primary care settings.

APRNs in an Integrated Workforce: Challenges and Solutions

As the Institute of Medicine (IOM) recommended in its landmark report, Crossing the Quality Chasm, the nation needs to move away from single providers and single disciplines working as islands unto themselves (Committee on Quality of Health Care in America, Institute of Medicine, 2001). Members of well-supported, integrated teams need to have authority and accountability to maximize the contributions of each practitioner toward system goals that benefit the patient and society.

In an integrated workforce, APRNs will have differing roles and relationships with primary care and specialty physicians. There will be models of care in which APRNs work directly with specialty physicians (e.g., endocrinologists managing patients with diabetes) and/or with primary care physicians (who will have patients with a wide variety of acute and chronic conditions, and an increasing number of patients having multiple chronic conditions). Primary care physicians will refer patients to APRNs with expertise in managing chronic care populations. APRNs will refer to specialists for specific patient conditions, or to primary care physicians to manage complex symptom management. The role of an APRN is likely to vary according to whether the team involves family physicians, general internists, or medical specialists. How physicians organize their practice will also vary depending on the roles that APRNs play.

Once the issue of comparability between APRN care and that delivered by physicians is set aside in favor of an integrated team concept, disciplines can focus on the overarching goals (Pawlson et al., 2011). Some of the issues and challenges that must be confronted to develop an integrated workforce include development of patient-centered integrated teams, supporting outcome driven policy, build a shared healthcare vision to reduce quality gaps, avoid professional protectionism, educate an interprofessional workforce, reform reimbursement, and improve workforce data collection (see Figure 1).

Integrated teams. Patient-centered care should be driven by patient need. Rather than framing assessments of care quality in terms of that delivered by provider type "A" versus provider type "B," we propose a more productive policy framework that focuses on an integrated care model in which the providers assume responsibility for care based on the needs of the patient. The right provider may be an APRN, physician, or APRN-physician team that could include an array of other professionals as well. NPs (and CNMs and CRNAs depending on the care needed) are well prepared and legally authorized to provide many of the same services now provided by physicians. A patient's choice of provider in an integrated team context should not be impeded by unnecessary barriers. Patients should be able to decide who they want to see for their annual exam or who they prefer to monitor and manage their blood pressure as an outpatient, as long as it is within the providers legally authorized scope of practice based on their education and experience.

- Patient-centered care based on patient need in integrated care model
- Outcome driven policy to allow innovative models of care to bring value to consumer and community
- Focus on quality gaps for priority population, quality metrics, and support for interdisciplinary care
- Avoid professional protectionism in expanding systems of care
- Educate an interprofessional workforce
- Reform provider reimbursement to maximize efficiency and quality
- Improve workforce data to evaluate outcomes and inform policy

Figure 1. Integrated workforce challenges and solutions

Outcome driven policy. Policy should be guided by outcomes, value, and consumer and community benefit, rather than taking a provider-centric perspective. Our systematic review of the evidence revealed that there are many opportunities for APRNs to contribute as "substitutes," "alternatives," "complements," or "extenders" to the care provided by physicians.

Focus on quality gaps. The 2011 National Healthcare Quality Report, indicates that quality of care in the US has had uneven improvements and is lagging in making care safer, promoting health living and disparities related to race, ethnicity and socioeconomic status and access (Agency for Healthcare Research and Quality, 2012, March). An expanded APRN workforce can have a positive influence in all three. In addition, quality metrics should refocus on the continuum of care instead of episodic care (Christian et al., 2007; Committee on Redesigning Health Insurance Performance Measures, Payment, and Performance Improvement Programs, Board on Health Care Services, Institute of Medicine, 2006). Refocusing on patient outcomes across all providers and teams of providers is a first step in implementing a comprehensive metric of quality. There should be priority funding for interdisciplinary studies that include practitioners (APRNs, physicians, etc.) in the development of protocols that are patient centric. Measures of integrated care across the continuum of care need to be developed and tested in different settings and populations. Consensus should be established on the important outcomes of quality.

Table 2. Potential Role of APRNs in Addressing Workforce Needs

Primary care shortages	Provide a pool of primary care providers capable of alleviating the shortage of primary care physicians in certain areas.
Supplement medical resident care	Replace residents and fellows who are practicing fewer hours due to graduate medical education reform
Provide care for vulnerable populations	Expand access to care in rural or inner-city areas. Promote public health / population based initiatives including prenatal / infant mortality improvement programs.
Disease and chronic care management and medical homes	Improve chronic care management and medical home expansion to improve quality of life, reduce complications and readmissions
TeleHealth	Support consumer-based e-health/technology supported care models, including remote patient monitoring
Access/convenient care	Provide care through retail clinics and other models of community-based care

coverage for the uninsured, APRNs can have a greater role in providing primary care (NPs and CNMs), pregnancy care and delivery (CNMs), chronic disease management (NPs and CNSs), and anesthesia care (CRNA). Eighteen percent of NPs (American Academy of Nurse Practitioners, 2010) practice in rural areas where distances to access care are great and practitioners sparse. CNMs attend a substantial portion of births in the nation's most rural states (American College of Nurse-Midwives [ACNM], 2012). CRNAs are the sole anesthesia providers in 85% of rural hospitals (Pine, Holt, & Lou, 2003).

APRNs have long demonstrated their value as central actors in innovative care delivery models that address shortages of both primary and specialty care for underserved population groups. Eliminating barriers that restrict the scope of their practice would enable them to be still more effective in this area of persistent and growing need.

Disease management and chronic care. APRNs can optimize health in the delivery of primary care and disease management of patients with chronic illnesses. Examples include management of patients with diabetes (Lenz, Mundinger, Hopkins, Lin, & Smolowitz, 2002) and heart failure (Naylor et al., 2004). These two chronic diseases as a primary diagnosis alone account for more than 1.54 million hospital discharges in 2010 generating charges of more than US$52 billion dollars. (HCUPnet) Based on our systematic review, in comparisons of teams with and without APRNs, NPs and CNSs are effective at reducing readmissions, improving adherence to evidence-based care, and reducing hospital length of stay when patients are admitted. APRNs used to their full potential can have a profound effect on the efficiency and cost of care in the chronic care population.

Medical homes. As medical homes and other types of coordinated programs (both primary care and specialized "principal care" for persons with a "dominant condition") become major features of the health care infrastructure, it will be essential that collaborative teams with the right "skill mix" are defined and used. The inclusion of APRNs providing care to the full extent of their competencies and skills is a crucial component. The medical home should determine the best way to use APRNs—and, indeed, all other types of qualified health care providers—to attain the best outcomes for patients.

Telehealth and HIT. As use of health information technology (HIT) spreads, including remote patient monitoring and the use of personal health record/consumer-centric e-health self care, there will be an increased need for appropriate practitioners to provide professional support from a "distance." Patients with chronic illnesses, such as heart failure, benefit by telehealth care accessed in the home. APRNs, with their expertise in patient communication and education, can for example, assess a patient's progress in nutrition, weight management, or adherence to medications to identify and treat symptoms before they develop to a level that requires hospitalization. This opportunity for expanded use of APRNs will be applicable in a variety of settings and practices, but especially for patients isolated by geography, age, or disability who have difficulty accessing specialty or chronic care services.

Retail clinics. Consumers' increasing desire for ready access to care on their own terms is a trend not likely to go away. Demand for user-friendly health care has propelled the convenient care (a.k.a. "retail clinic") movement (Hansen-Turton, Ryan, Miller, Counts, & Nash, 2007). There are more than 1,200 retail clinics operating nationwide, and their number is expected to reach 3,400 by 2014 (Herrick, 2010). NPs are generally the providers of care in retail clinics (Mehrotra et al., 2009). For three commonly treated acute conditions (otitis media, pharyngitis, and urinary tract infections), costs at retail clinics are lower and quality of care is similar to that in physicians' offices and urgent care centers (Mehrotra et al., 2009; Weinick, Pollack, Fisher, Gillen, & Mehrotra, 2010). Setting-based outcomes were compared for the selected conditions because they are commonly managed in all ambulatory care settings. Results also indicate that antibiotic prescribing patterns and provision

Many jurisdictions already permit NPs to deliver care as independent providers (Christian, Dower, & O'Neil, 2007). Twenty-two states allow totally autonomous NP practice (NCSBN website 3-5-2012 see https://www.ncsbn.org/2567.htm). Seventeen accord NPs full prescriptive authority (NCSBN at https://www.ncsbn.org/2567.htm): Alaska, Arizona, Colorado, District of Columbia, Hawaii, Idaho, Iowa, Maine, Maryland, Montana, New Hampshire, New Mexico, Oregon, Rhode Island, Utah, Washington, and Wyoming (National Council of State Boards of Nursing at https://www.ncsbn.org/2567.htm). Twenty-seven jurisdictions, condition NP practice on a "collaborative agreement" of some type (National Council of State Boards of Nursing at https://www.ncsbn.org/2567.htm). In reality, this usually means that NPs autonomously perform comprehensive health assessments (history and physical examinations) and medical diagnoses, but are required to have a written agreement of collaboration with a physician to do so. The physician does not oversee the work or sign off on charts and may not even be located at the same practice site.

Still, APRNs on the whole remain an underutilized resource with the demonstrable potential to do more for special populations and others. Expanding APRNs' scope of practice to take full advantage of their educational preparation could go far toward alleviating the growing strain on our primary care physician workforce exerted by the combined pressures of demography and expanded insurance coverage under the Patient Protection and Affordable Care Act (ACA).

There are also practice model arguments for enhancing the role of APRNs. Nursing skills complement those of physicians in the case of chronically ill patients. The "medical home" model for serving patients with chronic illness, for example, envisions 24/7 provider access—something that is not likely achievable unless there is a team. Yet, most descriptions of the medical home refer to physician-directed care. For example, the Patient-Centered Primary Care Collaborative endorses access to care based on "an ongoing relationship with a personal physician trained to provide first contact, continuous, and comprehensive care" who "leads a team of individuals at the practice level who collectively take responsibility for the ongoing care of patients" (Pawlson et al., 2011). That said, a growing number of states (e.g., Maryland, Pennsylvania, Colorado) have allowed APRNs to function as primary care providers, some even permitting nurse-led medical homes. This movement has prompted the National Committee for Quality Assurance, Utilization Review Accreditation Commission (URAC), and the Joint Commission to include nurse-led primary care practices in their patient-centered medical home recognition and accreditation programs, and to replace the term "physician" with "clinician" in their relevant materials to accommodate NPs and physician assistants (PAs) (Joint Commission, 2011; NCQA, 2011). Federal legislation that incorporates NPs as providers who are responsible and accountable for care has been introduced, representing a further positive step.

Emerging trends of physician visits in the home (house calls) and the incorporation of medical care into residential settings also make the case for integrated teams in which each profession, including APRNs, contributes its unique range of competencies in a collaborative model of care. (Bookbinder et al., 2011; Deitrik et al., 2011; Landers, Gunn & Stange, 2009; Naylor et al., 1999; Ornstein, Smith, Foer, Lopez-Cantor, & Soriano, 2011). Complex and chronic diseases are best managed by a team with diverse expertise sufficient to meet a patient's multiple needs (Interprofessional Education Collaborative Expert Panel, 2011; Shih et al., 2008).

Opportunities for Optimizing APRN Use

There are a number of ways that APRNs are meeting present health care workforce needs but could be used more effectively to address these and future needs. Table 2 summarizes key areas in which APRNs can have a potential role in addressing workforce needs.

Primary care. Evidence suggests that we need to rethink how to deliver primary care. Over the past decade there has been an inexorable decrease in the number of American medical students going into primary care residency training programs (Jeffe, Whelan, & Andriole, 2010). The critical shortage of primary care physicians that was identified before passage of health care reform will be further exacerbated by the mandates of the new law (Dodoo et al., 2005). The number of primary care physicians grew just 1.2% to 90 per 100,000 people from 1995 to 2005. By comparison, the number of primary care NPs rose 9.4% to 28 per 100,000 people over the same period (Steinwald, February 12, 2008). APRNs have already been deployed to improve access where primary care physicians are in short supply, such as rural settings and among underserved urban populations. Sixty-eight percent of NPs practice in primary care (American Academy of Nurse Practitioners, 2010). Rather than relying on physicians alone to satisfy the primary care needs of the general population, using APRNs (and PAs, among others) would stretch the workforce and improve access.

Medical resident care. When medical resident work hours were reduced because excessively long hours were found to compromise patient safety, NPs immediately became part of the workforce solution (Christmas et al., 2005; Lundberg, Wali, Thomas, & Cope, 2006; Molitor-Kirsch, Thompson, & Milonovich, 2005; Resnick, Todd, Mullen, & Morris, 2006). This substitution was based on emerging evidence that APRN care was not only safe, but also substitutable for most resident care (Brown & Grimes, 1995; Horrocks, Anderson, & Salisbury, 2002; Laurant et al., 2005). The success of this solution can and should be extended to other settings that are still struggling to meet the resident hour restrictions.

Serving vulnerable populations. APRNs often care for the nation's uninsured and vulnerable populations. As we expand

Table 1. Key Findings of a Systematic Review of APRN Outcomes, Number of Studies, Randomized Controlled Trials and Level of Evidence

	Number of studies (*N* of RCTs)	Level of evidence
Nurse practitioner (NP) outcomes are similar to physician groups for the following:		
Patient satisfaction with provider/care	6 (4 RCT)	High
Self-report of perceived health status	7 (5 RCT)	High
Functional status	10 (6 RCT)	High
Blood glucose	5 (5 RCT)	High
Blood pressure	4 (4 RCT)	High
Emergency department visits	5 (3 RCT)	High
Hospitalization	11 (3 RCT)	High
Mortality	8 (1 RCT)	High
Length of stay	16 (2RCT)	Moderate
Duration of ventilation	3 (0 RCT)	Low
NP patient outcomes are better than physician groups for: management of serum lipids	3 (3RCT)	High
Certified nurse midwives (CNM) outcomes are similar to physicians for:		
Apgar scores	11 (1RCT)	High
Low birth weight	8 (1RCT)	High
CNM care compared with physicians has proportionally fewer:		
Cesarean sections	15 (1RCT)	High
Epidurals	10 (0RCT)	Moderate
Labor augmentations	9 (1RCT)	High
Episiotomies	8 (1RCT)	High
Labor inductions	9 (0RCT)	Moderate
Vaginal operative deliveries	8 (1RCT)	High
Labor analgesia use	6 (1RCT)	High
Perineal lacerations	5 (1RCT)	High
CNM care compared with physicians is comparable or proportionally better outcomes:		
Vaginal birth after cesarean	5 (0RCT)	Moderate
NICU admission	5 (0RCT)	Moderate
Breastfeeding	3 (0RCT)	Moderate
Clinical nurse specialists(CNS) group outcomes compared with non-CNS groups:		
Inpatient length of stay comparable or lower	7 (2RCT)	High
Inpatient costs comparable or lower	4 (2RCT)	High
Complications comparable or lower	3 (1RCT)	Moderate
Satisfaction comparable	3 (2RCT)	High

Note: Adapted from "Advanced practice nurse outcomes 1990-2008: A systematic review," by Newhouse et al.(2011), *Nursing Economics*, 29, 230-250.

Foundation Initiative on the Future of Nursing, at the Institute of Medicine, 2011).

The Case for Expanded Roles for APRNs

Over the years, APRNs have assumed an increasingly prominent place in the health care system, in particular, stepping in to fill certain provider shortages. In some measure, these shortages have been driven by employment trends as fewer physicians opt to practice alone or with only a single physician partner—a drop from 40.7% in 1996-1997 to 32.5% in 2004-2005 (Liebhaber & Grossman, 2007). It is especially noteworthy that APRNs have long been relied on to provide care for the most vulnerable (e.g., elderly and disabled), minority populations, and those living in inner-city and rural areas (Lewandowski & Adamle, 2009).

This is evident in federally qualified health centers (FHQC), which increase access to primary care services in areas where resources are constrained. FQHCs provide primary care for all ages including dental, mental health, and substance abuse services (Rural Assistance Center, 2011). A team-based approach to primary care uses varied nonphysician providers. In 2010, 9,100 physicians and 5,800 NPs, physician assistants (PAs) or CNMs provided essential primary and preventative care in FQHCs (Medpac, 2011).

Policy Implications for Optimizing Advanced Practice Registered Nurse Use Nationally

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Robin P. Newhouse, PhD, RN, NEA-BC, FAAN[1], Jonathan P. Weiner, DrPH[2], Julie Stanik-Hutt, PhD, ACNP, CCNS, FAAN[3], Kathleen M. White, PhD, RN, NEA-BC, FAAN[3], Meg Johantgen, PhD, RN[1], Don Steinwachs, PhD[2], George Zangaro, PhD, RN[4], Jillian Aldebron, JD[5], and Eric B. Bass, MPH, MD[6]

Abstract

This article examines the potential benefits of enhanced use of advanced practice registered nurses (APRNs) given health care workforce projections that predict an inadequate supply of certain types of providers. The conclusions of a systematic review comparing the effectiveness of care provided by APRNs with that of physicians alone or teams without APRNs indicate the viability of this approach. Allowing APRNs to assume roles that take full advantage of their educational preparation could mitigate the shortage of primary care physicians and improve care processes. The development of health care policy should be guided by patient-centric evidence rather than how care has been delivered in the past.

Keywords

advanced nursing practice, health care quality, nursing /health care workforce issues, outcomes measurement

Introduction

Advanced practice registered nurses (APRNs) [nurse practitioners (NPs), certified nurse-midwives (CNMs), certified registered nurse anesthetists (CRNAs), and clinical nurse specialists (CNSs)] are crucial providers of care that have not been used to their full potential in the health care delivery system. An estimated 240,460 APRNs are currently practicing in environments where they exercise a high degree of professional autonomy in the delivery of care to millions of patients annually (Health Resources and Services Administration, 2004). Our systematic review of nearly two decades of research conclusively found that care delivered by APRNs and care delivered by physicians (alone or in teams without an APRN) produce equivalent patient outcomes (Newhouse et al., 2011; Johangten et al., 2012).

Table 1 provides the key findings of our review, including the frequency of studies reviewed, research designs and level of evidence (high, moderate, or low). These studies measured discrete patient outcomes and compared care delivered by APRNs (both on their own and as part of teams) to care delivered by other providers (mainly physicians) practicing without APRNs. The review summarizes the significance as reported by the authors. A patient outcome was included in the summary if it was measured in at least three studies. A total of 28 patient outcomes derived from 69 studies (20 randomized controlled trials and 49 observational) were aggregated on this basis. A high level of evidence was considered present if there were at least two experimental studies of high quality or three high-quality observational studies that supported the outcome.

These findings offer a firm evidentiary basis for supporting an enhanced role for APRNs in the health care workforce consistent with the breadth and depth of their education and training. As we move away from silos to embrace integrated models of health care delivery in which professionals collaborate across disciplinary boundaries to produce new, more effective methods of care, the success of these efforts will depend in large part on the ability of each practitioner to maximize its contribution as a member of the team (Choi & Pak, 2007; Committee on the Robert Wood Johnson

[1]University of Maryland, Baltimore, MD, USA
[2]The Johns Hopkins University, School of Public Health, Baltimore, MD, USA
[3]The Johns Hopkins University, School of Nursing, Baltimore, MD, USA
[4]The Catholic University of America, School of Nursing, DC, WA, USA
[5]Independent Consultant
[6]The Johns Hopkins University, School of Medicine, Baltimore, MD, USA

Corresponding Author:
Robin P. Newhouse, University of Maryland, 655 West Lombard St, Suite 316, Baltimore, MD 21201, USA
Email: newhouse@son.umaryland.edu

dramatically reducing waiting times for care.

Expanding nursing scope of practice not only can help fill the gap in primary care providers, but it can save money as well. RAND estimates that in Massachusetts, using nurse practitioners to their full capacity could save the state between $4.2 and $8.4 billion over ten years. Other studies find sizable savings from care provided by nurses in clinics in retail pharmacies. In these cases, APRNs have the authority to diagnose, treat, and prescribe medications, among other services. Also, tapping nursing's potential is the fastest and least expensive way to meet growing demand for primary care. Nurses can be trained faster and for a lot less than medical school costs. Between three and 12 nurses can be educated for the price of one doctor.

There is hope. Employers and patients are beginning to clamor for progress in this area and the turf wars may lose steam as we move away from fee-for-service and toward accountable care organizations, in which a team of providers takes responsibility for the well-being of a population in return for global rather than provider-specific payments. The Federal Trade Commission may provide a further nudge. It has weighed in on a handful of states' efforts to restrict nursing's scope, finding cause for anti-competitive practices and, in some cases, evidence that the restrictive laws protect professional interests rather than consumers.

The remaining 34 states that restrict APRN's scope of practice will eventually have to come to terms with a growing shortage of physicians and increasing demands to save money and restructure how we receive and pay for health care. The inconsistent, often punitive, and highly politicized regulatory environment surrounding APRNs must recognize the new horizons in medical care in the United States.

This article available online at:

http://www.theatlantic.com/health/archive/2012/05/why-nurses-need-more-authority/256798/

One of the best ways to alleviate this shortage is to expand the scope of practice for advanced practice registered nurses (APRNs), well-trained registered nurses with specialized qualifications who can make diagnoses, order tests and referrals, and write prescriptions. APRNs could provide a variety of services that primary care physicians now provide.

The definitive word on medical practice in America -- the highly respected and impartial Institute of Medicine (IOM) of the National Academy of Sciences -- has weighed in on this idea of allowing APRNs to do more, in a landmark 2010 report "The Future of Nursing." The IOM conducted an exhaustive review of all the available studies of the efficacy and safety of care provided by APRNs and concluded that properly trained APRNs can independently provide core primary care services as effectively as physicians. They can provide wellness and preventive care services, diagnose and manage common, uncomplicated acute illnesses, and help patients manage chronic diseases such as diabetes. In its report, the National Academy of Sciences recommended that "[a]dvanced practice registered nurses should be able to practice to the full extent of their education and training."

But despite an urgent need and clear evidence that APRNs can complement and extend primary care providers' roles -- without sacrificing quality of care -- nurses are only permitted to practice independently to the full extent of their training and competence in 16 states and the District of Columbia. The remaining states impose regulatory barriers that limit their scope of practice. These barriers should and can be removed.

But the turf wars of organized medicine are preventing progress. The American Medical Association, the American Osteopathic Association, the American Academy of Pediatrics, and the American Academy of Family Physicians all oppose expanding the scope of nurse-practitioner responsibilities, despite the IOM report and recent research demonstrating that an expanded scope of practice for APRNs has no impact on primary care physician income.

In Colorado, where there are far too few anesthesiologists available for rural and critical access hospitals, the state's medical and anesthesiologists societies sued to overturn former Governor Bill Ritter's 2010 decision to allow Certified Registered Nurse Anesthetists (CRNAs) to provide anesthesia and pain management care in these hospitals. Instead, they prefer to make people travel hundreds of miles out of their communities to have a procedure that a CRNA is licensed and trained to carry out. They are also apparently fine with hospitals being forced to close as a result of a lack of anesthesiologists. This is a classic example of doctor-centric care trumping patient-centric care.

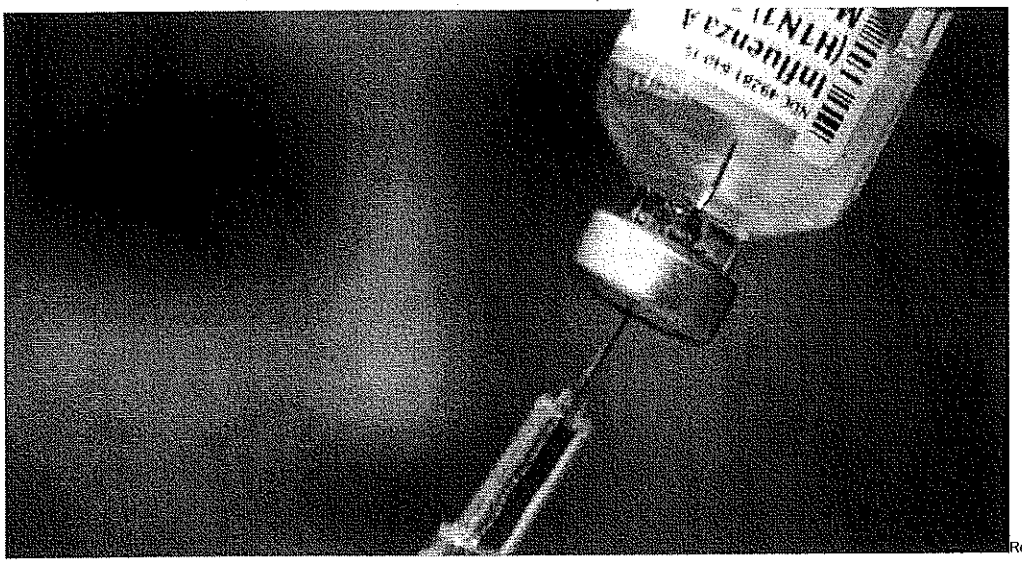
Apparently the physician organizations are threatened by some mix of concerns about lost income and their traditional position as "captain of the ship." Those opposed to expanding the scope of nurses' practice also argue that physicians with more years of training under their belts must necessarily know more than an APRN ever could. Of course they know more, but it is well established that they do not know more about providing the core elements of basic primary care.

And why primary care physicians -- already overburdened and overworked -- wouldn't want some support with routine care and services is puzzling. Allowing well-trained APRNs to handle routine care frees up physicians focus on diagnostic dilemmas and more complex management issues while

Why Nurses Need More Authority

By John W. Rowe

Allowing nurses to act as primary-care providers will increase coverage and lower health-care costs. So why is there so much opposition from physicians?



Reuters

Think it takes a long time to get an appointment with a primary care provider now? Brace yourself: it will likely only get worse. We're facing a severe shortage of primary care physicians in the nation. The Association of American Medical Colleges predicts a shortfall of 29,800 primary care physicians by 2015, and 65,800 by 2025, mainly because of the anticipated increase in demand for services from the Affordable Care Act (ACA), deterrents to entering the field, such as relatively lower incomes, and growth in the general population and specifically growth in the elderly population. Should the ACA pass muster with the Supreme Court next month, an additional 30 to 33 million previously uninsured Americans will be covered -- and even if ACA is not implemented in full, and in the end merely expands Medicaid, it will add 17 million to the insured ranks by 2020.

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The PEARSON REPORT

NPDB & HIPDB State Ratios

	NP STATE RATIO FOR NPDB OCCURRENCE	DO STATE RATIO FOR NPDB OCCURRENCE	MD STATE RATIO NPDB OCCURRE
ALABAMA	1:642	1:10	1:8
ALASKA	1:123	1:8	14
ARIZONA	1:74	1:3	1:3
ARKANSAS	1:300	1:5	1:4
CALIFORNIA	1:196	1:8	1:3
COLORADO	1:91	1:5	1:4
CONNECTICUT	1:685	1:22	1:6
DELAWARE	1:240	1:4	1:4
DC	1:146	1:5	1:5
FLORIDA	1:65	1:3	1:2
GEORGIA	1:221	1:5	1:4

HAWAII	1:456	1:7	1:5
IDAHO	1:73	1:8	1:4
ILLINOIS	1:227	1:6	1:3
INDIANA	1:285	1:3	1:3
IOWA	1:148	1:3	1:3
KANSAS	1:220	1:3	1:2
KENTUCKY	1:165	1:6	1:3
LOUISIANA	1:98	1:3	1:2
MAINE	1:155	1:7	1:4
MARYLAND	1:134	1:14	1:4
MASSACHUSETTS	1:105	1:11	1:5
MICHIGAN	1:247	1:2	1:2
MINNESOTA	1:364	1:11	1:7
MISSISSIPPI	1:118	1:5	1:2
MISSOURI	1:225	1:3	1:3
MONTANA	1:69	1:4	1:2
NEBRASKA	1:339	1:7	1:3
NEVADA	1:72	1:5	1:3
NEW HAMPSHIRE	1:139	1:15	1:3
NEW JERSEY	1:161	1:3	1:2
NEW MEXICO	1:51	1:2	1:2
NEW YORK	1:165	1:6	1:2
NORTH CAROLINA	1:166	1:11	1:5
NORTH DAKOTA	1:238	1:6	1:3
OHIO	1:777	1:3	1:3
OKLAHOMA	1:91	1:4	1:3
OREGON	1:82	1:7	1:5
PENNSYLVANIA	1:216	1:2	1:2
RHODE ISLAND	1:77	1:2	1:3
SOUTH CAROLINA	1:263	1:7	1:3
SOUTH DAKOTA	1:115	1:6	1:3
TENNESSEE	1:133	1:4	1:4
TEXAS	1:114	1:3	1:3
UTAH	1:131	1:9	1:3
VERMONT	0	1:12	1:4
VIRGINIA	1:243	1:12	1:5
WASHINGTON	1:91	1:5	1:4
WEST VIRGINIA	1:151	1:4	1:1
WISCONSIN	1:908	1:8	1:7
WYOMING	1:85	1:2	1:2

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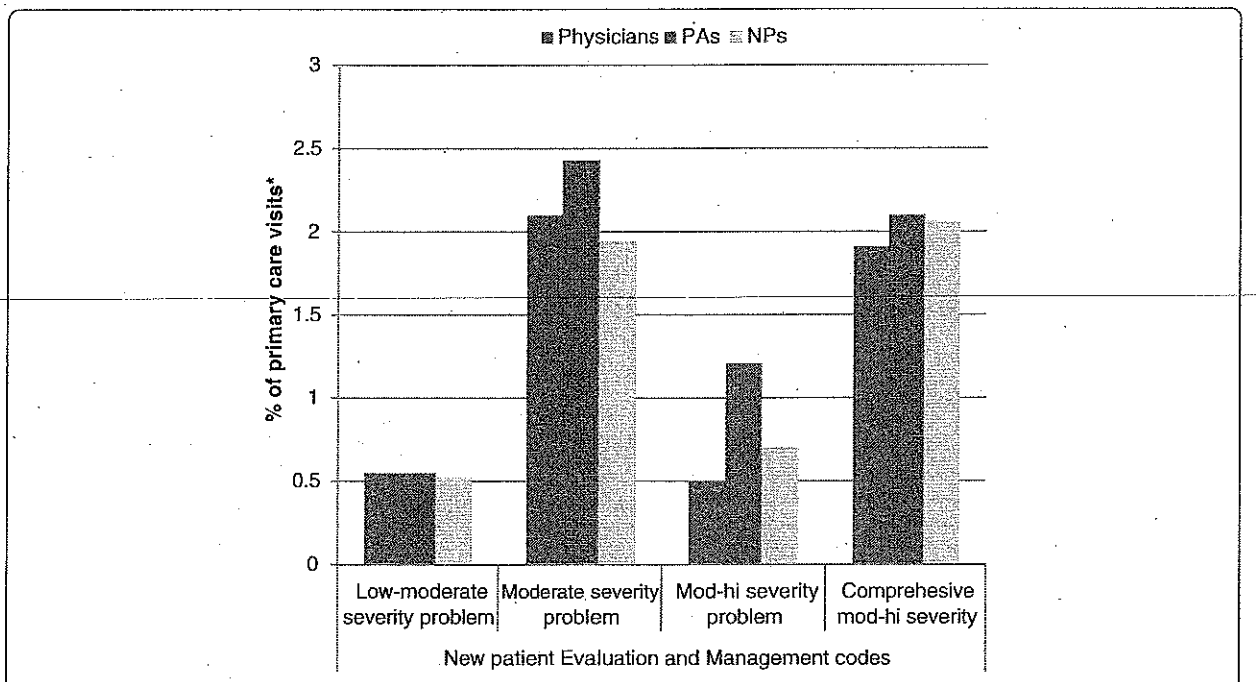

Figure 5 Evaluation and management, new patient Current Procedural Terminology (CPT®) codes: proportions by provider type, 2010. *Only visits to physicians, nurse practitioners, and physician assistants were included. Bars represent the percentage of visits to each provider type that are within the indicated CPT® code.

Our study describes a large integrated health system that uses NPs and PAs to fill patient care roles similar to those of physicians. These results demonstrate that a highly successful nationwide primary care system relies on NPs and PAs to provide over one quarter of primary care visits to a patient population with a high prevalence of chronic disease. Future research should compare the quality and costs associated with various combinations of providers and allocations of patient care work, and should elucidate the approaches that maximize quality and efficiency.

Abbreviations

COPD: Chronic Obstructive Lung Disease; CPT®: Current Procedural Terminology; DCG: Diagnostic Cost Group; E/M: Evaluation and management; ICD-9: International Classification of Diseases; NP: Nurse Practitioner; PA: Physician Assistant; VHA: Veterans Health Administration; VIReC: VHA Information Resource Center; VISNs: Veterans Integrated Service Networks.

Competing interests

The authors declare that they have no competing interest.

Authors' contributions

PAM conceived the study, provided leadership for the study design, and drafted the manuscript. DHA performed the data analysis. All authors participated in design of the study, contributed to interpretation of results, provided substantive critique of manuscript drafts, and approved the final manuscript.

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Author details

[1]Department of Community and Family Medicine, Duke University Medical Center, Durham, NC, USA. [2]Health Service Research and Development Center of Excellence, Durham Veterans Affairs Medical Center, Durham, NC, USA. [3]Epidemiologic Research and Information Center, Durham Veterans Affairs Medical Center, Durham, NC, USA. [4]Department of Medicine, Duke University Medical Center, Durham, NC, USA.

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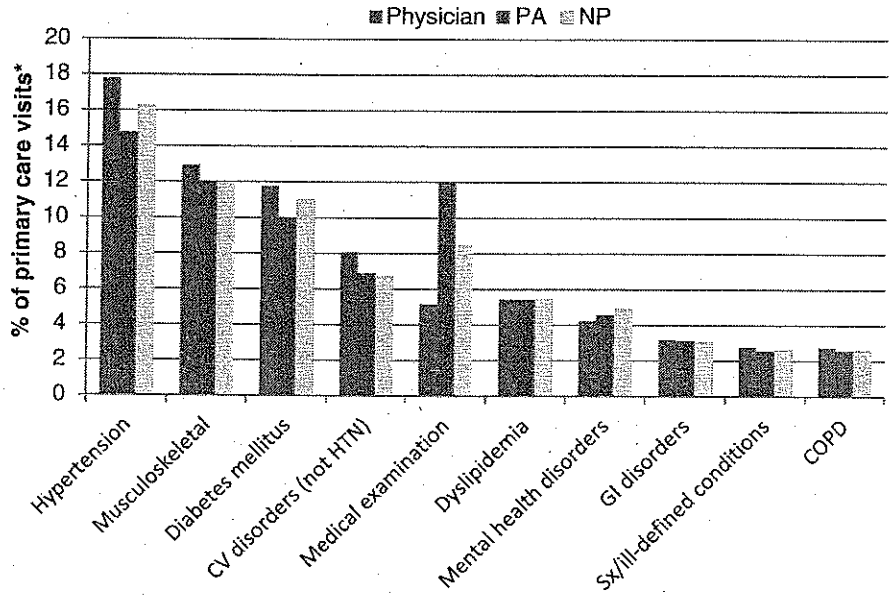

Figure 3 Percentage of visits to each provider type by primary visit diagnosis (10 leading diagnoses by frequency), 2010.
*Only visits to physicians, nurse practitioners, and physician assistants were included. Cardiovascular disorders exclude hypertension since hypertension is a separate category. COPD = chronic obstructive lung disease.

through comparison of use and outcomes across facilities or VISNs that use PAs and NPs differently. The VHA primary care data also support analysis at the team level, which was beyond the scope of this project but which could support important analyses of the effects of team structure and composition on outcomes.

Conclusions

Primary care physician shortages currently exist or are expected around the world. In response, many nations are exploring or developing roles for nonphysician providers, and information about current primary care use of NPs and PAs is highly relevant to those endeavours.

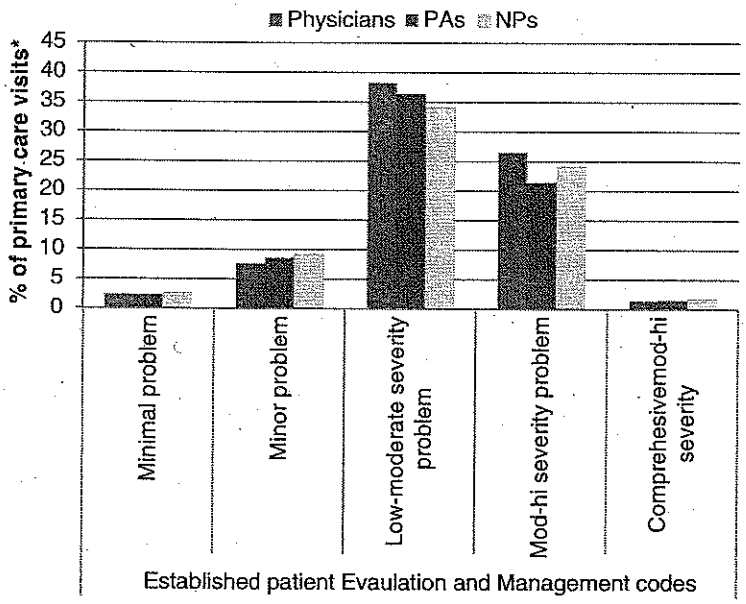

Figure 4 Evaluation and management, established patient Current Procedural Terminology (CPT®) codes: proportions by provider type, 2010.
*Only visits to physicians, nurse practitioners, and physician assistants were included. Bars represent the percentage of visits to each provider type that are within the indicated CPT® code.

Table 1 Comparison of 2010 VHA primary care encounter[a] characteristics by provider type

	Physician	Physician assistant	Nurse practitioner
Mean age (years)	63	61	62
Male (%)	93	93	90
Race or ethnicity (%)			
Non-Hispanic white	58	61	58
Non-Hispanic black	14	13	14
Hispanic	6	3	4
Asian	1	1	1
American Indian	1	1	1
Unknown	21	21	22
Purpose of visit (%)			
Scheduled clinic visit	92	86	90
Unscheduled visit	4	5	5
Physical examination to determine compensation and pension eligibility	3	8	5
Current Procedural Terminology (CPT®) codes (%)			
Evaluation and management, established patient	76	71	72
Evaluation and management, new patient	5	6	5
Immunization	7	6	6
Disability evaluation	3	8	5
Lifestyle counselling	2	1	2
Preventive medicine	1	2	1
Missing and other	6	6	8
Mean diagnostic cost group scores[b] (s.d.)	0.89 (0.891)	0.82 (0.824)	0.84 (0.821)

[a] Only visits to physicians, nurse practitioners, and physician assistants were included.

[b] DCG = diagnostic cost group, a comorbidity measure based on age, sex, and diagnoses over a one-year time period. Scores are standardized so that a value of one is the score of a typical Medicare patient.

remains small, NPs attended more visits with these female patients. The finding that PAs attended more unscheduled visits suggests that PAs may often be used to staff walk-in or same-day appointment sections of primary care clinics. This deployment of PAs could also explain why they saw proportionately more new patients with higher complexity, since ill veterans who present to obtain care for the first time may be routed through sectors of the practice set aside for unscheduled appointments.

Physician assistants and, to a lesser extent, NPs also saw more visits for the purpose of determining benefit eligibility than did physicians. While these eligibility visits are detailed and are important to veterans' financial futures, they are routine in nature and generally do not address emergent conditions. Therefore, assigning these visits to less expensive and less highly trained providers may be an efficient use of human resources.

Study strengths and limitations

Our results are strengthened by the high quality of the medical record data we used. The data are national in scope, reflecting the experience of veterans across the country. Data were recorded as part of routine administrative processes at or near the time of patient encounters, removing recall as a source of bias. Perhaps most importantly, PA and NP providers within VHA directly document their own patient encounters, so our analysis did not suffer from the common practices, such as billing "incident to" the physician, which can obscure PA and NP patient care activities in administrative datasets.

It is possible that PAs and NPs saw patients jointly with physicians more than the data reflect. The scarcity (<2%) of encounters that coded multiple providers of interest (physician, PA, NP) may be an artefact of routine practices in which the documenting provider does not code other providers who may have seen the patient. This practice may also explain why care by medical residents is not well-represented in the data. Given the substantial teaching mission of the VHA, physician resident participation may have been much larger than the 3% of visits for which a resident was listed as the primary provider.

The large regional differences that we found in the use of NPs and PAs in VHA primary care could influence our results. As we discussed, this regional variation in NP and PA use probably affects the race and ethnicity differences that we found in the proportions of patients seen by each provider type. These regional variations could mask differences that are not apparent in our analysis.

The generalizability of our results is influenced by a number of factors. Most VHA providers are salaried, and may therefore behave differently than providers in the private sector, whose income may depend on patient and procedure volume. Moreover, VHA patients have a higher burden of chronic disease than the general US population. However, information about the use of NPs and PAs in caring for a population with a high prevalence of chronic disease can inform workforce planning for other similar settings. This is important for health workforce policy, since chronic disease accounts for over half of US healthcare expenditure [22].

Future research

While our study elucidates patient care activities of NPs and PAs in primary care in the VHA, future research should establish which allocations of labour maximize quality and efficiency. The large variation that we found in the magnitude of PA and NP use across regional VISN networks suggests that there may also be variation in the *pattern* of NP and PA use. This variation, while hidden within our nationally aggregated results, could present opportunities for research on the best use of PAs and NPs

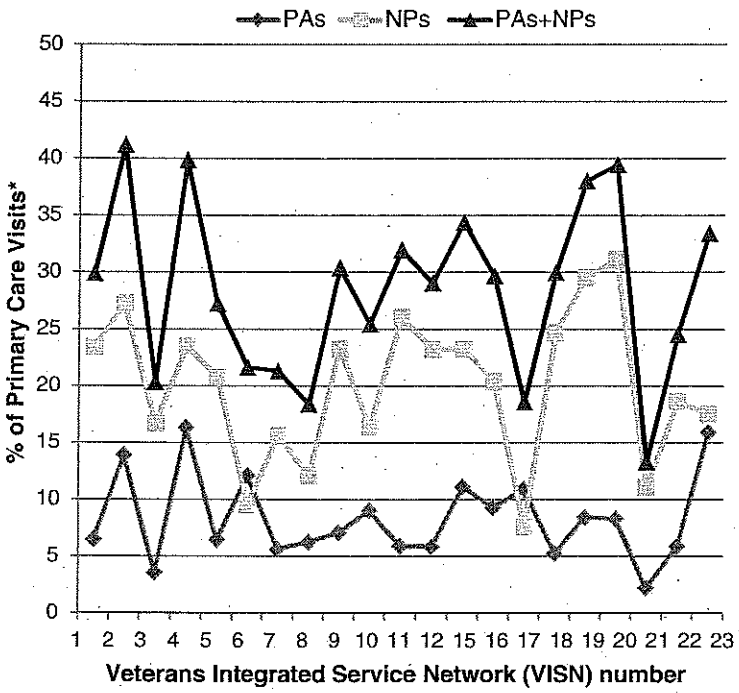

Figure 2 Variation in number of VHA primary care visits to PAs and NPs by regional network (VISN), 2010.
*Only visits to physicians, nurse practitioners, and physician assistants were included.

0.89; NPs, 0.84; PAs, 0.82). The differences in the DCG scores are quite small compared with the standard deviation of these measures, suggesting that the scores can be considered similar across the three provider groups. All three groups saw patients with lower DCG scores than the average Medicare patient, probably because the VHA population includes many people in the under-65 age group. The finding of only small differences in this measure of patient complexity challenges the prevailing notion that NPs and PAs see patients who are less medically complex than those cared for by physicians. Since our study did not address referral rates by provider types, we cannot assess whether PAs or NPs were more likely to refer complex patients to specialists. Analysis of referral rates and appropriateness of referrals will be important in future evaluations addressing both quality of care and cost efficiency by provider type.

The most commonly seen 2010 primary visit diagnoses were similar across provider groups (Figure 3). The two leading diagnoses for all provider types were hypertension and musculoskeletal conditions. For physicians and NPs, the third most common diagnosis was diabetes mellitus, but for PAs the third most common diagnosis was "general medical examination", followed by diabetes mellitus. Physician assistants had notably more visits in the category of "medical examination" (12% of all visits to PAs) than NPs (8.5%) and physicians (5.2%). For all other diagnoses, the proportion of each provider type's visits agreed within 2% (absolute).

Procedure codes for patient visits were heavily concentrated in the evaluation and management (E/M) categories, particularly for established patients. Physician assistants performed more disability evaluations and saw more new, as opposed to established, patients for E/M encounters than did physicians. In addition, PAs had correspondingly fewer encounters with established patients than did physicians or NPs. Nurse practitioners fell between physicians and PAs on numbers of encounters in these three categories (established patients, disability evaluations, and new patients). Within encounters for established patients, physicians staffed slightly more visits towards the more complex end of the spectrum than did NPs or PAs (Figure 4). For new patients, PAs attended higher proportions of the most complex encounters (Figure 5).

Overall, NPs, PAs, and physicians filled similar roles in VHA primary care clinics, although there were some differences in patient complexity and purpose of visits. The similarities in the patterns of patient encounter characteristics across provider types suggests that NPs and PAs function more as physician substitutes than as physician complements [8] in VHA primary care. Both provider types, however, have found specific patient care niches. Although the proportion of women patients in the VHA

since larger numbers of NPs than PAs practice in primary care [21]. Our study cannot determine whether the predominance of NPs over PAs is due to supply factors, such as possible PA preference for subspecialty practice, or to demand factors, such as preferential recruitment of NPs for primary care positions.

The annual number of VHA primary care encounters involving the three provider types increased from 9.6 million to 10.6 million between 2005 and 2010. Almost all of this increased workload was absorbed by physicians, whose annual primary care encounters increased from 6.7 to 7.7 million annually. The percentage of total encounters attended by physicians increased from 69.8% to 72.5% over the six years studied, with corresponding minor decreases in the percentages seen by NPs and PAs (Figure 1).

Regional variation in use of NPs and PAs

The use of NPs and PAs varies widely by regional network (VISN), with the two provider types together attending as few as 13% (VISN 21) and as many as 41% (VISN 2) of primary care encounters in 2010 (Figure 2). In some regional networks, such as VISN 2, both NPs and PAs see relatively large numbers of patients (27% of encounters for NPs and 14% for PAs). In most VISNs, NPs attend substantially more encounters than do PAs, up to about four times as many in VISN 20 (31% for NPs and 8% for PAs). However, in two VISNs (VISN 6 and 17), PAs attend slightly more visits than NPs (12% and 11% for PAs versus 10% and 8% for NPs respectively). We did not examine variability at the facility level, which may also be extensive. This variability may provide an opportunity for comparative research across a spectrum of PA and NP use.

Patient and encounter characteristics

In 2010, the distribution of patient age, sex, and race was fairly constant across the provider groups (Table 1). The mean age of patients whose visits were attended by physicians (62.8 years) was minimally higher than that of patients seen by NPs (61.7years) or PAs (61.1 years). Nurse practitioners saw slightly more women (10% of patient encounters) than did PAs (6.7%) and physicians (6.6%). Slightly more visits to physicians and NPs were by patients from minority groups (21 and 20%, respectively) compared with visits to PAs (18%). Differences in proportions of encounters with patients of racial and ethnic minorities may be due to geographical differences in PA and NP use. The purpose of the visit varies by provider type, with PAs seeing more patients for physical examinations to determine eligibility for benefits (9%) than physicians (3.4%) or NPs (5.2%). Physician assistants also saw more unscheduled patients (5.3%) than did physicians (4.2) or nurses (4.5%).

Nurse practitioner and PA patients had slightly lower DCG complexity scores than physician patients (physicians,

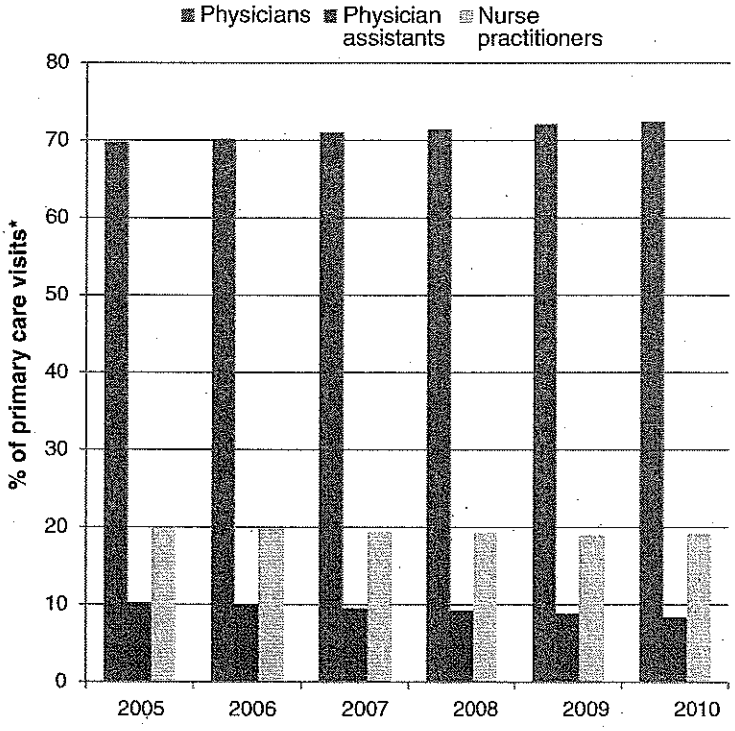

Figure 1 Trend in percentage of primary care visits by provider type, 2005 to 2010.
*Only visits to physicians, nurse practitioners, and physician assistants were included.

Background

Primary care, an essential determinant of health system equity, efficiency, and effectiveness [1], is threatened by inadequate supply and distribution of the provider workforce [2,3]. As the US primary care system confronts provider shortfalls due to demographic trends, the growing prevalence of chronic disease [4], and low proportions of physicians choosing primary care practice [5], a possible solution is expanded use of physician assistants (PAs) and nurse practitioners (NPs) [6]. This solution is supported by a large body of research demonstrating high quality of NP and PA care [7,8] and by recent research suggesting that higher proportions of NPs in primary care clinics are associated with improved outcomes among patients with diabetes [9,10].

The Veterans Health Administration (VHA), the United States' largest integrated health system, is a leader in primary care innovation. Since the mid-1990s, the VHA has created a model primary care system by implementing strategies to coordinate and integrate care, maintain high standards of preventive and chronic disease care, make primary care accessible to veterans across the country, and provide high quality care while controlling costs [11-14].

Throughout this transformation, the VHA has explicitly promoted the use of NPs and PAs in primary care. The VHA is the largest employer of both PAs and NPs nationally [15,16]. Although deployment of NPs and PAs varies across regional VHA networks (Veterans Integrated Service Networks, or VISNs), many of these networks have been frontrunners in the utilization of nonphysician providers with respect to both numbers of PAs and NPs and to relative autonomy and responsibility in clinical care [15-17]. For example, VHA primary care NPs and PAs are typically responsible for management of their own panels of patients and are generally not required to obtain physician co-signatures for prescriptions, orders, or documentation [18,19]. Evaluation of the roles and impact of NPs and PAs in the VHA is critical in ensuring optimal care for veterans and may inform best practices for use of PAs and NPs in other settings. The VHA is a promising and pertinent system to study because of its unparalleled national system of coded data, the high burden of chronic disease in its patient population, and its relatively expansive use of PAs and NPs. The purpose of this study was to characterize the use of NPs and PAs in VHA primary care and to examine whether their patients and patient care activities were, on average, less medically complex than those of physicians.

Methods

This is a retrospective cross-sectional analysis of national administrative data from VHA primary care encounters (2005 to 2010) listing a physician, NP, or PA as the first provider for the encounter. Other provider types (such as registered nurses, licensed practical nurses, pharmacists, and social workers) were the first provider listed for about 28% of all encounters and were omitted from the analysis. Encounters with physician residents were also excluded, but the number of visits for which a physician resident was listed as the first provider was small (less than 3% of total for all types). After we eliminated all provider types other than physicians, PAs, and NPs, the vast majority (>98%) of encounters in the dataset listed only one provider as involved in the encounter. Therefore, we analysed data for only the first provider listed. Our analysis of trends in the proportion of primary care visits attended by each provider type from 2005 to 2010 is based on 9.6 million to 10.6 million encounters from each year. For all of the other analyses, we used only 2010 data, comprising 10.6 million encounters.

Variables analysed by provider type included patient age, sex, race, VISN, visit primary diagnosis by International Classification of Diseases (ICD-9) code, procedures by Current Procedural Terminology (CPT®) code, and comorbidity score. Encounter primary diagnoses (ICD-9 codes) were aggregated into 288 categories using the Health Cost and Utilization Project Clinical Classification Software [20], and then further categorized into 30 clinical categories by our team. The comorbidity score system used was that of the diagnostic cost groups (DCG), which standardizes risk compared with the average Medicare patient (DCG score = 1), where a score >1 indicates that the patient studied has a higher health risk than the average Medicare patient. This score was pre-calculated for each patient by VHA health services researchers and was obtained through the VHA Information Resource Center (VIReC).

Statistical analysis was descriptive and accomplished using SAS Version 9.2 (SAS Institute, Cary, NC). The extremely large size of our dataset produced highly precise estimates, even for differences of trivial magnitude and no clinical consequence. For this reason, and because our approach to the analysis was descriptive (rather than modelling), we chose to present summary statistics without confidence intervals or estimates of statistical significance.

This study was approved by the Durham Veterans Affairs Medical Center Institutional Review Board, which found that it complied with ethical and regulatory standards.

Results and discussion

Trends and numbers of patient encounters by provider type

A substantial portion (29%) of VHA primary care encounters are with PAs and NPs. Nurse practitioners are more prominent than PAs in VHA primary care, attending approximately twice as many visits as PAs (19.2% versus 8.4% in 2010). This mirrors the non-VHA distribution,

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HUMAN RESOURCES FOR HEALTH

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Characteristics of primary care office visits to nurse practitioners, physician assistants and physicians in United States Veterans Health Administration facilities, 2005 to 2010: a retrospective cross-sectional analysis

Perri A Morgan[1*], David H Abbott[2], Rebecca B McNeil[2] and Deborah A Fisher[3,4]

Abstract

Background: Primary care, an essential determinant of health system equity, efficiency, and effectiveness, is threatened by inadequate supply and distribution of the provider workforce. The Veterans Health Administration (VHA) has been a frontrunner in the use of nurse practitioners (NPs) and physician assistants (PAs). Evaluation of the roles and impact of NPs and PAs in the VHA is critical to ensuring optimal care for veterans and may inform best practices for use of PAs and NPs in other settings around the world. The purpose of this study was to characterize the use of NPs and PAs in VHA primary care and to examine whether their patients and patient care activities were, on average, less medically complex than those of physicians.

Methods: This is a retrospective cross-sectional analysis of administrative data from VHA primary care encounters between 2005 and 2010. Patient and patient encounter characteristics were compared across provider types (PA, NP, and physician).

Results: NPs and PAs attend about 30% of all VHA primary care encounters. NPs, PAs, and physicians fill similar roles in VHA primary care, but patients of PAs and NPs are slightly less complex than those of physicians, and PAs attend a higher proportion of visits for the purpose of determining eligibility for benefits.

Conclusions: This study demonstrates that a highly successful nationwide primary care system relies on NPs and PAs to provide over one quarter of primary care visits, and that these visits are similar to those of physicians with regard to patient and encounter characteristics. These findings can inform health workforce solutions to physician shortages in the USA and around the world. Future research should compare the quality and costs associated with various combinations of providers and allocations of patient care work, and should elucidate the approaches that maximize quality and efficiency.

Keywords: Health manpower, Nurse practitioners, Physician assistants, Primary health care, United States Department of Veterans Affairs

* Correspondence: perri.morgan@duke.edu
[1]Department of Community and Family Medicine, Duke University Medical Center, Durham, NC, USA
Full list of author information is available at the end of the article

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Conclusion

Nurse practitioners have been evaluated in other countries for more than 30 years now, but until now no evaluations studied NPs in Dutch general practices using a large scale, randomized controlled design. This study lends support to an increased involvement of specially trained NPs in Dutch primary care, treating common complaints and contributes to knowledge of the effectiveness of the NP as first point of contact in primary care from a national and international point of view.

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Author contributions

AD, JM, ED, CS and BV were responsible for the study conception and design. AD and BV performed the data collection. AD and BV performed the data analysis. AD and BV were responsible for the drafting of the manuscript. AD, JM, ED, CS and BV made critical revisions to the paper for important intellectual content. AD and BV provided statistical expertise. ED and BV obtained funding. JM, ED and BV provided administrative, technical or material support. JM, CS and BV supervised the study.

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What is already known about this topic

- Nurse practitioners may potentially substitute for general practitioners, particularly in the care of patients with minor health problems at first point of contact.
- Nurse practitioner consultations lead to high levels of patient satisfaction and high quality of care and do not differ from general practitioner consultations in health status, number of prescriptions ordered and health service utilization.

What this paper adds

- Patients highly appreciate the quality of care provided by nurse practitioners in Dutch primary care.
- No differences were found in health status, medical resource consumption and compliance with practical guidelines when compared with general practitioners.
- Patients seeing nurse practitioners were more often invited to re-attend, had more follow-up consultations and their consultations took statistically significantly longer.

Implications for practice and/or policy

- Nurse practitioners can be considered as the first point of contact for patients in general practice.
- Specialized education is needed to prepare practice nurses for the nurse practitioner role.

in the NP intervention group had statistically significantly more follow-up consultations. It is also possible that patients might feel less confident with an NP than with a GP and as a result would like to have extra checks for their complaints.

Among those who had seen a doctor, 26·4% had a preference for an NP or no preference if they had a similar illness in the future. Among those who had seen an NP, 46·5% had a preference for an NP or no preference for a GP or NP. This suggests that once patients have consulted an NP, they return to this type of practitioner for future problems. Regarding patient satisfaction, the effectiveness of the consultation and medical resource consumption, it might be expected that this percentage will grow when the NP role is more known in general practice and NPs develop in terms of work experience.

Nurse practitioner consultations were statistically significantly longer, but no difference was seen in the provision of information. This may be attributable to the booking interval, which was 15 minutes for a consultation of a NP and ten minutes for a GP, and the fact that NPs were newly graduated and had less experience than the GPs. We have no data on whether NPs had a more holistic approach, as found by other researchers (Reveley 1998, Seale *et al.* 2006), who concluded that NPs use more social, emotional and patient-centred talk. GPs, on the other hand, confined themselves more to gathering information directly relevant to diagnosis and treatment (Redsell *et al.* 2007). Williams and Jones (2006) and Shum *et al.* (2000) found that time in consultations mattered to patients, whether this was time to discuss problems or time saved as a result of having issues resolved. Factors associated with the style and emphasis of consultations were also important.

Policy implications

This study lends support to an increased involvement of NPs in primary care, treating patients with common complaints at first point of contact. NPs provided care of equal quality to GPs and greater continuity of care would be expected when NPs work full-time.

These results were achieved by NPs who had followed a training programme, which equipped them to make both diagnostic and treatment decisions, in addition to the usual programme of the Master in Advanced Nursing Practice. This additional input is recommended to prepare the NPs for their specific role in primary care.

It cannot be assumed that similar results will be obtained by NPs working in different settings, with different groups of patients or with different level of education or experience.

The initiative reported in this paper was a first step in gaining acceptance the NP as a new professional in treating common complaints. How primary care is provided is an important policy question and depends on the extent to which NPs gain authority. The process of implementing and evaluating APN roles is as complex and dynamic as the roles themselves (Bryant-Lukosius & Dicenso 2004). Policymakers indicate support for advanced practice and the autonomy of NPs. The process of authorization (for example, writing prescriptions), however, has constraints, which not only support nurses' progress but also hinder it (Turner *et al.* 2007). A widespread national and international debate about the appropriate mix of skills in primary care is needed to develop greater understanding of the potential value of the NP role (Roodbol 2005), and in particular, the NP in general practice (Wilson *et al.* 2002, Laurant 2007). An economic evaluation of our project will be published in the future.

Table 5 Medical resource use

	Nurse practitioner		General practitioner		
	Number of patients	%	Number of patients	%	*P*
1 prescription	411/747	55·0	352/650	54·2	0·75
2 prescriptions	126/747	16·9	127/650	19·5	0·20
≥3 prescriptions	66/747	8·8	51/650	7·8	0·51
Investigations carried out	18/747	2·4	19/650	2·9	0·55
Referrals	90/747	12·0	92/650	14·2	0·24
Asked to return	340/676	50·3	250/604	41·3	0·001*
Actually returned for the same problem	121/515	23·5	89/487	18·3	0·04*

*Statistically significant *P* value.

programme 2 months before the start of the study were compared with GPs with an average work experience of 16 years (SD = 10·1) and who had build confidential relationships with their patients.

Furthermore, patients in the reference group were statistically significantly older. As patients were randomized, we cannot explain this result. Patients who returned all the questionnaires were statistically significantly older, than those who did not. A possible explanation is that more participating patients did not have a paid job and/or experienced more time to participate in the trial.

Study limitations

This study gives an overall view of NPs employed in different types of practice, with a different degree of urbanization. We did not investigate the influence of the particular characteristics of practices on the results, for example the workload. The practices were comparable in their vision to educate and employ an NP and in receiving facilitation during the project (2004–2006).

The strengths of this study were the large sample size and the ability to randomize patients to equivalent providers. However, there were also several limitations.

In all practices, the recruiters mentioned that at times when they experienced a very high workload it was not always possible to assess patients for inclusion. Four practices did not accurately record the patients who were asked to participate in the trial. In the other practices, the mean percentage and standard deviation were calculated of patients who refused to participate and this was 25% (SD = 10·0). This percentage was extrapolated to the total group of 1501 included patients and thus it was estimated that 2000 patients were assessed for eligibility on the days that the NP and GP were both available. Because most of the patients knew the practitioners working in the practice personally, it was not possible to blind them to the intervention.

Finally, the study had some characteristics that limit the generalizability of the results. The trial took place in one region, the NPs were senior nurses, were newly-graduated and the trial was conducted in general practices, which participated in a project to educate NPs as new professionals in primary care. These GPs can be seen as early adopters of innovations.

Discussion of results

Patients valued the care provided by NPs equally to that by GPs. Patients perceptions of the quality of care in the two groups were equal and they highly appreciated the communications, attitudes and the provision of information. In these items and in overall satisfaction with the consultation, no statistically significant differences between groups were found. Other researchers have found that patients are more satisfied with consultations by NPs (Kinnersley *et al.* 2000, Mundinger *et al.* 2000, Venning *et al.* 2000). Differences in educational level and/or work experience as an NP may possibly explain our findings.

Also, no statistically significant differences were found in patients' health status, medical resource consumption and in practitioners' compliance in using practical guidelines. As the NP role in Dutch general practices is new and will develop in the future, these results are comparable with other studies conducted in different settings and different healthcare systems, published several years ago (Kinnersley *et al.* 2000, Mundinger *et al.* 2000, Shum *et al.* 2000, Venning *et al.* 2000).

Nurse practitioners were more likely to ask patients to return. This can be explained by the fact that in the training programme the NPs are educated to ask every patient to return if the problem persists or becomes worse. Thus, those

Table 4 Effectiveness of the consultation

	Nurse practitioner		General practitioner		Mean difference	*P*
	n	Mean (SD)	*n*	Mean (SD)		
Before the consultation						
Burden of the illness*	745	3·85 (2·77)	622	4·06 (2·82)	0·21	0·17
Concerns about the illness*	744	4·64 (2·59)	622	4·77 (2·51)	0·13	0·35
EQ5-D**	723	0·82 (0·19)	595	0·80 (0·19)	0·01	0·41
Difference between before and two weeks after the initial consultation						
Burden of the illness*	473	−1·77 (3·18)	451	−1·50 (2·63)	0·27	0·16
Concerns about the illness*	476	−1·51 (3·20)	450	−1·40 (2·97)	0·11	0·60
EQ5-D	456	+0·05 (0·17)	415	+0·04 (0·15)	0·01	0·20

*Likert-scale (0–10).

and a reduction in concerns (mean = −1·40, SD = 2·97). No statistically significant between-group differences were noted in degree of burden (P = 0·16) or concerns related to the illness (P = 0·60). A small change was seen in health status, measured with the EQ5-D: at T0, the mean score between the two groups was not statistically significant (mean = 0·82, SD = 0·18 vs. mean = 0·80, SD = 0·18), but the NP intervention group showed an improvement of 0·05 (SD = 0·17) and the reference group an improvement of 0·04 (SD = 0·15, P = 0·20 at T2) (table 4).

Nurse practitioners were more likely to ask patients to re-attend (50·3%, P = 0·001), whilst these patients seemed to return statistically significantly more than those in the reference group (23·5%, P = 0·04). Patients in the NP intervention group reported that they would return because of continuing health problems or illness (59·6% vs. 46·9%, P = 0·01).

Of the 492 patients who consulted a GP and returned the follow-up questionnaire after 2 weeks, 19·8% stated that they would self-manage similar illness in the future, 42·1% would consult a GP for a similar illness in the future, 1·3% indicated that they would consult the NP and 25·1% had no preference for type of practitioner. Of the 517 patients who consulted an NP and returned the questionnaire, 19·4% stated that they would self-manage the illness in the future, 27·3% would consult a GP, 8·1% would consult an NP and 38·4% had no preference for type of practitioner. There was no statistically significant difference between the groups for these statements.

Nurse practitioners spent an average of 12·22 minutes (SD = 5·7) in face-to-face contact with patients, compared with 9·20 minutes (SD = 4·8) for GPs (P < 0·001).

For NPs, 179 consultations and from GPs, 126 consultations were available for analysing compliance in using the practical guidelines from the Dutch College of General Practitioners. No statistically significant differences were found in compliance: NPs adhered to the guidelines in 79·8% of cases and GPs in 76·2%. The median in the NP intervention group was 86·6% vs. 93·6% in the reference group. The interquartile ranges were 45·8/100 in the NP intervention group and 50·0/100 for the reference group.

No statistically significant difference between groups occurred in percentage of prescriptions given (P = 0·75), investigations (P = 0·55) and referrals (P = 0·24) carried out (Table 5).

Of the number of the patients who had a follow-up consultation (n = 210), those from the NP intervention group returned on average 1·71 times for the same problem (SD = 0·82) and those from the reference group 1·66 times (SD = 0·89). These results were not statistically significantly different.

Patients from both groups reported absence from their paid job because of the illness of an average of 1·11 days (NP intervention group: SD = 0·32, reference group: SD = 0·31). Finally, there was no statistically significant difference between groups in the mean number of days patients reported being unable to perform their daily activities because of their illness (NP intervention group: mean = 2·53, SD = 2·89, reference group: mean = 2·69, SD = 2·90).

Discussion

In this study, we evaluated the process and outcomes of care provided by Dutch GPs or specially trained NPs at first point of contact. The results can be used for international comparisons with similar studies (Kinnersley *et al.* 2000, Mundinger *et al.* 2000, Venning *et al.* 2000). In these reports, no information was given about the work experience of the GP. The work experience of the NPs ranged from 1 to 5 years (Kinnersley *et al.* 2000, Venning *et al.* 2000). We compared newly-graduated NPs with GPs, an obvious but non-equivalent comparison. NPs who finished their education

Table 2 Demographic information and presenting diagnoses

Demographic information*	Total n = 1397 (%)	Nurse practitioner n = 747 (%)	General practitioner n = 650 (%)
Age (years)			
<25	184 (13·2)	110 (14·7)	74 (11·4)
26–45	543 (38·9)	310 (41·5)	233 (35·8)
46–65	488 (34·9)	248 (33·2)	240 (36·9)
>65	182 (13·0)	79 (10·6)	103 (15·8)
Gender			
Male	545 (39·0)	285 (38·2)	260 (40·0)
Female	852 (61·0)	462 (61·8)	390 (60·0)
Diagnoses†‡	n = 1232 (%)	n = 673 (%)	n = 559 (%)
Categories			
Conditions of the throat, nose and ears/respiratory system	379 (30·8)	210 (31·3)	169 (30·2)
Skin conditions	360 (29·2)	223 (33·2)	137 (24·5)
Musculoskeletal system	294 (23·9)	137 (20·4)	157 (28·1)
Sexually transmitted diseases	47 (3·8)	24 (3·5)	23 (4·1)
Contraception	20 (1·6)	16 (2·4)	4 (0·7)
Urinary tract infection	9 (0·7)	7 (1·0)	2 (0·4)
Other	123 (10·0)	56 (8·3)	67 (12·0)

*Based on complete case analysis; missing data: 12 patients in the NP intervention group 0 patients in the reference group.
†209 patients had more than one diagnosis.
‡Based on complete case analysis; missing data: 86 patients in the NP intervention group 78 patients in the reference group.

Table 3 Satisfaction after the consultation

	Nurse practitioner		General practitioner		Mean difference	P
	n	Mean (SD)	n	Mean (SD)		
Communication/attitude*						
Did he/she show that he/she understood your problem?	690	5·49 (0·88)	611	5·53 (0·79)	−0·04	0·41
How clearly did he/she tell you what the plan was?	689	5·48 (0·88)	610	5·50 (0·84)	−0·02	0·74
How clear was the explanation of the goals and procedure of the treatment?	692	5·51 (0·87)	612	5·52 (0·83)	−0·01	0·76
Are you convinced about the importance of the advice given?	692	5·46 (0·95)	611	5·53 (0·91)	−0·07	0·17
Were you able to speak about your problems and receive the appropriate attention?	689	5·61 (0·83)	613	5·60 (0·80)	0·01	0·78
Provision of information*						
Causes of problems/illness	688	5·13 (1·17)	612	5·21 (1·16)	−0·08	0·21
Relief of symptoms	687	5·33 (1·04)	614	5·37 (1·07)	−0·04	0·47
Duration of illness	683	5·20 (1·31)	608	5·28 (1·41)	−0·09	0·25
Reduce chance of recurrence	685	5·27 (1·53)	607	5·42 (1·62)	−0·15	0·08
What to do if your problem/illness persists	684	5·36 (1·24)	610	5·30 (1·51)	0·06	0·45
Overall satisfaction about this consultation**	683	8·19 (1·18)	609	8·20 (1·26)	−0·015	0·83

*Likert-scale 1–6.
**Likert-scale 0–10.

Two weeks after the consultation, patients in the NP intervention group reported that their symptoms had improved (mean = −1·77, SD = 3·18) and that their concerns were reduced (mean = −1·51, SD = 3·20). Those assigned to the GP also reported (on a Likert-type scale from 0 to 10) an improvement in their symptoms (mean = −1·50, SD = 2·63)

feedback and for testing the reliability of their documentation. As a result, in one practice, the software for data extraction was adapted.

Ethical considerations

The study was approved by the appropriate ethics committee and patients were recruited and given information and assurances as described above.

Data analysis

Data from the questionnaires were coded and entered into a Microsoft Access 2000 database created for the study. The SPSS software version 12·0 (SPSS Inc., Chicago, IL, USA) was used to analyse the data.

No power calculation was performed as the number of participating practices was defined at the start of the project. This number was defined by the number of NPs being enrolled in the training programme.

Analyses were undertaken to compare patients within and between the groups (NP-led care or GP-led care) to which they were originally assigned. Any patient who was not initially seen by the GP or the NP at the point of randomization or who was seen by both professionals was excluded from the final analysis.

Descriptive statistics (percentage, mean and standard deviation, median, interquartile ranges, values of kurtosis and skewness) were calculated for all variables, and histograms with normal curves were plotted to ensure that the data were normally distributed. A two-tailed *t*-test was applied for continuous variables. For categorical variables, the chi-squared test for independent samples was used. The results are presented as treatment differences and 95% confidence intervals. A 5% statistical significance level was used throughout.

Results

It is estimated that 2000 patients attended the practice for a consultation; 499 met one or more exclusion criteria, declined to participate, had no interest or were too ill (See Figure 1). After randomization, 58 patients who were allocated to the NP intervention group and 47 patients in the reference group did not attend the appointment they had booked or refused to participate because of being too ill or not having an interest. A total of 1501 patients were enrolled for randomization; 817 (54·4%) were allocated to an NP and 684 (45·6%) to a GP. The two initial questionnaires (T0, T1) were completed by 1306 (87·0%) patients and 1009 (67·2%) completed the postal questionnaire at T2. Data from medical records were available for 1397 patients (93·1%).

The patient demographics and main diagnosis categories are shown in Table 2. Most patients in the NP intervention group were aged between 26 and 45 years (41·5%) and in the reference group, most were aged between 46 and 65 years (36·9%). Those randomized to the GP were statistically significantly older (mean = 46·1, SD = 16·6) than those in the NP intervention group (mean = 42·8, SD = 16·5; $P < 0·001$).

The most frequently reported diagnoses were conditions of the throat, nose and ears/respiratory system (30·8%) and skin conditions (29·2%). Groups were comparable in terms of reported number of diagnoses.

Patients who returned all questionnaires were statistically significantly older (mean = 48·74, SD = 16·8) than those who did not (mean = 42·75, SD = 16·4; $P < 0·001$). There were no statistically significant differences in gender and type of diagnosis between patients with or without complete data.

No statistically significant differences were noted between patients in two groups in terms of other (chronic) diseases. In the NP intervention group, a higher prevalence of minor injuries (+3·6%), migraine (+3·1%), chronic skin injuries (+2·9%) and emotional distress (+2·4%) was recorded than in the reference group. In the reference group, a higher prevalence was notable for hypertension (+6·1%), diabetes (+3·0%), varicose veins (+2·7%), back injuries (+2·6%) than in the NP intervention group. No statistically significant differences in health status were measured between groups at baseline.

From Table 3, it can be seen that the items related to communication, attitude and provision of information (scored on a Likert-type scale from 1 to 6), were highly appreciated by patients from both groups (min = 5·46, max = 5·61). Comparable results were found in groups for the items related to the provision of information (min = 5·13, max = 5·42). No statistically significant difference in overall satisfaction was reported: the NP intervention group scored a mean of 8·19 (SD = 1·18) and the reference group a mean of 8·20 (SD = 1·26). Patients ($n = 583$) who reported at least one other (chronic) disease were statistically significantly more satisfied with a consultation of the NP (mean = 8·35, SD = 1·07). Patients in the reference group scored a mean of 8·11 (SD = 1·32; $P = 0·02$).

Patients from both groups equally regarded the NP or GP as the right professional to treat their illness ($P = 0·35$), equally said that they would visit their practitioner in the future ($P = 0·67$) and would recommend their professional to other patients if asked ($P = 0·41$).

directly after the consultation (T1) and two weeks after the consultation (T2). The first and second questionnaires (T0, T1) were completed prior to leaving the practice. The third questionnaire (T2) was sent and returned by post. It took patients approximately five minutes (T0) to ten minutes (T1 and T2) to complete the questionnaires.

Demographic information and data on diagnoses, prescriptions, referrals and investigations were extracted from the computer systems. The questionnaires were coded in a manner that allowed the data to be merged with that obtained from the computer system. Patients were assured that only the researcher would see data at the individual level.

Demographic information and health status

Demographic data, such as gender, age and diagnoses, were derived after recruitment of patients. At T1, patients were asked using a questionnaire if they had (had) any (chronic) diseases. These were recorded according to the Health and Labour Questionnaire (van Roijen *et al.* 1996).

Patient perceptions of quality of care

A self-completion patient measurement tool was used to measure patient perceptions of quality of care. The 12 items, which were partly derived from a validated instrument (Wensing *et al.* 1997) and a questionnaire developed for patients seeking 'same day' consultations (Kinnersley *et al.* 2000), were related to communication, attitude, provision of information and overall satisfaction. Responses were scored on a Likert-type scale: 6 was 'excellent' and 1 was 'poor'. Patients reported if the practitioner to whom they were assigned was the right professional to treat their illness (T1).

Effectiveness of the consultation and follow-up consultations

At baseline (T0) and two weeks after the consultation (T2), patients recorded the burden of their illness and their current level of concern on Likert-type scales (scale 0–10) (Kinnersley *et al.* 2000). Data about health status were collected using the EQ-5D, which patients completed at T0 and T2. The EQ-5D is a multi-attribute health status classification system to measure preferences for five attributes: mobility, self care, usual activity, pain/discomfort and anxiety/depression. The EQ5-D scores range between 0·00 (dead) and 1·00 ('full health') (Drummond *et al.* 2003).

Patients were asked in the questionnaire if they had been advised to re-attend (T1) and whether they had had a follow-up consultation (T2). They reported how they would deal with similar illnesses in the future: self managing the illness, consulting a GP, consulting an NP or having no preference for GP or NP (T2).

Duration of consultation

The research assistant recorded the length of each consultation using a stop-watch, starting from the moment the patient went into the consulting room of the NP or GP and stopping when the patient left the room. The duration included the time taken to prescribe drugs and interruptions. This objective timing of each individual consultation is regarded as the golden standard for measuring the time of duration of consultation (Wilson & Childs 2002).

Compliance with practice guidelines for general practitioners

To assess whether the quality of care was conform professional standards, a selection of 21 practice guidelines on minor health problems, derived by the Dutch College of General Practitioners (Braspenning & Schellevis 2004), was applied. These guidelines refer to the definition of the problem, the relevant history questions, clinical investigations, use of prescriptions and referrals. We investigated to what extent NPs and GPs followed the guidelines during the consultations and, where applicable, during follow-up consultations. The list of practice guidelines is available upon request from authors.

Medical resource consumption

Data were obtained about the consultations and the patient's presenting illness, prescriptions issued, investigations ordered and referrals to other healthcare professionals. For this purpose, every patient participating in the trial was identified on the practice computer system and the corresponding clinical notes were searched.

Finally, patients recorded (T2) if they had a follow-up consultation, how many consultations they had for the same problem, how many days they reported illness in their (paid) job and how many days they were prevented from performing daily activities.

Validity and reliability

To assure content validity, the questionnaires were discussed with two GPs with a background in research. The questionnaires were then tested with a group of 40 patients. This resulted in two textual refinements and asking the name of the practitioner instead of the type of practitioner (NP or GP) consulted.

Special attention was paid to ensuring the reliability of documentation by professionals. In each practice, information was given about the relevance of systematically recording medical data. Software was developed to extract data from the computer systems. The extracted data were used during meetings in the general practices to provide

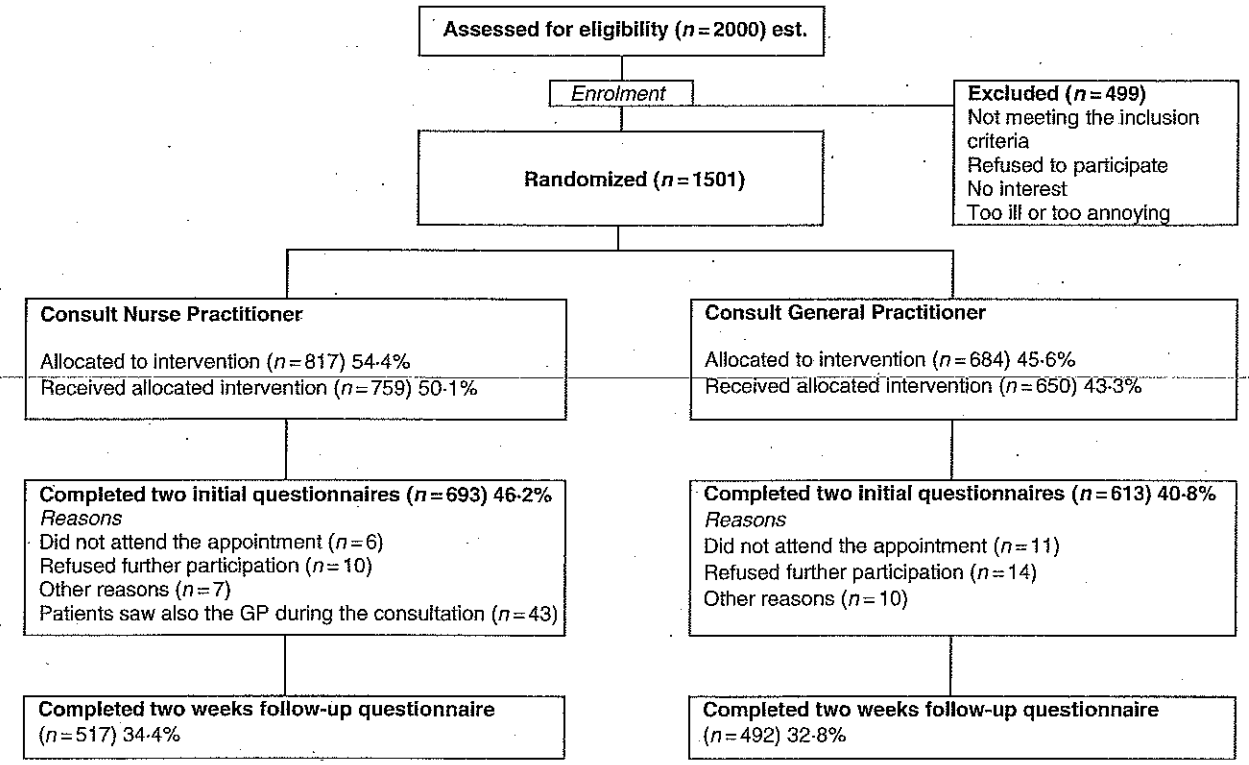

Figure 1 Flowchart of the study.

Table 1 Characteristics of the general practices (n = 15)

	Number of practices
Degree of urbanization	
< 5000	1
5000–30,000	4
30,000–100,000	4
> 100,000	6
Number of general practitioners	
1	3
2	2
3	3
4	2
5	5
Practice list size	(n = 79,310)
2000–4000	5
4000–6000	4
6000–8000	2
8000–10,000	1
10,000–12,000	3

nurse in general practice (n = 4), in a hospital (n = 3), home care (n = 2), a drug addiction service (n = 1) or an asylum seekers' centre (n = 2). The GPs had an average work experience of 16 years (SD = 10·1). The NPs worked part-time (0·6 full-time equivalent).

Patients who attended in general practice for an appointment during the study period were assessed for inclusion. Those aged over 16 years and coming for an initial consultation were invited to participate in the trial if they asked for an appointment on a day when the NP was present and had time available in the schedule. The patients were randomized and allocated to either the NP intervention group (NP-led care) or the reference group (GP-led care). Sequentially-numbered sealed envelopes containing randomized assignments to the two groups were provided by an independent person. The codes were generated from random number tables.

In each practice, a research assistant explained the project to patients as they arrived for their appointment and informed consent was obtained. Patients were excluded from the study if one or more of the following criteria applied: those who were not registered in the practice, had language or reading problems, were children under 16 years of age, came for a follow-up consultation and/or did not give the reason for the appointment to the recruiter.

Data collection

Data were collected by means of three questionnaires and from the computer systems of the practices. Patients filled in their own questionnaires before the consultation (T0),

Introduction

Against the background of the need to increase service capacity, to meet rising demand and to improve access to primary care, a project was initiated to introduce the nurse practitioner (NP) role in Dutch general practices. At the start of the project in 2004, only five NPs worked in a general practice nationwide.

Background

In achieving an adequate mix of healthcare personnel (WHO 2000, Buchan & Dal Poz 2002), a need for NPs has been reported in the United States of America (USA), Europe, Canada, Australia and the Far East (Reay *et al.* 2003, McKenna *et al.* 2006). These developments contribute to an increase in service capacity that is needed to meet a rising demand, to overcome a shortage of physicians in certain settings, to improve the quality of care, to advance the careers of nurses and to reduce healthcare costs by employing the 'lowest cost provider'.

Recently, strong interest has been shown in the concept of NPs providing primary care. In this way, NPs may potentially substitute for doctors, particularly in the management of patients with minor health problems. The term NP is generally used to identify Registered Nurses with additional education and training, e.g. Master in Advanced Nursing Practice, who work within an expanded scope of practice that includes diagnosing, prescribing and treating medical conditions within specific settings (Reay *et al.* 2003).

Moreover, a systematic review of studies in primary care (Horrocks *et al.* 2002) has shown that NP consultation is likely to lead to high levels of patient satisfaction and high quality of care. Other studies demonstrated that nurse(s) (practitioners) give more information (Shum *et al.* 2000) and more advice on self-care and management (Kinnersley *et al.* 2000, Shum *et al.* 2000). Similar results have been found regarding health status (Kinnersley *et al.* 2000, Mundinger *et al.* 2000, Lenz *et al.* 2004), number of prescriptions ordered (Kinnersley *et al.* 2000, Venning *et al.* 2000) and health services utilization (Mundinger *et al.* 2000, Lenz *et al.* 2004).

However, these results mostly relate to Great Britain and the USA. Since the introduction of the NP in 1965 in the USA, the role has been expanded and diversified. In view of differences, such as the variability in autonomy of NPs (Offredy & Townsend 2000), level of education of NPs and characteristics of healthcare systems, there is a need for more research findings about NPs from other countries. In this Dutch trial, the effectiveness of NPs and general practitioners (GPs) in providing primary care, as first point of contact, was evaluated.

The study

Aim

The aim was to evaluate process and outcomes of care provided to patients with common complaints by GPs or specially trained NPs as first point of contact.

Design

A randomized controlled trial was conducted in 2006 in 15 general practices in the southern region of the Netherlands. Since NPs were appointed on a part-time basis, the trial took place on the days when GPs and NPs were both working in the practices. A flowchart of the study is shown in Figure 1.

Participants

A convenience sample was used and 12 NPs and 50 GPs participated in the trial. Table 1 shows the type of practice, their location, list size and the number of GPs in the 15 practices recruited.

At the start of this project, the role of the NP in the treatment of patients with common complaints was new for the Dutch setting. Therefore, a specific 2-year practice-oriented training programme was developed, which consisted of the Higher Professional Education Master's degree in Advanced Nursing Practice (MANP), including an academic course on managing common complaints. During the programme, the NPs were employed and facilitated by and educated in general practices. This trial took place 2 months after the NPs successfully completed the training programme.

A specified set of common complaints was compiled for which the patients seek medical attention. These common complaints will often lead to minor health problems. The NP sees patients with respiratory and throat problems, ear and nose problems, musculoskeletal problems and injuries, skin injuries, urinary problems, gynaecological problems and geriatric problems. The role of the NP involves assessing symptoms including physical examinations where appropriate, diagnosing and making decisions about further treatment, including writing prescriptions, referrals to primary or secondary services and clinical investigations. The NP has no full authority to prescribe medications and so the GP is always available for consultation and to validate prescriptions and referrals.

Before they started the NP training programme, the participants were all senior nurses with an average of 12 years (SD = 7·6 years) working experience as a (practice)

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ORIGINAL RESEARCH

Nurse practitioners substituting for general practitioners: randomized controlled trial

Angelique T.M. Dierick-van Daele, Job F.M. Metsemakers, Emmy W.C.C. Derckx, Cor Spreeuwenberg & Hubertus J.M. Vrijhoef

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Correspondence to A.T.M. Dierick-van Daele: e-mail: angeliquedierick@orange.nl

Angelique T.M. Dierick-van Daele MSc
Research Fellow
Department of Integrated Care,
University Hospital of Maastricht,
The Netherlands

Job F.M. Metsemakers MD PhD
Professor of General Practice
CAPHRI (School of Primary Care and Public Health), University of Maastricht,
The Netherlands

Emmy W.C.C. Derckx MSc
Director
Foundation for Development of Quality Care in General Practice, Eindhoven,
The Netherlands

Cor Spreeuwenberg MD PhD
Professor of Integrated Chronic Care
Maastricht University Medical Centre (MUCH), The Netherlands

Hubertus J.M. Vrijhoef PhD
Associate Professor
CAPHRI (School of Primary Care and Public Health), University of Maastricht,
The Netherlands

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Abstract

Title. Nurse practitioners substituting for general practitioners: randomized controlled trial.

Aim. This paper is a report of a study conducted to evaluate process and outcomes of care provided to patients with common complaints by general practitioners or specially trained nurse practitioners as first point of contact.

Background. Studies in the United States of America and Great Britain show that substituting nurse practitioners for general practitioners results in higher patient satisfaction and higher quality of care. As the American and British healthcare system and settings differ from that in the Netherlands, a Dutch trial was conducted.

Methods. A total of 1501 patients in 15 general practices were randomized to consultation by a general practitioner or a nurse practitioner. Data were collected over a 6-month period in 2006 by means of questionnaires, extracting medical records from practice computer systems and recording the length of consultations.

Findings. In both groups, the patients highly appreciated the quality of care. No statistically significant differences were found in health status, medical resource consumption and compliance of practical guidelines in primary care in the Netherlands. Patients in the NP intervention group were more often invited to re-attend, had more follow-up consultations and their consultations took statistically significantly longer.

Conclusion. Nurse practitioners and general practitioners provide comparable care. Our findings support an increased involvement of specially trained nurse practitioners in the Dutch primary care and contribute to knowledge of the effectiveness of care provision by nurse practitioners from a national and international perspective.

Keywords: general practitioner, nurse practitioner, outcomes, process, quality of care, randomized controlled trial, substitution

SOURCES OF SUPPORT

Internal sources

- Centre for Quality of Care Research (WOK), University of Nijmegen, Netherlands.
- National Primary Care Research and Development Centre (NPCRDC), University of Manchester, UK.

External sources

- Ministry of Health, Welfare and Sports, Netherlands.
- Department of Health, UK.

INDEX TERMS

Medical Subject Headings (MeSH)

Family Practice [economics; *organization & administration]; Health Services Needs and Demand [economics; *organization & administration]; Nurse Practitioners [organization & administration]; Nurses [*organization & administration]; Personnel Delegation [*organization & administration]; Primary Health Care [economics; *organization & administration]

MeSH check words

Humans

WHAT'S NEW

Last assessed as up-to-date: 15 July 2004.

Date	Event	Description
24 June 2008	Amended	Converted to new review format.

HISTORY

Protocol first published: Issue 4, 1998

Review first published: Issue 2, 2005

Date	Event	Description
16 July 2004	New citation required and conclusions have changed	Substantive amendment

CONTRIBUTIONS OF AUTHORS

Miranda Laurant and Bonnie Sibbald wrote the protocol, performed the searching, read the abstracts and retrieved and appraised relevant evidence. Two researchers (ML, BS) extracted the necessary data using a checklist developed by EPOC, modified and amended for the purposes of this review. David Reeves conducted the meta-analyses. Rosella Hermens, Jozé Braspenning, and Richard Grol acted as supervisors to these processes. Miranda Laurant wrote the first draft of the review. All authors were involved in the discussion.

DECLARATIONS OF INTEREST

None known.

Table 5. Resource Utilisation Outcomes (*Continued*)

			Antiplatelet:no difference
Stein, 1974	Management of patients with chronic conditions	Consultation rate: no difference	Prescriptions: Changed medication: no difference

Table 6. Cost Outcomes

Study (no)	Nurse role	Cost outcomes	Notes
Chambers, 1977	First contact and ongoing primary care	Direct cost per 1000 patients per year: nurses - increase of 26% from $68130 to $85.690 doctors - increase of 21% from $93190 to $112.730	
Lattimer, 1998	First contact for patients with urgent problems out-of-hours	Annual direct cost nurse-led service - £81.237 more than doctor-led service Savings: generated in reduced hospital and primary care utilisation £94.422 Net reduction in costs with nurse-led service £3728 - £12.3824 (determined by sensitivity analysis)	
Spitzer, 1973	First contact and ongoing primary care	Average cost per patient per year-nurses - $297.01doctors - $285.67	Spitzer reported an overall reduction in practice costs following the introduction of nurse practitioners but this finding was based on observational before-and-after data. Data obtained from the related randomised controlled trial (reported above) did not support this finding
Venning, 2000	First contact care for patients with urgent problems	Total direct cost per consultation: Nurses - mean £18.11 (range £0.66 - £297.1) Doctors - mean £20.70 (range £0.78 - £300.6)not significantly different	
Lewis, 1967	Ongoing care for patients with stable chronic diseases	Total direct cost per year:nurses - $3.251doctors - $4.199Average cost per patient per year:nurses - $98.51doctors - $127.24	

Table 5. Resource Utilisation Outcomes *(Continued)*

Mundinger, 2000	First contact and ongoing care	Consultation rate: no difference		Hospital admissions: no difference Emergency room visits: no difference Speciality visits: no difference
Kinnersley, 2000	First contact care for urgent problems	Consultation length: Nurse significantly longer Return Visit: Recommended: No difference Re-attend for same problem: No difference	Prescriptions:No difference Investigation ordered: no difference	Referral to hospital: no difference
Lattimer, 1998	First contact care for urgent problems	Impact on doctors' workload: Telephone advice from doctor: significantly fewer with nurse led care Surgery visits: Significanlty fewer with nurse-led care Home visits: Significanlty fewer with nurse-led care		Hospital admission within 24 hours: no difference Hospital admission with 3 days: no difference Emergency room visits: no difference Referred to hospital emergency room: no difference
Myers, 1997	First contact care for urgent problems		Prescriptions: Nurse signifciantly less	Referral: no difference
Shum, 2000	First contact care for urgent problems	Consultation length: Nurse significantly longer Return visit: no difference	Prescriptions: No difference	Emergency room visit: no difference Out-of-hours-calls: no difference
Venning, 2000	First contact care for urgent problems	Consultation length: Nurse significantly longer Return visit: All visits: nurse significantly more Asked to return: Nurse significantly more	Prescriptions: All: no difference Antibiotics: no difference Investigations: Nurse significantly more	Referral to hospital: no difference
Moher, 2001	Management of patients with chronic conditions		Prescriptions: Antihypertensives: no difference Lipid lowering:no difference	

Table 4. Process of Care Outcome (*Continued*)

		- stable patients: no difference - unstable patients: nurse significantly fewer lapses
Kinnersley, 2000	First contact and ongoing care	Provision of information: - Cause of illness: nurse significantly more - Relief of symptoms: nurse significantly more - Duration of illness: nurse significantly more - Reduce recurrence: nurse significantly more - Action if problem persists: no difference
Shum, 2000	First contact and ongoing care	Provision of infomation:- Self-medication: nurse significantly more- Self-management: nurse significantly more
Spitzer, 1973	First contact and ongoing care	Adequate treatment:- Drug treatment: no difference- Management of episodes: no difference
Venning, 2000	First contact and ongoing care	Examinations: no difference
Moher, 2001	Management of patietns with chronic conditions	Adequate assessment: - clinical assessment: no difference - blood pressure: no difference - cholesterol: no difference - smoking status: no difference

Table 5. Resource Utilisation Outcomes

Study (no)	Nurse role	Consultations	Presc'n. & Invest'n.	Other services
Flynn, 1974	First contact and ongoing care		Investigations & tests (11 indicators): -nurse significantly more tests for 4 indicators (electro- cardiogram; bacteriology; urinalysis; minor X-ray); the remainder showed no difference	Nurse-led care was associated with a significantly higher use of other services
Hemani, 1999	First contact and ongoing care	Consultation rate: No difference compared to qualified doctors; Nurse significantly more visits compared to trainee doctors	Lab tests: (6 indicators) no difference	Hospital admission: no difference Emergency room visits: no difference Specialty visits: no difference

Table 3. Patient outcomes (*Continued*)

Lewis 1967	Management of patients with chronic conditions	Health status: resolution of symptoms: nurse better.	Provider preference: nurse better	Kept appointment: no difference	
McIntosh 1997	Management of patients with chronic conditions	Health status: -reduction in alcohol consumption: no difference			
Moher 2001	Management of patients with chronic conditions	Objective measurement health status: -Blood pressure: no difference - Cholesterol: No difference - Not Smoking: No Difference			
Stein 1974	Management of patients with chronic conditions	Objective measurement health status: -Blood sugar: no difference - Weight: no difference Mortality: no difference			Knowledge: nurse better

Table 4. Process of Care Outcome

Study (No)	Nurse Role	Provider Care
Chambers, 1977	First contact and ongoing care	Adequate care: - clinical assessment: no difference - drug treatment: no difference
Flynn, 1974	First contact and ongoing care	Recommendations on: Ordered diet: - diabetic: no difference - low salt: nurse significantly higher frequency - low calorie: no difference - bland: no difference Exercise: - Increase activities: nurse significantly higher frequency
Gordon, 1974	First contact and ongoing care	Lapses in care: no difference Subgroup:

Table 3. Patient outcomes *(Continued)*

			-pro- fessional care: nurse significantly better -relation- ship to provider: no difference -ade- quacy of time: nurse significantly better - explanation helpful: no difference -advice helpful: no difference Provider preference: patients preferred nurse significantly more often
Venning 2000	First contact care for urgent problems	Health status: no difference Objective measures of patient health: -Asthma - peak flow: no difference -Diabetes - blood sugar: no difference -Hypertension - systolic blood pressure: no difference -Hypertension - diastolic blood pressure: nurse significantly better	Satisfaction: Adults -General: nurse significantly better -Communication: nurse significantly better - Distress relief: nurse significantly better -Professional care: nurse significantly better Children -General: nurse significantly better -Communication with parent: no difference -Communication with child: nurse significantly better - Distress relief: nurse significantly better -Adherence intent: no difference

Table 3. Patient outcomes *(Continued)*

Gordon 1974	First contact and ongoing care	Health Status: no difference	Subjective perceptions of clinical care (10 dimensions): no difference	Medication: no difference Kept appointment: no difference
Mundinger 2000	First contact and ongoing care	Number of Health Complaints - no difference Health Status (10 dimensions) : No difference Objective Measures of patient health: - Asthma - peak flow: no difference - Diabetes - blood sugar: no difference - Hypertension: systolic pressure: no difference - Hypertension: disatolic pressure: nurse better	Satisfaction (3 dimensions) no difference in overall satisfaction, but nurse worse on 1 dimension Would recommend provider to others: no difference	
Spitzer 1973	First contact and ongoing care	Health status: -Physical function (3 indicators): no difference - Emotional function: no difference -Social function: no difference Mortality: no difference	Satisfaction: no difference	
Kinnersley 2000	First contact care for urgent problems	Health status: -resolution of symptoms: no difference resolution of concerns: no difference	Satisfaction: - child care: nurse better -adult care: no difference Provider preference: no difference	
Latimer 1998	First contact care for urgent problems	Mortality: no difference		
Shum 2000	First contact care for urgent problems	Health status: no difference	Satisfaction: -general: nurse significantly better	

Table 2. Methodological quality of randomized controlled trials *(Continued)*

			done					
Mundinger 2000	Done	No	Professional - Not clear; Patient - Not done	Not clear	Done	Resource - Done; Patient - Not clear	Resource - Done; Patient - Not clear	Not clear
Shum 2000	Done	No	Professional - Not clear; Patient - Done	Done	Not clear	Not done	Done	Not clear
Spitzer 1974	Not clear	Yes	Professional - Not clear; patient - Not clear	Not clear	Done	Mortality - Done; Others - Not clear	Mortality - Done; Others - Not clear	Not clear
Stein 1974	Not clear	No	Professional - Not clear; Patient - Done	Not done	Not clear	Not clear	Not clear	Not clear
Venning 2000	Not clear	No	Professional - Not clear; Patient - Not done	Done	Not clear	Not done	Health status - done; Others - Not clear	Not clear

Table 3. Patient outcomes

Study (no)	Nurse Role	Health status	Satisfaction	Compliance	Other
Chambers 1978	First contact and ongoing care	Health status: -Physical function: nurse better - Emotional function: no difference -Social function: no difference			
Flynn 1974	First contact and ongoing care			Medication: no difference Diet: no difference	Patients' knowledge: - Exercise: nurse significantly better - Disease complications: no difference - Diet: no difference

Table 1. Methodological Quality of controlled before and after studies *(Continued)*

Myers 1997	Not clear	No	Professional - Not clear; Patients - Done	Done	Not clear	Done	Not clear	Not done

Table 2. Methodological quality of randomized controlled trials

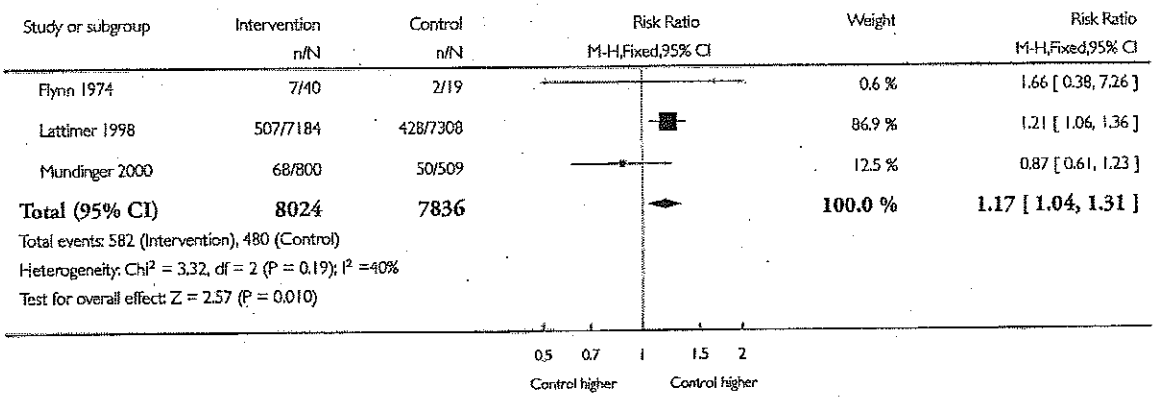
Study (no)	Power	Unit Analysis Error	80% follow-up	Concealment	Baseline Assessment	Blinded Assessment	Reliable Outcomes	Contamination
Chambers 1978	Not done	Yes	Professional - Not clear; Patient - not done	Not clear	Done	Not clear	Not clear	Not clear
Flynn 1974	Not clear	No	Professional - Not clear; Patient - done	Not clear	Not clear	Not done	Not done	Not clear
Hemani 1999	Not done	No	Professional - Not clear; Patient - done	Done	Not clear	Done	Done	Not clear
Kinnersley 2000	Done	No	Professional - Not clear; Patient - Not done	Done	Not clear	Not done	Done	Not clear
Lattimer 1998	Done	No	Professional - Not clear; Patient - done	Done	Not clear	Done	Done	Not clear
Lewis 1967	Not clear	No	Professional - Not clear; Patient - done	Not clear	Not clear	Done	Not clear	Not clear
McIntosh 1997	Done	No	Professional - Not clear; Patient - done	Not clear	Done	Not done	Done	Not clear
Moher 2001	Not clear	No	Professional - Not clear; Patient -	Not clear	Done	Done	Not clear	Done

Analysis 1.7. Comparison 1 Doctor-Nurse substitution study results, Outcome 7 Hospital admission.

Review: Substitution of doctors by nurses in primary care

Comparison: 1 Doctor-Nurse substitution study results

Outcome: 7 Hospital admission



ADDITIONAL TABLES

Table 1. Methodological Quality of controlled before and after studies

Study (no)	Power	Unit Analysis Error	80% follow-up	Comparability	Baseline Assessment	Blinded Assessment	Reliable Outcomes	Contamination
Chambers 1977	Not clear	Yes	Professional - Not clear; Patients - Done	Done	Done	Done	Not clear	Not clear
Gordon 1974	Not clear	No	Professional - Not clear; Patients - Done	Done	Not clear	Resource - Done; Patient - Not done	Not clear	Not clear

Analysis 1.5. Comparison 1 Doctor-Nurse substitution study results, Outcome 5 Hospital referral.

Review: Substitution of doctors by nurses in primary care

Comparison: 1 Doctor-Nurse substitution study results

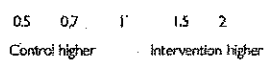
Outcome: 5 Hospital referral

Study or subgroup	Intervention n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Kinnersley 2000	33/652	34/716		35.6 %	1.07 [0.67, 1.70]
Lattimer 1998	26/7184	34/7308		37.1 %	0.78 [0.47, 1.29]
Venning 2000	11/641	25/651		27.3 %	0.45 [0.22, 0.90]
Total (95% CI)	**8477**	**8675**		**100.0 %**	**0.79 [0.58, 1.07]**

Total events: 70 (intervention), 93 (Control)

Heterogeneity: $Chi^2 = 4.12$, df = 2 (P = 0.13); I^2 =51%

Test for overall effect: Z = 1.51 (P = 0.13)



Analysis 1.6. Comparison 1 Doctor-Nurse substitution study results, Outcome 6 Attendance at Accident&Emergency.

Review: Substitution of doctors by nurses in primary care

Comparison: 1 Doctor-Nurse substitution study results

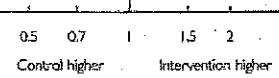
Outcome: 6 Attendance at Accident%Emergency

Study or subgroup	Attendance at Accide n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Lattimer 1998	412/7184	398/7308		63.9 %	1.05 [0.92, 1.20]
Mundinger 2000	274/800	172/509		34.0 %	1.01 [0.87, 1.18]
Shum 2000	14/675	13/664		2.1 %	1.06 [0.50, 2.24]
Total (95% CI)	**8659**	**8481**		**100.0 %**	**1.04 [0.94, 1.15]**

Total events: 700 (Attendance at Accide), 583 (Control)

Heterogeneity: $Chi^2 = 0.14$, df = 2 (P = 0.93); I^2 =0.0%

Test for overall effect: Z = 0.75 (P = 0.45)



Analysis 1.4. Comparison 1 Doctor-Nurse substitution study results, Outcome 4 Prescription ordered.

Review: Substitution of doctors by nurses in primary care

Comparison: 1 Doctor-Nurse substitution study results

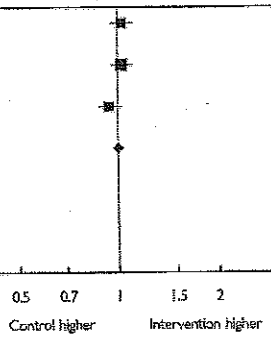
Outcome: 4 Prescription ordered

Study or subgroup	Intervention n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Kinnersley 2000	407/652	434/716		31.3 %	1.03 [0.95, 1.12]
Shum 2000	481/736	518/816		37.1 %	1.03 [0.96, 1.11]
Venning 2000	391/641	421/651		31.6 %	0.94 [0.87, 1.03]
Total (95% CI)	**2029**	**2183**		**100.0 %**	**1.00 [0.96, 1.05]**

Total events: 1279 (intervention), 1373 (Control)

Heterogeneity: $Chi^2 = 2.91$, $df = 2$ ($P = 0.23$); $I^2 = 31\%$

Test for overall effect: $Z = 0.10$ ($P = 0.92$)



Analysis 1.2. Comparison 1 Doctor-Nurse substitution study results, Outcome 2 Patient satisfaction.

Review: Substitution of doctors by nurses in primary care

Comparison: 1 Doctor-Nurse substitution study results

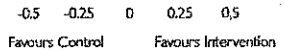
Outcome: 2 Patient satisfaction

Study or subgroup	Intervention N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
1 Sub-category							
Kinnersley 2000	544	77.9 (10.72)	596	74.05 (10.78)		31.4 %	0.36 [0.24, 0.48]
Shum 2000	635	78.6 (16)	657	76.4 (17.8)		36.1 %	0.13 [0.02, 0.24]
Venning 2000	608	4.4 (0.46)	571	4.22 (0.54)		32.5 %	0.36 [0.24, 0.47]
Total (95% CI)	**1787**		**1824**			**100.0 %**	**0.28 [0.21, 0.34]**

Heterogeneity: Chi^2 = 10.78, df = 2 (P = 0.005); I^2 =81%

Test for overall effect: Z = 8.24 (P < 0.00001)

Test for subgroup differences: Not applicable



Analysis 1.3. Comparison 1 Doctor-Nurse substitution study results, Outcome 3 Scheduled return visits.

Review: Substitution of doctors by nurses in primary care

Comparison: 1 Doctor-Nurse substitution study results

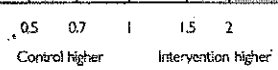
Outcome: 3 Scheduled return visits

Study or subgroup	Intervention n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Kinnersley 2000	222/652	168/716		39.0 %	1.45 [1.22, 1.72]
Shum 2000	92/790	79/582		22.2 %	0.86 [0.65, 1.14]
Venning 2000	236/634	161/648		38.8 %	1.50 [1.27, 1.77]
Total (95% CI)	**2076**	**1946**		**100.0 %**	**1.34 [1.20, 1.49]**

Total events: 550 (Intervention), 408 (Control)

Heterogeneity: Chi^2 = 12.23, df = 2 (P = 0.002); I^2 =84%

Test for overall effect: Z = 5.21 (P < 0.00001)



DATA AND ANALYSES

Comparison 1. Doctor-Nurse substitution study results

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Physical function (better vs not better)	3	3211	Risk Ratio (M-H, Fixed, 95% CI)	1.02 [0.98, 1.05]
2 Patient satisfaction	3	3611	Std. Mean Difference (IV, Fixed, 95% CI)	0.28 [0.21, 0.34]
2.1 Sub-category	3	3611	Std. Mean Difference (IV, Fixed, 95% CI)	0.28 [0.21, 0.34]
3 Scheduled return visits	3	4022	Risk Ratio (M-H, Fixed, 95% CI)	1.34 [1.20, 1.49]
4 Prescription ordered	3	4212	Risk Ratio (M-H, Fixed, 95% CI)	1.00 [0.96, 1.05]
5 Hospital referral	3	17152	Risk Ratio (M-H, Fixed, 95% CI)	0.79 [0.58, 1.07]
6 Attendance at Accident&Emergency	3	17140	Risk Ratio (M-H, Fixed, 95% CI)	1.04 [0.94, 1.15]
7 Hospital admission	3	15860	Risk Ratio (M-H, Fixed, 95% CI)	1.17 [1.04, 1.31]

Analysis 1.1. Comparison 1 Doctor-Nurse substitution study results, Outcome 1 Physical function (better vs not better).

Review: Substitution of doctors by nurses in primary care

Comparison: 1 Doctor-Nurse substitution study results

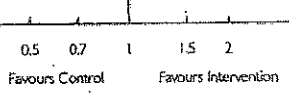
Outcome: 1 Physical function (better vs not better)

Study or subgroup	Intervention n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Chambers 1978	181/296	298/569		17.2 %	1.17 [1.04, 1.32]
Kinnersley 2000	401/484	450/529		36.3 %	0.97 [0.92, 1.03]
Shum 2000	550/672	546/661		46.5 %	0.99 [0.94, 1.04]
Total (95% CI)	**1452**	**1759**		**100.0 %**	**1.02 [0.98, 1.05]**

Total events: 1132 (Intervention), 1294 (Control)

Heterogeneity: Chi² = 8.39, df = 2 (P = 0.02); I² =76%

Test for overall effect: Z = 0.79 (P = 0.43)



(*Continued*)

Sanders 1989	Nurses working as supplements
Sharp 1996	Nurses working as supplements
Thompson 1982	Nurses working as supplements
Vetter 1984	Nurses working as supplements
Vetter 1992	Nurses working as supplements
Wilkinson 1993	Nurses working as supplements
Woollard 1995	Nurses working as supplements

Participants: Where the mean age or proportion of males in the study group as a whole was not reported, we have estimated these values by averaging the figures given for each intervention group.
Outcomes: Only usable outcomes (i.e. amenable to statistical analysis) are listed
Allocation Concealment: A - Adequate; B - Unclear; C- Inadequate; D - Not used.

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Bakx 1997	Nurses working as supplements
Batchelor 1975	Nurses working as supplements
Campbell 1998	Nurses working as supplements
Cargill 1991	Nurses working as supplements
Cherkin 1996	Nurses working as supplements
Cupples 1994	Nurses working as supplements
Fall 1997	Nurses working as supplements
Family Heart 1994 a	Nurses working as supplements
Fullard 1987	Nurses working as supplements
Goldberg 1991	Nurses working as supplements
Jamrozik 1984	Nurses working as supplements
Klerman 1987	Nurses working as supplements
Mann 1998	This paper describes to two studies, both are excluded because nurses work as supplements
Margolis 1996	Nurses working as supplements
Muir J 1995	Nurses working as supplements
Mynors-Wallis 1997	Nurses working as supplements
Pine 1997	Nurses working as supplements
Ridsdale 1996 a	Nurses working as supplements
Robson 1989	Nurses working as supplements

Stein 1974

Methods	RCT
Participants	23 patients, mean age 56 years, 0% male 1 nurse Unknown number of doctors
Interventions	Intervention: patients allocated to nurse-led care Control: patients allocated to doctor-led care
Outcomes	Patient outcomes: health status; mortality; knowledge Resource utilisation: consultation rate; prescriptions
Notes	Nurse title: nurse practitioner Nurse role: Ongoing care for patients with diabetes mellitus Study period: 6 months

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

Venning 2000

Methods	RCT
Participants	1316 patients, all ages, 42% male 20 nurses Unknown number of doctors
Interventions	Intervention: patients allocated to nurse Control: patients allocated to doctor
Outcomes	Patient outcomes: health status; satisfaction; compliance with follow-up attendance; enablement Process of care: examinations Resource utilisations: length of consultation; return visits; prescriptions; investigations; use of other services- hospital referral, direct costs
Notes	Nurse title: nurse practitioner Nurse role: First contact care for patients with urgent problems Study period: 2 weeks

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Shum 2000

Methods	RCT
Participants	1815 patients, mean age 27.5 years, 40% male 5 nurses 19 doctors
Interventions	Intervention: patients allocated to nurse Control: patients allocated to doctor
Outcomes	Patient outcomes: health status; satisfaction; provider preference Process of care: provision of information Resource utilisation: length of consultation; return visits; prescriptions; use other services - emergency room visits, use of out-of-hour services
Notes	Nurse title: practice nurse Nurse role: First contact care for patients with urgent problems Study period: 2 weeks

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Spitzer 1973

Methods	RCT
Participants	4325 patients, all ages, 42.5% male 2 nurses 2 doctors
Interventions	Intervention: families allocated to nurse Control: families allocated to doctor
Outcomes	Patient outcomes: health status; satisfaction, provider preference Process of care: Standards of care Resource utilisation: direct costs
Notes	Nurse title: nurse practitioner Nurse role: First contact and ongoing primary care Study period: 12 months

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Mundinger 2000

Methods	RCT
Participants	1316 patients, mean age 44.5 years, 25.5% male 7 nurses 17 doctors
Interventions	Intervention: patients allocated to nurse-led care Control: patients allocated to doctor-led care
Outcomes	Patient outcomes: health status; satisfaction Resource utilisation: consultation rate; use of other services -hospital admissions, emergency room visits, specialty visits
Notes	Nurse title: nurse practitioner Nurse role: First contact and ongoing primary care Study period: 6 months

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Myers 1997

Methods	CBA
Participants	1000 patient contacts, mean age 35.5 years, 40% male 2 nurses 6 doctors
Interventions	Intervention: patients choosing nurse Control: patients choosing doctor
Outcomes	Resource utilisation:prescriptions; use of other services - referral
Notes	Nurse title: nurse practitioner Nurse role: First contact care for patients with urgent problems Study period: 14 days

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	D - Not used

McIntosh 1997

Methods	RCT
Participants	119 patients, mean age 31.5 years, 50% male 1 nurse 1 doctor
Interventions	Intervention: patients allocated to nurse Control: patients allocated to doctor who provided identical treatment
Outcomes	Patient outcomes: alcohol consumption
Notes	Nurse title: nurse practitioner Nurse role: Counselling to problem drinkers Study period: 12 months

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Moher 2001

Methods	RCT
Participants	1347 patients, mean age 66 years, 69% male Unknown number of nurses and doctors in 21 practices
Interventions	Intervention: patients allocated to nurse-led follow-up Control: patients allocated to doctor-led follow-up
Outcomes	Patient outcomes: cardiovascular risk factors Process of care: adherence to guidelines. Resource utilisation: prescriptions
Notes	Nurse title: practice nurse Nurse role: Ongoing primary care for patients with coronary heart disease Study period: 18 months

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Lattimer 1998

Methods	RCT
Participants	10134 patients, all ages, 48% male 6 nurses 55 doctors
Interventions	Intervention: incoming phone calls on randomly selected days were allocated to nurse telephone consultation. Control: incoming phone calls on other days were answered by a receptionist who passed the message to a doctor
Outcomes	Patient outcomes: mortality Resource utilisation: physician workload, use of other services - hospital referral and admission, emergency room visits, direct costs
Notes	Nurse title: not clear Nurse role: First contact care for patients with urgent problems out-of-hours Study period: 3-7 days

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Lewis 1969

Methods	RCT
Participants	66 patients, 16+ years, 12% male Unknown number of nurses and doctors
Interventions	Intervention: patients allocated to nurse-led care Control: patients allocated to doctor-led care
Outcomes	Patient outcomes: health status; provider preference; compliance with follow-up attendance Resource utilisation - direct costs
Notes	Nurse title: not clear Nurse role: Ongoing primary care for patients with stable chronic disease Study period: 12 months

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Hemani 1999

Methods	RCT
Participants	450 patients, mean age 61 years, 98% male 9 nurses 45 doctors
Interventions	Intervention: patients allocated to nurse-led primary care Control 1: patients allocated to trainee doctors (2nd ,3rd year residents) Control 2: patients allocated to fully trained doctors (attending physicians)
Outcomes	Resource utilisation: consultation rate; tests;, use of other services-hopsital admission, emergency room visits, specialty visits
Notes	Nurse role: First contact and ongoing primary care Study period: 12 months

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Kinnersley 2000

Methods	RCT
Participants	1465 patients, all ages, 40% male 10 nurses Unknown number of doctors in 10 practices
Interventions	Intervention: patients allocated to nurse Control: patients allocated to doctor
Outcomes	Patient outcomes: health status; satisfaction; provider preference Process of care: provision of information Resource utilisation: length of consultation; return visits; prescriptions; investigations; use other services - referral
Notes	Nurse title: nurse practitioner Nurse role: First contact care for patients with urgent problems Study period: 2-4 weeks

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Flynn 1974

Methods	RCT
Participants	60 patients, age unknown, gender unknown 4 nurses Unknown number of doctors
Interventions	Intervention: patients allocated to nurse-led primary care Control: patients allocated to doctor-led primary care
Outcomes	Patient outcomes: compliance with medication and diet; knowledge Process of care: suggested lifestyle changes Resource utilisation: tests and investigations; use of other health services
Notes	Nurse title: nurse clinician Nurse role: First contact and ongoing primary care Study period: 6-12 months

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Gordon 1974

Methods	CBA
Participants	169 patients, all ages, 38% female. Unknown number of nurses and doctors
Interventions	Intervention: patients allocated to nurse-led primary care Control: patients allocated to doctor-led primary care
Outcomes	Patient outcomes: health status; satisfaction; compliance with medication and follow-up attendance. Process of care: lapses in care
Notes	Nurse title: nurse clinician Nurse role: First contact and ongoing primary care Study period: 12 months

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	D - Not used

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Chambers 1977

Methods	CBA
Participants	2313 patients, all ages, 52% male 1 nurse Unknown number of doctors
Interventions	Intervention: two villages allocated to nurse-led care Control: neighbouring villages allocated to doctor-led care
Outcomes	Process of care: standards of care Resource utilisation: direct costs
Notes	Nurse title: practice nurse Nurse role: First contact care and ongoing primary care Study period: 12 months

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	D - Not used

Chambers 1978

Methods	RCT
Participants	868 patients, all ages, 34% male 1 nurse 1 doctor
Interventions	Intervention: families allocated to nurse-led primary care Control: families allocated to doctor-led primary care
Outcomes	Patient outcomes: health status
Notes	Nurse title: practice nurse Nurse role: First contact and ongoing primary care Study period: 12 months

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

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'saved' time in activities that only doctors can perform (Richardson 1999).

It is self-evident that nurses must be adequately trained to act as substitutes for doctors. There is, however, no agreement as to the level of training required for nurses to undertake the specific roles covered by this review, and no consistency in the qualifications nurses must have to merit job titles such as nurse practitioner. Few studies contained detailed information on the nature of nurses' training for the specific role under investigation, making it impossible for us to draw any conclusions as to whether or how training affects outcomes. All the studies included in this review adopted the position that the nurses they investigated were competent to carry out the clinical role assigned to them and, indeed, the evidence supports that assumption. Additional research is therefore needed to examine the relationship between training and outcome.

The limitations of this review need to be considered. Our search strategy was designed to maximise sensitivity (detection of relevant research) at the expense of specificity (excluding irrelevant research). Even so, relevant research proved difficult to identify and some papers may have been missed, particularly in the 'grey' literature that we did not search. Publication bias seems unlikely as the clinical and research communities are interested equally in whether nurses outperform doctors or the reverse. The inclusion of only English and Dutch language publications risks excluding potentially relevant work. We did, however, screen the English abstracts of papers published in other languages and found none that appeared relevant. Research into doctor-nurse substitution in primary care appears primarily to have been conducted in Canada, the USA and the UK which are English-speaking countries.

We restricted our meta-analyses to Fixed Effect (FE) models. The FE approach provides reliable estimates of the average effect (and confidence interval) across included studies, but findings cannot be generalised beyond these studies to the wider population of practitioners and practices. Therefore, where we have generalised beyond the studies in hand, this has been a qualitative judgement based on assessment of all the available evidence of which the meta-analysis is just one component.

Most studies included only small numbers of nurses and very few considered the potential for variation in outcomes by practitioner. This may have led to over precision in the estimates of differences between doctors and nurses. In addition, studies intended to demonstrate the comparability of nurse and doctor care need to be powered to assess the equivalence, not difference, of outcomes. This was done in only one study (Lattimer 1998). A final concern is the narrow range of nurse roles that has been subjected to rigorous evaluation. Nurses in many countries provide a far wider range of care than is represented in the current research literature. Nurse-doctor substitution in the management of patients with particular chronic diseases has been infrequently studied.

AUTHORS' CONCLUSIONS

Implications for practice

The findings suggest that appropriately trained nurses can produce as high quality care as primary care doctors and achieve as good health outcomes for patients. Indeed nurses providing first care for patients needing urgent attention tend to provide more health advice and achieve higher levels of patient satisfaction compared with doctors.

Nurse-doctor substitution has the potential to reduce doctors' workload. However this benefit will not be realised in practise if doctors continue to provide the types of care that have been transferred to nurses. Doctors' workload may remain unchanged either because there was previously unmet need that nurses now fulfil or because nurses generate demand for care where previously there was none.

Nurse-doctor substitution has the potential to reduce the direct costs of care. Cost savings are, however, highly dependent on salary differentials between doctors and nurses and these may vary across locations and over time. In addition, savings on nurse salaries may be offset by nurses' longer consultation length and increased rate of patient recall relative to doctors, leading to no overall savings on cost.

Implications for research

Cost, particularly societal cost, has not been well investigated despite the widely held view that nurse-led care will generate savings. Future studies of nurse-doctor substitution should give more attention to the financial aspects of care. Related to this is the question of what impact nurses have on doctor behaviour and workload. This has rarely been evaluated despite the widely held view that nurses can 'save' doctors' time.

The methodological quality of studies is variable. Future studies should seek to maximise the numbers of practitioners (particularly nurses), rather than numbers of patients, in order to reduce the effect of any individual practitioner on outcomes. Studies also need to adopt methods of statistical analysis that account for variation in outcomes between practitioners, to avoid over precision and an inflated risk of type 1 errors (false positive results). Studies intended to demonstrate the comparability of nurse and doctor care need to be powered to assess the equivalence, not difference, of outcomes. A final concern is the narrow range of nurse roles that has been subjected to rigorous evaluation. Nurses in many countries provide a far wider range of care than is represented in the current research literature. Related to this is the question of what levels of training and experience are required by nurses working as doctor substitutes. The characteristics of nurses and doctors (numbers, training, experience) need to be reported more often and more consistently in studies in order to shed light on this issue.

there were no significant differences between doctors and nurses in referral rates to hospital (relative risk of referral by nurse compared to doctor = 0.79, 95% confidence interval: 0.58, 1.07) (Comparison 01.05). Doctors' workload was assessed in one study (Lattimer 1998); three outcomes were assessed, all of which showed a reduction in doctors' workload with nurse-led care (Table 5).

Costs were assessed in two studies (Lattimer 1998; Venning 2000). One study (Lattimer 1998) showed a net reduction in direct costs with nurse-led care while the other (Venning 2000) found no difference (Table 6).

C. Routine management of patients with chronic conditions.

Patient outcomes were assessed in four studies (Lewis 1969; McIntosh 1997; Moher 2001; Stein 1974). Health status was assessed in all four studies; eight outcomes were measured of which one was significantly better with nurse-led care and seven showed no significant difference. Patient satisfaction was assessed in one study (Lewis 1969) and was found to be significantly higher with nurse-led care. Compliance was assessed in one study (Lewis 1969) and no significant difference was found. Patient knowledge was assessed in one study (Stein 1974) and was found to be significantly higher with nurse-led care (Table 3).

Process of care was investigated in one study (Moher 2001). Of the four outcomes measured, none differed significantly (Table 4).

Resource utilisation was assessed in two studies (Moher 2001; Stein 1974). Consultation rate was examined in one study (Stein 1974) and no significant difference was found. Prescribing rates were investigated in both studies; four outcomes were measured and none showed a significant difference (Table 5).

Direct cost of care was assessed in one study (Lewis 1969) and no significant difference was found (Table 6).

DISCUSSION

The findings suggest that nurses and doctors generate similar health outcomes for patients, at least in the short-term, over the range of care investigated. This work included the provision of first contact and/or ongoing care for unselected patients and the management of patients with specific chronic conditions. The findings must be viewed with caution, however, given that only 1 study (in which nurses provided first contact care for patients wanting urgent attention out-of-hours) was powered to assess equivalence of care.

Patient satisfaction was higher when nurses, as opposed to doctors, provided first contact care for people wanting urgent attention. Patient satisfaction with chronic disease management was also found to higher with nurse-led care, although this was investigated in only one study. The reason for this difference is unclear and may relate to a number of factors. Nurses tended to have longer consultations than doctors, and patient satisfaction is higher with longer consultations (Freeman 2002). Nurses also tended to provide more information to patients than did doctors which might also have enhanced satisfaction.

High satisfaction with nurse care did not, however, mean that patients inevitably preferred nurses to doctors. Patient preferences in most studies were mixed with some patients preferring to see nurses while others preferred to see doctors. Preference might partly relate to the nature of the presenting problem. Nurses may be preferred when the patient believes their problem to be 'minor' or 'routine' but doctors are preferred when the problem is thought to 'serious' or 'difficult' (Drury 1988).

Productivity was lower when nurses, as opposed to doctors, provided first contact care for people wanting urgent attention. Nurses tended to have longer consultation lengths and higher rates of patient recall while achieving the same health outcomes as doctors. This might be a learning effect whereby nurse productivity would improve as nurses gained more experience in their role. However, two of the three studies which assessed productivity used experienced nurses (Kinnersley 2000; Venning 2000) and only one (Shum 2000) did not. Moreover, no appreciable differences were found between doctors and nurses in other aspects of resource utilisation such as prescribing, use of tests or investigations, or referrals to other services. It therefore seems unlikely that the lower productivity of nurses as compared with doctors reflects their relative inexperience.

While no appreciable differences in resource use were found when nurses substituted for doctors in providing ongoing care for undifferentiated patients or those with particular chronic conditions, caseload (number of patients seen per unit of time) was not measured so productivity is unknown.

Only one of five studies (Lattimer 1998) in which nurses provided first contact care for patients wanting urgent attention out-of-hours, demonstrated clear cost savings with nurse-led services. In all other studies - spanning all three of the nursing roles considered in this review - the lower salary costs of nurses were offset by their increased use of resources or lower productivity. As salary differentials between nurses and doctors may vary from place to place and over time, the net saving to health care services, if any, will be highly context dependent (Richardson 1998).

Only 1 study investigated the impact of nurses on doctors' workload and this showed reductions in the demand for doctors (Lattimer 1998) in which nurses provided first contact care for patients wanting urgent attention out-of-hours). However, a recent controlled trial of adding nurses to doctors' teams showed no reduction in physician workload(Laurant 2004). This may be because nurses addressed previously unmet need or because nurses generated demand where previously there was none. In either case, the findings suggest that the addition of nurses to physician teams may not reduce workload unless active steps are taken to ensure doctors discontinue providing the services that have been transferred to nurses. Efficiency gains are possible if doctors invest this

1978; Spitzer 1973) used cluster randomisation without correcting for clustering in the analysis. Concealment of allocation was not reported in seven studies (Chambers 1978; Flynn 1974; Lewis 1969; McIntosh 1997; Moher 2001; Mundinger 2000; Spitzer 1973). In 12 out of 13 trials (Chambers 1978; Flynn 1974; Gordon 1974; Hemani 1999; Kinnersley 2000; Lattimer 1998; Lewis 1969; McIntosh 1997; Mundinger 2000; Myers 1997; Shum 2000; Spitzer 1973; Stein 1974; Venning 2000) it was unclear whether or not contamination had occurred. Of the 13 trials, none fulfilled eight or more criteria; seven studies met four to seven criteria; and six studies met three or fewer criteria.

Effects of interventions

A. First contact and ongoing care for all presenting patients.

Patient outcomes were assessed in five studies (Chambers 1978; Flynn 1974; Gordon 1974; Mundinger 2000; Spitzer 1973). Health status was investigated in four of these (Chambers 1978; Gordon 1974; Mundinger 2000; Spitzer 1973); 25 outcomes were measured of which two were significantly better with nurse-led care and 23 showed no significant difference. One of the two observed differences between nurses and doctors is untrustworthy in that the study (Chambers 1978) made no allowance for cluster randomisation in the analysis. Patient satisfaction was assessed in three studies (Gordon 1974; Mundinger 2000; Spitzer 1973); 15 outcomes were measured of which one was significantly better with doctor-led care and 14 showed no significant difference. Patient compliance was assessed in two studies (Flynn 1974; Gordon 1974); four outcomes were measured and none differed significantly between doctors and nurses. Patient knowledge was assessed in one study; three outcomes were measured of which one was significantly better with nurse-led care and two showed no significant difference (Table 3).

Process of care was assessed in four studies (Chambers 1977; Flynn 1974; Gordon 1974; Spitzer 1973)). Of the 12 outcomes measured, three were significantly better with nurse-led care. In 2 cases the nurse was significantly more likely than the doctor to provide lifestyle advice (Flynn 1974). In one case, sub-group analysis suggested that the nurse had significantly fewer lapses in care when treating patients with unstable chronic disease (Gordon 1974). The remaining nine outcomes showed no significant difference (Table 4).

Resource utilisation was assessed in three studies (Flynn 1974; Hemani 1999; Mundinger 2000). Consultation rates were investigated in two studies (Hemani 1999; Mundinger 2000) and neither found a significant difference between doctors and nurses. Tests and investigations were assessed in two studies (Flynn 1974; Hemani 1999); 22 outcomes were measured of which four showed significantly higher rates for nurses and the remainder showed no difference. Use of other health care services was assessed in all three studies; seven outcomes were measured of which one showed a significantly higher rate for nurses and the remainder showed no significant difference (Table 5).

Direct costs were assessed in two studies (Chambers 1977; Spitzer 1973) and no significant differences were found (Table 6).

B. First contact care for patients wanting urgent attention.

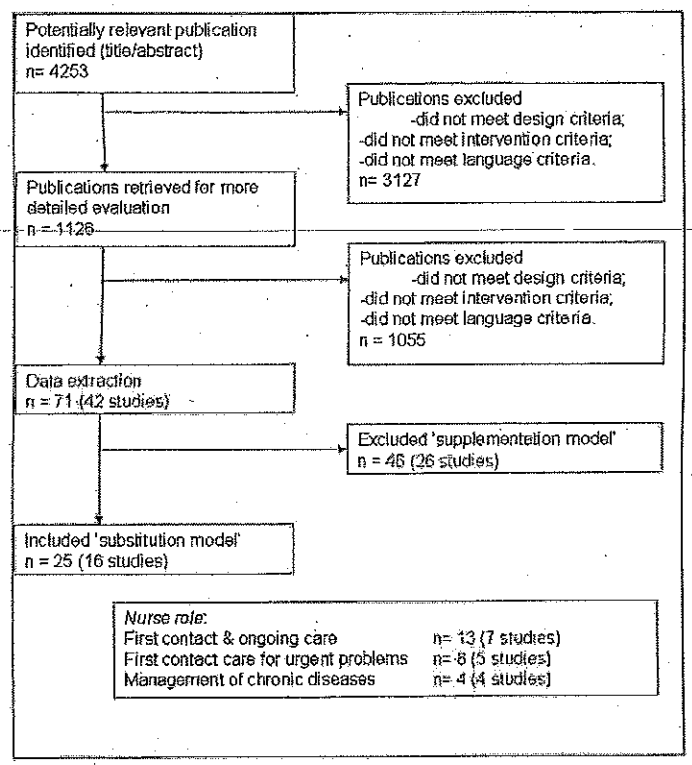
Patient outcomes were assessed in four studies (Kinnersley 2000; Lattimer 1998; Shum 2000; Venning 2000). Health status was investigated in all four studies; five outcomes were measured and none differed significantly between doctors and nurses. Patient satisfaction was assessed in 3 studies (Kinnersley 2000; Shum 2000; Stein 1974); 19 outcomes were measured of which 12 were significantly better with nurse-led care and seven showed no significant difference. Meta-analysis of three studies (Kinnersley 2000; Shum 2000; Venning 2000) showed that patient satisfaction was higher with nurse-led care as compared with doctor-led care (standardised mean difference 0.28, 95% confidence interval:0.21, 0.34) but the effect size was highly variable between studies (See Comparison 01.02). Patient compliance and enablement were measured in one study (Venning 2000) and no significant differences were found (Table 3).

Process of care was assessed in three studies (Kinnersley 2000; Shum 2000; Venning 2000). Of the eight outcomes measured, six were significantly better with nurse-led care - all showing nurses provided more information to patients than did doctors. The remaining two outcomes showed no significant difference (Table 4).

Resource utilisation was assessed in five studies (Kinnersley 2000; Lattimer 1998; Myers 1997; Shum 2000; Venning 2000). Consultation length was measured in three studies (Kinnersley 2000; Shum 2000; Venning 2000) and all showed significantly longer consultations for nurses. Consultation rate was investigated in three studies (Kinnersley 2000; Shum 2000; Venning 2000); five outcomes were measured of which three showed significantly higher rates for nurses and the remainder showed no difference. Meta-analysis of these three studies showed that nurses were more likely than doctors to recall a patient (relative risk nurse will recall patient compared with doctor = 1.34, 95% confidence interval: 1.20, 1.49) but with considerable heterogeneity across studies (See Comparison 01.03). Prescribing rate was investigated in three studies (Kinnersley 2000; Shum 2000; Venning 2000); five outcomes were measured of which one showed a lower rate for nurses and the remainder showed no difference. Meta-analysis of these three studies suggested there was no significant difference between doctors and nurses in prescribing rates (relative risk nurse will prescribe compared to doctor = 1.00; 95% confidence limit: 0.96, 1.05) (See Comparison 01.04). Tests and investigations were examined in two studies (Kinnersley 2000; Venning 2000); two outcomes were measured of which one showed a higher rate for nurses.

Use of other services was investigated in five studies (Kinnersley 2000; Lattimer 1998; Myers 1997; Shum 2000; Venning 2000); nine outcomes were measured and none showed a significant difference between nurses and doctors. Meta-analysis of three studies (Kinnersley 2000; Lattimer 1998; Venning 2000) suggested that

Figure 1. Trial Flow



We included 16 studies. In seven studies (Chambers 1977; Chambers 1977; Flynn 1974; Hemani 1999, Mundinger 2000, Spitzer 1973), the nurse assumed responsibility for first contact and ongoing care for all presenting patients. In five studies the nurse assumed responsibility for first contact care for patients wanting urgent consultations during routine practice hours (Kinnersley 2000; Myers 1997; Shum 2000; Venning 2000) or out-of-hours (Lattimer 1998). In four studies (Lewis 1969; McIntosh 1997; Moher 2001; Spitzer 1973) the nurse had responsibility for the ongoing management of patients with particular chronic conditions. In one of these studies (McIntosh 1997) the nurse provided counselling to problem drinkers. In all studies, the control or comparison group consisted of doctors providing the same services to patients as the nurses.

Risk of bias in included studies

Of the 16 studies included, three were controlled before-and-after studies (Chambers 1977, Gordon 1974, Myers 1997) and 13 were randomised or quasi-randomised controlled trials (Chambers 1978; Flynn 1974; Hemani 1999; Kinnersley 2000; Lattimer 1998; Lewis 1969; McIntosh 1997; Moher 2001; Mundinger 2000; Shum 2000; Spitzer 1973; Stein 1974; Venning 2000) (See Characteristics of Included Studies). The methodological quality of controlled before-and-after studies (Chambers 1977; Gordon 1974; Myers 1997) was assessed by nine quality criteria (Table 1). None of the three controlled before-and-after studies reported the statistical power. In one study (Chambers 1977) the unit of allocation was the community, whereas the unit of analysis was the patient with no allowance for clustering. In all three studies the intervention and control groups appeared to be comparable. Each study fulfilled four of the nine quality criteria.

The methodological quality of randomised controlled trials (Chambers 1978; Flynn 1974; Gordon 1974; Hemani 1999, Kinnersley 2000, Lattimer 1998, Lewis 1969, Moher 2001, Mundinger 2000, Shum 2000, Spitzer 1973, Stein 1974, Venning 2000) was also assessed by nine criteria (Table 2). All studies had methodological shortcomings. The power was reported in five of 13 trials (Kinnersley 2000; Lattimer 1998; McIntosh 1997; Mundinger 2000; Shum 2000), and two studies (Chambers 1978; Hemani 1999) reported that the study lacked the statistical power to detect clinically meaningful differences. Two studies (Chambers

If a single publication reported two or more separate studies, then each study was extracted separately. If the findings of a single study were spread across two or more publications, then the publications were extracted as one. For each study with more than one control or comparison group for the nurse intervention, we report only the results for the control condition in which doctors provided the same intervention as the nurse.

Standard EPOC criteria were used to assess the methodological quality of the studies (See Assessment of Methodological Quality in Group Details).

Analysis

Studies were grouped by nurse role for analysis, as follows:

- First contact and ongoing care for undifferentiated patients.
- First contact care for patients wanting urgent attention during office hours or out-of-hours.
- Routine management of patients with chronic conditions.

For each group, meta-analysis was applied to outcomes for which there was adequate reporting of intervention effects from at least three randomised controlled trials. We excluded non-randomised studies from meta-analysis due to their inherently greater potential for bias, and we excluded outcomes for which less than three randomised controlled trials were available on the grounds that a meta-analysis would not add substantial value to a semi-quantitative examination. Outcomes not amenable to meta-analysis were subjected to semi-quantitative synthesis. All results reported below are statistically significant unless otherwise stated.

A fixed-effects (FE) model was used for all meta-analyses. A general recommendation is that, when there is evidence of substantial heterogeneity between study results, a Random Effects (RE) model should also be applied (Petitti 2001). Despite significant heterogeneity, we decided against the use of RE models for two main reasons: (i) we had very small numbers of studies in each analysis - three at most; and (ii) we had no basis for assuming that effect sizes are normally distributed. These factors can result in RE estimates of overall effect and confidence intervals that are quite inaccurate (Alderson 2004; Biggerstaff 1997; Maas 2004) and, in our view, the risk of drawing an inappropriate conclusion from the analysis was too large to justify the use of RE models. In contrast, the FE model is known to provide accurate estimates of the average effect (and confidence interval) within the included studies even when the number of studies is small(Brockwell 2001), but does not provide a statistical basis for generalising beyond the studies in hand (Bailey 1987).

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies.

The initial searches identified 4253 potentially relevant articles (3784 in the original search, and 469 in the updated search) of which 25 publications, relating to 16 studies met our inclusion criteria (Figure 1). We identified a further 46 studies which investigated the role of nurses working as supplements to primary care doctors; these have been excluded from the review and will be reported separately.

#21 patient counselling
#22 nurs* near5 general pract*
#23 #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or # 19 or #20 or #21 or #22
#24 ('Clinical-Trials' / all topical subheadings / all age subheadings in DE) or ('Double-Blind-Studies' / all topical subheadings / all age subheadings in DE) or ('Evaluation-Research' / all topical subheadings / all age subheadings in DE) or ('Prospective-Studies' / all topical subheadings / all age subheadings in DE) or ('Single-Blind-Studies' / all topical subheadings / all age subheadings in DE) or ('Study-Design' / all topical subheadings / all age subheadings in DE)
#25 random allocation
#26 rct
#27 (randomised controlled trial*) or (randomized controlled trial*)
#28 comparative stud*
#29 interupted time series
#30 #24 or #25 or #26 or #27 or #28 or #29
#31 #3 and #10 and #23 and #30
with limitations
#32 #31 and (PY=1999-2001) and (DT=JOURNAL-ARTICLE) and (LA=ENGLISH)
Medline SEARCH STRATEGY UPDATE:
Combination Set 1 + Set 2 + Set 3 + Set 4 (with limitations)
#31 #30 and (PY=1999-2001) and (LA=ENGLISH) and (PT=JOURNAL-ARTICLE) (59 records)
#30 #3 and #10 and #23 and #29 (95 records)
Set 4: Design/methodology
#29 #24 or #25 or #26 or #27 or #28 (141427 records)
#28 interupted time series (0 records)
#27 Comparative stud* (4656 records)
#26 (randomised controlled trial*) or (randomized controlled trial*) (14922 records)
#25 rct (350 records)
#24 ('Clinical-Trials' / all subheadings in MIME,MJME) or ('Controlled-Clinical-Trials' / all subheadings in MIME,MJME) or ('Double-Blind-Method' / all subheadings in MIME,MJME) or ('Evaluation-Studies' / all subheadings in MIME,MJME) or ('Follow-Up-Studies' / all subheadings in MIME,MJME) or ('Prospective-Studies' / all subheadings in MIME,MJME) or ('Random-Allocation' / all subheadings in MIME,MJME) or ('Randomized-Controlled-Trials' / all subheadings in MIME,MJME) or ('Single-Blind-Method' / all subheadings in MIME,MJME) or ('Research-Design' / all subheadings in MIME,MJME) (134715 records)

Set 3: Substitution
#23 #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or # 19 or #20 or #21 or #22 (255757 records)
#22 nurs* near5 general pract* (156 records)
#21 patient counseling (263 records)
#20 team* (11973 records)
#19 health promotion (6052 records)
#18 skill mix (53 records)
#17 role* (189215 records)
#16 cooperat* (14653 records)
#15 substitut* (30365 records)
#14 multidisplin* (4 records)
#13 deleg* (428 records)
#12 clinical practice (8293 records)
#11 ('Cooperative-Behavior' / all subheadings in MIME,MJME) or ('Job-Description' / all subheadings in MIME,MJME) or ('Professional-Autonomy' / all subheadings in MIME,MJME) or ('Clinical-Competence' / all subheadings in MIME,MJME) (10749 records)
Set 2: Nurse
#10 #4 or #5 or #6 or #7 or #8 or #9 (50752 records)
#9 health visit* (335 records)
#8 practice nurs* (2311 records)
#7 district nurs* (110 records)
#6 nurse manager* (192 records)
#5 nurs* (50649 records)
#4 ('Nurse-Administrators' / all subheadings in MIME,MJME) or ('Nurse-Clinicians' / all subheadings in MIME,MJME) or ('Nurse-Midwives' / all subheadings in MIME,MJME) or ('Nurse-Practitioners' / all subheadings in MIME,MJME) or ('Community-Health-Nursing' / all subheadings in MIME,MJME) (6662 records)
Set 1: Setting
#3 #1 or #2 (18096 records)
#2 primary near care (12217 records)
#1 ('Family-Practice' / all subheadings in MIME,MJME) or ('Primary-Health-Care' / all subheadings in MIME,MJME) or ('Primary-Nursing-Care' / all subheadings in MIME,MJME) or ('Physicians-Family' / all subheadings in MIME,MJME) (12588 records)

The titles and abstracts of articles uncovered by the above searches were independently screened by two reviewers. The full text of potentially relevant articles was obtained for further evaluation. The reference lists of included articles, and of existing published reviews of doctor-nurse substitution, were checked for other potentially relevant studies. Only articles written in English or Dutch were included.

Data collection and analysis

Each potentially relevant study was independently assessed for inclusion in the review by two reviewers. Differences between the reviewers were resolved by discussion. Excluded studies along with the reasons for their exclusion are given below (See Reference list, excluded studies). A data extraction form based on the standard EPOC checklist was designed for this review (See Group Details). Data from each included study were extracted independently by two reviewers. Differences were resolved by discussion.

to a different type of professional (i.e. nurse), usually with the intention of reducing cost or addressing workforce shortages. Substitution studies typically examine the case where a nurse is responsible for providing the same health care as a doctor, and the performance of these two practitioners is compared. For example, a nurse-led clinic for a particular disease or condition is compared to a doctor-led clinic.

Supplementation refers to the situation where a nurse supplements or extends the care of the doctor by providing a new primary care service. The aim is generally to improve the quality of care rather than reduce cost or address workforce shortages. Supplementation studies typically compare usual care by a doctor to an innovative service provided by a nurse working alongside a doctor. For example, a family practice with a nurse-led diabetes clinic is compared to a family practice without such a clinic. This type of study risks confounding two aspects of care provision:

a)type of service (specialised clinic vs routine consultation), and

b)who provides that service (doctor or nurse)

Supplementation studies have been excluded from this review.

Some studies investigated complex interventions where practitioner care was combined with other interventions. Where a factorial study design was employed, the nurse can be compared with the doctor independently of other interventions. In such cases, we report only the effect attributable to the nurse compared with the doctor.

Types of outcome measures

Four types of outcomes were considered for this review, patient outcomes, process of care outcomes, resource utilisation outcomes and cost outcomes.

Patient outcomes

- Morbidity.
- Mortality.
- Quality of life.
- Satisfaction.
- Patient compliance.
- Other (knowledge, preference for doctor or nurse).

Process of care outcomes

- Practitioner adherence to clinical guidelines.
- Standards or quality of care.
- Practitioner health care activity (examinations, provision of advice).

Resource utilisation outcomes

- Frequency and length of consultations.
- Return visits.
- Prescriptions.
- Tests and investigations.
- Referral/use of other services.

Cost outcomes

- Direct (service) .
- Indirect (societal) costs.

Search methods for identification of studies

The following databases were searched: Medline; Cinahl; Bids Embase; Social Science and Citation Indexes; British Nursing index; HMIC; EPOC Register; Cochrane Controlled Trial Register (CCTR); and the National Primary Care Research and Development Centre's own database. The search terms combined Medical Subject Headings (MeSH) and free text words as shown in the strategy below. The search was conducted first in 1999 (1966 till 1999) and then updated in 2002 (1999 till 2002). The updated search was restricted by study design.

Search methods

#1 ('Family-Practice' / all topical subheadings / all age subheadings in DE) or ('Physicians-Family' / all topical subheadings / all age subheadings in DE) or ('Primary-Health-Care' / all topical subheadings / all age subheadings in DE) or ('Primary-Nursing' / all topical subheadings / all age subheadings in DE) or ('Nursing-Care' / all topical subheadings / all age subheadings in DE)

#2 primary near care

#3 #1 or #2

#4 ('Community-Health-Nursing' / all topical subheadings / all age subheadings in DE) or ('Nurse-Administrators' / all topical subheadings / all age subheadings in DE) or ('Nurse-Midwives' / all topical subheadings / all age subheadings in DE) or ('Nurse-Practitioners' / all topical subheadings / all age subheadings in DE) or ('Clinical-Nurse-Specialists' / all topical subheadings / all age subheadings in DE)

#5 nurse*

#6 nurse manager*

#7 district nurs*

#8 practice nurs*

#9 health visit*

#10 #4 or #5 or #6 or #7 or #8 or #9

#11 ('Cooperative-Behavior' / all topical subheadings / all age subheadings in DE) or ('Job-Description' / all topical subheadings / all age subheadings in DE) or ('Professional-Autonomy' / all topical subheadings / all age subheadings in DE) or ('Clinical-Competence' / all topical subheadings / all age subheadings in DE)

#12 clinical practice

#13 deleg*

#14 multidisplin*

#15 substitut*

#16 cooperat*

#17 role*

#18 skill mix

#19 health promotion

#20 team*

b)safely substitute for doctors in an wide array of services, so reducing demand for doctors; and

c)reduce the direct costs of services because nurse are cheaper to hire than physicians.

Nurses may work either as doctor supplements or as doctor substitutes. Nurses working as doctor supplements provide services which complement or extend those provided by doctors. The aim is to improve the quality of care and extend the range of services available to patients. In contrast, nurses working as doctor substitutes provide services which otherwise would be provided by doctors alone. The aim is to reduce the demand for doctors. Gains in service efficiency may be achieved if doctors give up providing the services they have delegated to nurses, and instead invest their time in activities that only doctors can perform (Richardson 1999). This review is focused on the impact of nurses working as substitutes for primary care doctors.

Previous systematic reviews of doctor-nurse substitution in primary care have sought to identify whether nurses differ from doctors in terms of patient outcomes, process of care or resource utilisation. In 1995, Brown and Grimes conducted a meta-analysis of American and Canadian research into doctor-nurse substitution in primary care (Brown 1995). Thirty-eight studies were included in the review, covering a wide range of nursing roles and encompassing both (quasi) experimental and observational research designs. The findings suggested that, as compared with doctor-led care, nurse-led care was associated with higher levels of patient compliance and satisfaction, longer consultations, and higher rates of laboratory testing. Health outcomes for patients were similar. These findings are supported by the more recent systematic review of Horrocks et al in 2002 (Horrocks 2002). They included 11 randomised controlled trials and 23 prospective observational studies of nurses acting as doctor substitutes for patients with undifferentiated healthcare problems in primary care settings in developed countries. The findings suggested that patient health care outcomes were similar for doctors and nurses, but that nurse-led care was associated with higher levels of patient satisfaction, longer consultations and higher rates of investigation.

Both reviews are flawed in their inclusion of observational research which is susceptible to producing biased estimates of differences between doctors and nurses through failure to control for other factors that may affect outcome. In addition, by combining a diversity of nurse roles, it remains unclear whether the observed differences or similarities between nurses and doctors vary with the particular type of role substitution. We aimed to address these deficiencies.

OBJECTIVES

Our aim was to investigate the impact of nurses working as substitutes for primary care doctors on:

- Outcomes for patients
- Process of care
- Resource utilisation
- Direct (service) and indirect (societal) costs

METHODS

Criteria for considering studies for this review

Types of studies

Three types of study were eligible for inclusion:

- Randomised controlled trials (RCT): Random or quasi-random allocation of subjects to intervention and control groups.
- Controlled before and after studies (CBA): the intervention group is compared with a control group selected by non-random processes. Outcomes must be measured before as well as after the intervention.
- Interrupted time series (ITS). Longitudinal examination of outcomes with at least three observations before and again after the intervention.

Types of participants

- Doctors - primary care physicians which could include general practitioners, family doctors, paediatricians, general internists or geriatricians.
- Nurses - any qualified nurse working as a substitute to a primary care physician. This could include: nurse practitioners, clinical nurse specialists, advanced practice nurses, practice nurses, health visitors, etc. As the job title, education, and experience of nurses varies considerably among and within countries, we did not select nurses by virtue of their job title. Only trainee nurses and mental health nurses were excluded.
- Patients - presenting in primary care, excluding accident and emergency.

The review is limited to primary health care services that provide first contact and ongoing care for patients with all types of health problems. It includes family practice or general practice, outpatient settings, and ambulatory primary care settings (excluding accident and emergency).

Types of interventions

Our focus was on nurses working as substitutes for primary care doctors. Substitution refers to the situation where task(s) formerly performed by one type of professional (i.e. doctor) are transferred

Main results

4253 articles were screened of which 25 articles, relating to 16 studies, met our inclusion criteria. In seven studies the nurse assumed responsibility for first contact and ongoing care for all presenting patients. The outcomes investigated varied across studies so limiting the opportunity for data synthesis. In general, no appreciable differences were found between doctors and nurses in health outcomes for patients, process of care, resource utilisation or cost.

In five studies the nurse assumed responsibility for first contact care for patients wanting urgent consultations during office hours or out-of-hours. Patient health outcomes were similar for nurses and doctors but patient satisfaction was higher with nurse-led care. Nurses tended to provide longer consultations, give more information to patients and recall patients more frequently than did doctors. The impact on physician workload and direct cost of care was variable.

In four studies the nurse took responsibility for the ongoing management of patients with particular chronic conditions. The outcomes investigated varied across studies so limiting the opportunity for data synthesis. In general, no appreciable differences were found between doctors and nurses in health outcomes for patients, process of care, resource utilisation or cost.

Authors' conclusions

The findings suggest that appropriately trained nurses can produce as high quality care as primary care doctors and achieve as good health outcomes for patients. However, this conclusion should be viewed with caution given that only one study was powered to assess equivalence of care, many studies had methodological limitations, and patient follow-up was generally 12 months or less.

While doctor-nurse substitution has the potential to reduce doctors' workload and direct healthcare costs, achieving such reductions depends on the particular context of care. Doctors' workload may remain unchanged either because nurses are deployed to meet previously unmet patient need or because nurses generate demand for care where previously there was none. Savings in cost depend on the magnitude of the salary differential between doctors and nurses, and may be offset by the lower productivity of nurses compared to doctors.

PLAIN LANGUAGE SUMMARY

In primary care, it appears that appropriately trained nurses can produce as high quality care and achieve as good health outcomes for patients as doctors. However, the research available is quite limited.

Many countries have sought to shift the provision of primary care from doctors to nurses in order to reduce the demand for doctors and improve healthcare efficiency. The expectation is that nurses working as substitutes can provide as high quality care as doctors at lower cost. This review found that quality of care is similar for nurses and doctors but it is not known if it decreases the doctor's workload. Nurses tend to provide more health advice and achieve higher levels of patient satisfaction compared with doctors. Even though using nurses may save salary costs, nurses may order more tests and use other services which may decrease the cost savings of using nurses instead of doctors.

BACKGROUND

Demand for primary care services has increased in many countries due to population ageing, rising patient expectations, and reforms that shift care from hospitals to the community. At the same time, the supply of physicians is constrained and there is increasing pressure to contain costs. Shifting care from doctors to nurses, is one possible response to these challenges (Jenkins-Clarke 1998; Whitecross 1999). A review of research into the substitutability of nurses for doctors suggested that 25% to 70% of the work undertaken by doctors might be moved to nurses (Richardson 1998). In primary care, nurses may undertake much of the health promotion work of family practice (Family HSG 1994; Muir 1995), and play a leading role in the routine management of chronic diseases such as asthma, diabetes and coronary heart disease (Aubert 1998; Charlton 1991; Kirkman 1994). The expectation is that primary care nurses working in extended roles can:

a)enhance the quality of services provided by doctors;

[Intervention Review]

Substitution of doctors by nurses in primary care

Miranda Laurant[1], David Reeves[2], Rosella Hermens[1], Jose Braspenning[1], Richard Grol[1], Bonnie Sibbald[3]

[1]Scientific Institute for Quality of Health Care, Radboud University Nijmegen Medical Centre, Nijmegen, Netherlands. [2]National Primary care Research and Development Centre, University of Manchester, Manchester, UK. [3]Health Service Research, NPCRDC, 5th Floor, Williamson Building, Manchester, UK

Contact address: Miranda Laurant, Scientific Institute for Quality of Health Care, Radboud University Nijmegen Medical Centre, 114 IQ Health Care, PO Box 9101, Nijmegen, 6500 HB, Netherlands. M.Laurant@iq.umcn.nl.

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ABSTRACT

Background

Demand for primary care services has increased in developed countries due to population ageing, rising patient expectations, and reforms that shift care from hospitals to the community. At the same time, the supply of physicians is constrained and there is increasing pressure to contain costs. Shifting care from physicians to nurses is one possible response to these challenges. The expectation is that nurse-doctor substitution will reduce cost and physician workload while maintaining quality of care.

Objectives

Our aim was to evaluate the impact of doctor-nurse substitution in primary care on patient outcomes, process of care, and resource utilisation including cost. Patient outcomes included: morbidity; mortality; satisfaction; compliance; and preference. Process of care outcomes included: practitioner adherence to clinical guidelines; standards or quality of care; and practitioner health care activity (e.g. provision of advice). Resource utilisation was assessed by: frequency and length of consultations; return visits; prescriptions; tests and investigations; referral to other services; and direct or indirect costs.

Search methods

The following databases were searched for the period 1966 to 2002: Medline; Cinahl; Bids, Embase; Social Science Citation Index; British Nursing Index; HMIC; EPOC Register; and Cochrane Controlled Trial Register. Search terms specified the setting (primary care), professional (nurse), study design (randomised controlled trial, controlled before-and-after-study, interrupted time series), and subject (e.g. skill mix).

Selection criteria

Studies were included if nurses were compared to doctors providing a similar primary health care service (excluding accident and emergency services). Primary care doctors included: general practitioners, family physicians, paediatricians, general internists or geriatricians. Primary care nurses included: practice nurses, nurse practitioners, clinical nurse specialists, or advanced practice nurses.

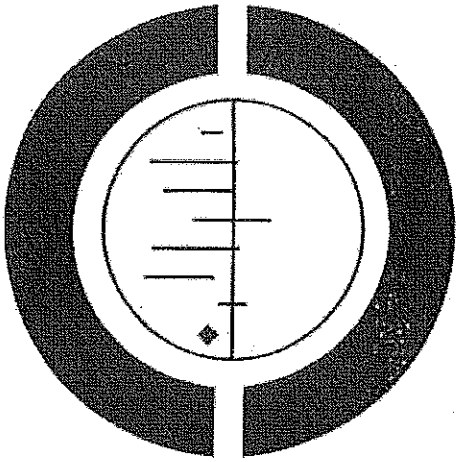
Data collection and analysis

Study selection and data extraction was conducted independently by two reviewers with differences resolved through discussion. Meta-analysis was applied to outcomes for which there was adequate reporting of intervention effects from at least three randomised controlled trials. Semi-quantitative methods were used to synthesize other outcomes.

TABLE OF CONTENTS

Substitution of doctors by nurses in primary care (Review)

Laurant M, Reeves D, Hermens R, Braspenning J, Grol R, Sibbald B



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A memorable patient

Bridging medicine

In the early 1990s, as a registrar at J J Hospitals in Mumbai (Bombay), I had the experience of a lifetime. J J Hospitals was situated in a Muslim area of the city, and most of its catchment population were Muslim community whereas most of the doctors were Hindu. With trust between patients and doctors paramount, the different religious beliefs had never vitiated the congenial atmosphere at the hospital.

Then, on 6 December 1992, some Hindu radicals demolished the Babari mosque at Ayodhya, igniting widespread riots. Fundamentalists in both communities set on each other—destroying shops, burning vehicles, and attacking individuals of the opposite faith. Hundreds were killed and thousands injured. The normally busy, vibrant city of Bombay, an epitome of religious harmony, was transformed into a virtual war zone, with seething hatred and distrust. Faced with the stupendous task of managing the countless casualties pouring in, every resident was working relentlessly.

In the casualty department I saw a young Muslim teenager brought by his elder brother. His three fingers were partially cut, but when I rushed to offer first aid I was suddenly rebuffed by the patient's brother, who held me back vehemently with an angry and suspicious stare. Clearly he wasn't prepared to risk his brother being treated by a Hindu doctor. A lot of persuasion was in vain. Ultimately, I had to request one of my Muslim colleagues to take the patient to the operation theatre for further management and tried to forget this as an unpleasant event.

Six hours later, the elder brother himself was wheeled into casualty bleeding profusely from a stab in the groin. Without immediate surgical intervention, he would bleed to death. He looked very angry as I approached and obviously still didn't trust me but realised that his life was at stake. Taking his silence as tacit approval, I rushed him to the operating theatre, controlled the bleeding, and cleaned and sutured the wound. Luckily, no major neurovascular structures were injured. Assuming him to be another religious fanatic, I ignored him once he was settled postoperatively. I had the next patient to look after, and the next, and the next.

Two days later, the atmosphere was still tense. I was working in my own ward when I saw my reluctant patient walking towards me holding a plastic bag with something suspicious within. I also noticed his brother with the injured fingers standing at the end of the ward guarding the door. The ward was a cul-de-sac with no place to run or hide. Panicked, I looked around for a security guard, but none was there. As the man came closer, I knew my life was in danger. Not knowing what was ahead of me, I shut my eyes tightly preparing for any eventuality. He lifted my hand and placed the plastic bag on it, then hugged me tightly and whispered in my ear, "Shukria Bhaijan" ("Thank you, big brother").

I can't remember how long we stood like this, but I could feel tears running down his cheeks. The plastic bag contained a present—chicken biryani his mother had prepared specially for us, the Hindu doctors. I was completely overwhelmed by his gesture, and tears ran down my cheeks. The whole ward was at a standstill, in a state of a shock, watching a Hindu and a Muslim hugging each other in the midst of a city burning in Hindu-Muslim riots.

Until then, I had considered medicine as merely a science used to heal human bodies. But that day I realised medicine can also touch hearts, unite minds, bridge religious divides, and provide memories to cherish life long.

Kishor Choudhari *consultant neurosurgeon, Royal Victoria Hospital, Belfast*

We welcome articles up to 600 words on topics such as *A memorable patient, A paper that changed my practice, My most unfortunate mistake,* or any other piece conveying instruction, pathos, or humour. If possible the article should be supplied on a disk. Permission is needed from the patient or a relative if an identifiable patient is referred to. We also welcome contributions for "Endpieces," consisting of quotations of up to 80 words (but most are considerably shorter) from any source, ancient or modern, which have appealed to the reader.

generally high quality, although only one study used patients new to both providers.[14]

Noticeable heterogeneity was observed between the studies on almost all outcomes. Although differences between studies in terms of setting, level of nurse training, and the period of time studied were anticipated and explored in our review, much heterogeneity remained after allowing for these factors. This probably reflects the diverse ways in which nurse practitioners currently work. Despite these differences, the direction of the effect for the main findings was consistent between different studies and also between the randomised controlled trials and the observational studies.

It was not possible to conduct a robust economic analysis of the costs of care from nurse practitioners compared with doctors. Only five studies provided data about costs.[10 12 15 16 26] These used different approaches to the valuing of resources and were inadequately powered for economic analysis. The lack of good evidence about the economic impact of substituting nurse practitioners for doctors needs to be addressed in future research, otherwise changes may be introduced that are thought to be efficient when they may not be so.[27]

Policy implications

Our review lends support to an increased involvement of nurse practitioners in primary care. However, most recent research has been based on nurse practitioners providing care for patients requesting same day appointments predominantly for acute minor illness and working in a team supported by doctors. It cannot be assumed that similar results would be obtained by nurse practitioners working in different settings or with different groups of patients, nor that they could substitute entirely for general practitioners.

Unresolved issues

Future research should address several unresolved issues. Firstly, if patients are more satisfied with care provided by nurse practitioners then the factors that lead to this effect should be elucidated. Satisfaction with care could be related to differences in the training and consultation skills of nurses, patients' expectations, or the extra length of time that nurse practitioners spend in consultations.

Secondly, nurse practitioners and doctors did not necessarily work under similar circumstances or with similar pressures on their time, even in the controlled trials. It is necessary to determine whether the differences between nurse practitioners and doctors in patient satisfaction and quality of care remain if they work under identical circumstances, particularly with the same rates of booked consultations.

Thirdly, research on nurse practitioners needs to be broadened to encompass a wider range of patient groups, including those with complex psychosocial problems or chronic diseases. Research is also necessary that extends beyond the scope of comparing individual nurses with doctors and evaluates different models of organisation, such as several nurse practitioners providing care at first point of contact supported by a smaller number of general practitioners providing second line advice.

Finally, the role of a nurse practitioner is not clearly defined in the United Kingdom and includes nurses from a wide range of educational backgrounds. In addition, nurses are increasingly involved in assessing and advising patients with minor illness in settings such as NHS Direct and NHS walk-in centres without a recognised qualification for this role. It is important to study the training, skills, and experience that nurses need in order to offer the benefits to patients shown by our review.

What is already known on this topic

Nurse practitioners have existed in North America for many years

An increasing number of such nurses are being employed in the United Kingdom in general practice, emergency departments, and other primary care settings

Reviews suggest that nurse practitioners are equivalent to doctors on most variables studied, but the relevance of this in the context of the NHS is unclear

What this study adds

Patients are more satisfied with care from a nurse practitioner than from a doctor, with no difference in health outcomes

Nurse practitioners provide longer consultations and carry out more investigations than doctors

Most recent research has related to patients requesting same day appointments for minor illness, which is only a limited part of a doctor's role

Conclusion

Patients are at least as satisfied with care at the point of first contact with nurse practitioners as they are with that from doctors. Although assessments of the quality of care and short term health outcomes seem to be equivalent to that of doctors, further research is needed to confirm that nurse practitioner care is safe in terms of detecting rare but important health problems.

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Process measures

	No of studies	No in intervention group	No in control group	Odds ratio or weighted mean difference (95% CI)	Heterogeneity		Overall effect	
					χ^2	P value	Z value	P value
Consultation length	5	2277; mean 14.89 min	2286; mean 11.14 min	3.67 (2.05 to 5.29)*	81.67 df=4	<0.00001	4.44	0.00001
Prescriptions	4	1685/2503	1944/2861	1.02 (0.90 to 1.15)	3.26 df=3	0.35	0.32	0.8
Investigations	5	932/2573	1015/2896	1.22 (1.02 to 1.46)	6.31 df=4	0.18	2.18	0.03
Return consultations	6	835/2919	913/3247	1.05 (0.87 to 1.28)	12.06 df=5	0.034	0.54	0.6
Referrals	2	44/1293	59/1367	0.71 (0.30 to 1.70)	4.07 df=1	0.044	0.76	0.4

*Weighted mean difference. Only one study reported admissions and none reported patient adherence.

were all in general practice settings, three in the United Kingdom and two in the United States.[10–12 14 18]

The figure presents the summary statistics for studies using continuous data. These suggest that patients were more satisfied with consultations with nurse practitioners than those with doctors. The results showed considerable heterogeneity, which was explored by comparing studies of individual consultations with care over time and by comparing studies based on nurse practitioners with different levels of training. Although there remained considerable heterogeneity between the studies, all analyses suggested that patients were more satisfied with consultations with nurse practitioners. Three randomised controlled trials reported results with dichotomous data.[15–17] Two of them were set in emergency units.[16 17] No significant difference was found in patient satisfaction for patients attending either provider with these studies (all studies (n=3), odds ratio 1.56, 0.56 to 4.34; overall effect z=0.85, P=0.4; and all studies of emergency units (n=2), 3.27, 0.41 to 25.98; z=1.12, P=0.3).

Health status

Any measure used by the authors to determine either health status or quality of life and its validity for this purpose were recorded. Seven randomised controlled trials reported on these outcomes.[10–12 14 16 19 20] These results were not analysed with meta-analysis because of the heterogeneity between measures and episode of care length, but a comparison of the results showed no significant differences in patient health outcomes (table E on bmj.com).

Process measures

The results for process outcomes for which there were sufficient data for meta-analysis showed that nurse practitioners undertook significantly more investigations and had longer consultations than doctors (table).

Quality of care

Quality of care measures may include communication skills, accurate diagnosis, investigations appropriately carried out, and appropriate advice on self management or medication.[21] Six randomised controlled trials reported quality of care outcomes (see table F on bmj.com).[11–13 15–17] Heterogeneity of measures used meant that analysis was restricted to qualitative review only. Nurse practitioners seemed to identify physical abnormalities more often.[13] In one study nurse practitioners gave more information to patients.[11] Interestingly this study also reported no apparent difference in patients' intention to self treat next time. Nurse practitioners made more complete records and scored better on communication than did doctors.[16 17] They also offered more advice on self care and management.[11 12] Two studies set in emergency departments tested the appropriateness of investigations and ability to interpret *x* ray films.[16 17] The results suggested that nurse practitioners were as accurate as doctors at ordering and interpreting *x* ray films, with small in-study variations depending on the relative experience of both providers.

Discussion

Nurse practitioners can provide care that leads to increased patient satisfaction and similar health outcomes when compared with care from a doctor. Nurse practitioners seemed to provide a quality of care that is at least as good, and in some ways better, than doctors.

Although all of the randomised trials found no significant differences between doctors and nurse practitioners in health outcomes, the research has important limitations. The studies used many different outcome measures, reflecting the difficulty in measuring changes in health outcomes after single consultations predominantly about minor illnesses. None of the studies in our review was adequately powered to detect rare but serious adverse outcomes. Since one important function of primary care is to detect potentially serious illness at an early stage, a large study with adequate length of follow up is now justified.

Limitations of the review

Ambiguity exists over the use of the term "nurse practitioner," with much debate about this role.[22 23] The overlap between nursing roles in the United Kingdom and the introduction of another advanced practice nursing title, nurse consultant, adds to the difficulty in understanding the role definitions in nursing.[1 2 24] Although specific training for nurse practitioners is available, the content of this varies.[25] Because of this ambiguity, the definition used in our review was purposefully inclusive.

Our review was limited by the quality of the available studies. There were few recent randomised trials, and the larger number of observational studies were generally of poor quality. Because of these problems we based our conclusions primarily on the randomised trials, the more recent of which were of

oped countries (Europe, North America, Australasia, Israel, South Africa, and Japan) to increase its relevance for the UK system. Some studies concerned care provided at a single consultation, others concerned care over a period of time. We included both types of study, but we used sensitivity analysis to compare the results from these different types. Finally, we only included studies if they provided data about one or more of the following outcomes: patient satisfaction, health status, health service costs, or process of care measures (consultation length, number of prescriptions, investigations, referrals, admissions, return consultations, patient adherence, or measures of quality of care).

Identification of studies

We identified studies from searches of electronic databases and hand searches of recent editions of relevant journals, bibliographies, and reference lists of other reviews and papers.[6 7] We scrutinised the following databases with no language restrictions: Medline (1966-2001), Embase (1980-2001), CINAHL (1982-2001), science citation index, database of abstracts of reviews of effectiveness, national research register, Cochrane controlled trials register and the specialist register of trials maintained by the Cochrane Effective Practice and Organisation of Care Group. We used the Cochrane optimal search strategy for randomised controlled trials, with advice from university librarians. All educational centres offering training for nurse practitioners in the United Kingdom and nurse practitioner organisations in the United States, South Africa, and Australia were approached for any unpublished studies. We contacted authors of included studies for additional research and for missing data. Data were extracted by one reviewer (SH) and one of two other reviewers (EA or CS) working independently. Disagreements were resolved by discussion with the third reviewer.

Assessment of study quality

We assessed methodological quality on the basis of the criteria of the review group of the Cochrane Effective Practice and Organisation of Care Group. We did not calculate a composite score for study quality in view of the current debate about the validity of such scores.[8 9]

Data analysis

We conducted our analyses with Meta-View Rev-Man software version 4.1. We calculated odds ratios for dichotomous outcomes and standardised mean differences for continuous outcomes. We used random effects methods in the analysis because of the degree of heterogeneity of the studies. If standard deviations were not available we used the average standard deviation reported by other studies for that outcome. We used meta-analytic techniques to combine data from the randomised controlled trials where at least two studies provided data on a particular outcome. For the observational studies we compared the findings qualitatively. These studies were carried out in a variety of settings; many were small and had other methodological shortcomings, making quantitative synthesis inappropriate. We analysed studies set in emergency departments or minor injury units together and separately from those based in general practice owing to the degree of heterogeneity between these different settings.

We investigated heterogeneity by examining the results from studies conducted in differing settings, studies of individual consultations or care over time, and studies of nurse practitioners with different levels of qualification. We carried out sensitivity analysis to explore the impact of including or excluding studies where there was ambiguity regarding inclusion.

Results

Searches identified 119 potentially relevant papers, of which 35 reporting 34 studies fulfilled the inclusion and exclusion criteria. These papers comprised 11 randomised controlled trials (table A on bmj.com) and 23 observational studies (table B on bmj.com). Tables C and D on bmj.com show the quality assessment of the included studies.

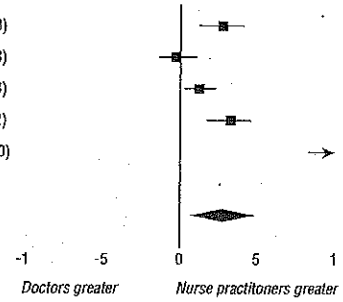
The results for the observational studies may be obtained from the authors. The findings of the observational studies replicated those of the randomised controlled trials for all outcomes except costs and investigations, despite shortcomings in their design.

Patient satisfaction

Nine randomised trials reported patient satisfaction (one of these was unpublished).[10-18] One paper could not be included in a meta-analysis owing to a lack of detail in the reporting of results.[15] Five trials reported continuous data on patient satisfaction (figure). These

Study	No of patients in nurse practitioner group	Mean (SD)	No of patients in doctor group	Mean (SD)	Weight (%)	Standardised mean difference (95% CI)
Kinnersley et al 2000[12]	334	68.6 (8.8)	403	65.9 (10.8)	22.7	0.27 (0.13 to 0.42)
Mundinger et al 2000[14]	644	4.45 (0.83)	389	4.46 (0.83)	23.4	-0.01 (-0.14 to 0.11)
Shum et al 2000[11]	635	78.6 (16.0)	657	76.4 (17.8)	24.0	0.13 (0.02 to 0.24)
Venning et al 2000[10]	388	4.4 (0.46)	390	4.24 (0.52)	22.8	0.33 (0.18 to 0.47)
Winter 1981[18]	25	94.78 (9.0)	25	74.03 (17.0)	7.1	1.50 (0.87 to 2.14)
Total (95% CI)	2026		1864		100.0	0.27 (0.07 to 0.47)

Test for heterogeneity χ^2=32.01, df=4, P<0.00001
Test for overall effect z=2.67, P=0.008



Studies reporting continuous data on patient satisfaction

Systematic review of whether nurse practitioners working in primary care can provide equivalent care to doctors

Sue Horrocks, Elizabeth Anderson, Chris Salisbury

Abstract

Objective To determine whether nurse practitioners can provide care at first point of contact equivalent to doctors in a primary care setting.

Design Systematic review of randomised controlled trials and prospective observational studies.

Data sources Cochrane controlled trials register, specialist register of trials maintained by Cochrane Effective Practice and Organisation of Care Group, Medline, Embase, CINAHL, science citation index, database of abstracts of reviews of effectiveness, national research register, hand searches, and published bibliographies.

Included studies Randomised controlled trials and prospective observational studies comparing nurse practitioners and doctors providing care at first point of contact for patients with undifferentiated health problems in a primary care setting and providing data on one or more of the following outcomes: patient satisfaction, health status, costs, and process of care.

Results 11 trials and 23 observational studies met all the inclusion criteria. Patients were more satisfied with care by a nurse practitioner (standardised mean difference 0.27, 95% confidence interval 0.07 to 0.47). No differences in health status were found. Nurse practitioners had longer consultations (weighted mean difference 3.67 minutes, 2.05 to 5.29) and made more investigations (odds ratio 1.22, 1.02 to 1.46) than did doctors. No differences were found in prescriptions, return consultations, or referrals. Quality of care was in some ways better for nurse practitioner consultations.

Conclusion Increasing availability of nurse practitioners in primary care is likely to lead to high levels of patient satisfaction and high quality care.

Introduction

Recent policy developments in the National Health Service, including NHS walk-in centres, NHS Direct, and nurse led personal medical services schemes, have been based on nurses rather than doctors acting as first point of contact with the health service.[1,2] Several factors have led to this expansion in the role of nurses, including issues of cost, the need to increase provision of care to improve access, the availability of doctors, and the skills and expertise of nurses.

Particular interest has been shown in the concept of nurse practitioners providing front line care in general practice and in emergency departments. In this way they may potentially substitute for doctors, particularly in the management of patients with acute illness. Nurse practitioners have undergone further training, often at graduate level, to work autonomously, making independent diagnoses and treatment decisions.[3] It is important to consider whether the evidence supports the notion that nurse practitioners can substitute for doctors by providing safe, effective, and economical front line management of patients.

Nurse practitioners have been established in North America for several decades, and studies of their role have been reviewed previously.[4,5] But these reviews are dated and of limited applicability to the United Kingdom. After the expansion of nurse practitioners in the NHS during the 1990s, several relevant randomised controlled trials have been published that directly compare nurse practitioners and doctors. We aimed to systematically review research that assesses the process, costs, or outcomes of care provided by nurse practitioners compared with doctors, working in primary care as a first point of contact for any patient with undifferentiated health problems.

Methods

Selection of studies for review

We included randomised controlled trials and observational studies with a prospective experimental design comparing nurse practitioners and doctors working in a similar way as concurrent controls. Because of inconsistency in the use of the term "nurse practitioner," we developed criteria to determine whether papers should be included. We included studies where nurses provided first point of contact, made an initial assessment, and managed patients autonomously, whether or not they were described as nurse practitioners. We used sensitivity analysis to examine the effect on our results of including or excluding "ambiguous" studies where inclusion was debatable.

We also included studies if the nurse provided care at first point of contact for unselected patients in primary care including general practice, out of hours centres, walk-in centres, and emergency departments. The main focus of our review was previously undiagnosed patients with undifferentiated health problems. We limited our review to studies from devel-

Division of Primary Health Care, University of Bristol, Bristol BS6 6JL
Sue Horrocks *research associate*
Chris Salisbury *consultant senior lecturer*
Faculty of Health and Social Care, University of West of England, Bristol BS16 1DD
Elizabeth Anderson *senior lecturer*
Correspondence to: C Salisbury
c.salisbury@bristol.ac.uk

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Additional tables and references appear on bmj.com

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given the substantial body of literature showing patients of nurse practitioners to be highly satisfied (Larrabee, Ferri, and Hartig 1997; Powers, Jalowiec, and Reichelt 1984; Carrino and Garfield 1995; Brown and Grimes 1995; Ramsay, McKenzie, and Fish 1982; Cintron 1983; Knudtson 2000; Bryant and Graham 2002). In the Phase 1 results, there was some indication that physician patients had higher satisfaction ratings for selected communication-related subscales, and these were attributed to a geographic move of the nurse practitioner office, which may have interfered with patients' perceptions of continuity, and to the higher percentage of native Spanish-speaking physicians than nurse practitioners.

To address the potential bias in sample selection, further study assessing the satisfaction or dissatisfaction of patients who have not recently visited a physician or nurse practitioner might be useful. Such a study would necessarily use a satisfaction instrument that relies on respondents' long-term memory and that would not query respondents about the last month or year of care.

It is possible that greater long-term improvement could have been achieved had the participants availed themselves of more frequent primary care during the 2-year follow-up period. In this study, the only way in which access to primary care was facilitated was to provide a referral to, and an appointment with, a PCP and to send a reminder regarding the initial visit to that provider. No additional reminders or educational interventions regarding the use of PCPs were supplied, and participants were not encouraged in any way to return to their assigned provider. A more aggressive intervention directed toward facilitating access to primary care and educating patients about the importance and value of primary care services might have resulted in greater utilization of primary care services and possibly greater long-term improvement in health status than was observed.

Despite the limitations of small sample size and a relatively homogeneous ethnic minority population, this follow-up study adds to the growing body of evidence supporting the equivalence of nurse practitioner and physician-delivered primary care outcomes. Additional research is needed to examine possible differences in the way these two disciplines deliver primary care and to determine the comparability of additional outcomes that might be more sensitive to those differences.

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room or urgent care center for primary care. During Phase 1, participants' use of emergency room/urgent care services declined from the prerecruitment level, and their use of primary care services increased. The lower rate of emergency room/urgent care utilization was sustained during Phase 2. This finding, which was consistent in nurse practitioner and physician groups, suggests that facilitating the receipt of follow-up by a PCP following an emergency/urgent care encounter may help to establish different, more appropriate, patterns of health care utilization, at least with respect to the inappropriate use of emergency room services.

The participants' disappointingly low rate of return to the assigned provider during the 2nd follow-up year was not surprising for several reasons. First, the study population is a transient one that engages in frequent relocation within New York City and frequent travel to the Dominican Republic for periods of 3 months or longer. Second, this population is likely to experience barriers that prove to be disincentives to using primary health care, even when Medicaid insurance is available. These barriers include language and literacy problems, and complex administrative and bureaucratic systems (Ku and Matani 2001; Minkoff, Bauer, and Joyce 1997). Third, the current Medicaid program in the section of Manhattan in which the vast majority of the participants live does not require a primary care gatekeeper, so it allows enrollees to switch PCPs, see specialists without referrals, and use the emergency room for nonemergent conditions. There was, therefore, limited incentive to return for primary care follow-up, particularly for those who did not define themselves as ill.

Measuring and interpreting patient satisfaction in this study posed challenges. For instrument validity purposes, the sample was limited to those participants who went to their assigned provider within the 2nd year of the study. This limitation was necessary, because the instrument used to measure satisfaction assumed the respondent had received care in the last year. However, it is very possible that by imposing this limitation—thereby eliminating respondents who switched providers or did not seek primary care in the 2nd year—we not only restricted the variability in the sample but, most important, may have systematically excluded study participants who were dissatisfied with their care.

The findings on patient satisfaction indicate that while no statistically significant differences appeared between nurse practitioner and physician patients, some differences—in visit-based continuity and communication—did exist, with p values approaching significance. It is possible that if the sample size were larger, the difference would become significant. The results indicating greater satisfaction with physicians in some subscales are surprising,

more "pure" intervention, or less clouded by the effect of other providers. However, it is also a potential bias into the study. Patients excluded from the analysis because they did not receive care only from their originally assigned provider type might have experienced different outcomes or may have been less satisfied with their care than those patients who adhered to the intervention. Furthermore, the decision to limit the sample resulted in a relatively small sample size and low statistical power for some variables, particularly the physiological and satisfaction measures. The sample size of 406 was sufficient to yield power of .80 at the .05 alpha level to detect a 2-point difference on the two summary scales of the SF-36. The power to detect between-group differences in number of primary care visits with this size sample is .68. Alternative approaches, such as an intention-to-treat analysis including all randomized participants, would have increased the statistical power. However, as noted above, such analyses would have greatly favored the null hypothesis—in our case the research hypothesis—by including participants who had changed practices during the study or had not had any contact with their PCP for 2 years. Nevertheless, the relatively low statistical power may have contributed to the finding of few nurse practitioner-physician differences.

The one 2-year outcome that differed for the physician and nurse practitioner patients was use of primary health care services during the 2nd year of the follow-up period. Although the physician and nurse practitioner groups did not differ in the frequency of primary care visits during the first 6 months or 1 year following their initial visit to the assigned provider, the physician patients made more primary care visits during the 2nd year. This unexpected finding was, in part, attributable to Medicaid insurance status, based on decreased differences when insurance status was controlled. Another contributing factor may have been that the nurse practitioner clinic was moved geographically to a site approximately two miles from the original one during Phase 2. Patients who found the new location to be inconvenient may have been less likely to continue with the assigned practice, either choosing not to pursue care or switching to a PCP who was unaffiliated with the medical center. Unaffiliated community providers were not included in the billing data that were used to measure health care utilization in this study.

The frequency with which the patients visited PCPs and specialists decreased over time. This change was not surprising, given the recruitment setting. Frequency of health care use would be expected to increase in the short run as the problem that led to the emergency room or urgent care center visit was followed up and treated, then ultimately to decrease following resolution of the problem or regularization of the treatment. Because of the eligibility criteria, participants recruited into the study reported no regular PCP, and many had displayed a prerecruitment pattern of using the emergency

versus 44.6 percent for physician patients), and a larger percentage of physician patients had 5 or more visits (23.9 percent versus 15.3 percent for nurse practitioner patients). Because insurance status is believed to be an important predictor of patient retention in primary care practices, we reexamined the physician-nurse practitioner group differences with insurance status controlled. The difference decreased slightly in magnitude but remained statistically significant.

During the entire 2-year period following the initial visit—that is, excluding the initial visit to the assigned provider—the participants in the study sample as a whole had an average of 5.97 follow-up primary care visits (SD = 5.59, range 1-32). Of these, an average of 2.09 (SD = 3.06, range 0-17) primary care visits occurred in year 2. Emergency room and urgent care services were used by 31.8 percent of patients during year 2, 29.6 percent of the patients used specialist services, and 9.8 percent of patients were hospitalized. Paired t-tests and chi-square analyses were used to compare the number of primary care, specialist, and emergency/urgent care visits and hospitalizations during the first and second years following recruitment into the study. Significant decreases in the mean number of primary care ($t = 13.777$, $p < .001$) and specialist visits ($t = 4.742$, $p < .001$) occurred during the second year. Primary care visits decreased from an average of 3.9 in year 1 to 2.1 in year 2, and specialist visits decreased from an average of 1.6 in year 1 to .96 in year 2. There were no significant changes in the number of emergency room/urgent care visits or hospitalizations between years 1 and 2. Patterns of change did not differ for nurse practitioner and physician groups.

DISCUSSION

The results of this 2-year follow-up study are consistent with findings from the first phase of the research, which indicated that outcomes of patients assigned for their primary care to a nurse practitioner practice do not differ from those of patients assigned to a physician PCP. Two years after their initial visit to the assigned PCP, nurse practitioner and physician patients reported similar levels of health status and satisfaction with care, and their utilization of specialists and emergency/urgent care resources, as well as the frequency of hospitalization, were equivalent.

While the results are consistent with other studies examining the quality of nurse practitioner-delivered care, they must be interpreted with caution. The participants in the follow-up study were those patients who returned at least once to the assigned primary care practice and who did not receive primary care from any other of the medical center's primary care practices during the 2-year follow-up period. Limiting the analysis to these patients provided a

TABLE 6 Number of Emergency Room/Urgent Care Visits and Hospitalizations ($N = 406$)

	1st Year					2nd Year				
	Nurse Practitioner ($n = 222$)		*Physician ($n = 184$)*		*Comparison*	*Nurse Practitioner ($n = 222$)*		*Physician ($n = 184$)*		*Comparison*
Emergency room/urgent care										
0	159	71.6	124	67.4	$\chi^2 = 7.066$	154	69.4	123	66.8	$\chi^2 = 2.522$
1	40	18.0	27	14.7	$p = .070$	39	17.6	34	18.5	$p = .471$
2	11	5.0	22	12		16	7.2	20	10.9	
3 or more	12	5.4	11	6		13	5.9	7	3.8	
Hospitalizations										
0	212	95.5	170	92.4	$\chi^2 = 1.743$	212	95.5	169	91.8	$\chi^2 = 2.317$
1 or more	10	4.5	14	7.6	$p = .187$	10	4.5	15	8.2	$p = .128$

TABLE 5 Mean Number of Annual Primary Care and Specialist Visits, Unadjusted and Adjusted for Medicaid Status ($n = 406$)

	1st Year				*2nd Year*			
	Nurse Practitioner (n = 222)	*Physician* (n = 184)	*Comparison*	p	*Nurse Practitioner* (n = 222)	*Physician* (n = 184)	*Comparison*	p
Unadjusted								
Primary care visits	3.60	4.22	$t = 2.001$	.05	1.76	2.50	$t = 2.453$	.02
Specialist visits	1.46	1.80	$t = 1.329$	.19	1.01	0.91	$t = -.482$	.63
Adjusted for Medicaid status								
Primary care visits	3.66	4.16		.11	1.82	2.43		.05
Specialist visits	1.49	1.76		.31	1.05	0.87		.40

	Comparison of 1st Year and 2nd Year for Entire Sample			
	1st Year	*2nd Year*	*Change (paired t-test)*	p
Primary care visits	3.88	2.09	13.777	.0001
Specialist visits	1.61	0.96	4.742	.0001

TABLE 4 Patient Satisfaction of Participants Who Had Primary Care During Year 2 ($N = 217$)

	Nurse Practitioner		*Physician*			
Subscale[a]	M	SD	M	SD	*Comparison*	p
Financial Access	72.69	26.65	73.75	23.13	$t = .242$	.809
Organization Access	68.15	16.35	67.59	15.47	$t = -.249$	.804
Visit-Based Continuity	90.80	16.56	94.41	14.06	$t = 1.667$	.104
Knowledge of Patient	65.44	18.61	69.01	17.79	$t = 1.364$	.174
Preventive Counseling	74.50	26.86	68.63	28.20	$t = -1.463$	.145
Integration	78.47	19.57	79.11	16.43	$t = .183$	.856
Interpersonal Treatment	82.05	18.13	84.95	15.93	$t = 1.203$	.231
Communication	80.87	19.20	85.03	15.84	$t = 1.678$	.103
Trust	75.05	13.08	75.72	12.52	$t = .368$	.713

a. As measured by Primary Care Assessment Survey, range of scores, 0 to 100 (100 = best).

ogical measures between 6 months and 2 years in either the nurse practitioner or the physician group.

Satisfaction with Care

Because of the time frame of the PCAS, satisfaction with care was measured only for the 217 nurse practitioner and physician patients who had returned to their assigned practice during the 2nd year of the study and had received primary care only from that practice. There were no significant differences in overall satisfaction with care received from the assigned PCP. The two groups did not differ on overall satisfaction or on any of the PCAS subscales (Table 4); however, two of the subscales—visit-based continuity and communication—approached statistical significance, with the physician patients scoring higher.

Health Services Utilization

Participants' utilization of health services during the 2nd year following their initial visit differed slightly from the patterns in the 1st year, during which no nurse practitioner-physician group differences occurred. In year 2, nurse practitioner and physician patients did not differ significantly on their use of specialist, emergency room, or inpatient hospital services (Tables 5 and 6); however, physician patients had higher primary care utilization than nurse practitioner patients (2.50 versus 1.76 visits). The difference was attributable to two patterns: a larger percentage of nurse practitioner patients had no primary care visits during year 2 (59.9 percent for nurse practitioner patients

TABLE 3 Physiological Measures at 6 Months and 2 Years

	6 Months					2 Years					Comparison of 6 Months and 2 Years for Entire Sample		
	Nurse Practitioner n = 66		Physician n = 54			Nurse Practitioner n = 70		Physician n = 64					
	M	SD	M	SD	Comparison	M	SD	M	SD	Comparison	6 Months	2 Years	Change (paired t-test)
Hypertensive patients											$n = 106$		
Systolic blood pressure	135.24	21.55	140.85	17.15	$t = 1.552$ $p = .123$	139	19.22	141.88	18.8	$t = .874$ $p = .384$	138.83	140.88	$t = -1.067$ $p = .288$
Diastolic blood pressure	83.35	12.66	85.29	13.06	$t = .828$ $p = .409$	85.89	12.10	88.14	12.33	$t = 1.068$ $p = .288$	$n = 107$ 84.92	87.52	$t = -2.024$ $p = .045$
Asthmatic patients											$n = 32$		
Peak flow	278.53	110.28	278.19	106.11	$t = -.012$ $p = .990$	292.82	94.2	319.90	136.56	$t = .915$ $p = .365$	285.59	298.09	$t = -1.043$ $p = .301$
	Nurse Practitioner n = 15		Physician n = 19			Nurse Practitioner n = 21		Physician n = 22					
	M	SD	M	SD		M	SD	M	SD				
Diabetic patients											$n = 32$		
Glycosylated hemoglobin	9.11	2.09	9.73	2.50	$t = .769$ $p = .448$	8.91	2.77	10.27	3.88	$t = 1.320$ $p = .194$	9.66	9.94	$t = -.697$ $p = .491$

TABLE 2 Self-Reported Health Status[a] ($N = 406$)

	Baseline					6 Months					2 Years				
	Nurse Practitioner (n = 222)		Physician (n = 184)			Nurse Practitioner (n = 200)		Physician (n = 165)			Nurse Practitioner (n = 222)		Physician (n = 184)		
Subscale	M	SD	M	SD	*Comparison*	M	SD	M	SD	*Comparison*	M	SD	M	SD	*Comparison*
Physical function	61.09	30.15	59.26	28.22	$t = -.629$ $p = .530$	65.09	28.39	64.04	27.93	$t = -.355$ $p = .723$	68.34	27.39	64.24	28.55	$t = -1.473$ $p = .142$
Role Physical	32.96	43.68	36.41	45.25	$t = .780$ $p = .436$	54.88	46.26	56.97	46.41	$t = .430$ $p = .668$	54.58	46.57	54.17	46.73	$t = -.089$ $p = .929$
Bodily Pain	39.82	31.44	43.03	29.48	$t = 1.053$ $p = .293$	54.11	33.17	53.41	32.88	$t = -.201$ $p = .841$	51.99	29.79	51.20	30.99	$t = -.261$ $p = .794$
General Health	41.17	23.85	42.75	23.26	$t = .672$ $p = .502$	50.76	22.97	49.74	26.16	$t = -.396$ $p = .696$	52.78	22.87	51.37	24.21	$t = -.603$ $p = .547$
Vitality	44.42	24.42	45.36	24.90	$t = .383$ $p = .702$	54.88	27.47	55.76	27.29	$t = .304$ $p = .762$	54.28	25.02	54.56	24.76	$t = .113$ $p = .910$
Social Function	55.28	27.91	58.36	27.20	$t = 1.115$ $p = .266$	71.94	27.55	71.67	25.90	$t = -.096$ $p = .924$	69.88	27.63	65.49	29.56	$t = -1.543$ $p = .124$
Role Emotion	42.53	47.89	43.57	48.22	$t = .216$ $p = .829$	55.67	47.51	57.98	47.27	$t = .464$ $p = .643$	52.41	48.19	54.51	46.87	$t = .440$ $p = .660$
Mental Health	50.22	25.30	52.51	26.00	$t = .896$	61.62	27.29	62.22	26.95	$t = .212$	59.91	23.80	57.24	23.23	$t = -1.136$
Physical Function summary	37.17	11.45	37.49	11.48	$t = .281$ $p = .779$	41.19	11.15	40.80	11.28	$t = -.333$ $p = .739$	42.11	11.35	41.21	11.96	$t = -.772$ $p = .441$
Mental Health summary	38.94	13.20	39.88	14.16	$t = .685$ $p = .494$	44.93	13.76	45.53	13.50	$t = .417$ $p = .677$	43.48	13.20	43.14	13.14	$t = -.255$ $p = .799$

Note: Some participants interviewed at 2 years were not interviewed at 6 months.
a. Measured by SF36, scores ranged from 0 to 100 (100 = best).

TABLE 1 Demographic Characteristics of Nurse Practitioner and Physician Groups ($N = 406$)

	Nurse Practitioner (n = 222)		*Physician (n = 184)*			
	Number	*Percentage*	*Number*	*Percentage*	*Comparison*	p
Age						
18-39	71	32.0	57	31.0	$\chi^2 = 0.27$	.87
40-64	128	57.7	105	57.1		
65+	23	10.4	22	12.0		
Gender						
Female	46	20.7	28	15.2	$\chi^2 = 2.004$	.15
Male	176	79.3	156	84.8		
Race						
Hispanic	208	94.5	163	89.6	$\chi^2 = 6.255$	.10
Black	10	4.5	14	7.7		
Other	2	1.0	5	2.7		
Target conditions						
Asthma	43	19.4	30	16.3	$\chi^2 = .641$	.42
Diabetes	23	10.4	24	13.0	$\chi^2 = .708$	.40
Hypertension	83	37.4	69	37.5	$\chi^2 = .001$	.98
Medicaid status at baseline						
Enrolled	194	87.4	176	95.7	$\chi^2 = 8.505$	.004
Not enrolled	28	12.6	8	4.3		

to 46.48, and in all cases $p < .001$). Within-subjects contrasts revealed that significant improvements occurred in all subscales and summary scores from baseline to 6 months and from baseline to 2 years. These improvements were expected because baseline data were collected just after an ER or urgent care visit. Significant changes from 6 months to 2 years were found only for two subscales: Social Functioning and Mental Health, both of which decreased. There were no significant group-by-time interaction effects, suggesting that patterns of change were similar in the nurse practitioner and physician groups.

When the physiological indicators of nurse practitioner and physician patients who were hypertensive, diabetic, or asthmatic were compared at 2 years following the initial visit, no significant differences were discerned between the nurse practitioner and physician groups in any of the measures (Table 3). It is noted that the glycosylated hemoglobin levels for the nurse practitioner and physician groups indicate that in neither group was diabetes

1998) to measure patient satisfaction. Subscales of the PCAS include Financial Access, Organizational Access, Visit-Based Continuity, Knowledge of Patient, Preventive Counseling, Integration, Interpersonal Treatment, Communication, and Trust. Scores are calculated for each subscale and are extrapolated to a range from 0 to 100. The developers of the PCAS have found each of the subscales to exhibit consistently strong reliability and validity.

Bilingual research nurses took blood pressures, peak flow readings, and drew blood to measure glycosylated hemoglobin for the hypertensive, asthmatic, and diabetic patients, respectively. The medical center provided billing data about participants' use of primary, specialist, emergency room, and hospital care for the 2-year period following the initial visit to the assigned PCP and 6 months prior to baseline. Data were analyzed using chi-square, *t*-tests, and repeated measures analysis of variance (SPSS-PC).

RESULTS

Characteristics of Study Sample

The 406 patients in the study sample for Phase 2 were largely middle-aged (mean age of 46.5 years), female (81.8 percent), Hispanic (92.3 percent), Spanish speaking (87.4 percent), and enrolled in Medicaid at baseline (91.1 percent). Fifty-nine percent of the participants had one or more of the targeted chronic conditions: hypertension, diabetes, and/or asthma. Nurse practitioner and physician patient groups did not differ in age, gender, ethnicity, or target conditions (Table 1). The only difference between the two groups was in the percentage who were enrolled in Medicaid at baseline, with patients in the physician group more likely to be enrolled.

Health Status

Consistent with the findings of Phase 1, there were no statistically significant differences between nurse practitioner and physician patients in their self-reported health status at 2 years, when measured with either the SF-36 subscales or the physical and mental health summary scores (Table 2). The study sample had mean baseline scores on the SF-36 summary scores that fell within the lowest quartile of national norms for the instrument (Ware et al. 1994).

Repeated measures analysis of variance was used to examine SF-36 subscale and summary score changes from baseline to 6 months and 2 years in the study sample of 406 participants. Within-subjects (time-related) effects were found for all subscales and summary scores (F values ranged from 12.11

percent vs. 18.1 percent, $p = .022$) and had lower mental health scores (39.37 vs. 41.72, $p = .042$) when compared with those who sought primary care from other sources. When compared with those who sought no primary care, the 406 patients who stayed with their original practice were significantly older (mean age 46.51 vs. 41.12, $p = .001$), more likely to be enrolled in Medicaid (91.1 percent vs. 81.6 percent, $p = .005$), and to be hypertensive (37.4 percent vs. 24.3 percent, $p = .012$). The patients lost to follow-up were more likely to be male (29.1 percent vs. 18.2 percent, $p = .000$) and not enrolled in Medicaid at baseline (17.8 percent vs. 8.9 percent, $p = .000$). Chi-square analyses and t-tests were run to compare the nurse practitioner patients lost to follow-up ($n = 237$) with the physician patients lost to follow-up ($n = 168$). No significant differences were found with respect to baseline demographics or self-reported health status. Chi-square analyses and t-tests were also run to examine potential differences between the nurse practitioner and physician patients who were interviewed at Phase 2 but did not stay with their originally assigned provider. No significant differences were found for their baseline health status or most demographics, although nurse practitioner patients were slightly more likely to be Hispanic (94.3 percent vs. 88.9 percent, $p = .045$). The most consistent pattern across the above comparisons was the expected result that patients with health care insurance coverage were more likely than those without to continue seeking primary health care during the 2-year period; in analyses of health care utilization in which it was a highly relevant variable, insurance status was controlled statistically.

For the analysis of patient satisfaction, the sample was further limited to the 217 patients who had received primary care from the assigned provider during year 2 (12 to 24 months following the initial visit). The reason for this limitation was the validity of the data generated from the standardized instrument. Instructions were that the participant was to refer only to the previous year when answering the questions. The decision to limit the sample to only those patients who received the pure intervention during the previous year unfortunately resulted in a low statistical power to detect differences between the groups and increased the likelihood that the null hypothesis would be supported.

DATA COLLECTION AND OUTCOME MEASURES

Participants were permitted to choose the site of data collection: either in their homes, in a university office setting, or by phone. Data collection by bilingual interviewers consisted of the verbal administration of the Medical Outcomes Study Short–Form 36 (MOS SF-36) (Ware et al. 1993) to measure health status and the Primary Care Assessment Survey (PCAS; Safran et al.

percent could not be located, 1.2 percent were unable to complete the interview, and 10.4 percent refused. The response rate was consistent with that reported for other studies conducted in similar populations (DeLia, Cantor, and Sandman 2001; Marcus et al. 1998; Mickey et al. 1995; Pavlik et al. 1996). Regarding the 735 participants who were interviewed, the mean age was 46.6 years, 80 percent were female, 92.6 percent were Hispanic, and 91 percent had been enrolled in Medicaid at baseline.

According to medical center billing data, the 735 patients who completed Phase 2 displayed four different patterns of primary health care receipt during the 2 years following their initial visit to the practice to which they were assigned: (1) 406 (55.2 percent) returned only to their originally assigned practice for primary care services after the initial visit, (2) 169 (23 percent) received primary care from the assigned practice and at least one other practice, (3) 57 (7.8 percent) sought primary care only from other practices, and (4) 103 (14 percent) did not receive any additional primary health care from a medical center practice. The latter participants gave reasons such as the following: not being sick (51.8 percent), experiencing financial barriers to seeking care (18.5 percent), or being dissatisfied with their care (3.2 percent). The dissatisfied participants were evenly distributed between nurse practitioner and physician groups.

The present analysis is limited to the 406 patients who received primary care only from the assigned practice and made at least one follow-up visit to that practice during the 2 years following the initial visit. This subsample was the only one that received the treatment as assigned and in which the effect of the treatment could be isolated. Because the focus of the study was to compare outcomes of patients receiving primary care from a nurse practitioner or a physician, it seemed prudent to eliminate patients who had, in essence, contaminated the treatment by crossing over from one type of PCP to another. To have included all participants in an intention to treat analysis would have provided a more conservative estimate of the effect of the intervention and thus would have increased the likelihood of finding no difference. Because we were testing a hypothesis of no difference, we did not want to employ any device that would increase the chance of such a finding.

Demographics and baseline summary SF-36 scores were compared for the 406 patients to the remaining patients who did not receive the sustained intervention with (1) those who received primary care from other providers, either from the assigned practice in addition to another practice or only another practice ($n = 226$); (2) those who did not receive any additional primary care ($n = 103$); and (3) those lost to follow-up ($n = 405$). Chi-square analysis and t-tests revealed that the 406 patients who consistently stayed with their originally assigned practice (the present sample) were less likely to be diabetic (11.6

hospital located in New York City in a predominantly Hispanic neighborhood. To be eligible, they must have presented with a nonemergent medical condition and reported that they did not have a regular primary care provider (PCP). If they agreed to participate, they were randomly assigned to primary care follow-up at one of the medical center's ambulatory care clinics (either a nurse practitioner clinic or one of five physician clinics) and were given an appointment with the designated provider. While their initial assignment was to a specific provider within the nurse practitioner or physician practice, patients were free to switch providers within the practice type to which they were assigned.

The Phase 1 study sample was composed of the 1,316 patients who kept their initial appointment with the PCP to whom they were assigned. Patient outcomes were measured 6 months after the initial visit to the assigned provider. Results were that the two groups did not differ in health status at 6 months or in any of the health service utilization variables (primary care, specialist, or emergency room visits or hospitalizations) at 6 months or at 1 year. The two groups did not differ in satisfaction following the initial visit, but physician patients reported statistically higher average scores on one dimension of satisfaction (provider attributes) at 6 months. There were no nurse practitioner-physician differences in either peak flow or glycosylated hemoglobin values at 6 months; however, diastolic blood pressure was significantly lower in nurse practitioner patients. Both of the statistically significant differences were too small to be considered clinically significant. The conclusion was that patient outcomes were comparable for nurse practitioner and physician patients.

PHASE 2 METHOD

SAMPLE

The goal at Phase 2 was to collect 2-year follow-up data from as many of the Phase 1 participants as possible. The eligible sample for Phase 2 was composed of the 1,140 participants who were recruited into Phase 1 beginning January 1, 1996. (Research funding was secured for Phase 2 in 1997, at which point the 176 patients who were recruited in 1995 had already passed the point of their 2-year anniversary and thus were ineligible for follow-up.) Attempts were made to contact all of the eligible participants by mail, then phone calls and/or home visits were made to arrange and carry out data collection.

Of the eligible patients, 735 (65.7 percent) were located and interviewed for Phase 2. A total of 405 participants were lost to follow-up. Of these, 88.4

CONCEPTUAL FRAMEWORK

The conceptual framework for both original and follow-up studies was based on a combination of Donabedian's (1988) structure-process-outcome model and conceptualizations and studies of professional socialization (e.g., Hall 1975, 1983; Hardy and Conway 1978). Donabedian's model provided the broad logical umbrella linking structural elements—including the background and education of the providers; the characteristics of patients served; resources available; and the organizational context of policies, interactional patterns, and expectations in which care is provided—to processes and outcomes of care. The import of the context for practice is underscored by Moscovice's (1978) finding that the practice setting exerted a stronger influence on patterns of primary care than did level of training when registered nurses and family nurse practitioners were compared.

Professional socialization theory asserts that during the process of being educated in a profession, the trainee is indoctrinated not only with the substantive knowledge that is needed to practice the profession but also its worldview, norms, and values. The process of socialization involves both formal and informal interactions and is ongoing. During the basic phases of their education, nurses and physicians are socialized to view patients, health, and illness somewhat differently. Physicians, educated according to the medical model, tend to adopt a more biological explanation of illness and to take a system- or disease-specific orientation, whereas nurses tend to view the patient from a biopsychosocial perspective, which emphasizes the whole patient in a family and community context and stresses illness prevention. However, nurses who go beyond their basic professional education and are educated at the master's level to be advanced practice nurses (for the purposes of this study, nurse practitioners) receive an additional overlay of powerful socializing experiences that are more akin to medical education in that they focus on diagnosis and treatment of illness. Because nurse practitioners and physicians receive many of the same socializing influences, it is reasonable to hypothesize that they would practice similarly and achieve similar patient outcomes. The prediction of no differences was also underpinned by the structural similarities between the two types of practices in the patient populations served and the organizational context, which was identical.

PHASE 1 OVERVIEW: METHODS AND KEY FINDINGS

Study participants were recruited into the study in 1995-1997 from the emergency room and urgent care center of an urban academic medical center

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In 2000, Venning et al. examined cost- effectiveness of general practitioners and nurse practitioners in primary care. No significant differences were found in prescribing or health outcome for the two groups. Patients were more satisfied with nurse consultations, even when length of consultation was controlled for. The authors concluded that outcomes of care and cost were similar between the two groups; if nurses could reduce consultation time and return rate they could become more cost effective

Although individual studies do contribute to evidence about the effectiveness of care between doctors and nurses, the most robust evidence is in the form of systematic reviews and meta- analysis, of which there are relatively few examples. Thus, it is difficult to make firm generalizable or internationally based conclusions from the literature. It is clear, however, that randomized studies, in specific areas of advanced nursing practice, do support the view that nurses can provide care at least equivalent to doctors, although the full cost/benefit implications of this are not clear with the evidence currently available. It should also be noted that in some cases the outcome measures utilized for these studies are short term and it is not clear what the long term benefits are. Kitzman & Groth (2003) report research studies that include long term outcomes of advanced practice nursing. These studies indicate that long term outcomes of care from advanced practice nurses compared to traditional services, when the diagnosis is already established, are at least equally good to traditional services.

ECONOMIC IMPLICATIONS

The economic evaluation and implications of doctor/nurse skill- mix and advanced-practice roles have been reported (Kernick and Scott 2002), and frameworks within which this could be assessed have been published (Carroll and Fay 1997; Vincent 2002; Kernick and Scott 2002). The estimation of costs when the services of advanced practitioners are under-utilized has also been proposed (Nichols 1992). A number of recent of economic evaluations have been undertaken to examine the cost-effectiveness of specific nurse-led services. The results of these studies are mixed and the implementation of nurse-led services are reported variously as cost neutral, higher cost, or lower cost ((McGrath 1990).

TRANSITIONING TO A NEW HEALTHCARE DELIVERY SYSTEM

Linking outcome data with cost data is one method for illuminating the value of nurse practitioner practice. If clinical outcomes for nurse practitioners are similar or better than other health-care providers and costs are less, then nurse practitioners could become the preferred provider for these services and establish the value of nurse practitioner practice. Similarly, if costs and outcomes are comparable, customer satisfaction will be an advantage. By specifying cost-effective areas, nurse practitioners can identify market niches, seek out business possibilities, and develop strategies for obtaining desirable new business.

It is imperative that NPs document the cost effectiveness of care in order to receive recognition and support. The most cost-effective providers are likely to also be the most marketable, and the savviest at reimbursement through third-party payers, and thus the most successful.

AUTHOR INFORMATION

Paul J. Carruth, Ph.D., CPA is a Professor of Accounting at Southeastern Louisiana University. He can be reached at Southeastern Louisiana University, School of Business, SLU Box 10468, Hammond, LA. He has written extensively about healthcare issues. E-mail: pcarruth@selu.edu

Ann K. Carruth, DNS, RN is a Professor of Nursing and Interim Dean at Southeastern Louisiana University. She can be reached at Southeastern Louisiana University, School of Nursing & Health Sciences, SLU Box 10781, Hammond, LA 70402. She too has written extensively about healthcare issues. E-mail: acarruth@selu.edu

coverage, it is speculated that the health of the disadvantaged population will not improve nearly as much as that of the advantaged population. Recent experience in Massachusetts confirms that limited PCP capacity undercuts the effect of expanded insurance coverage (Kowalczyk, 2009; Steinbrook, 2008).

Increasing health care visits will result in the need to increase PCP or mid-level providers' office efficiency. A more efficient office has lower operating expenses and allows providers to see more patients in a day without decreasing quality. Reduced expenses, in turn, raise providers' incomes and encourage more medical students, physician assistants and nurse practitioners to become providers. As a result of expanded coverage, a lack of PCP availability means newly insured will have difficulty finding a regular source of primary care.

EFFECTIVENESS OF NURSE PRACTITIONERS IN PROVIDING HEALTHCARE

Nurse practitioners (NPs) are a large part of the healthcare delivery workforce (Cooper, Laud, & Dietrich, 1998) and have been shown to provide quality, cost-effective care associated with high degrees of patient satisfaction (Hayes, 2007; Pinkerton & Bush, 2000). Extensive documentation indicates that for most healthcare situations, prevention and early access to care is more cost effective than treatment for chronic illnesses caused by lifestyle choices.

Researchers have compared the quality and effectiveness of care provided by NPs with that given by physicians. Recent studies compared outcomes of care provided by nurse practitioners with those of physicians and found no significant differences in health status, physiological measures, patient satisfaction, or health-service utilization (Brown & Grimes, 1995; Mundinger et al., 2000; Paez & Allen, 2006).

In addition, NPs are highly skilled in providing comprehensive assessments, which result in clinical decisions that are safe as well as cost effective (Mundinger et al., 2000). Other studies have reported both favorable outcomes associated with the utilization of NPs in acute care settings, especially as reflected on reduced length of stay and hospital costs (Cowan et al., 2006).

Others have reported similar NP cost-effective patterns associated with medical prescriptions. Researchers have found that the NP model for drug prescriptions is cost effective in various settings (Cowan, et al, 2006; Chen et al, 2009; Murphy et al, 2009). More research is need, however, on the patterns and prevalence of drug utilization among NPs in primary care practices.

Research supports that NP delivered care is cost-effective. Unique in healthcare, NPs respond to evolving trends that include wellness and consumer based health care demand. Many studies have documented the effectiveness of nurse practitioner care. Providers who deliver superior outcomes at comparable costs are at a competitive advantage in any health-care system. In a watershed study, the Office of Technology Assessment (1981; 1986) found that NPs provided equivalent or improved medical care compared to physicians. The mean 2009 salary for NPs across disciplines in the US was $90,200 (American Academy of Nurse Practitioners [AANP], 2009). This is significantly less that than the median compensation for primary care physicians.

Numerous studies have demonstrated the cost savings of NP managed clinics (Chen, McNeese-Smith, Cowan, Upenieka, and Afifi, 2009; Chenowith, Martin, Pankowski, and Raymond, 2005; Chenowith, Martin, Panowski and Raymond, 2008; Hunter, Ventura, and Keams, 1999; Paez and Allen, 2006; Sears, Wickizer, Franklin, Cheadie, and Berkowitz, 2007). According to the American Medical Group Association (2009), the mean salary for family care MDs was $198,000 and internal medicine was $205,000, substantially more than NPs. Research has shown that when productivity measures, salaries, and costs of education are taken into consideration, NPs are cost effective providers of health care. This is especially relevant in rural areas where there is critical shortage of MDs.

A number of previous literature reviews of the role of advanced practice nurses (APNs) in primary care settings have suggested that nurses can provide care which is equivalent to that provided by doctors in these settings. Research in Europe supports the theory that patients were generally more satisfied with consultations from nurse practitioners than with doctors. These findings were supported by published randomized controlled trials (RCTs).

the NPs space, certain support personnel salaries, and equipment are all fixed costs. Chart supplies and disposable supplies are examples of variable costs. As a practice increases the number of patients seen during a set period of time, more supplies are needed, thereby increasing the amount of money the practice spends to treat patients. In a cost analysis, cost data such as financial statements are examined and categorized. The categories should have the following elements: the categories must be relevant to the situation; the categories should be distinct and not overlap; and the categories must cover all possibilities (Finkler & Hanson 1995).

Salaries and benefits and other compensation for staffing are often placed in one category, and all costs for supplies in another category. On the other hand, focusing on operations is another approach where costs can be classified based on the function or activity for which the resources are used. (West, West & Malone, 1998). Arbitrary allocations are avoided, and costing accuracy is improved because inputs are linked to the resources of the corresponding activities, such as scheduling patient visits, meeting with pharmaceutical representatives, checking in new patients, and assessing and treating patients. Monetary value can be assigned once all cost data have been identified and categorized. In most instances, market prices yield a reasonable estimate of opportunity costs (Luce et al. 1996). Depreciation must be calculated when determining costs for capital goods. Labor costs are separated into hourly wages, and fringe benefits should be separated from wages. Replacement costs should also be included in the cost analysis (Finkler & Hanson 1995). When all costs have been identified and valued, they are totaled and an efficiency analysis is performed.

Most cost analyses in health care use gross cost-estimation methods (Finkler & Hanson 1995). In this method, all costs are totaled and indirect costs are arbitrarily allocated to services or products. A cost-per-patient or cost-per-visit ratio by the NP is determined by calculating the total costs of production and dividing this figure by the total number of patients or patient visits. Gross costing is often simpler and more straight-forward to calculate but the arbitrary allocation of indirect costs can result in cost distortion and faulty conclusions about profitability. In attempting to reduce or control costs, health-care executives could incorrectly reduce or eliminate activities or services that appear to be unprofitable (West & West 1997). For gross costing, total costs are divided by the total number of the clients or client visits that are NP specific to obtain a cost-per-patient or cost-per-visit ratio. In the case of NPs, however, activity-based costing may be more useful because the care involves more than one functionality. This type of costing, however, requires a detailed inventory and measurement of resources used, and is time-consuming. To improve accuracy in estimating resource consumption by avoiding arbitrary, total indirect cost allocations must be determined. These costs would need to be categorized into cost pools representing various resources, and activities associated with those resources identified. These activities are known as cost or activity drivers (West & West 1997). An example would be the time that NPs spend on different types of client visits. The time necessary for NPs to perform an annual pap and pelvic examination may be substantially different than the time needed for NPs to perform a wellness visit. In each case, the cost of production will be affected by the amount of time and the salary and benefit cost of the NP. Once all costs are identified and linked to an appropriate activity, a summary measure is obtained for each activity. Direct and indirect costs are summed to obtain the total cost, and a cost-per-client or client visit is calculated. Understanding and managing operational costs are crucial in attaining financial stability. With the anticipated increase in insured Americans entering the health care system, cost analysis of NPs will continue to be significant in establishing their role in providing affordable access to more Americans.

THE IMPACT ON EXPANDED COVERAGE TO MORE U.S. CITIZENS

If preventive and chronic care reduced costly urgent events, why do costs continue to rise? First, good-quality preventive and chronic care, though cost-effective, do not in general reduce costs. Second, improved chronic and urgent care extends the lives of persons who often have costly conditions (Kaiser Family Foundation, 2009). Costs have been found to be 42% lower for intermediate and skilled care residents and 26% lower for those with long-term stays (Hummel and Pirzada, 1994). Third, higher care utilization resulting from increased coverage and quality of care reduces the availability of sufficient numbers of physicians, especially for disadvantaged patients.

As a result of these issues, minor acute events that would otherwise have resulted in a visit to a Primary Care Physician (PCP) increasingly shifted to more costly care in hospital emergency departments. Overloaded physicians and the inability to obtain timely care, are at the root of strain on the health care system. Because physicians lack the capacity to improve preventive and chronic care for all of the additional patients who obtain

opposes increasing autonomy of NPs, regulatory changes are inevitable given the enactment of the new Affordable Care Act of 2010.

The need for healthcare reform was prompted by an imperative to reduce the relentless increase in spending on medical care in the United States. Changes in health care delivery are expected since more Americans will be insured and will be able to seek care from approved providers. It is estimated that 32 million newly insured Americans will enter the system by 2014. In addition, the predicted 40,000 primary-care doctor shortfall by 2020 will further drive up the need for more NPs or other physician assistants.

TRENDS IN NUMBER OF NPs

For at least a decade, the United States has experienced worsening workforce shortages in the health professions. The American Association of Medical Colleges projects a nationwide shortage of 45,000 primary care physicians by 2020, and shortages are predicted in all other health disciplines including nursing, oral health, and behavioral health.

The physician workforce is aging. Many physicians are nearing retirement just as the growth of an aging population and advances in technology contribute to a growing demand for physician services http://bhpr.hrsa.gov/healthworkforce), hence the growing demand for a strong NP workforce. According to the "National Sample Survey of Registered Nurses 2008: Initial Findings" there were an estimated 158,348 nurse practitioners with credentials as NPs in the United States. This represents an increase from an estimated 141,209 NPs in 2004 http://bhpr.hrsa.gov/healthworkforce/rnsurvey/.

CONSIDERATIONS FOR RETURN ON INVESTMENT

A cost analysis can provide critical efficiency information and an accurate understanding of cost structures necessary for appropriate treatment pricing, appropriate bidding for managed-care contracts and financial stability. Because more nurse practitioners work in offices and clinics, a comparison of production costs and efficiency can be evaluated (Vincent, 2002).

The concept of return on investments (ROI) should be used to examine cost effectiveness of care provided by nurse practitioners compared to other healthcare physician extenders, such as physician's assistants. Return on investment typically refers to short-term financial benefit, usually within 1-5 years of making a decision, secured in return for a short-term financial investment. Many physicians understand that once NPs are employed by their practice, they will require additional training. Benefits of investments are often characterized by cost reductions. The cost effectiveness analysis is the ratio of the net cost of an investment, in this case the cost of national healthcare, to a defined health outcome. A cost-effectiveness analysis of healthcare examines long – term cost savings and long term outcomes. When compared to other ratios, the lowest ratio is considered the most cost effective. In order for the government and other healthcare insurance carriers to feel that the return on investment is worthwhile, the current cost of healthcare must be offset by the improved health outcomes and long-term cost savings.

To evaluate the investment of using NPs in practice, a time frame for the analysis must be determined and financial data gathered. When conducting a cost analysis, the first step is to decide on the perspective, as costs included in the analyses will vary depending on the perspective selected. The most common types of costs used in cost analyses are direct and indirect costs, fixed and variable costs, and opportunity costs. Many of the costs associated with NPs involves salary. The average salary of NPs is considerably less than physicians, and significantly less than physicians who specialize. Data are examined using other cost categories. Direct costs are easily identified, are often controlled by the manager, and include all of the goods, services and other resources consumed in production. Examples of direct costs are laboratory equipment, supplies, personnel, diagnostic services and rent for office space (Finkler, Ward, Baker, 2007; Luce et al. 1996). Indirect costs, such as business overhead, can be more challenging to determine than direct costs. However, failure to take these costs into consideration can lead to erroneous cost-control strategies. Examples of indirect costs are housekeeping and other contracted services (Finkler, Ward, & Baker, 2007). Other cost categories are fixed and variable. Fixed costs do not vary with a change in the number of client visits or services provided, while variable costs do (Finkler, Ward, & Baker, 2007). Rent for

THE COST OF HEALTH CARE FOR ALL

U.S. health care is costly, fragmented, and complex. Each year, new technologies, medical devices, medications and procedures are added to the continuum of research to practice. Healthcare comprises approximately 1.4 trillion dollars or 15% of the Gross Domestic Product (Center for Medicare and Medicaid Services, 2005). Health care costs continue to rise at two-and-a half times the rate of inflation in the economy. Estimates indicate that by 2016, health care costs will reach 20 percent of the GDP. It is generally thought that healthcare in the U.S. is better than many industrialized countries. In fact, even though the U.S. per-capita expenditures on health care are 20 percent higher than any other nation, key health indicators such as infant mortality (23rd) and life expectancy (28th) are well below many other nations. The poor and uninsured are the most likely group to use the ED inappropriately for minor health complaints, because of a lack of or inadequate health insurance (Koska, 1989). Knowing this, healthcare insurance agencies are responding by examining ways to provide cost effective care. One way to save money is to shift costs to employees through premium increases, higher deductibles, and more out-of-pocket payments.

Hospital care and prescription drugs are responsible for much of the overall escalation in health care spending (Pear, 2004), and accounted for 30% and 11% of the total increase between 2002 and 2004, respectively (Smith, Cowan, Heffler, & Catlin, 2006). Expenditures on antibiotics make up approximately 15% to 30% of pharmaceutical costs, accounting for the largest proportion among drug categories (Ansari, 2001; Ansari, Gray et al., 2003).

Managed care has profoundly affected the delivery of health care in the United States in recent years. It was originally intended to provide cost-effective healthcare services (Council on Graduate Medical Education [COGME], 1997); Health Resources and Services Administration [HRSA], 1999). However, over time managed care has become associated with multiple financial arrangements with cost controls imposed by employer-paid health plans and insurance companies. This has influenced relationships, generated conflicts and ethical dilemmas, fostered negativity and created frustration. As a result many providers and consumers of health care distrust the system (Hayes, 2003; HRSA, 1999). Not unlike physicians, some difficulties arise because nurse practitioners do not understand the managed care system or the economic aspects of health care (Hayes, 2002, 2003). If NPs are unable to adapt to the demands of a constantly changing healthcare environment, or if they harbor negative attitudes about managed care, they may convey those attitudes to patients, thus fostering patient doubt about the adequacy of their NP-provided care.

ECONOMIC IMPACT OF MID LEVEL PROVIDERS AND THE ROLE OF NURSE PRACTITIONERS IN THE HEALTHCARE MARKETPLACE

The cost of health care doubled from 1990-2001 and is projected to double again by the year 2012 (www.prevent.org). Research supports that 50% of health-care expenditures are attributed to preventable lifestyle health behaviors. These lifestyle exposures contribute to many diseases including type 2 diabetes, hypertension, heart disease, stroke, and some forms of cancer and obesity. According to the Center for Disease Control and Prevention (CDC, 2002), each year at least 300,000 people die from illnesses associated with obesity; 440,000 die from illnesses attributed to cigarette smoking; and 40% of all deaths are caused by heart disease or stroke.

Nurse practitioners (NPs) are in a unique position to deliver high-quality care to meet the increase healthcare needs of the U.S. population. Although certain aspects of the nurse practitioner role may differ among various practices and populations, increasing competition for access to patients makes it incumbent on nurse practitioners to document the cost-effectiveness of their care (Vincent, 2002). NPs are health care providers who provide primary care, ambulatory care, acute care, specialty care, and long-term care. The NP role was created in 1965 as a response to shortages in trained physicians in the US. NPs rank as one of the fastest growing health-care professions. According to the American Academy of Nurse Practitioners, there are approximately 140,000 NPs qualified to practice. NPs are trained at the masters or doctoral level to provide care in a specialized area. NP students spend 600 hours or more training with MDs or NPs in their specialization. Boards of Nursing in each state regulate practice and grant state licensure once certification exams are passed. Most NPs work collaboratively with physicians. However, 11 states currently allow independent NP practice. While the American Medical Association

The Financial And Cost Accounting Implications Of The Increased Role Of Advanced Nurse Practitioners In U.S. Healthcare

Paul J. Carruth, Southeastern Louisiana University, USA
Ann K. Carruth, Southeastern Louisiana University, USA

ABSTRACT

On March 23, 2010, the Affordable Care Act became law. The need for healthcare reform was prompted by an imperative to reduce the relentless increase in spending on medical care in the United States. One approach to examining and solving the problem of escalating costs is to focus on applying proven principles of evidence-based practice and cost-effectiveness practices to find the least-expensive way to ensure clinical services of acceptable quality without sacrificing patient satisfaction. Advanced practice registered nurses (APRNs) have positioned themselves to serve an integral role in national health care reform. A successful transformation of the nation's health system will require utilization of all clinicians, including highly qualified APRNs, to provide cost-effective, accessible, patient-centered care. There is extensive, consistent evidence that nurse practitioners (NPs) provide care of equal or better quality at lower cost than comparable services provided by other qualified health professionals. However, current policies in many states prevent NPs from practicing within their full, legally defined scopes of practice. The Office of Technology Assessment's conclusions noted in 1981 that APRNs can be substituted for physicians in a significant portion of medical services with at least similar outcomes. Since then, numerous studies have supported that the care provided is equal to those provided by physicians for services within the overlapping scopes of licensed practice. This paper combines economic analysis with review of literature on health care reform initiatives to explore how the goals of healthcare reform can be accomplished by advanced nurse practitioners to provide their wide range of services directly to patients in a variety of clinical settings.

Keywords: Healthcare Reform; Mid-Level Providers; Healthcare Accounting

INTRODUCTION

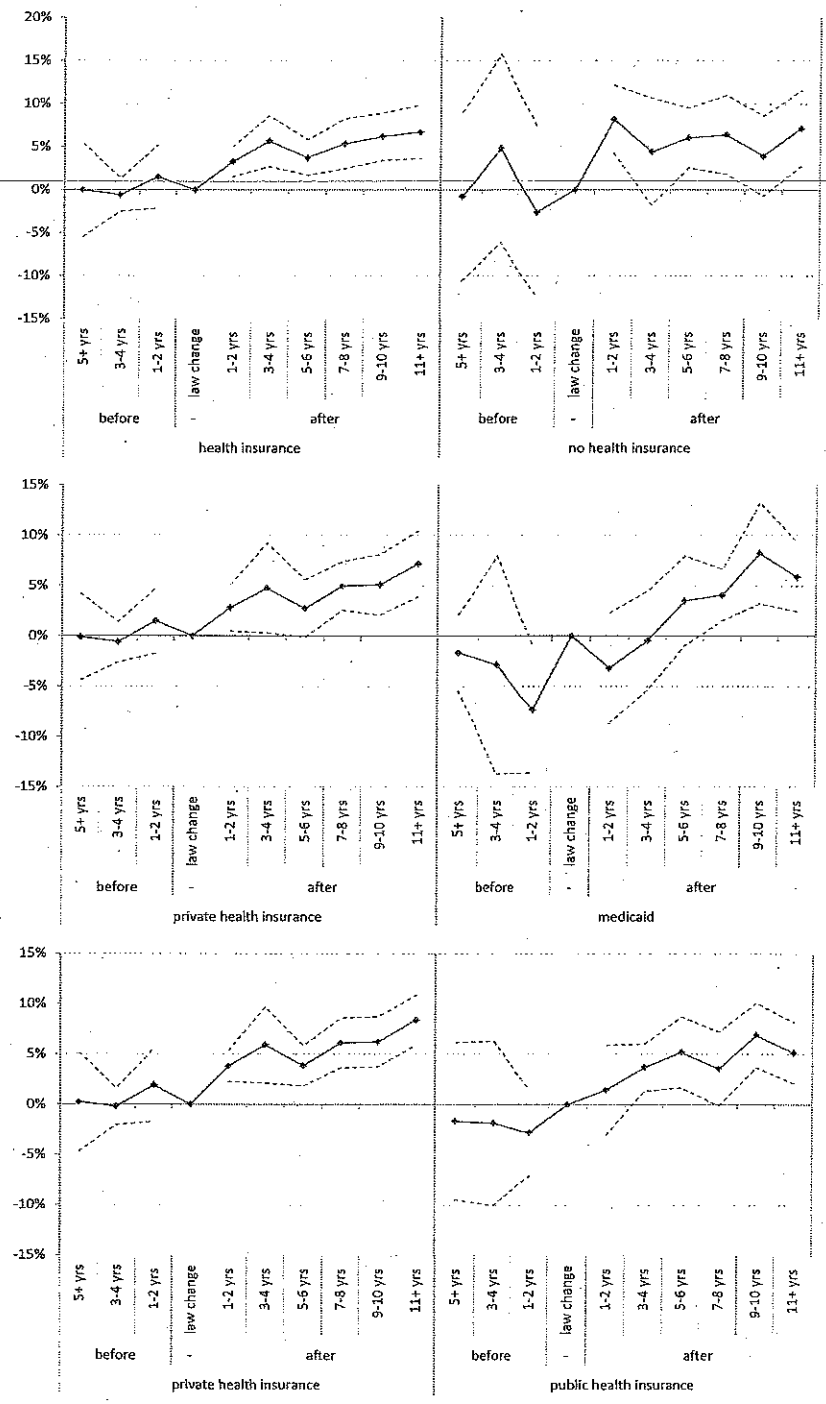
With tens of millions of uninsured or underinsured individuals in the U.S. combined with higher deductibles imposed from health insurance companies, the demand for cost-effective health care options is on the rise (McCallum and Jacoby, 2009). With the 2010 health care reform legislation, insurance coverage will be expanded for the entire population, advantaged and disadvantaged, causing the uninsured to drop significantly. One assertion made by this legislation is that U.S. citizens will receive improved quality of care as a result of expanded coverage. This will result in improvement in the effective management of disease and injury. On the negative side, health care costs will rise, especially among those who seek preventive and chronic care. This assertion is supported by Hadley and Holahan's statistical analysis indicating that extended coverage would increase health care spending by 3% to 6% (2003). As a result of the passage of this legislation, it is estimated that more than 32 million additional Americans will soon gain health insurance, and thus access to health care. This article analyzes the cost implications of using nurse practitioners (NPs) to address the rising need for new mid level providers under the new Affordable Care Act of 2010.

Table 10: Mechanisms and Sensitivity Analysis

	Physician Supply	Placebo Tests				State Trends			
Years relative to	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
full independence	GP Ratio	Any Dental visit	ln(Dental visits)	Any Opto. visit	ln(Opto. visits)	Checkup last year	Checkup last year	Checkup last year	Checkup last 2 years
5+ years before	0.00444*	0.00808	-0.00935	0.00521	-0.0784	-0.00158	0.0187	-0.00300	0.000832
	(0.00265)	(0.0333)	(0.0300)	(0.0163)	(0.0485)	(0.036)	(0.0235)	(0.0208)	(0.0177)
3-4 years before	0.00448*	0.00108	-0.00301	-0.00648	-0.0566	0.000432	0.00860	-0.00782	0.00386
	(0.00241)	(0.0297)	(0.0517)	(0.00991)	(0.0387)	(0.0175)	(0.0208)	(0.0168)	(0.0158)
1-2 years before	0.00156	0.0285	0.0360	0.00479	-0.0846**	0.00954	0.00866	-0.0229	0.000149
	(0.00204)	(0.0231)	(0.0241)	(0.0118)	(0.0421)	(0.0276)	(0.0257)	(0.0161)	(0.0102)
1-2 years after	0.000299	0.0129	0.0129	-0.00121	-0.0525	0.0396***	0.0216**	-0.0161	-0.00612
	(0.00112)	(0.0288)	(0.0606)	(0.0153)	(0.0473)	(0.0107)	(0.00953)	(0.0179)	(0.0112)
3-4 years after	-0.00131	0.0327	0.00191	0.0115	-0.0960**	0.0553***	0.0233	0.0122	0.0138
	(0.00163)	(0.0273)	(0.0384)	(0.0144)	(0.0430)	(0.013)	(0.0177)	(0.0216)	(0.0140)
5-6 years after	-0.00122	0.0495**	0.0524	0.00589	-0.0740	0.0410***	-0.00339	0.000381	0.00870
	(0.00182)	(0.0251)	(0.0363)	(0.0154)	(0.0454)	(0.0125)	(0.0236)	(0.0193)	(0.0135)
7-8 years after	-0.00262	0.0198	0.0580	0.000981	-0.0126	0.0554***	-0.00394	0.00475	0.00665
	(0.00258)	(0.0237)	(0.0348)	(0.0152)	(0.0509)	(0.0186)	(0.0359)	(0.0232)	(0.0175)
9-10 years after	-0.00189	0.0154	0.0135	0.0170	-0.0182	0.0581***	-0.00755	0.0170	0.0182
	(0.00293)	(0.0320)	(0.0388)	(0.0196)	(0.0474)	(0.0164)	(0.0399)	(0.0332)	(0.0237)
11+ years after	0.00250	0.0318	0.0342	0.00626	-0.0310	0.0680***	-0.00265	0.0265	0.0273
	(0.00317)	(0.0286)	(0.0393)	(0.0193)	(0.0599)	(0.0186)	(0.0553)	(0.0327)	(0.0233)
Observations	722	447,502	170,241	447,502	21,545	219,276	219,276	2,935,971	2,935,971
State Trends	No	No	No	No	No	No	Yes	Yes	Yes
Data Source	ARF	MEPS	MEPS	MEPS	MEPS	MEPS	MEPS	BRFSS	BRFSS

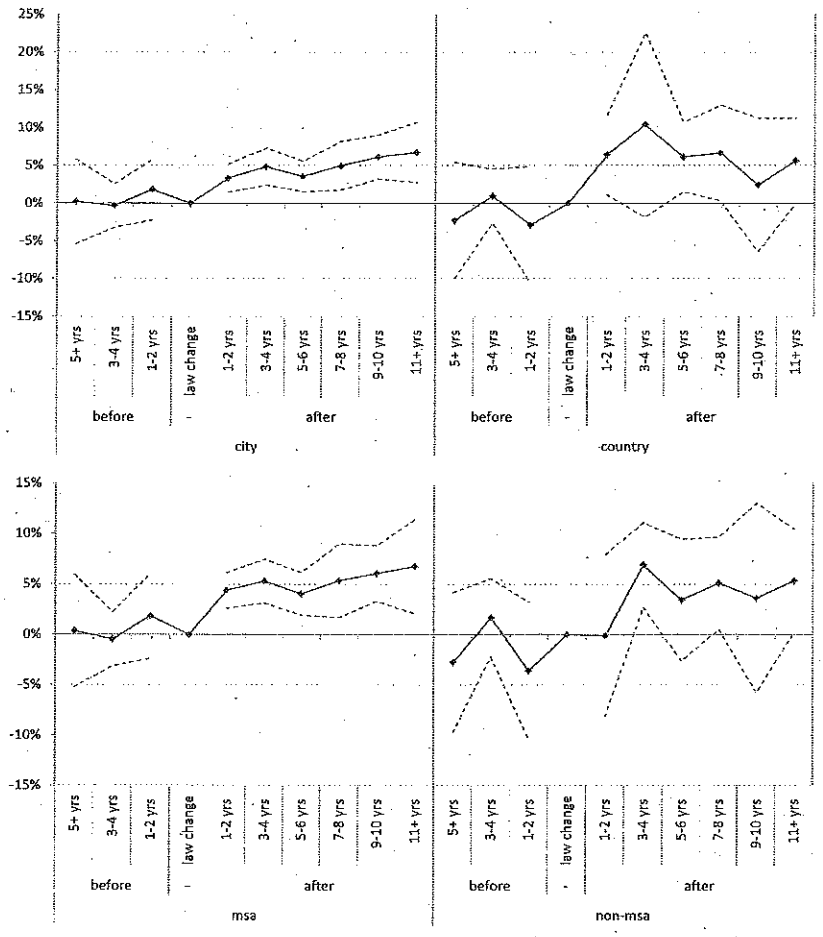
Regressions are estimates of equation (1) using data source listed at bottom. For MEPS and BRFSS data, regressions are weighted using provided sample weights. Columns (1), (3), and (5) are OLS regressions. Columns (2), (4), (6), (7), (8), and (9) are logit regressions and reported coefficients are average marginal effects. Dependent variable is listed at top and described in text. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels respectively. Standard errors in parentheses are Huber-White robust estimates clustered at the state level.

Figure 6: Heterogeneous Effects of NP Independence on Checkup Frequency: Insurance Status



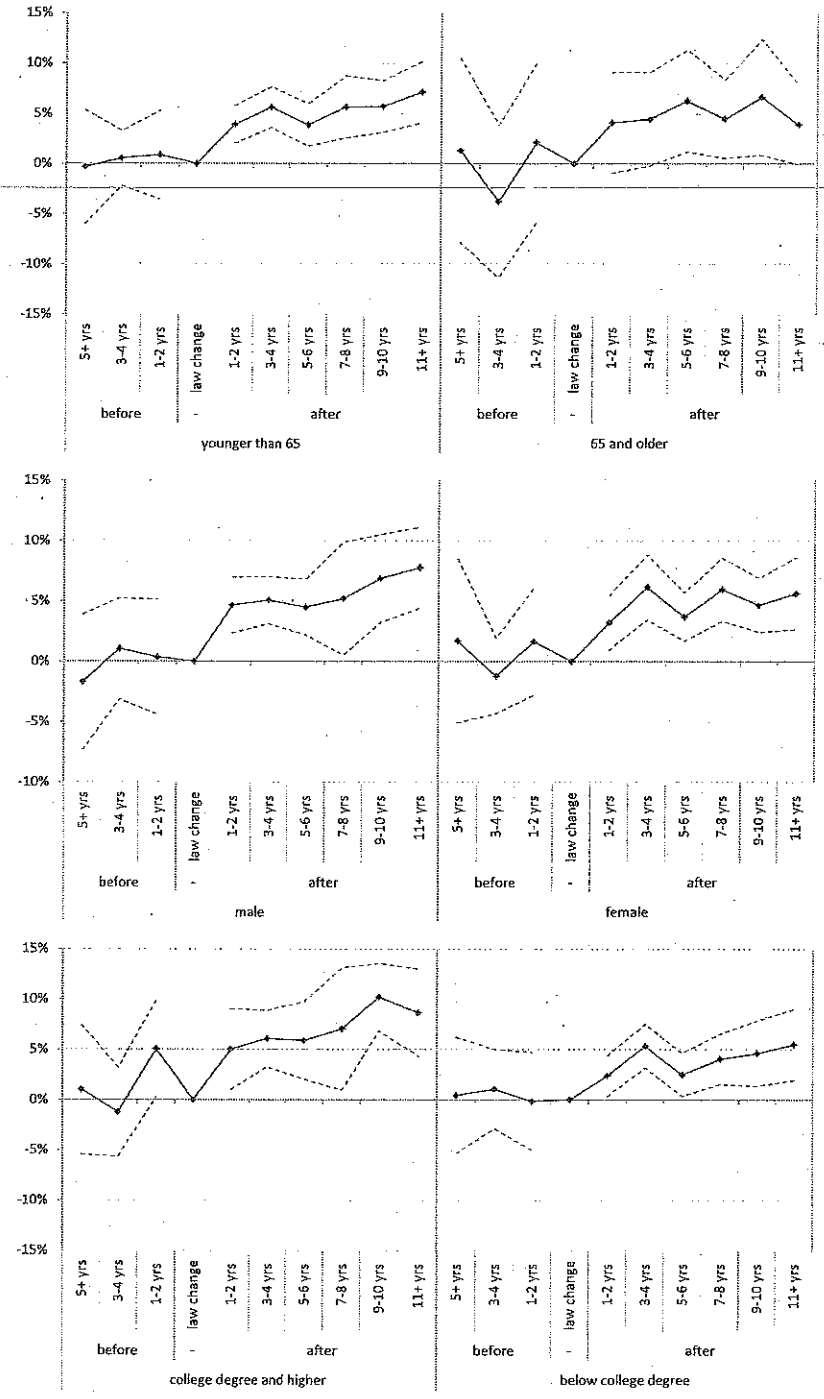
Graphs plot average marginal effects from event study logit regressions with dependent variable indicating if individual has had a routine checkup in past 12 months. Regression shown in first panel includes interactions of treatment effect dummies with indicators for whether individual has any form of health insurance/no health insurance; second panel, indicators for private health insurance/Medicaid; third panel, indicators for private health insurance/Medicaid or Medicare. Blue lines indicate point estimates of coefficients, and red dashed lines indicate 90% confidence intervals of estimates.

Figure 5: Heterogeneous Effects of NP Independence on Checkup Frequency: Geography



Graphs plot average marginal effects from event study logit regressions with dependent variable indicating if individual has had a routine checkup in past 12 months. Regression shown in first panel includes interactions of treatment effect dummies with indicators for whether individual lives in an urban/rural county according to USDA Economic Research Service 1993 Rural-Urban Continuum Code; second panel, indicators for whether individual lives in a metropolitan statistical area or not. Blue lines indicate point estimates of coefficients, and red dashed lines indicate 90% confidence intervals of estimates.

Figure 4: Heterogeneous Effects of NP Independence on Checkup Frequency: Demographics



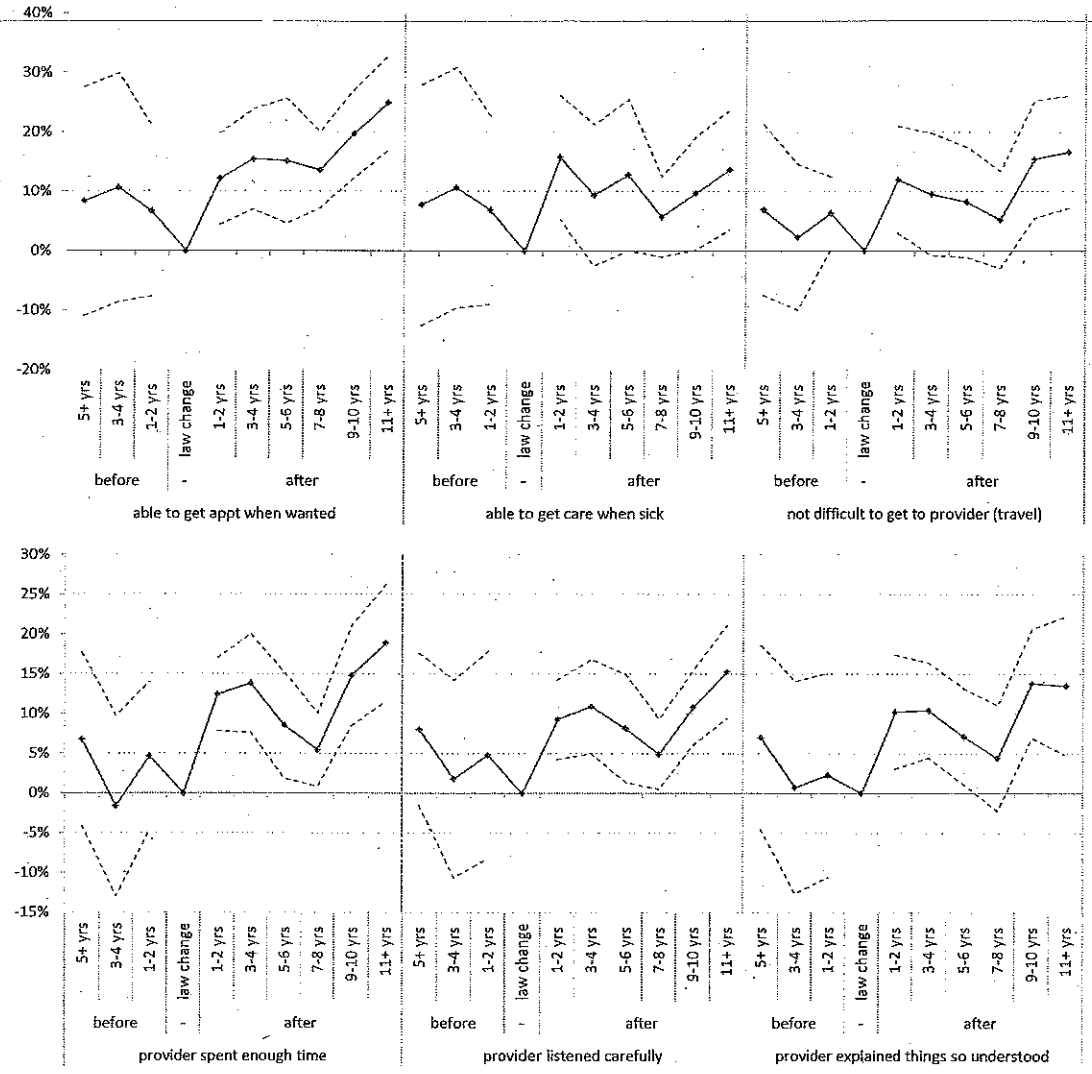
Graphs plot average marginal effects from event study logit regressions with dependent variable indicating if individual has had a routine checkup in past 12 months. Regression shown in first panel includes interactions of treatment effect dummies with indicators for whether individual is under/over age of 65; second panel, indicators for male/female; third panel, indicators for more/less than 16 years of education. Blue lines indicate point estimates of coefficients, and red dashed lines indicate 90% confidence intervals of estimates.

Table 9: ICD-9 Codes for Ambulatory Care Sensitive Conditions

ACS Condition and ICD-9-CM Code(s)	Comments
Congenital syphilis [090]	Secondary diagnosis for newborns only
Immunization-related and preventable conditions [033, 037, 045, 320.0, 390, 391]	Hemophilus meningitis [320.0] age 1-5 only
Grand mal status and other epileptic convulsions [345]	
Convulsions "A" [780.3]	Age 0-5
Convulsions "B" [780.3]	Age >5
Severe ENT infections [382, 462, 463, 465, 472.1]	Exclude otitis media cases [382] with myringotomy with insertion of tube [20.01]
Pulmonary tuberculosis [011]	
Other tuberculosis [012-018]	
Chronic obstructive pulmonary disease [491, 492, 494, 496, 466.0]	Acute bronchitis [466.0] only with secondary diagnosis of 491, 492, 494, 496
Bacterial pneumonia [481, 482.2, 482.3, 482.9, 483, 485, 486]	Exclude case with secondary diagnosis of sickle cell [282.6] and patients < 2 months
Asthma [493]	
Congestive heart failure [428, 402.01, 402.11, 402.91, 518.4]	Exclude cases with the following surgical procedures: 36.01, 36.02, 36.05, 36.1, 37.5, or 37.7
Hypertension [401.0, 401.9, 402.00, 402.10, 402.90]	Exclude cases with the following procedures: 36.01, 36.02, 36.05, 36.1, 37.5, or 37.7
Angina [411.1, 411.8, 413]	Exclude cases with a surgical procedure [01-86.99]
Cellulitis [681, 682, 683, 686]	Exclude cases with a surgical procedure [01-86.99], except incision of skin and subcutaneous tissue [86.0] where it is the only listed surgical procedure
Diabetes "A" [250.1, 250.2, 250.3]	
Diabetes "B" [250.8, 250.9]	
Diabetes "C" [250.0]	
Hypoglycemia [251.2]	
Gastroenteritis [558.9]	
Kidney/urinary infection [590, 599.0, 599.9]	
Dehydration - volume depletion [276.5]	
Iron deficiency anemia [280.1, 280.8, 280.9]	Age 0-5
Nutritional deficiencies [260, 261, 262, 268.0, 268.1]	
Failure to thrive [783.4]	Age < 1 only
Pelvic inflammatory disease [614]	Exclude cases with a surgical procedure of hysterectomy [68.3-68.8]
Dental Conditions [521, 522, 523, 525, 528]	

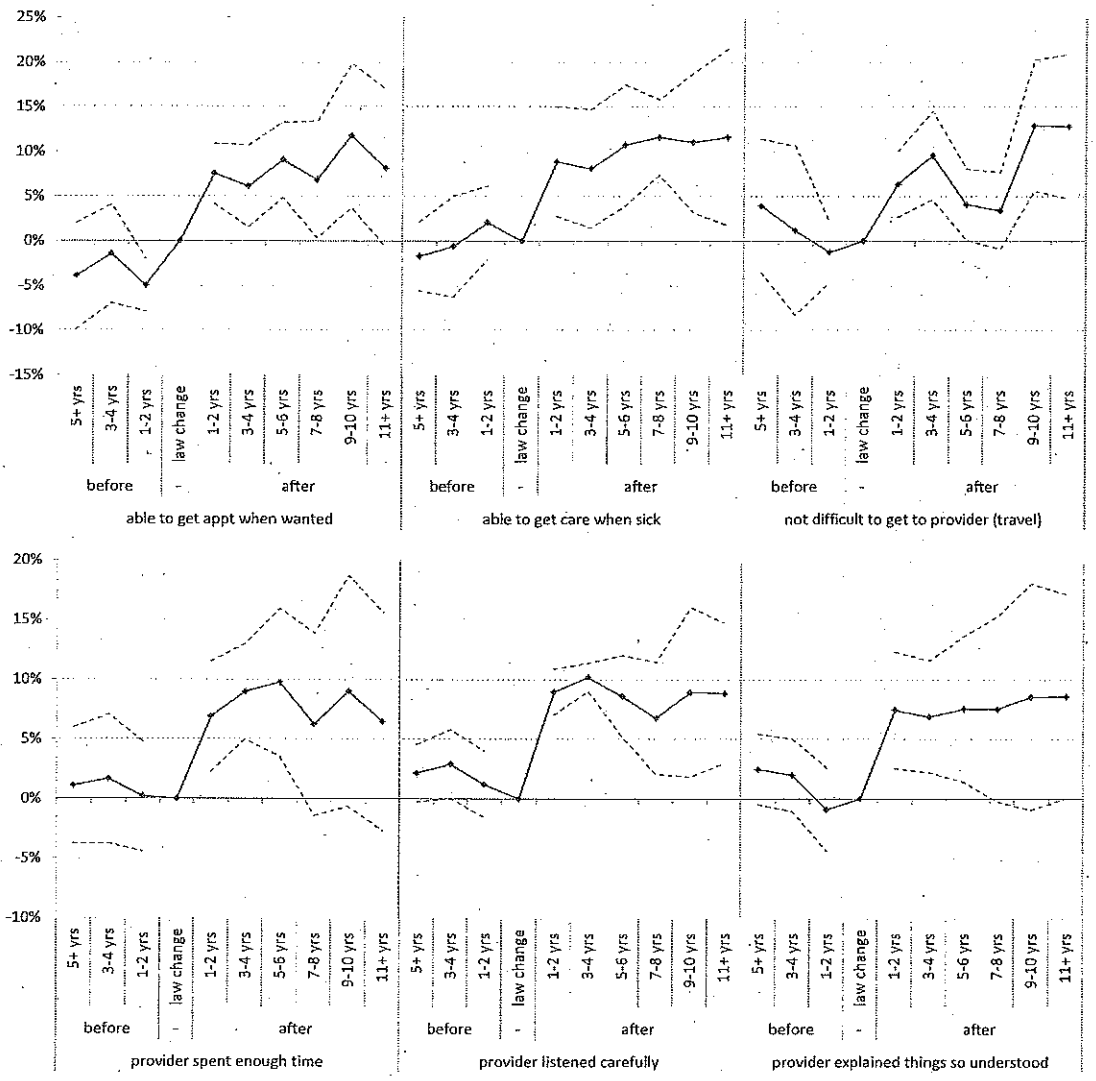
List of conditions and notes from appendix of Billings et al. (1993). We omit "skin grafts with cellulitis" as an ambulatory care sensitive condition from the list in Billings et al. (1993) because no ICD-9 code is provided to identify it.

Figure 3: Event Study Results: Children



Graphs plot average marginal effects from event study logit regressions with dependent variable listed at bottom of graph. First panel depicts results from columns (4)-(6) of Table6; second panel depicts results from columns (5)-(7) of Table 7. Blue lines indicate point estimates of coefficients, and red dashed lines indicate 90% confidence intervals of estimates.

Figure 2: Event Study Results: Adults



Graphs plot average marginal effects from event study logit regressions with dependent variable listed at bottom of graph. First panel depicts results from columns (1)-(3) of Table6; second panel depicts results from columns (2)-(4) of Table 7. Blue lines indicate point estimates of coefficients, and red dashed lines indicate 90% confidence intervals of estimates.

Table 7: NP Independence Effect on Patient-Reported Visit Quality

	Adults				Children		
Years relative to full independence	(1) Health Care Rating	(2) Enough Time	(3) Listen Carefully	(4) Explained Clearly	(5) Enough Time	(6) Listen Carefully	(7) Explained Clearly
5+ years before	-0.0193	0.0111	0.0216	0.0249	0.0676	0.0802	0.0702
	(0.0841)	(0.0296)	(0.0147)	(0.0179)	(0.0663)	(0.0583)	(0.0701)
3-4 years before	-0.0107	0.0167	0.0291*	0.0198	-0.0162	0.0179	0.00716
	(0.0449)	(0.0329)	(0.0175)	(0.0185)	(0.0690)	(0.0756)	(0.0812)
1-2 years before	-0.0589	0.00206	0.0122	-0.00879	0.0463	0.0483	0.0225
	(0.0823)	(0.0280)	(0.0169)	(0.0212)	(0.0569)	(0.0793)	(0.0781)
1-2 years after	0.191***	0.0691	0.0896***	0.0744**	0.124***	0.0923***	0.102**
	(0.0295)	(0.0434)	(0.0117)	(0.0296)	(0.0282)	(0.0305)	(0.0435)
3-4 years after	0.164***	0.0899***	0.102***	0.0690**	0.138***	0.109***	0.104***
	(0.0382)	(0.0244)	(0.00706)	(0.0285)	(0.0376)	(0.0360)	(0.0364)
5-6 years after	0.198***	0.0975***	0.0861***	0.0753**	0.0852**	0.0814**	0.0709*
	(0.0630)	(0.0377)	(0.0207)	(0.0371)	(0.0406)	(0.0413)	(0.0366)
7-8 years after	0.229**	0.0623	0.0677**	0.0755	0.0544*	0.0488*	0.0439
	(0.0961)	(0.0464)	(0.0285)	(0.0472)	(0.0281)	(0.0269)	(0.0403)
9-10 years after	0.261**	0.0903	0.0894**	0.0856	0.148***	0.108***	0.138***
	(0.108)	(0.0588)	(0.0432)	(0.0576)	(0.0383)	(0.0286)	(0.0416)
11+ years after	0.114	0.0648	0.0887**	0.0859*	0.189***	0.153***	0.135**
	(0.119)	(0.0555)	(0.0357)	(0.0520)	(0.0446)	(0.0357)	(0.0530)
Observations	151,402	151,526	151,164	151,695	74,072	74,002	74,070

Regressions are weighted estimates of equation (1) using sampling weights provided in MEPS data. Column (1) is an OLS regression. All other columns are logit regressions and reported coefficients are average marginal effects. Dependent variable is listed at top and described in text. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels respectively. Standard errors in parentheses are Huber-White robust estimates clustered at the state level.

Table 8: NP Independence Effect on Health Outcomes

	Adults		Medical Conditions			
Years relative to full independence	(1) Health Status	(2) BMI	(3) Any ER Visit, ACS cond.	(4) ln(ER visits), ACS cond.	(5) Any ER Visit, all cond.	(6) ln(ER visits), all cond.
5+ years before	-0.0416	0.0991	-0.00320	-0.0146	-0.00091	-0.0378**
	(0.0574)	(0.462)	(0.00681)	(0.0599)	(0.00306)	(0.0142)
3-4 years before	0.0564	0.0651	-0.0131	-0.0727	-0.00490	-0.00498
	(0.0357)	(0.271)	(0.0103)	(0.0456)	(0.00346)	(0.0252)
1-2 years before	0.00679	0.0673	-0.00234	-0.0701	-0.00479*	-0.0253
	(0.0494)	(0.227)	(0.00606)	(0.0474)	(0.00282)	(0.0176)
1-2 years after	0.0726*	-0.246**	-0.0102	-0.140***	-0.000928	-0.0255**
	(0.0425)	(0.109)	(0.0103)	(0.0440)	(0.00243)	(0.00975)
3-4 years after	0.0467	-0.501***	-0.0148	-0.121***	0.00640*	0.00366
	(0.0365)	(0.107)	(0.0104)	(0.0359)	(0.00325)	(0.0124)
5-6 years after	0.0403	-0.328*	-0.0107	-0.100**	0.00598**	-0.00507
	(0.0371)	(0.167)	(0.0104)	(0.0470)	(0.00250)	(0.0270)
7-8 years after	0.105***	-0.360	-0.0122	-0.181***	0.00632	-0.0204*
	(0.0370)	(0.291)	(0.00963)	(0.0420)	(0.00517)	(0.0111)
9-10 years after	0.0448	-0.418*	-0.0142*	-0.150***	0.00363	-0.0167
	(0.0474)	(0.213)	(0.00794)	(0.0428)	(0.00356)	(0.0182)
11+ years after	0.108**	-0.540*	-0.0124	-0.128**	0.00310	0.00686
	(0.0495)	(0.290)	(0.0112)	(0.0503)	(0.00612)	(0.0220)
Observations	327,489	220,280	178,502	11,105	1,411,644	76,131

Regressions are weighted estimates of equation (1) using sampling weights provided in MEPS data. Columns (1), (2), (4), and (6) are OLS regressions. Columns (3) and (5) are logit regressions and reported coefficients are average marginal effects. Dependent variable is listed at top and described in text. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels respectively. Standard errors in parentheses are Huber-White robust estimates clustered at the state level.

Table 5: Treatment Effects Relative to Baseline

Dependent Variable	Baseline	LR Treatment	LR Treatment/Baseline
Adult Checkup	0.66	0.068	10.30%
Adult Appt. When Wanted	0.48	0.0811	16.90%
Adult Care When Sick	0.58	0.116	20.00%
Adult Easy to Get to Provider	0.67	0.128	19.10%
Adult Enough Time	0.49	0.0648	13.22%
Adult Listen Carefully	0.58	0.0887	15.29%
Adult Explained Clearly	0.59	0.0859	14.56%
Child Checkup	0.68	0.00545	0.80%
Child Appt. When Wanted	0.70	0.249	35.57%
Child Care When Sick	0.77	0.136	17.66%
Child Easy to Get to Provider	0.70	0.166	23.71%
Child Enough Time	0.70	0.189	27.00%
Child Listen Carefully	0.75	0.153	20.40%
Child Explained Clearly	0.77	0.135	17.53%

Dependent variables as defined in text. Baseline is the weighted sample mean of each dependent variable for pooled MEPS data from 1996-2010. LR Treatment is the coefficient on the dummy for 11+ years since the law change.

Table 6: NP Independence Effect on Appointment Availability and Travel Costs

	Adults			Children		
Years relative to	(1)	(2)	(3)	(4)	(5)	(6)
full independence	Appt. when wanted	Care when sick	Travel	Appt. when wanted	Care when sick	Travel
5+ years before	-0.0393	-0.0173	0.0394	0.00256	0.0832	0.0687
	(0.0362)	(0.0235)	(0.0453)	(0.109)	(0.117)	(0.0871)
3-4 years before	-0.0144	-0.00619	0.0116	-0.0132	0.106	0.0229
	(0.0336)	(0.0343)	(0.0573)	(0.135)	(0.117)	(0.0743)
1-2 years before	-0.0495**	0.0203	-0.0127	-0.0182	0.0662	0.0632*
	(0.0179)	(0.0249)	(0.0202)	(0.0937)	(0.0868)	(0.0374)
1-2 years after	0.0753***	0.0887**	0.0637***	0.121***	0.157**	0.120**
	(0.0204)	(0.0374)	(0.0224)	(0.0466)	(0.0632)	(0.0546)
3-4 years after	0.0611**	0.0807**	0.0957***	0.154***	0.0933	0.0952
	(0.0279)	(0.0403)	(0.0301)	(0.0513)	(0.0722)	(0.0624)
5-6 years after	0.0905***	0.107***	0.0408*	0.151**	0.127	0.0817
	(0.0256)	(0.0412)	(0.0241)	(0.0638)	(0.0773)	(0.0562)
7-8 years after	0.0684*	0.116***	0.0337	0.136***	0.0569	0.0524
	(0.0396)	(0.0256)	(0.0261)	(0.0390)	(0.0407)	(0.0496)
9-10 years after	0.118**	0.110**	0.129***	0.197***	0.0964*	0.154**
	(0.0491)	(0.0475)	(0.0445)	(0.0453)	(0.0580)	(0.0602)
11+ years after	0.0811	0.116*	0.128***	0.249***	0.136**	0.166***
	(0.0534)	(0.0599)	(0.0491)	(0.0484)	(0.0611)	(0.0574)
Observations	134,131	63,713	208,247	64,110	22,076	87,386

Regressions are weighted estimates of equation (1) using sampling weights provided in MEPS data. All columns are logit regressions and reported coefficients are average marginal effects. Dependent variable is listed at top and described in text. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels respectively. Standard errors in parentheses are Huber-White robust estimates clustered at the state level.

Table 4: NP Independence Effect on Probability of Routine Checkup in Last 12 Months

Years relative to full independence	(1) Adults	(2) Children
5+ years before	-0.00158	0.0283
	(0.0360)	(0.0654)
3-4 years before	0.000432	-0.00674
	(0.0175)	(0.0471)
1-2 years before	0.00954	-0.0188
	(0.0276)	(0.0479)
1-2 years after	0.0396***	-0.0289
	(0.0107)	(0.0250)
3-4 years after	0.0553***	-0.0199
	(0.0130)	(0.0233)
5-6 years after	0.0410***	-0.0527
	(0.0125)	(0.0449)
7-8 years after	0.0554***	-0.0130
	(0.0186)	(0.0483)
9-10 years after	0.0581***	-0.0390
	(0.0164)	(0.0362)
11+ years after	0.0680***	0.00545
	(0.0186)	(0.0510)
Observations	219,276	102,012

Regressions are weighted estimates of equation (1) using sampling weights provided in MEPS data. All columns are logit regressions are reported coefficients are average marginal effects. Dependent variable is listed at top and described in text. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels respectively. Standard errors in parentheses are Huber-White robust estimates clustered at the state level.

Table 3: Determinants of Timing of NP Full Independence

	(1)	(2)	(3)	(4)
Physicians per 100,000	-0.00748	-0.0122	-0.0110	0.00172
	(0.0434)	(0.0458)	(0.0345)	(0.0379)
Medical Benefits per 100,000	-3.00e-05	-5.16e-05	-1.51e-05	-9.69e-05
	(5.06e-05)	(7.32e-05)	(4.69e-05)	(6.19e-05)
Change in Medical Benefits per 100,000	-3.928	-13.17**	4.834	-1.490
	(4.978)	(5.499)	(6.666)	(5.247)
Inpatient Days per 100,000	3.56e-05	8.34e-06	1.69e-05	1.04e-05
	(5.43e-05)	(7.66e-05)	(5.18e-05)	(6.65e-05)
Outpatient Visits per 100,000	-1.32e-05	-9.18e-06	-1.36e-05	-7.96e-06
	(2.31e-05)	(2.62e-05)	(1.80e-05)	(2.24e-05)
# of Medical Schools	3.903	3.642	2.501	2.688
	(2.348)	(2.333)	(2.241)	(2.372)
Democrat Governor	4.172*	4.779**	4.503**	5.418**
	(2.236)	(2.169)	(2.058)	(2.050)
Share over 65	-65.83	-134.7	-106.1	-75.05
	(130.1)	(152.9)	(108.6)	(149.2)
Share under 20	34.18	-99.67	-80.58	-82.61
	(72.54)	(86.05)	(67.99)	(79.26)
Share urban	-8.314	-7.578	-6.045	-8.504
	(13.39)	(12.06)	(9.173)	(8.857)
Real Personal Income	-0.00136	-0.00329	-0.00268	-0.00284
	(0.00240)	(0.00286)	(0.00230)	(0.00307)
Constant	19.93	94.62	65.76	67.79
	(43.69)	(55.00)	(40.93)	(52.12)
Observations	443	443	285	285
R^2	0.436	0.539	0.362	0.412
R^2 with only Year FE		0.436		0.250
Start Year	1970	1970	1980	1980
Year FE	No	Yes	No	Yes

Observations are state-years from 1970-2008 in column 1 and 1980-2008 in columns 2 and 3. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels respectively. Standard errors are Huber-White robust estimates clustered at the state level.

Table 2: 1970 Characteristics of States by NP Independence

State Characteristics	Ever have full NP indep. Mean	Never have full NP indep. Mean	Difference (Ever-Never)
Physicians per 100,000	137.54	137.11	0.43
Medical Benefits per 100,000	5,128.30	6,660.61	-1532.31*
Change in Medical Benefits per 100,000	10.67%	15.07%	-4.4%
Inpatient Days per 100,000	123,751.10	129,941.60	-6,190.5
Outpatient Visits per 100,000	96,718.63	83,999.98	12,718.65
# of Medical Schools	1.18	4.91	-3.73***
Democrat Governor	0.36	0.27	0.09
Share over 65	0.09	0.10	-0.01
Share under 20	0.39	0.37	0.02**
Share urban	0.69	0.74	-0.05
Real Personal Income	4,027.38	4,091.57	-64.19
Observations	18	33	

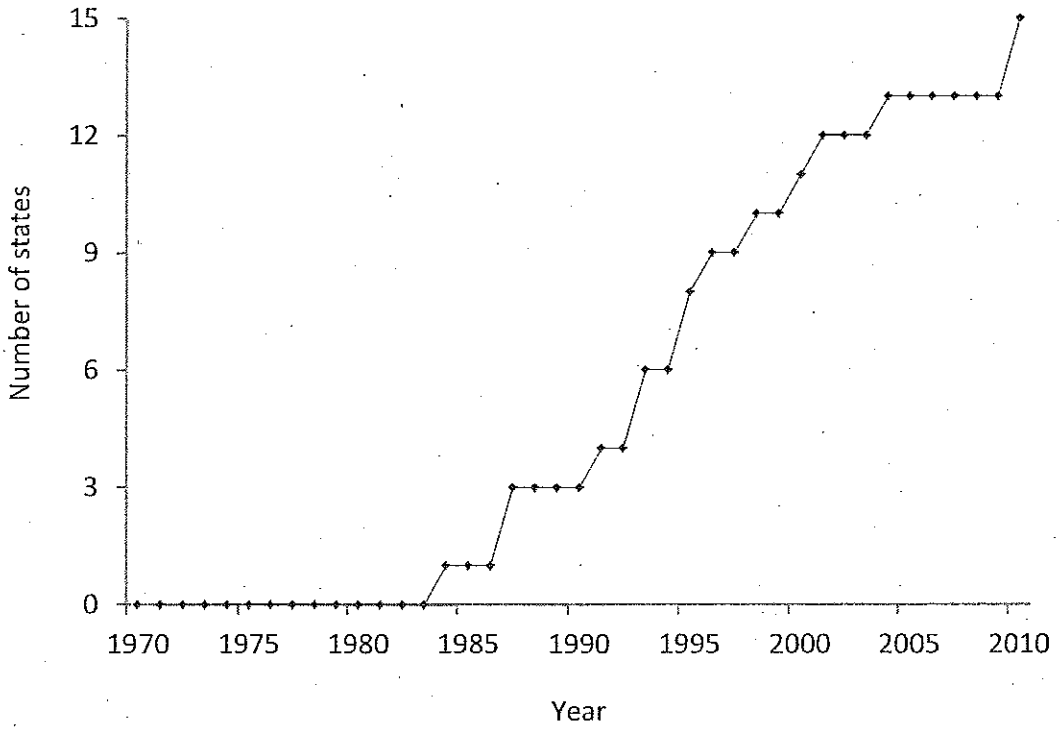
*, **, *** denote statistical significance at the 10%, 5%, and 1% levels respectively. Variables as defined in text. All means calculated using state level population weighted data from 1970 only, except for "Change in Medical Benefits per 100,000," which is calculated using data from 1970 and 1971.

Table 1: NP Practice and Prescriptive Authority by State and Year

Independent practice authority	AK (1984), AR (1995), AZ (2000), CO (1980), CT (1989 - repealed in 1997 by attorney general decision), DC (1995), HI (1994), IA (1983), ID (2004), KY (2000), MD (2010), ME (1996), MI (1978), MT (1984), ND (1980), NH (1991), NJ (1996), NM (1993), OK (1972), OR (1987), RI (1975), TX (1989 - repealed in 2005), UT (1993), VT (2011), WA (1973), WV (1991), WY (1993)
Independent prescriptive authority	AK (1987), AZ (1984), CO (2010), DC (1995), HI (2011), IA (1995), ID (2004), MD (2010), ME (1996), MT (1984), ND (2011), NH (1991), NM (1993), OR (1979), UT (1998), VT (2011), WA (2001), WI (1995), WY (1993)
Independent practice and prescriptive authority	AK (1987), AZ (2000), CO (2010), DC (1995), HI (2011), IA (1995), ID (2004), MD (2010), ME (1996), MT (1984), ND (2011), NH (1991), NM (1993), OR (1987), UT (1998), VT (2011), WA (2001), WY (1993)

Data collected by authors from state statutes and Board of Nursing rules and regulations, cross-referenced with January issues of *The Nurse Practitioner* from 1995-2011. Year in parentheses is the year that state allows NPs the form of independence listed at left.

Figure 1: Number of States with Independent NP Practice by Year



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of removing the administrative burden of oversight and supervision from both NPs and physicians, as our flexible empirical approach accounts for possible shifts in NP or physician supply in response to the law changes.

Our findings also shed light on current policy debates. The cost-effectiveness of medical care delivered in emergency rooms is well-known to be low, and our analysis indicates that patients with better availability of primary care make fewer emergency room visits.[26] This is an encouraging finding for the coming implementation of the Affordable Care Act, though it also highlights the need to boost provider supply so as to ensure that primary care appointment availability does not fall. The efficacy of the Affordable Care Act in increasing the number of primary care providers may be critical in limiting medical spending by moving care out of emergency rooms and into primary care offices. Our work contributes to this discussion by showing that allowing the current stock of primary care providers more time to focus on patient care by removing administrative burdens can be an effective and low cost way to increase the overall availability of primary care.

Further research is necessary to assess other supply side effects of changes in NP scope-of-practice laws, including potential changes in the quality of NPs that may be caused by higher ability workers choosing to become NPs when NPs have greater freedoms. Increases in NP ability may allay some concerns of physician groups about allowing NPs a wider scope-of-practice and increase the overall productivity of the health care sector, generating further cost savings. As Kleiner et al. (2012) point out, NPs and physicians are both complements and substitutes in the production of medical services, so changes in NP quality may have implications for physician quality as well. Overall, the results of this paper indicate that NPs can serve an important role in improving population health by providing necessary primary care.

[26] MEPS data shows that in 2010, the median cost of an office visit was $91, while the median cost of an emergency room visit was $391.

receiving a routine checkup. While the estimated increase in probability is similar in the first 2 years after NP independence, the estimates with state trends are very close to zero in later years. This indicates that the estimated preexisting trend in checkup frequency in states that allow NP independence is upward, a counterintuitive result if health care concerns play any role in states allowing NPs full independence.[25] Columns (8) and (9) show that when using the longer pre-trend in the BRFSS data, the estimated effect of NP independence is smaller but the pattern is consistent with our original estimates, even when extending the dependent variable to include checkups over the past 2 years. Our results are therefore qualitatively robust to the inclusion of state trends, though the direct inclusion of state trends in the MEPS analysis would induce downward bias due to poor estimates of trends in utilization prior to NP independence.

6 Conclusion

Concerns over both health care costs and the current and future supply of primary care providers have sparked growing interest in the effects of relaxing scope-of-practice laws for NPs. We estimate the direct effect of changing these regulations, and our results show that allowing NPs to practice and prescribe drugs without physician oversight leads to increased health care utilization and improvements in health outcomes. We provide evidence that the timing of law changes that give NPs full independence is exogenous to state health care utilization rates, and our event study approach shows that adults obtain routine checkups at a higher frequency in response. We also show that health care quality indicators rise and indirect costs of obtaining care fall for both adults and children. The increase in utilization of care yields improvements in health outcomes for patients, with higher self-reported health status, lower BMI, and fewer emergency room visits for conditions responsive to primary care. We also present evidence that the majority of these positive effects are the result

[25] Our estimates in Table 3 indicate that health care concerns explain 10-16% of the timing of the decision to allow NPs full independence.

it does not lead to a relative reduction in primary care from physicians. This finding is consistent with removal of administrative costs of oversight as an important mechanism for the causal effects identified above.

5.3 Placebo Tests: Utilization of Other Medical Services

To show that our estimated effects of NP independence are not biased by coincident increases in demand for all medical services, we use equation (1) to estimate the effect of NP independence on visits to dentists and optometrists. Results in columns (2)-(5) of Table 10 show no significant impact of NP independence on utilization of these services on either the intensive or extensive margin. This placebo test result provides further evidence that NP independence is not coincident with state Medicaid expansions, as many SCHIP and Medicaid programs cover dental visits for both children and adults to varying degrees.[24]

5.4 State Trends

A weakness of MEPS data for our analysis is that the lack of data before 1996 leaves few years before the policy change to identify preexisting state-specific trends in most states. As pointed out by Wolfers (2006), the inclusion of state-specific trends can therefore lead to upward or downward bias in our treatment effect estimates depending on the nature of the dynamic response of the outcome of interest to the policy change, and so we omit them in equation (1). To check the robustness of our results to the inclusion of state-specific trends, we use data from the Center for Disease Control's Behavioral Risk Factor Surveillance System over 1988-2010. While BRFSS data do not contain information on children or offer the same level of detail on utilization or outcomes as MEPS data, the extra years of data allow for more precise estimates of underlying trends. Columns (6) and (7) of Table 10 show the effect of including state-specific trends on our MEPS estimates of the probability of an adult

[24]See Shulman et al. (2004) and McGinn-Shapiro (2008) for information on Medicaid dental programs for children and adults.

when wanted for children. We interpret this as evidence that any change in supply of NPs caused by states allowing NPs full independence has small effects on outcomes relative to removing administrative burdens. This is consistent with the finding of Stange (2012) that changes in NP supply have minimal effects on health care markets.

5.2 Changes in Primary Care Physician Supply

One potential unintended consequence of allowing NPs full independence is a change in the percentage of physicians who choose to become primary care providers. If the stock of physicians working as general practitioners changes in response to a state granting NPs full independence, then the observed increases in health care utilization and outcomes must be primarily coming from increased use of NP services. If not, then the effects could arise from more appointments with NPs and physicians, as less time spent on supervision opens up more time for both NPs and physicians to focus on patient care.[23]

To investigate this possibility, we construct the ratio of physician general practitioners to the total number of active physicians for every available state and year from 1995-2008 using data from the Area Resource File of the U.S. Department of Health and Human Services. We focus on the ratio to control for large differences in the size and growth rate of the physician workforce across states. We use this ratio as the dependent variable in a state level event study specification that is identical to equation (1) but includes only the event study dummies and state and year fixed effects. Column (1) of Table 10 shows that the ratio of physicians in general practice does not change in response to NPs gaining full independence, even in the long run. The slightly positive pre-treatment trend is consistent with the results of Table 3, as a low share of physicians in general practice does not precede, and therefore potentially cause, the law change. We interpret this as evidence that granting NPs independence leads to an overall increase in the supply of preventive care available to the population, though

[23] As above, our estimation strategy accounts for a possible change in the mix of primary care physicians and specialists if it occurs because of changes in NP regulations, and so a change in this ratio does not affect the internal validity of our estimates.

Figure 6 shows that NP independence has similar effects on checkup frequency for those with and without insurance and those with private insurance compared to those on Medicaid. The comparison between privately insured and Medicaid insured individuals shows that our observed effects are not being driven by possible contemporaneous expansions of SCHIP programs. We also find no difference when comparing the privately insured against those with any form of public insurance. The uniformity of the effect of NP independence across these groups is striking and suggestive of a broad mechanism driving these treatment effects, such as the reduction in the administrative burden of supervision discussed above. We explore potential mechanisms further below.

5 Mechanisms and Sensitivity Analysis

5.1 Changes in NP Supply

Kalist and Spurr (2004) suggest that the supply of NPs should rise when regulations for NPs are more lax. Since the process of becoming an NP can take several years even for current registered nurses, our event study approach suggests a natural test of the importance of an increase in NP supply relative to the removal of the supervision requirements on health care utilization and health outcomes: we look for significant differences in the post-NP independence treatment effect between the first period (1-2 years after law passage) and the last (11+ years after law passage). This test requires the assumption that the required training time is long enough that any increased supply effects are negligible within 1-2 years of NPs gaining independence, while estimates from 11+ years after NP independence allow sufficient time for any transitional effects in the supply of NPs to diminish.[22] For our results in Tables 4, 6, and 7, the only variable for which we find a statistically significant difference between the short and long run effects of NP independence is the availability of appointments

[22] As we estimate the direct impact of changes in NP regulations, we correctly account for any increases in utilization or health outcomes caused by additional NP supply if the supply increase is caused by changes in NP regulations, so this possibility does not affect the internal validity of our estimates.

4.3 Heterogeneous Effects of NP Independence

The propensity to consume primary care when more becomes available may vary based on a number of individual characteristics, including age, gender, location, or insurance status. We therefore investigate potential heterogeneity in the response to NP independence of the probability that an individual has had a routine checkup in the previous 12 months. We modify equation (1) to include interaction terms between the treatment effects and indicators for the characteristics of interest, and we test for differences in treatment effects across the two groups with F-tests of the difference in estimated coefficients. We consider two groups to show no difference in their responses to NP full independence if no more than one of the post-NP independence treatment dummies shows a significant difference from its counterpart in the other group.

Overall, we find little evidence of heterogeneity in the effect of NP independence. Figure 4 shows that the response to NP independence is similar among those above and below 65 years of age, men and women, and those with and without a 4 year college degree. Figure 5 divides the sample by location, with the city/country results based on whether an individual lives in a county classified as urban or rural in the 1993 USDA Economic Research Service Rural-Urban Continuum Code and the MSA/non-MSA results based on whether an individual lives in a Metropolitan Statistical Area according to MEPS.[21] Both sets of results suffer from large standard errors for the rural estimates, though the point estimates are relatively similar for the two groups in both regressions. This indicates that rural areas do not appear to consume disproportionately more primary care after NP independence and suggests that providers do not move in significant numbers from urban to rural counties or from MSAs to non-MSAs when NP have full independence. This is consistent with our earlier results on travel costs decreasing after NP independence if providers relocate within rural and urban areas.

[21] We classify a county as rural if it is a non-metropolitan county that is not adjacent to a metropolitan area. This corresponds to county codes 5, 7, and 9 in the 1993 USDA ERS Continuum Code.

condition." Table 9 reports the list of conditions considered responsive to preventive care in Billings et al. (1993). Because the distribution of emergency room visits for each condition is skewed towards 0, we estimate extensive and intensive margin effects in separate regressions using a dummy variable for any emergency room visit and the natural log of the number of visits as dependent variables. Columns (3) and (4) of Table 8 report results. On the extensive margin, we find consistently negative but imprecisely estimated effects of NP independence. On the intensive margin, we find a 12.8% long run reduction in the number of emergency room visits for ambulatory care sensitive conditions in response to NP independence. The mean number of emergency room visits in a year for conditions with non-zero visits is 1.17, so a 12.8% reduction represents 0.15 fewer emergency room visits per person per ambulatory care sensitive condition per year.

Individuals may go to the emergency room less when NPs have independence because they have ambulatory care sensitive conditions that become less severe or because the greater availability of primary care leads patients with a wide variety of conditions to substitute office-based care for emergency room care. If individuals are substituting, we expect to find a reduction in emergency room visits regardless of condition. We therefore run the same regressions including all conditions in columns (5) and (6). We find that NP independence has at most a small negative effect on emergency room visits for all conditions, suggesting that the degree of substitution of primary care visits for emergency room visits across all medical conditions is likely small. However, we cannot rule out the possibility that individuals with ambulatory care sensitive conditions are themselves substituting primary care for emergency room care. Thus, ambulatory care sensitive conditions generate fewer emergency room visits while the total number of emergency room visits is not affected by NP independence, a result consistent both with individuals having less severe medical conditions due to receiving more primary care and with patients with conditions likely to be affected by primary care switching from emergency room care to primary care. Overall, our results show improvements in health outcomes when NPs have full independence.

with 5 being "excellent" health.[19] Our results in column (1) of Table 8 show that adults have a higher self-reported health status after NP independence. However, the coefficient estimates do not exhibit a clear pattern, with some years post-NP independence showing significantly larger effects than others. We interpret this as weak evidence of an improvement in health outcomes.

For a less ambiguous measure of health, we look at changes in adult body mass index. 62.5% of adults in our sample have a BMI over 25, suggesting that weight loss would lead to a reduction in obesity-related health risks.[20] If patients are more likely to follow behavioral changes suggested by NPs than physicians as suggested by Brown and Grimes (1995), then patients may better adhere to diet and exercise routines and lose weight in response to NP independence. We report results in column (2) of Table 8. The pattern of post-NP independence coefficients indicates a slow decrease in BMI in states with NP independence, with a decrease of 0.25 in BMI the first 2 years and 0.54 after 11 years. These effects are modest: a decrease of 0.5 in BMI is a loss of approximately 3 pounds for a person 5' 2" tall and 3.5 pounds for a person 6' 2" tall. We believe that this effect size is consistent with small behavioral changes, and the weight loss represents an improvement in health.

We also test whether the additional preventive care consumed after NP independence leads to better management of chronic conditions using MEPS Medical Conditions data files. The Medical Conditions file reports the number of emergency room visits related to each medical condition an individual has. Of course, for many conditions, we would not expect preventive care to affect the severity of the condition. We instead focus on ambulatory care sensitive conditions, identified by Billings et al. (1993, p. 163) as "diagnoses for which timely and effective outpatient care can help . . . by either preventing the onset of an illness or condition, controlling an acute episodic illness or condition, or managing a chronic disease or

[19]MEPS contains several self-reported health status variables. Since we are treating the data as a repeated cross-section, we use the report in the second and fourth wave of each panel so as to avoid the same individual giving two ratings in a calendar year.

[20]The CDC considers a person with a BMI over 25 to be overweight and a BMI over 30 to be obese. See `http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html` for a discussion of how health risks increase with BMI.

We again code responses as 1 if the patient answers "always" and 0 otherwise and present results in columns (2)-(7) of Table 7 with magnitudes of long run effects in Table 5. We find that patients consistently report visits to be of higher quality in the years following NP independence, with increases in these metrics ranging from 13-15% for adults to 17-27% for children relative to their baseline values.[17] These results are consistent with the finding of Hooker and McCaig (2001) that NPs spend more time per patient than physicians during office visits. We take this as evidence that patients perceive their interactions with medical service providers to be of higher quality when NPs have full independence, so even individuals who do not consume more primary care after NP independence may show improvement in health outcomes.

We summarize our results in Figures 2 and 3. These graphs report the coefficients of the treatment dummies in the logit regressions of Tables 6 and 7, so effects are measured in percentage point increases in the given dependent variable. The patterns of coefficients in the figures are largely supportive of our research design, as pre-NP independence dummy variables are generally statistically insignificant and have smaller point estimates than post-NP independence dummy variables.[18] Most measures show a sharp increase in the years immediately following NP independence. The patterns also highlight the strength of the event study design, as the pre-treatment years serve as placebo tests of the effect of NP independence and offer further evidence that the timing of NP independence is exogenous to health care concerns.

4.2 Changes in Health Outcomes

Having established that NP independence leads to increases in health care utilization and patient-reported care quality, we now present evidence that these increases lead to improvements in health. We first look at patient self-reported health status on a familiar 1-5 scale,

[17] Parents answer questions about the quality of health care received by their children.

[18] Note that while a few of our pre-treatment dummies are statistically significant, the number of significant point estimates is consistent with expected rates of Type I error.

NP independence may increase checkup frequency by reducing indirect costs to the patient through lower travel times or more convenient appointment scheduling. Lower travel costs are consistent with geographic spread of medical providers in response to NP independence, while better availability of appointments is consistent with reduced time spent on supervision and consultations between physicians and NPs. We estimate these effects using patient responses to questions about the availability of an appointment when one is wanted, the availability of appointment when the patient is sick, and whether it is difficult to travel to a provider. We code these responses as 1 if the patient reports "always" being able to get an appointment when wanted or when sick and 0 otherwise, and 1 if travel to a patient's usual source of care is "not at all difficult" and 0 otherwise.[16] Table 6 presents results for both adults and children. We find that all of these measures respond positively to the introduction of NP full independence, with more individuals reporting that they always get an appointment when they want one, always find care when sick, and that it is easy to get to a medical provider. Table 5 shows that the long run effect magnitudes are economically significant, with 16-20% increases in these measures for adults and 17-35% increases for children relative to their baseline values.

NP independence can lead to changes in patient health outcomes through channels other than checkup frequency. If checkups increase in quality, then even individuals who do not receive a greater quantity of primary care in response to NP independence may see greater health benefits. We first use a survey question that explicitly asks patients to rate their health care quality over the past year on a scale of 0-10. Column (1) of Table 7 shows that patients report a higher level of overall health care quality after NP independence, though this effect appears to weaken slightly in the long run. To determine what drives this perceived increase in quality, we look for changes in visit quality using questions on whether the provider spent enough time with the patient, whether the patient felt that the provider listened to their concerns, and whether the provider explained things in a way that the patient understood.

[16]These responses correspond to the most favorable category available for each question.

two year intervals to improve the precision of our treatment effect estimates. To estimate long run effects, all available data 11 years or more after the law change is considered part of the "year 11" treatment. Similarly, all data 5 years or more before the law change is part of the "year -5" treatment. When our dependent variable of interest is binary, our regression is a logit model and our reported coefficients are average marginal effects.[15] Reported standard errors are clustered at the state level.

4.1 Preventive Care Utilization and Care Quality

We begin by estimating the effect of NP independence on the probability that an individual has had a routine checkup in the last 12 months. Increased utilization of yearly checkups is an important mechanism for NP independence to affect health outcomes. We split the sample into adults and children based on a cutoff at age 18, and Table 4 reports average marginal effects. For both adults and children, our pre-treatment dummies have small and statistically insignificant effects as desired. We find that the probability that an adult has had a checkup in the last year increases by 3.8 percentage points in the two years immediately after NP full independence. This effect rises to 6.8 percentage points after year 11, though the difference between the initial effect and the long run effect is not statistically significant. We do not find evidence of an increase in the likelihood of a yearly checkup for children.

Table 5 shows the magnitude of the estimated 6.8 percentage point long run effect relative to the baseline rate of adults getting yearly checkups. Over 1996-2010, 66% of adults report having a checkup in the last year. Our long run treatment effect therefore represents a 10.3% increase in the number of adults receiving yearly checkups. As noted above, states requiring NPs to be supervised by physicians often require 10% or more of the physician's and NP's time to be spent on direct supervision, consultations, or reviewing charts. Removing these requirements frees up more time for both physicians and NPs to see additional patients, so we believe that our estimated 10.3% increase in adults receiving yearly checkups is reasonable.

[15] As a robustness check, we also estimate these specifications using a linear probability model. All results are both qualitatively and quantitatively similar under this alternative functional form assumption.

the variance in the timing of the passage of NP full independence laws is unexplained by variables capturing state health care utilization and state demand for health care. We view this as evidence consistent with the assertions of Safriet (2002) and Institute of Medicine (2010) that the law change process is a political one and mostly unresponsive to population health or budgetary issues in a state. In our empirical work below, we therefore treat the timing of state law changes as exogenous to health care utilization and health outcomes.

4 Empirical Approach and Results

We use an event study approach to examine how increasing NP independence affects health care utilization and health outcomes. This research design allows the effects of NP independence to differ in different years and includes effect estimates from before law passage as a falsification test. Our baseline statistical model is

$$y_{ist} = \beta_0 + \sum_{k=-5}^{-1} \tau_k \cdot 1(t - T_s = k) + \sum_{k=1}^{11} \eta_k \cdot 1(t - T_s = k) + \gamma \cdot X_{it} + \alpha_t + \alpha_s + \epsilon_{ist} \qquad (1)$$

where y_{ist} is our outcome of interest for individual i in state s in year t, T_s is the year in which state s first allows NPs full independence, X_{it} are other individual level control variables, and α_t and α_s are year and state fixed effects. We control for age, race, health insurance status, ethnicity, gender, living in an urban area, employment status, marital status, education level, and income. All results use the sampling weights given in the MEPS data. The coefficients τ_k and η_k estimate the evolution of the effects of NP independence over time relative to the year of law passage. We include all observations from states that never allow full NP independence in the control group. We group the event study dummies into

as they use data from one chosen pre-treatment year to predict the length of time between that year and a county program implementation date. Our state level data set has too few observations to use all our covariates in a single meaningful regression. We alternatively estimate separate regressions using data from 1970 only where each covariate is used as the sole explanatory variable. Of these regressions, only medical benefits per 100,000 people has a statistically significant coefficient of 0.003, which suggests that states with higher medical benefits take longer to allow NPs to practice independently. This again contradicts the idea that states implement NP full independence in response to rising costs.

work, so both observed and unobserved differences across states accounted for by these fixed effects do not affect the internal validity of our estimates.

We now use these covariates to predict the timing of the adoption of NP full independence in the 18 states that ever allow it. We use state panel data over 1970-2008 to regress the covariates described above on the number of years remaining until the state allows full NP independence. We also estimate results on a shortened panel of 1980-2008 to insure that results are not greatly affected by having a long early period before any state allows full NP independence. We present results of these panel regressions in Table 3. Given the correlations between many of our health-related explanatory variables, it is perhaps not surprising that the only variable consistently correlated with the number of years until NPs gain full independence is the party of the governor. We find that states with Democratic governors tend to wait more years before allowing NPs full independence.

Since individual statistical significance is likely affected by multicollinearity, we instead look at R^2 as a measure of the overall power of all the variables in the regression when assessing the explanatory power of these covariates. The low R^2 values of these regressions, ranging from 0.36 to 0.54, indicate that these variables capturing important features of the health care markets and political conditions in states explain only a moderate amount of the variance in the timing of passage of NP independence laws. However, since the number of years remaining until law passage is a simple linear trend, these R^2 values are likely inflated by time trends in the explanatory variables. A regression of years until law passage on only year fixed effects shows an R^2 of 0.44 in the panel using data from 1970 and 0.25 using data from 1980.[13] This result is consistent with the presence of common unobserved trends, as we would expect more inflation of the regression R^2 in the longer panel. This suggests that our covariates add minimal explanatory power beyond simple flexible time controls, as the R^2 in columns (2) and (4) only increases by 0.1 and 0.16, respectively, with the inclusion of the additional covariates.[14] Overall, these regressions indicate that a high proportion of

[13] Using a linear trend as the only regressor yields $R^2 = 0.42$ over 1970-2008 and $R^2 = 0.24$ over 1980-2008.

[14] This is somewhat different from the approach of Hoynes and Schanzenbach (2009) and Bailey (2012),

first state to allow full NP independence in 1984, comes after the founding of the first NP training program in 1965, and is the earliest data point consistently available for many of the covariates we wish to compare. Table 2 presents our results. Though our test for differences among states has large standard errors because we have only 51 observations in 1970, we still find some statistically significant differences between the states that ever permit full NP independence and those that do not. We find that states that allow NPs full independence tend to have lower medical expenditures per person, fewer medical schools, and a younger population.[11] This contradicts the notion that high spending, older states permit NPs to practice without oversight as a means of cutting the cost of providing primary care services or to increase the availability of medical care for an elderly population.[12]

One interpretation of the fact that states that ever allow NPs full independence have many fewer medical schools is that if physicians remain in the state where they attended school to practice, then the number of medical schools proxies for the future supply of medical service providers. However, this does not appear to be true. Only 38.6% of doctors practice in the state where they went to medical school (American Association of Medical Colleges, 2011) and the physician to population ratio is almost exactly the same in the states that ever allow full NP independence and those that never do despite persistent differences in the number of medical schools across the two types of states. We also find no evidence that this difference in the number of medical schools in 1970 leads to a higher physician to population ratio in future years: by 2007, there were 261.41 physicians per 100,000 population in states that ever allow NPs full independence and 264.03 in states that never allow NPs full independence. Instead, we interpret this finding as evidence that the number of medical schools is proxying for the political power of physicians in the state. These observed differences across states and their persistence over time motivate the inclusion of state fixed effects in our empirical

[11] These same differences exist in state data over 1970-1980, so they appear to be persistent rather than an artifact of the small sample.

[12] A young population might have a high utilization of pediatric primary care services, one of the specialty areas of NPs, thereby causing a state to grant NPs full independence to deal with high demand among the young. However, no state allows NPs to practice independently until 1984, so most of those under the age of 20 in 1970 would no longer demand pediatric services.

board regulatory decisions made by political appointees, attorney general decisions, or other factors related to political bargaining rather than health concerns. We present evidence of the disorganization and unpredictability in law passage by looking for characteristics of states correlated with NPs gaining full independence following the approach of Hoynes and Schanzenbach (2009) and Bailey (2012). We choose variables that reflect both health-related population characteristics as well as proxies for the political power of physician groups motivated by the political discussions of Safriet (2002) and Institute of Medicine (2010). For each state and year, we include the physician to population ratio in the state, the amount of public money spent on medical benefits, the percentage change in public money spent on medical benefits, and the number of inpatient days and outpatient visits in the state per 100,000 residents. Each of these variables captures an aspect of the state's current equilibrium in the market for health care. The physician to population ratio may also reflect the relative political clout of physicians. We include the number of medical schools in a state as well as a dummy for whether the governor is a Democrat to measure the influence of political factors, as doctors may have greater political influence in states with more medical schools and the governor appoints regulators to state Boards of Nursing that can determine NP scope of practice.[9] We also include the share of the population over 65, under 20, living in an urban area, and real personal income to proxy for demand for medical services.[10]

We compare the 1970 characteristics of states that ever allow full NP independence to states that never do so to see if there are pre-treatment systematic differences in the observables of states that ever give NPs full independence. We choose 1970 as the start point for decisions over NP independence as it predates Montana's decision to become the

[9]See American Medical Association (2009) for a list of appointment procedures to state Boards of Nursing.

[10]Data on number of physicians, inpatient and outpatient visits, and number of medical schools from the Area Resource File of the U.S. Department of Health and Human Services. Data on inpatient and outpatient visits is linearly interpolated between 1970 and 1975 and between 1975 and 1980. Data on public medical benefits and real personal income from the BEA Regional Economic Information System. Public medical benefits are defined by the BEA as payments made directly or through intermediaries to vendors for care provided to individuals for medical purposes, consisting of payments from Medicare, Medicaid, and Children's Health Insurance Programs. We adjust personal income data to constant 2010 dollars using the CPI for all urban consumers obtained from the BLS. Share of population over 65, under 20, and urban from Census Bureau.

treat this as a repeated cross-section of information about individuals in different states over time. The data contains information on checkups, emergency room visits, and total numbers of visits to a variety of medical providers, as well as self-reported health status and measures of patient ease of access and perceived quality of care. The data also contains a rich set of individual characteristics, including race, gender, education, marital status, income, employment status, and type of health insurance. The confidential version of the MEPS data that we use reveals each individual's state of residence and more detailed information about medical conditions and procedures, neither of which is available in the public use version.

Our primary data sources for laws governing NP practice are state statutes and regulations from state Boards of Nursing from 1970 to present. We cross-reference this data with annual surveys published in the 1995-2011 January issues of *The Nurse Practitioner* for the overlapping years. The survey data in *The Nurse Practitioner* are obtained from representatives of state nursing organizations or from a member of the state Board of Nursing and are based on the interpretation of the state statutes or regulations of the survey responder.

We define independent practice authority for NPs as the absence of statutory or regulatory requirements for physician collaboration or supervision and independent prescriptive authority for NPs as the right to prescribe medications (including controlled substances, if allowed) without physician collaboration or supervision. We consider a state to allow NPs full independence if the state offers NPs both independent practice authority and prescriptive authority. In these states, NPs may establish their own practices without any involvement from a doctor. Under our definition of independence, 17 states and the District of Columbia allowed NPs full independence in 2010. Table 1 lists the years in which states changed their laws to allow NPs independent practice authority, independent prescriptive authority, and full independence from physician supervision.

In order to interpret the parameter estimates of our event study causally, the timing of states' decisions to allow NPs full independence must be exogenous to the outcomes of interest. As discussed above, state laws on NP practice are often the outcome of state

considering allowing NPs full independence.

Another potential issue in the analysis of health care utilization when NPs are fully independent is that of supplier-induced demand. Many early papers, following the work of Fuchs (1978), find that the suppliers of medical services are able to increase demand beyond the amount that is optimal for patients to consume because providers and patients have asymmetric information about patients' medical conditions.[8] In our analysis, it is possible that allowing NPs full independence might lead to an increase in the utilization of health services that does not improve societal welfare if primary care providers in these states respond to increased competition by inducing more demand for primary care from their patients to increase their incomes. We do not believe that supplier-induced demand is a concern in this case for several reasons. The evidence in favor of supplier-induced demand is strongest for medical providers ordering additional tests when they own the equipment used for the tests (Hillman et al., 1990; Mitchell and Scott, 1992) or in procedures ordered by specialists with less opportunity for repeat business from the same patient than primary care providers have (Gruber and Owings, 1996). Hooker and McCaig (2001) show that there is little difference in the number of diagnostic tests ordered by NPs and physicians. Studies that have focused on primary care providers, such as Grytten et al. (1995), Van De Voorde et al. (2001), Cockx and Brasseur (2003) and Madden et al. (2005), do not find evidence of supplier-induced demand in the number of visits to primary care providers, while Dranove and Wehner (1994) critique the empirical strategies used in some work supportive of supplier-induced demand. The available empirical evidence suggests that there is at most a minimal effect of supplier-induced demand in primary care services.

3 Data

Our main analysis uses data on health care utilization and health outcomes from the Medical Expenditure Panel Survey Full Year Consolidated Data Files over the period 1996-2010. We

[8] See Dranove (1988) for a summary of this literature.

patients who received care from NPs. Sox (1979) examines 40 studies of NP or physician assistant-delivered office-based care and finds the quality of NP and physician assistant care to be indistinguishable from physician care.

Recent randomized trials studying health outcomes of patients receiving primary care from NPs without physician supervision reach the same conclusion. Mundinger et al. (2000) randomly assign patients to either an NP-run or physician-run primary care practice over 1995-1997 and find that patients receiving primary care from physicians reported similar levels of health status and satisfaction with care as patients receiving care from NPs practicing without physician supervision six months after the initial primary care visit. They also find that patient utilization of specialists, emergency room visits, and frequency of hospitalization were equivalent across provider types. Letz et al. (2004) confirm these results in a study of the same patients two years after their initial visit to the randomly assigned provider. In a meta-analysis of randomized trials, Brown and Grimes (1995) find that patients who visit NPs "were more likely to be compliant with taking medications, keeping appointments and following recommended behavioral changes than patients" who visit physicians (Pohl et al., 2010, p. 181). These studies show that the quality of primary care provided by NPs practicing independently is comparable to that of physicians.

Independence for NPs is also a potential source of cost savings in medical care. Medicare reimburses independent NPs at 85% of the rate of physicians for services performed, while state Medicaid reimbursement rates for NPs vary. Cost savings may also come from lower salaries and less training time for NPs relative to physicians. In a recent analysis of the Massachusetts health care reform, Eibner et al. (2009) estimate that medical costs would decrease between 0.6 and 1.3% over 10 years if Massachusetts allowed NPs full independence.[7] Given the similarities between Massachusetts' health care law and the provisions of the Affordable Care Act, this estimate of cost savings may be applicable for other states

[7]The estimates here also include cost savings from relaxing scope-of-practice laws for physician assistants. However, NPs outnumbered physician assistants 4 to 1 in Massachusetts in 2007 when the estimates were created and the proposed policy changes for physician assistants did not include some freedoms given to NPs. Thus, the vast majority of this cost savings comes through NP independence.

legally constraints an NP's ability to setup primary care facilities in any chosen location and provide patients with prescription medications. We consider NPs in states with laws requiring supervision or collaboration on any aspect of practice to be *dependent* and NPs in states without such laws to be *fully independent.*

Figure 1 shows that following Montana's adoption of full independence for NPs in 1984, the number of states allowing NPs full independence rose steadily between 1985 and 2005. The process of changing state laws on NP practice was often a contentious political fight. According to Safriet (2002, p. 304), legislators are "bombarded by heavily-financed lobbying efforts emanating from state and national professional organizations, individual health care providers (who are also voters), and interested citizens." The federal government has also exerted indirect pressure on states to allow NPs more independence. The Federal Trade Commission held hearings beginning in 2002 on the level of competition between different types of providers of care in medical markets.[6] These hearings indicate federal concern over the rationale behind state laws requiring physician supervision of NP practice and suggest that population health and welfare are not overriding factors for state legislatures and regulators when determining the degree of NP independence. In our empirical work, we examine state-level determinants of the decision to allow NPs full independence.

Despite claims from physician groups that independent NPs offer a lower quality of care than physicians or physician-led teams, two waves of randomized control trials have concluded that there is no difference in the quality of primary care received by patients using NPs and those using physicians as measured by patient health outcomes. The first set of studies examined the effectiveness of NPs when under physician supervision. Sackett et al. (1974) and Spitzer et al. (1974) study the Burlington randomized trial, a 1971 trial program of NPs as primary care providers in a large suburban Ontario practice. These studies examine physical, emotional, and social factors as well as mortality and care satisfaction of patients and find that patients who received care from physicians had no differences from

[6]See `http://www.ftc.gov/bc/healthcare/research/healthcarehearing.htm` for a summary of the hearings.

titioners, certified nurse midwives, certified registered nurse anesthetists, and clinical nurse specialists. In 2010, approximately two thirds of all APNs in the U.S. were NPs (Phillips, 2011). NPs most commonly specialize in primary care areas such as family practice, adult practice, women's health, pediatrics, and gerontology. NPs provide primary and preventive health care services, prescribe medications, diagnose and treat common minor illnesses and injuries, and counsel patients on adopting healthy lifestyles. NPs practice in community clinics, health centers, urgent care centers, hospitals, nurse practitioner practices/offices, retail-based clinics, and walk-in clinics.

Since the first NP program was developed in Colorado in 1965, states set their own laws and regulations governing the scope of NP practice. These laws vary widely by state. States may require physicians to be physically on site to supervise an NP or require a written collaborative agreement between an NP and an offsite physician detailing referral policy and physician review of patient charts. States can also mandate that physicians review or cosign all prescriptions written by an NP and impose restrictions on prescriptions of certain types of medications, limits on private and Medicaid reimbursement, limited hospital privileges, and strict malpractice liability insurance requirements for NPs. For example, Texas requires that an NP must have a collaborating physician spend at least one out of every ten days at the clinic where the NP practices, the NP's practice must be located no more than 75 miles from the physician's office, and a randomly selected 10% of the NP's patient charts must be reviewed each month (Pettypiece, 2013; Traweek and Goodman, 2011). Alabama similarly requires that a collaborating physician must supervise at least 10% of the NP's working hours and review all adverse patient outcomes and 10% of all medical records (Alabama Board of Medical Examiners Administrative Code, 2012).

We choose to focus on the two most significant areas of delivering primary care, practice authority (diagnosing and treating patients) and prescriptive authority (prescribing medications). While any barrier can reduce the willingness of an NP to have a fully independent practice, a requirement for physician involvement in NP practice or prescriptive authority

NPs have more independence, while the price of well-child visits falls. Our paper has a longer time horizon and focuses on changes in utilization and health outcomes rather than labor market outcomes for primary care providers. Stange (2012) estimates the effect of county-level variation in the number of NPs and PAs on health care expenditures and preventive screenings and finds minimal impact in MEPS data.[4] Our paper has a different source of identification and estimates the direct impact of changes in regulations, allowing for time variation in regulations to impact provider supply as suggested by Kalist and Spurr (2004).[5] This motivates our use of time-varying treatment effects, which allow us to test whether changes in regulations or changes in NP supply drive our results.

We find that states that allow NPs to practice and prescribe without physician supervision see increases in health care utilization and care quality, with utilization increases primarily coming from adults while quality increases impact both adults and children. We find that these increases have positive effects on self-reported health status and body mass index. Patients with conditions that respond to primary care show reductions in emergency room use, suggesting both an improvement in health and cost savings in the provision of care. The response to NP independence shows little heterogeneity across the population, so the gains in health outcomes are widespread. Our evidence suggests that the primary mechanisms for these changes are the elimination of physician and NP time spent on supervision and decreases in indirect costs of receiving medical care such as better appointment availability and lower patient travel costs, rather than changes in provider supply or composition.

2 Background and Related Literature

Advanced practice nurses (APNs) are registered nurses who serve as health care providers in a broad range of primary care, acute care and outpatient settings. APNs include nurse prac-

[4]Stange (2012) also uses a difference-in-difference approach to show that preventive screening frequency does not change when NPs and PAs are allowed to prescribe controlled substances.

[5]Kalist and Spurr (2004) show that NP independence, under a somewhat different definition than ours, increases enrollments in NP training programs.

where advanced training has a larger marginal impact on patient health.

We estimate the causal effect of NP independence on population utilization of care and health outcomes by exploiting plausibly exogenous state level variation in the timing of changes in regulations governing the level of supervision that doctors must provide for NPs. We collect data on scope-of-practice laws and regulations for NPs by state from 1970 to 2010. Identification comes from within state variation in regulations over time. Our findings indicate that the timing of changes in NP regulations is not well-explained by changes in state health care concerns, as argued by Safriet (2002) and Institute of Medicine (2010).

We obtain individual level data on health care utilization and outcomes from the Medical Expenditure Panel Survey and the Behavioral Risk Factor Surveillance System. As states have allowed NPs to practice or prescribe independently for different lengths of time, we use an event study approach to investigate the difference between short and long run effects of NP independence. We also look for heterogeneous effects of NP independence, such as whether women, rural populations, or people without medical insurance have greater changes in utilization or health outcomes.

Several recent papers examine changes in health care utilization or health outcomes in response to changes in the supply of medical providers or changes in occupational licensing. Cook et al. (2012) find that increases in minimum nurse staffing ratios do not lead to better outcomes for patients, while Garthwaite (2012) finds that physicians reduce the amount of time spent with each patient when public insurance programs expand. Both papers show that increasing the number or availability of medical providers does not imply that health care utilization will rise or health outcomes will improve, though neither focuses on NPs or scope-of-practice laws as we do.

Kleiner et al. (2012) and Stange (2012) are most similar in spirit to our paper. Kleiner et al. (2012) analyze responses in NP and physician wages and the prices of primary care services when NPs gain more independence between 2002 to 2007 using a difference-in-difference approach. They find that the wages of NPs and physicians both increase when

notably, some states allow NPs to both practice and prescribe drugs without physician supervision, effectively enabling them to be independent providers of primary care services. These laws and regulations represent an important policy tool through which states can influence the total amount of preventive care provided, the geographic distribution of primary care providers, and potentially the overall cost of medical care. In early 2012, over 50 bills were under consideration in state legislatures across the U.S. that would affect scope-of-practice laws for NPs (Cassidy, 2012). However, little is known about the effect of allowing NP independence on the utilization of primary care and population health outcomes.

The implications of NP independence for health care utilization are not immediately clear. NP independence may lead to higher health care utilization rates if independent NPs practice in areas with few doctors, thereby lowering the cost of accessing health care for people in these areas, or by removing administrative burdens of collaboration between NPs and doctors, thereby freeing up more time to spend on patient care rather than reviewing charts and diagnoses. Primary care utilization might show no response or even decrease if fewer doctors provide primary care when NPs do not require physician supervision or if patients believe that NPs provide a lesser quality of care when not supervised by a physician.

The impact of NP independence on health outcomes is also an outcome of significant debate and interest. Physician groups argue that NPs working without physician supervision will lead to a decrease in the quality of primary care, as NPs have less medical training than doctors (American Academy of Family Physicians, 2012). On the other hand, the Institute of Medicine claims that "what nurse practitioners are able to do once they graduate varies widely for reasons that are related not to their ability, education or training, or safety concerns, but to the political decisions of the state in which they work" (Institute of Medicine, 2010, p. 5)). A number of randomized trials have concluded that patients using NPs for primary care have comparable health outcomes to patients who use doctors.[3] NPs managing relatively simple ailments without the supervision of a doctor may also allow doctors to work on cases

[3]See Naylor and Kurtzman (2010) for a summary of these studies.

1 Introduction

Implementation of the Affordable Care Act is expected to increase demand for medical services across the U.S., particularly the demand for primary care services. Primary care providers offer regular preventive medical care, reducing the number of routine medical problems that become emergency room visits and keeping chronic conditions from worsening until a hospital stay is required. With 7 out of 10 deaths in the U.S. every year the result of chronic diseases and nearly half of all adults diagnosed with a chronic illness, increasing the amount of preventive services consumed by the population may have significant impacts on population health outcomes in the long run.[1] As primary care is generally more cost effective than acute care in an emergency room or hospital, more preventive care may also create long run cost reductions in medical care. Towards both these ends, the Affordable Care Act contains a number of provisions designed to increase the amount of primary care consumed in the U.S., including mandating coverage for preventive services, funding community disease prevention measures, and increasing the number of primary care providers.[2]

Traditionally, physicians have been the health care professionals responsible for providing primary care. But with fewer physicians choosing to enter primary care, the approximately 56,000 nurse practitioners (NPs) practicing primary care in 2010 are the largest group of non-physician primary care providers, representing 19% of all primary care providers (Schwartz et al., 2011; AHRQ, 2011). Since the mid-1990s, the number of NPs in primary care has grown at 9.4% per year while the number of physicians in primary care has grown at 1.1% per year, so NPs will likely be an even larger percentage of primary care providers in the future (GAO, 2008). NPs are also more likely than physicians to practice in rural areas (AHRQ, 2012). State scope-of-practice laws regulate the types of medical services that NPs can provide and the necessary level of physician involvement in NP practice. Most

[1] For information on rates of various chronic diseases in the U.S., see the Center for Managing Chronic Disease (`http://cmcd.sph.umich.edu/statistics.html`) and the Center for Disease Control (`http://www.cdc.gov/chronicdisease/`).

[2] See `http://www.healthreform.gov/newsroom/primarycareworkforce.html` for more details on the provisions of the Prevention and Public Health Fund, established as part of the Affordable Care Act.

Nurse Practitioner Independence, Health Care Utilization, and Health Outcomes*

Jeffrey Traczynski and Victoria Udalova†

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Abstract

A number of states permit nurse practitioners (NPs) to practice and prescribe drugs without physician oversight, allowing NPs to fill the traditional primary care provider role long held by physicians. Little is known about the effect of NP independence on population health care utilization rates or long run health outcomes. We estimate the causal impact of NP independence by exploiting variation in the timing of state law passage. We find that in states that allow NPs greater freedom from oversight by doctors, the frequency of routine checkups increases and various measures of care quality improve. We also find less emergency room use by patients with ambulatory care sensitive conditions. These effects come from decreases in the administrative burden of collaboration between physicians and NPs and indirect costs to patients of accessing medical care.

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†Jeffrey Traczynski: Department of Economics, University of Hawaii at Manoa, Honolulu, HI 96822; jtraczyn@hawaii.edu. Victoria Udalova: Department of Economics, University of Wisconsin-Madison, Madison, WI 53706; udalova@wisc.edu.

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Implications for Nurse Leaders

Nurse-managed clinics are viewed as an integrally important component of the health care system for vulnerable populations. The findings in this review demonstrate clearly the need to enhance patient volume. Furthermore, more work is needed to remove policies restricting reimbursement for nurse practitioners. Specifically, revenue and volume enhancement can be addressed by allowing NPs to participate in state and federal programs such as Medicaid and Medicare, as well as with third-party payers. Evidence also suggests that NMCs decrease urgent care visits, emergency room visits, and hospital admissions demonstrating their role in containing rising health care costs. This review also confirmed that NMCs provide high-quality care with a high level of patient satisfaction. At a time when patients are looking for competent, high-quality health care among rising costs, nurse-managed clinics have established that they are important, viable, community-based safety nets for health care services. **$**

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evaluates how to make nurse-managed clinics more cost-effective while simultaneously improving quality of care for these vulnerable patients.

Cost analysis of nurse-managed clinics. Interestingly, of the two studies that discussed break-even analysis, both discussed the need to increase productivity by increasing the volume of patients seen. Ervin and colleagues (1998) felt that 3.35 visits each hour were needed to achieve break-even analysis, whereas Saywell and colleagues (1995) were very much consistent with 3.5 patient visits per hour. One of the perennial difficulties of NMCs described in each article was the need for volume enhancement. To achieve this, more clients on Medicaid, Medicare, and third-party payers need to compose the patient caseload so revenue can be enhanced. Findings that show that NMCs overall are more expensive than other local practices must be interpreted in light of low volume of patients and reimbursement issues at NMCs. If these problems are solved, NMCs have the potential to be cost-effective solutions to providing care for both insured and uninsured clients. Solutions for making NMCs more cost effective include operating the clinics at total maximum capacity and developing well-designed capitated contracts and revenue from third-party payers. Several authors described reduced use of emergency rooms, urgent care centers, and hospitalizations, which are the alternative resources if NMCs are not available, providing further evidence of the potential cost effectiveness of NMCs. Proposed health care reforms have suggested greater use of advance practice nurses in the primary care setting. This supports the need for systematic efforts to develop cost-effective NMCs.

Patient satisfaction and quality of care among patients at nurse-managed clinics. Evidence to date suggests that patients overall are highly satisfied with the care they receive at NMCs. In one study, clients preferred to have their medical treatments performed at the NMC on an outpatient basis rather than in a hospital, thus demonstrating quality of care and cost containment. Several other studies demonstrated that overall patients at NMCs were satisfied with the care they received and were very positive about their experiences and care. Indicators of quality of care at NMCs include removing barriers to care, improving health care access, and developing therapeutic relationships with nurse practitioners. Much evidence also exists that NMCs improve the use of preventative services, aid in the promotion of health, compliance of treatment, patient satisfaction, and reduce emergency room visits and rehospitalizations. All of this provides further verification of the ability of NMCs to provide high-quality care while improving the cost effectiveness of providing health care.

Nurse-managed clinics have the potential to serve as an important safety net for patients and can positively influence the health and cost outcomes for vulnerable populations. The findings of this review contribute to an understanding of what is needed to improve the financial viability of NMCs. One of the consistent themes in this review is the need for patient volume enhancement and the importance of reimbursement through Medicaid and third-party payers if NMCs are to remain viable. Another recurring theme of this review is that NMCs can reduce the number of clients using the more costly emergency-based services thereby reducing health care costs. Lastly, this review demonstrated that patients of NMCs overwhelming expressed high satisfaction with quality of health care received and experiences of care resulting in improved cost expenditures and cost containment.

Limitations

The lack of a standardized approach to measuring quality of care and patient satisfaction presents difficulty when comparing results across studies. For example, some studies surveyed if patients preferred to have medical treatments performed at the NMC versus the hospital as a measure of quality of care. Other studies surveyed patients regarding subsequent use of the NMC as a measure of quality. Still other studies employed quality of life surveys and national benchmarks as indicators of quality. Although methods used to assess quality of care varied widely, preventing statistical evaluation of findings across studies, the conclusions from each study were consistent that NMCs provide quality care to patients. Another limitation is the descriptive nature of all of the studies reviewed. Descriptive studies allow for personal interpretation of data and again may not be as sensitive in measuring cost and quality care outcomes of NMCs. However, studies in which patients are randomly assigned to either NMCs versus private physician offices would be financially unfeasible because the study would have to bear the cost of the services provided.

the estimated hospital charges saved in 1992 were $1,163,912. Hunter and colleagues (1999) demonstrated that the cost per visit for the Nurse-Managed Clinic for the Homeless was $62.71 compared to Erie County Medical Center Emergency Room cost per visit of $213.27. Helvie (1999) did not report data, but staff at the local emergency room stated that visits by the population of patients seen at the NMC described in this article decreased since the nursing center opened and continued to decrease as clients became more aware of the clinic and its services as evidenced by less than 3% of the center's patients being seen for emergency care. Finally, Smith-Campbell (2005) showed that between 1990 and 2000, after a local community health center had opened, visits to the emergency room by uninsured clients decreased 25% and the local hospital saved an estimated $13.9 million because of the drop in total uninsured ED visits.

Patient satisfaction and quality of care among patients at nurse-managed clinics. The literature search retrieved three descriptive non-experimental studies that reported percentage of satisfaction among patients in relation to NMCs and expenditures of care, and four descriptive studies non-experimental studies that described ways in which patients at NMCs were satisfied with the care they received (see Table 2). All of these studies were level III evidence. This demonstrates the lack of quality level I evidence for systematic reviews relating to quality of care or patient satisfaction in relation to NMCs and expenditures.

Three studies reported results from satisfaction surveys given to patients at NMCs. Badger and McArthur (2003) reported that 93% of clients were completely or very satisfied with the care they received at the academic NMC in the study. Schroeder (1993) reported that 94% to 100% of clients surveyed stated they preferred to have medical treatments performed at the Nurse-Managed Community Center for Persons Living with HIV/AIDS on an outpatient basis rather than in the local hospital. Barkauskas and colleagues (2004) reported patients overwhelmingly expressed high satisfaction with the care they received and 99% indicated they would probably use the center again.

Four studies described the ways in which patients at NMCs were satisfied with the care they received. Badger and McArthur (2003) found that academic NMCs allowed patients to (a) develop therapeutic relationships with the nurse practitioners, (b) remove barriers to care such as transportation, and (c) improve health care access. Schroeder (1993) surveyed clients in 1992 and 1993 and noted a positive impact on quality of life. Helvie (1999) developed a patient satisfaction tool using a Likert scale and administered to patients on their third visit. Results showed that most patients were very positive about their experience and care provided. In the same study, a pre and post survey of patients using the SF-36 Health Survey was conducted. Results showed a significant improvement in clients health-related quality of life including being less nervous, having more pep, and feeling happier. In a study by Barkauskas and colleagues (2004), community focus group participants commented on the high quality of care received at the academic NMCs described in the study, and HEDIS protocols demonstrated that the quality of care provided in the academic NMCs was generally comparable with national benchmarks. Finally, Brooten, Youngblut, Kutcher, and Bobo (2004) demonstrated care provided by APNs resulted in greater use of preventative services, greater patient independence, promotion of health, adjustment to illness, stress management, functional status, compliance with treatment, patient satisfaction, and reduced emergency room visits and rehospitalizations.

Discussion

Nurse-managed clinics can serve as an important safety net in the health care delivery system by offering needed health services to the poor and underinsured populations. The current focus on the restructuring of Medicaid programs has resulted in funding cuts, reduction in provider reimbursement, and restrictions on eligibility. Consequently, fewer physicians are accepting Medicaid patients and more and more patients are turning to the emergency department for routine care. Being uninsured or underinsured can have serious health consequences and contribute to the rising cost of health care. With approximately 15% of the U.S. population underinsured, there is a need to conduct cost and quality analysis of nurse-managed clinics to assess whether they can feasibly provide a partial solution to the problem. Even more alarming, we are in danger of abandoning our most vulnerable population – children, if we do not find a solution to the problem. Despite these daunting statistics, little systematic work has been conducted that

lowing information was recorded: type of study and relevance of study, type of health care facility, type of health care providers, type of health care services provided, type of client, outcome measures defined as cost analysis or cost analysis and quality of patient care/period of data collection, statistical findings given in the study, and outcome measures/findings related to the research question.

Results

Cost analysis and potential health care cost savings of nurse-managed clinics. A search of the literature revealed a lack of level I quality systematic reviews regarding NMCs and cost expenditures. All of the studies in this review were level III evidence. From the literature search, two descriptive non-experimental studies discussed break-even analysis, two descriptive studies discussed operating costs per patient for NMCs, three descriptive studies discussed average charges per patient encounter in a NMC compared to other primary care settings in the local area, one descriptive non-experimental study described average charges per patient in a NMC setting, and five descriptive non-experimental studies compared costs between NMCs and the use of Emergency rooms, urgent care centers, or hospitalizations (see Table 2).

Two studies described break-even analysis of NMCs. Ervin, Chang, and White (1998) discussed the volume of patients that needed to be seen annually to achieve break-even costs for the NMC described in this study. To reach the break-even point, 7,227 client visits would be needed in 1 year or 3.35 visits each hour would need to occur. The researchers described decreasing the cost of operating the center as one approach to reaching the break-even point for costs since 14% of the center's expenses consisted of building expenses, including utilities, repairs, and property taxes. It was felt this could be achieved by acquiring donated space which included utilities or moving the nursing center to another location within the community. Saywell, Lassiter, and Flynn (1995) found the nurse-managed community health center in the study was operating at 40% of capacity. It was felt that maximum capacity under current staffing levels to achieve the break-even point financially was about 3.5 patients per hour and the clinic was currently operating at about 1.4 patients per hour.

Two studies reported total operating costs per patient for NMCs which included office expenses, personnel, and in-kind goods and services. Vonderheid, Pohl, Barkauskas, Gift, and Hughes-Cromwick (2003) found that operating costs per patient for the NMCs in this study ranged from $156 to $201 and were higher than local family practice physicians at $109 per patient. No center in that study was profitable whereas family practice physician offices showed a profit of $0.85 per patient. Barkauskas and colleagues (2004) looked at several academic NMCs and found that total operating costs varied greatly and ranged from $47 to $177 per patient. Only one of the centers in the study made a profit and losses were due to low volume of patients and problems with reimbursement.

Three studies compared the average charge per patient visit to other primary care settings in the local area. One study described average charge per patient encounter. Saywell and colleagues (1995) described the average direct cost of care per patient visit to be $41.86 and $70.00 if the cost of the patient's medicine was included. The first cost of $41.86 per patient visit was then compared to the average cost for a routine primary care physician office visit in the local area of $38. The authors calculated that if the clinic was operating at total maximum capacity, direct cost per patient with and without medications would be $21.13 and $15.97 respectively. Helvie (1999) compared cost per patient visit of $65 at the nurse-managed center versus cost per patient visit at the local emergency room of $215 to $323. Finally, Hunter, Ventura, and Kearns (1999) described the cost per visit for a nurse-managed clinic for the homeless to be $62.71 which is comparable to a local County Health Department's Medically Indigent Program at $61.82. The NMC's charge was significantly lower than the local County Health Department's Community Health Clinics at $84.71, the local County Medical Center General Clinics at $92, and the local County Medical Center Emergency Room at $213.27 per patient visit. Badger and McArthur (2003) described the charge per patient visit at the academic NMC described in the study as $15.17. This figure was extrapolated from 693 patient visits at a total cost of $10,512. The researchers did not compare the average charge per patient visit to other primary care settings in the local area.

Five descriptive studies described potential cost savings of NMCs associated with reduced use of emergency rooms, urgent care centers, and hospitalizations. Badger and McArthur (2003) noted that prior to the NMC in this study opening, a major problem was the misuse of costly emergency services, police, and paramedics. When comparing the number of emergency medical services provided before the clinic opened, the clinic reduced paramedic calls by 32% in the first 6 months. In dollars this translates into a health care cost savings of $16,650. A 39% reduction in police calls was also found, resulting in a cost savings of $9,400. Schroeder (1993) estimated that the hospital charges saved in 1991 due to the Nurse-Managed Community Center for Persons Living with HIV/AIDS was $785,744 and

Table 2. (continued)
Evidence of Cost of Providing Care and Quality of Care at Nurse-Managed Clinics

Study, Authors, Date	Type of Study and Relevance	Type of Client	Outcome Measures/Period of Data Collection	Type of Health Care Facility/Providers	Type of Health Care Services Provided	Outcomes
Emergency Department and Community Health Center Visits and Costs in an Uninsured Population (Smith-Campbell, 2005)	Descriptive non-experimental study Relevance score: 2	Clients are all uninsured; ages of clients are not described	1. Local emergency department use by uninsured patients 2. Emergency department perceived cost savings Period of data collection: 1988, 1990, 1993, 1995, and 1996-2001	Local community health center/APNs	Primary care	1. After the nurse-managed health center opened in 1990, visits to the ED by uninsured clients decreased 25% by 2000. 2. The hospital saved an estimated $13.9 million because of the drop in total uninsured ED visits; this cost is based on the average ED visit charge in 2000 ($1,620), not on actual cost.
Academic Nurse-Managed Centers: Approaches to Evaluation (Barkauskas et al., 2004)	Descriptive non-experimental study Relevance score: 2	Varied in ages among academic-nurse managed centers (ANMCs); population consisted of homeless, uninsured, veterans, chronically mentally ill, and university students	1. Care provided by ANMCs 2. Financial analysis Period of data collection: 4 years (1998-2002)	ANMCs/APNs, faculty	Primary care	1. Patients expressed high satisfaction with the care they received and 99% indicated they would probably use the center again; community focus group participants commented on the high quality of care received in the ANMCs; HEDIS protocols demonstrated that the quality of care provided in the ANMCs was generally comparable with national benchmarks. 2. Total operating costs per encounter varied greatly across the ANMCs from $47-$177; only one of the centers made a profit, and losses ranged from $18-$75 per encounter.
Quality and the Nursing Workforce: APNs, Patient Outcomes and Health Care Costs (Brooten, Youngblut, Kutcher, & Bobo, 2004)	Descriptive non-experimental study Relevance score: 3	Clients of all ages	1. Quality of care: defined as patient compliance, health promotion/prevention, patient independence, adjustment to illness, stress management, and patient's overall satisfaction 2. Health care costs defined as level of reimbursement, prescriptions written, diagnostic tests ordered, ER or UC use	Not described: article described the role of the APN in primary care, acute care, home care, and transitional care but did not described in exactly what setting/APNs	Primary care	1. APN provided care results in greater use of preventative services, greater patient independence, promotion of health, adjustment to illness, stress management, functional status, compliance with treatment, patient satisfaction, reduced ER visits, and rehospitalizations. 2. APNs are reimbursed at a lower rate than physicians for the same services, thereby saving health care costs, additionally APNs order fewer tests and prescription medications than physicians.

Table 2. (continued)
Evidence of Cost of Providing Care and Quality of Care at Nurse-Managed Clinics

Study, Authors, Date	Type of Study and Relevance	Type of Client	Outcome Measures/Period of Data Collection	Type of Health Care Facility/Providers	Type of Health Care Services Provided	Outcomes
Efficacy of Primary Care in a Nursing Center (Helvie, 1999)	Descriptive non-experimental study One portion of the study appears to be quasi-experimental. The "outcomes of services" portion of the study included a pre and post survey of patients using the SF-36 Health Survey. Relevance score: 3	Clients of all ages; homeless and low-income populations	1. Percentage and types of clients referred 2. Reported client satisfaction 3. Outcomes of services provided 4. Influence on ER visits 5. Cost-effectiveness of services Period of data collection: March 1997-September 1998	NMC/Family NP	Primary care	1. Less than 3% of center's patients were referred for emergency care. 2. Results of a patient satisfaction survey showed that most patients were very positive about the experience and care provided. 3. A pre and post survey reported a significant difference following interventions in the following areas: less nervous, more pep, and happier. 4. According to staff at the local ER, visits by this population of patients decreased since the nursing center opened; according to the NP these numbers decreased over the past few months as clients become more aware of the center. 5. Cost per patient visit was approximately $65, compared to cost per patient visit at the local emergency room which ranged from $215-$323.
Financial Performance of Academic Nurse-Managed Primary Care Centers (Vonderheid, Pohl, Barkauskas, Gift, & Hughes-Cromwick, 2003)	Descriptive retrospective non-experimental study Relevance score: 1	Varied patient mix with clients of all ages from diverse populations	1. Cost performance measures per patient (included service revenue, general operating costs, total operating costs) and per encounter were compared between the clinics and family practice physicians (obtained through national benchmarking data) Period of data collection: 2000 calendar year	NMCs/APNs	Primary care	1. Service revenue per patient ranged from $38-$231 among the centers, which was 200% higher than family practice physicians (FPP); general operating costs per patient ranged from $45-$79, which was higher than the $29 for FPPs; operating costs ranged from $156-$201 and were higher than FPPs at $109; no nursing center was profitable, but FPPs reported a $0.85 profit per patient.
Cost Analysis of a Nursing Center for the Homeless (Hunter, Ventura, & Kearns, 1999)	Descriptive non-experimental study Relevance score: 2	Men, women, and children; homeless populations	1. Cost of providing health care to the homeless at a NMC compared to the cost of going to the local ER, CHC, hospital clinic, or health department Period of data collection: 2 years (1992-1993)	NMC for the homeless/APNs	Primary care	1. Cost per visit for the NMC for the homeless was $62.71 compared to Erie County Health Department's Medically Indigent Program at $61.82, Erie County Health Department's Community Health Clinics at $84.71, Erie County Medical Center General Clinics cost of $92, and Erie County Medical Center Emergency Room cost per visit of $213.27.

Table 2.
Evidence of Cost of Providing Care and Quality of Care at Nurse-Managed Clinics

Study, Authors, Date	Type of Study and Relevance	Type of Client	Outcome Measures/Period of Data Collection	Type of Health Care Facility/Providers	Type of Health Care Services Provided	Outcomes
Academic Nursing Clinic: Impact on Health and Cost Outcomes for Vulnerable Populations (Badger & McArthur, 2003)	Descriptive non-experimental study Relevance score: 3	2/3 were women, majority > 60 years; mainly low-income/vulnerable populations	1. Quality of care 2. Costs 3. Client satisfaction Period of data collection: first 12 months of operation	Academic nursing clinic/Nurse practitioners: a family nurse practitioner and a psychiatric-mental health nurse practitioner	Primary care, mental health/ chemical dependency	1. Clients seen weekly if needed, patients developed therapeutic relationships with NPs, access barriers such as transportation were removed all resulting in improved quality of patient care. 2. Average patient visit cost $15.17; costly misuse of emergency services, police was prevented; reduction in paramedic calls; self-reports showed fewer hospitalizations. 3. 93% of patients were completely or very satisfied with the care received at the clinic.
Nursing's Response to the Crisis of Access, Costs, and Quality in Health Care (Schroeder, 1993)	Descriptive non-experimental study Relevance score: 3	Persons with HIV/AIDS; males > females	1. Estimated savings in hospital charges 2. Cost effectiveness of center Period of data collection: 2 years	Nurse-managed community center for persons living with HIV/AIDS/doctorate and master's-prepared APNs	Medical and supportive services are provided	1. Estimated hospital charges saved in 1991 were $785,744, and in 1992 were $1,163,912. 2. 94%-100% of clients surveyed stated that they preferred to have medical treatments performed at the center, rather than in a hospital; also clients surveyed in 1992 and 1993 reported a positive impact on quality of life.
A Cost Analysis of a Nursing Center's Services (Ervin, Chang, & White, 1998)	Descriptive non-experimental study Relevance score: 1	All ages/ pregnant women/low income population	1. Break-even analysis 2. Cost Period of data collection: October 1995-May 1996	NMC/Family NP, nurse midwife	Primary care for all ages/ prenatal care	1. One approach to reach break-even point for finances is to decrease cost of operating the center. 14% of the centers expenses consist of building expenses, including utilities, repairs, and property taxes. 2. To reach break-even volume the NPs would need to complete 3.35 visits each hour.
A Cost Analysis of a Nurse-Managed, Voluntary Community Health Clinic (Saywell, Lassiter, & Flynn, 1995)	Descriptive non-experimental study Relevance score: 1	73% were 18-54 years of age; 13% were in the 6-17 year age group; 2/3 were women; services not available to patients with personal health insurance	1. Cost accounting 2. Operating cost analysis 3. Clinic cost compared with physician cost Period of data collection: May 1993-April 1994	Nurse-managed community health center/NPs and volunteer physicians	Primary care	1. Average direct cost per patient visit $41.86; average total cost per patient visit (including opportunity costs) $70.99; costs included the cost of patient medicine in the visit. 2. Average charge for a routine office visit in the area was approximately $38. 3. The clinic was operating at 40% of capacity, maximum capacity under current staffing levels was about 3.5 patients per hour. At maximum capacity, direct costs and total unit costs (including medicine) were $21.13 per visit and $ 32.59 respectively; excluding medication costs per visit were $15.97 and $27.44 respectively.

billions of dollars. The same study also found that emergency department visits by uninsured children would increase from 9% to 25% (Napier, 2007).

Patients without health insurance commonly rely on some type of "safety net" to obtain health care services. Nurse-managed centers (NMCs) play an important role in the delivery of health care services to this population. The first centers were established in the early 1970s and paralleled the development of nurse-practitioner education (Barkauskas et al., 2004). Nurse-managed centers typically serve patients who would otherwise be underserved or not served at all. NMCs provide primary care with an emphasis on health promotion, disease prevention, and a focus on the family unit and community. Unfortunately, NMCs often struggle to remain financially viable. Numerous reasons have been attributed to NMCs failure to remain financially stable, but lack of third-party reimbursement stands out as one of the most important factors. It is important to assess whether NMC's can provide high-quality, economically viable systems of care for underserved patients. To date, there have been no systematic reviews that focus on quality and cost expenditures of NMCs in relation to health care services and continuity of care.

The purpose of this review is to assimilate evidence regarding the cost of providing care and the quality of care provided by nurse-managed clinics. Assessment of cost of care includes break-even analysis, operating costs of NMCs, average charges per patient encounter and per patient visit at NMCs, and cost comparisons between NMCs and the use of emergency rooms, urgent care, and hospital services. Quality of care will consider reports of patient satisfaction and descriptions of patient's experiences and care provided at NMCs.

Table 1.
Assessing Relevance of Descriptive Studies

Included quality of patient care/satisfaction in study.	+1
Included hospitalization/emergency room/urgent care use in relation to cost analysis in study.	+1
Included description of health care services in study.	+1

Methods

A broad search of the PubMed database of the National Library of Medicine and CINAHL database from 1970-2007 was conducted using the following MESH terms: *"Nurse practitioner" AND "Costs and Cost analysis;" "Nurse practitioner" AND "Costs and Cost Analysis" AND ("Quality assurance, healthcare;" OR "Quality indicators, healthcare;" OR "Quality of healthcare;" OR "Health care quality, access, and evaluation").* Related articles to relevant studies on PubMed were also reviewed and revealed two more articles. In addition all references within relevant papers were investigated for added articles (two articles). Although the focus of this review is about NMCs and cost and quality care outcomes, other NMC settings (defined as academic nurse-managed clinics, community health clinics, and any clinic that is nurse managed and provides primary care to the public) and methods of reimbursement were included to assess the overall cost and quality of care outcomes of NMCs. The search dates 1970-2007 were looked at specifically because it was in the early 1970s that nurse practitioner (NP) programs started to come to the forefront and NPs began to be recognized for their contributions to primary care. It was also in the early 1970s that the first NMCs were established.

For this systematic review, quantitative as well as qualitative studies were included. Inclusive criteria for the studies in this review included that the health care providers evaluated in the study must be advanced practice nurses (APNs), must be providing primary care in a nurse-managed health clinic setting, and outcomes must focus on cost analysis or cost analysis and quality of care of the clinic. Exclusion criteria included studies of health care that took place in a private office setting, or studies of health care providers who were not APNs, or studies of NPs who did not provide primary care, or studies whose outcomes did not include cost analysis or cost analysis and quality of care of NMCs.

A total of 711 articles were retrieved during the literature review process. As stated previously, studies that did not have an APN as the health care provider were not reviewed (22 articles), studies that did not take place in a NMC setting were not included (112 articles), studies whose outcomes did not include cost analysis or cost analysis and quality of care outcomes of NMCs were excluded (566 articles), and studies in which NPs did not provide primary care were excluded (5 articles).

The study designs of the included articles were reviewed to determine the level of evidence they contribute to the literature (Melnyk & Fineout-Overholt, 2005). Levels of evidence were stratified into four levels. Level I referred to systematic review of randomized controlled trials, level II included randomized controlled trials, level III indicated the study was a non-randomized controlled trial or from a cohort or case control analytical study, and level IV were articles whose findings were based on expert opinion. Furthermore, studies were assigned a relevance score on a 0 to 3 scale (see Table 1). For each study included in this literature review, the fol-

CNE SERIES

CNE Objectives and Evaluation Form appear on page 84.

Jennifer A. Coddington
Laura P. Sands

Cost of Health Care and Quality Outcomes of Patients At Nurse-Managed Clinics

- Lack of health insurance is a critical factor in access to appropriate health services and is directly associated with poor functioning, increased morbidity and mortality, lack of continuity of care, and rising health care costs.
- Nurse-managed clinics (NMCs) can serve as an important safety net in the health care delivery system by offering needed health services to the poor and underinsured populations.
- Indicators of quality of care at NMCs include removing barriers to care, improving health care access, and developing therapeutic relationships with nurse practitioners.
- Much evidence also exists that nurse-managed clinics improve the use of preventative services, aid in the promotion of health, compliance of treatment and patient satisfaction, and reduce emergency room visits and rehospitalizations.
- One of the consistent themes in this review is the need for patient volume enhancement and the importance of reimbursement through Medicaid and third-party payers if nurse-managed clinics are to remain viable.

THE SURGE IN THE NUMBER OF Americans lacking health insurance has become a priority on our national agenda. The continued rise in the number of uninsured, steep declines in employer-sponsored health insurance, and the lack of a national solution is alarming as policymakers scramble to develop health care reform. From 2002 to 2005, the number of uninsured Americans rose 7% to more than 46 million (Robert Wood Johnson Foundation [RWJF], 2007c). Even more concerning is that approximately 9 million children lack health insurance and an estimated 1.8 million children who are eligible for the State Children's Health Insurance Program are yet to be enrolled (RWJF, 2007a). Nearly 70% of low-income children are uninsured, and 75% of uninsured children live with someone who works full time (RWJF, 2007b). In addition, cost-containment measures to federal and state-funded health care programs have resulted in lower reimbursement rates and providers who are less willing to accept patients enrolled in these programs.

Lack of health insurance is a critical factor in access to appropriate health services and is directly associated with poor functioning, increased morbidity and mortality, lack of continuity of care, and rising health care costs (RWJF, 2007a). In a previous study, Medicaid program restructuring that resulted in a reduction of Medicaid enrollments increased emergency department use by uninsured persons and thereby increased the amount of uncompensated care provided by hospitals (Napier, 2007). Nationally, uncompensated health care costs health care institutions annually

JENNIFER A. CODDINGTON, MSN, RN, CPNP, DNP(c), is Visiting Associate Professor and Director, Pediatric Nurse Practitioner Master's Track, Purdue University School of Nursing, West Lafayette, IN, as well as Coordinator, Trinity Nursing Center for Infant and Child Health.

LAURA P. SANDS, PhD, is a Professor of Nursing, Director of Faculty Development of the School of Nursing, and a Co-director, Center for Healthcare Outcomes and Policy Research, Regenstrief Center for Healthcare Engineering, Discovery Park at Purdue University, West Lafayette, IN.

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Connecticut State Medical Society
FOUNDED IN 1792

160 St. Ronan Street, New Haven, CT 06511-2390 (203) 865-0587 FAX (203) 865-4997

Connecticut State Medical Society Testimony in Opposition to House Bill 6674 An Act Concerning Workforce Development and Improved Access to Health Care Services
Presented to the Public Health Committee
Monday March 16, 2009

Senator Harris, Representative Ritter and members of the Public Health Committee, on behalf of the more than 7,000 members of the Connecticut State Medical Society (CSMS), we present this testimony to you today in opposition to House Bill 6674 An Act Concerning Workforce Development and Improved Access to Health Care Services.

. Any workforce policies should recognize the continued and essential need for patients to have access to a personal physician who accepts responsibility for their entire health, working with nonphysician clinicians involved in caring for the patient. Workforce polices should ensure adequate supplies of physician and nurse practioners to improve access to quality care. Workforce policies should recognize that training more nurse practioniners does not eliminate the need nor substitute for increasing the number of physicians who are trained to treat the complex health care needs of patients.

This legislation would grant nurse practitioners, nurse psychotherapists, and certified nurse anesthetists, the authority to independently practice within a broad and vaguely defined scope of what is now considered the licensed practice of medicine.

While we have met with, listened to, and understand concerns raised by our nursing colleagues regarding difficulties in identifying collaborating physicians in what appears to be very limited situations, we have received limited c information regarding such an occurrence. While we offerd to work with our nurse colleagues with our APRN Assist program when such situations arise, we cannot support what clearly is a significant and unprecedented expansion of scope of practice in Connecticut.

In the last few years, it is true that advanced practice nurses have assumed some very specific and limited responsibilities and functions in collaboration with licensed physicians that in the past have been regarded beyond the scope of nursing. However, in these limited cases there existed a critical bond between the APRN and collaborating physician that ensured that the patient received the right care for the right reason at the right time. These functions have been mutually identified by the two parties; the physicians have assessed the abilities and talents of the APRN and there is an assurance that physicians are willing to assume responsibility for how and when that treatment is

delivered based on a set of protocols that have been established prior to the medically necessary determined services and treatment provided by the APRN.

By removing the requirement for collaboration with a physician, it will be the APRN that must now decide if there are any underlying concerns that may affect the patient and also what consequences will be presented to the patient whether the APRN is working with a patient with a single episode of care or with a patient with multiple co morbidities that involves complex and often varied treatment modalities. In fact, if passed, this bill would allow APRNs to open their own practices to evaluate, diagnose, and provide treatment for potentially complex and life-threatening disease, as well as prescribe, administer, and dispense medications to patients, including controlled substances that require the development of a treatment plan for the patient. All of this would take place without the benefit of oversight from a licensed physician.

We do not believe that in the name of quality of care you can substitute the care by an APRN for the medical and technical skills and knowledge of a licensed and practicing physician in Connecticut.

A physician's medical education and training is fundamentally different than that of a nurse's nursing education and training. Medical education and training is more extensive in the depth of clinical judgment and in scientific rigor. Physicians must have a minimum of ten years of post-secondary training in patient diagnosis and therapeutics just to be licensed in this state. The vast majority of physicians have additional years of education and training. Medical education and training provide the knowledge base necessary to understand and handle the vast array of illnesses and injuries that are presented in a direct patient care practice. This knowledge cannot be learned in a few years of college-level training or related masters' studies. Physicians complete on average 3200 hours of clinical training in medical school and 9000 hours during residency compared to 500 for APRNs. In addition, physicians must complete a minimum of 50 hours of continuing education every two years by statute and receive much more through more stringent requirements of hospitals and insurance panels.

There is no substitute for the education, training and skills of a physician. CSMS is very concerned with the suggestion that an APRN could act as a surrogate for a physician in delivering medical care to patients in Connecticut. We do not believe that there is evidence that patients are being unserved or underserved due to the retirement of physicians and we have pledged to work with the various nursing organizations to resolve any limited situations where there may be a need for a form of transition where an APRN is involved. The current provisions in Connecticut law are already very accommodating to nurses and we believe protect the interests and medical needs of our patients.

Again, patients will not be well-served if advanced practice nurses are allowed to practice and prescribe independently, without appropriate physician direction, knowledge and involvement. Every patient deserves the confidence of knowing that a fully trained physician is involved in the course of his or her medical care.

Please reject the concept of independent practice of APRNs and work with the CSMS in identifying the circumstances where we can assist our colleagues in creating opportunities for them to continue to benefit from collaboration with a physician in the treatment and care of patients. We are concerned first and foremost about the medical care received by the patients of Connecticut and we believe that licensed and well-trained physicians are the best able to identify, diagnose, treat and monitor patient illness and disease and when necessary and clinically appropriate, provide the medical and surgical procedures necessary for quality patient outcomes.

State of Connecticut

Hospital System Strategic Task Force Report

Findings and Recommendations

January 8, 2008

Co-chairs:

Robert Genuario, Secretary
Office of Policy and Management

Cristine Vogel, Commissioner
Office of Health Care Access

Task Force Members

Governor Rell appointed the following individuals to the Hospital System Strategic Task Force:

Co-Chairs:

Robert L. Genuario
Secretary, Office of Policy & Management

Cristine A. Vogel
Commissioner, Office of Health Care Access

Members:

Evelyn Barnum, *Chief Executive Officer, Connecticut Primary Care Association*

Polly T. Barey RN, MS, *Executive Director, Connecticut Nurses Association*

Arthur W. Brodeur, *Chair, Planning Committee, Windham Hospital*

David Cappiello, *State Senator, 24th District*

Christopher Dadlez, *President/CEO, St. Francis Hospital & Medical Center*

Kevin M. DelGobbo, *State Representative, 70th District*

J. Robert Galvin, MD, MPH, *Commissioner, Department of Public Health*

Richard Gray, *Executive Director, Connecticut Health & Educational Facilities Authority*

Toni Nathaniel Harp, *State Senator, 10th District*

Jennifer Jackson, *President & Chief Executive Officer, Connecticut Hospital Association*

Matthew Katz, *Executive Director, Connecticut State Medical Society*

Thomas Kirk, Jr., PhD, *Commissioner, Department of Mental Health & Addiction Services*

Paul E. Knag, Esq., *Murtha Cullina LLP*

Kevin Lembo, *Executive Director, Office of Healthcare Advocate*

Lawrence Levine, MD, FACEP, *President, Connecticut College of Emergency Physicians*

Denise W. Merrill, *State Representative, 54th District*

Timothy Meyer, *President, Connecticut Association of Health Plans*

Kevin Murphy, *Senior Vice President, Finance/CFO, Eastern Connecticut Health Network, Inc.*

Mary Anne O'Neill, *Associate Legal Counsel, Office of the Governor*

John Rathgeber, *President, Connecticut Business & Industry Association*

Michael Starkowski, *Commissioner, Department of Social Services*

Robert Trefry, *President/CEO, Bridgeport Hospital*

Table of Contents

Foreword

Concerned about the condition of Connecticut hospitals and Connecticut residents' access to health care, in April 2007, Governor M. Jodi Rell announced the formation of a task force (Appendix A) to develop strategies to stabilize and chart the future course of hospitals in Connecticut, many of which are facing financial hardship. Governor Rell appointed Robert L. Genuario, Secretary of the Office of Policy and Management (OPM), and Cristine A. Vogel, Commissioner of the Office of Health Care Access (OHCA), to chair the Hospital System Strategic Task Force. Task Force members included state agency commissioners, legislators, and individuals representing hospitals, the business community, community health clinics, consumer advocates, primary care providers, physicians, emergency department physicians, nurses, and insurance companies (Appendix B). The Task Force organized itself into three subcommittees to address the major issues facing hospitals: Finance, Utilization and Planning, and Workforce. In addition to input from Task Force members, on November 13, 2007, the Task Force held a public hearing to encourage feedback in response to preliminary recommendations made by the Task Force subcommittees.

The Governor requested that the Task Force examine the current financial health of Connecticut's hospitals, access to care, emergency room utilization, affordability, alternative delivery of primary care and the 'Certificate of Need' process.

The Task Force is part of Governor Rell's broader effort to ensure that all residents of Connecticut have access to quality, affordable health care. In December of 2006, the Governor announced her Charter Oak Health Care benefit plan, which is expected to provide low-cost health insurance to single people and families who cannot currently afford private insurance. The plan – targeted at lower income people, newly graduated college students, and self-employed people, many of whom may not have access to employer-sponsored health insurance and do not qualify for programs such as HUSKY or Medicaid – is intended to provide health insurance for about $250 a month, and includes state subsidies. In addition, Governor Rell has strongly supported Bond Commission funding for expansion and equipment at community health centers, announcing in September 2006 nearly $26 million for expanded medical and dental facilities in communities all across the state, enabling the centers to serve some 85,000 additional new patients.

This report of the Governor's Task Force builds upon the work completed by the Legislative Program Review and Investigations Committee and the action taken by the Administration and Legislature in the 2008–2009 biennium budgets to increase Medicaid funding for hospitals. The goal of this report is to provide recommendations that will further stabilize the health care delivery system in Connecticut as it explores serious workforce challenges, access limitations and some fundamental financial structural issues.

I. Highlights of the Task Force

Health care has changed significantly in recent years from hospital-based to outpatient-based services. More diagnostic and treatment procedures are provided to patients from an office or freestanding facility instead of a hospital. Hospitals, however, have remained cornerstones in their communities both as health care providers and as a safety net for patients who may not have access to the outpatient options due to facilities' suburban locations or patients' insurance status. The role as safety net provider, combined with escalating costs, has financially stressed many hospitals. In hospital Fiscal Year (FY) 2006 (covering the period October 1, 2005 through September 30, 2006), the average statewide hospital total margin was reported at 2.51% and the average statewide hospital operating margin was 0.62%. This low operating margin indicates that hospitals' patient revenue and expenses are practically breaking even. This report, and the recommendations that follow, focus mainly on the hospital delivery system of care and offer some short and long-term strategies to sustain the financial viability of the hospital system.

Due to the complexity of the subject, three task force subcommittees were formed to focus on specific areas of concern: (1) system-wide utilization and planning, (2) workforce issues, and (3) financial structure. The Task Force received recommendations from each subcommittee, from which several themes emerged:

- Connecticut has a relatively strong employer-sponsored health insurance coverage population that could be jeopardized if premiums continue to increase, which may in turn lead to fewer people having coverage.
- Ongoing cost increases, coupled with low reimbursement, have resulted in financial instability for many of Connecticut's hospitals.
- The economic pressure to make up for low operating margins by focusing on the highest-paying reimbursement sources (typically commercial insurance) leads to overlap in services and competition among hospitals for the services they provide.
- Emergency departments continue to experience an increase in volume of non-emergent cases more than likely related to a lack of access to primary care services.
- Emergency departments continue to struggle to provide appropriate and timely access for persons with psychiatric and/or substance abuse disorders (i.e., behavioral health patients in need of diversion or step-down to inpatient, residential, outpatient or other levels of care).
- Cost shifting from government-sponsored programs to private/commercial payers due to relatively low reimbursement rates from the former is unsustainable for both commercial payers as well as hospitals.
- The shortage of health care professionals (e.g., physicians, nurses, and allied health) limits access to primary care, medical specialties and exacerbates emergency department "on-call" coverage pressures.
- The fragile financial stability of many Connecticut hospitals is directly impacting their ability to obtain capital funding in order to provide modern facilities and keep pace with changing technology and patient and workforce safety.

There is no single solution to ensure hospital financial viability, but a combination of strategies will need to be applied before success can be realized. Connecticut has a strong health care delivery system that provides excellent care; this report focuses on the areas of weakness within the system and provides robust recommendations that should have a lasting impact.

II. Discussion of the Connecticut Hospital System

A. Overview of Connecticut Hospitals

Utilization, payer mix and competition are among the key factors that determine the financial strength of a hospital. Utilization is a measure of demand for health care services and directly impacts the revenue stream. Hospitals develop their budget projections using historical utilization measures and the reimbursement that will be received based on the payer source. The payer sources are generally grouped into five major categories: Medicare, Medicaid, commercial/private payers, the "uninsured," and "other" public programs. A hospital charges the same amount for a service to all patients, but what a hospital receives in payment for that service varies among payers. Competition enters into the financial condition of a hospital as they directly market and advertise for the most profitable patients and the most qualified professional staff.

Competition in the health care marketplace has changed. Hospitals compete for patients that require the more profitable services, such as elective angioplasty, specialized diagnostic technology for cancer care, inpatient orthopedic surgery and outpatient imaging and surgery. The nature of competition has also changed. Not only do the hospitals compete against other hospitals, but they also compete against privately-owned, free-standing facilities. Although Connecticut's Certificate of Need program may have slowed the growth and proliferation of such private outpatient facilities in comparison to other states, it is of great concern to hospitals because, unlike private outpatient facilities, hospitals must provide care to all patients regardless of insurance status and provide continuous emergency access. The shift in hospital payer mix attributable to the influx of privately-owned, free-standing facilities may hinder hospitals' ability to reinvest in their facilities and the health of the communities they serve.

The Task Force discussed the impact these issues have on the hospitals' bottom-line, and the report provides recommendations that specifically address these issues. Additional appendices have been included in this document for reference purposes.

B. Utilization of health care services

The Connecticut hospital system consists of 30 acute care hospitals (29 acute general hospitals and one children's hospital) totaling 9,256 licensed beds, with 7,231 of these beds staffed for patient care. Each hospital operates an Emergency Department 24 hours per day, seven days a week with an additional five emergency departments considered satellite facilities to the hospital (Appendices C and D). In FY 2006, there were 424,475 discharges from hospital inpatient services and 1.4 million hospital emergency department visits. It is important to note that statewide, inpatient staffed beds were occupied 78% in FY 2006, however, there are differences among individual hospitals. For example, New Milford Hospital is at 47% while Norwalk Hospital is at 98% occupancy.[1] This indicates that the demand for inpatient services is different throughout the state, and with such variation general statewide assumptions may be misleading. Many hospitals which are at or near capacity of their staffed beds have additional licensed beds that could be used to alleviate crowding within the emergency department. However, there are multiple issues to overcome before these beds can be added to the existing system including: staffing shortages, lack of space to bring the beds into operation and the capital costs associated with adding beds due to high construction/renovations costs.

The number of inpatient discharges has been increasing slightly from 416,300 in 2004 to 424,475 in 2006. Along with increases in discharges, the number of staffed inpatient beds has also increased from 7,182 to 7,231 in the same period. Full time equivalents (FTEs) for the same timeframe have increased from 45,741 to 47,524. However, when comparing number of discharges with the population, the utilization rate has declined overall, as shown in Table 1. In FY 2004, the number of discharges per 1,000 population was 123 while in FY 2006 it was reported at 121 discharges per 1,000 population.

Table 1: Inpatient Acute Care Utilization Rate for CT Discharges, FYs 2004-2006

	FY 2006	FY 2005	FY 2004
Discharges	424,475	423,179	416,300
CT Population	3,504,809	3,394,751	3,389,483
Utilization Rate (discharges/1,000 population)	121	125	123

Source: CT Office of Health Care Access Acute Care Hospital Discharge Database and U.S. Census Bureau 2004-2006 Population Estimates

With the nearly 2% increase in inpatient discharges from 2004 to 2006, the hospitals with the largest three-year percent increases in total discharges were Johnson (+16%), Hospital of Central Connecticut (formerly New Britain) (+13%) and MidState (+9%). Hospitals with the largest three-year percent decreases were Day Kimball (-12%), Rockville General (-10%) and Backus (-8%). As shown in Table 2, a wide variation in inpatient utilization exists and issues of demand and capacity are regional (if not local) and are not statewide.

Table 2: Connecticut Acute Care Discharges, FYs 2004 & 2006

Hospitals	Discharges		Change	
	FY 2004	FY 2006	#	%
Bradley Memorial **	2,319	2,369	50	2
Bridgeport Hospital	20,091	19,582	-509	-3
Bristol Hospital	8,357	7,954	-403	-5
Charlotte Hungerford	6,304	6,195	-109	-2
Connecticut Children's Medical Center	5,498	5,615	117	2
Danbury	19,522	20,403	881	5
Day Kimball	6,475	5,668	-807	-12
Essent-Sharon	3,040	2,880	-160	-5
Greenwich	11,391	12,348	957	8
Griffin	7,341	7,430	89	1
Hartford	37,734	39,490	1,756	5
Hospital of Saint Raphael	25,378	25,354	-24	0
John Dempsey	9,556	9,923	367	4
Johnson Memorial	3,624	4,212	588	16
Lawrence and Memorial	14,869	14,696	-173	-1
Manchester Memorial	8,668	8,958	290	3
Middlesex Memorial	12,089	12,866	777	6
MidState Medical Center	9,038	9,812	774	9
Milford Hospital	5,058	4,971	-87	-2
New Britain General**	16,663	18,623	1,960	12
New Milford	3,316	3,116	-200	-6
Norwalk	15,945	15,341	-604	-4
Rockville General	4,017	3,600	-417	-10
Saint Francis	32,527	31,647	-880	-3
Saint Mary's	12,069	12,984	915	8
Saint Vincent's Medical Center	19,182	19,672	490	3
Stamford	17,231	17,003	-228	-1
Waterbury	15,027	15,003	-24	0
William W. Backus	11,923	11,021	-902	-8
Windham Community Memorial	5,091	5,385	294	6
Yale-New Haven	46,957	50,354	3,397	7
Statewide	416,300	424,475	8,175	2

Source: CT Office of Health Care Access Acute Care Hospitals Discharge Database

** Effective 10/1/2007, the two hospitals merged to become the Hospital of Central Connecticut.

System capacity is generally measured by the number of inpatient beds. When compared with the population to determine a "use rate," Connecticut is below the national average with 2 hospital beds per 1,000 population versus the national average of 3 beds per 1,000 population.[2] Given such a difference, a review to identify the specific contributors and what interventions will be implemented should be completed.

Connecticut's hospitals serve as the safety net, caring for all patients regardless of their ability to pay. In Connecticut, like the nation, emergency departments (ED) are experiencing an overall trend of increased utilization. A small portion of the increase is due to population growth, while a larger percentage is attributable to more frequent use. In FY 2005, there were 1.4 million visits

to Connecticut EDs. For every 1,000 Connecticut residents there were 415 ED visits in FY 2005. This is higher than the national use rate of 387 per 1,000 population.[3] This ED use rate also changes significantly depending upon the hospital and the payer source. For instance, according to Connecticut Hospital Association (CHA) data, privately insured patients seek care at an ED at a rate of 250 visits per 1,000 population as compared to State-Administrated General Assistance (SAGA) patients at 1,578 visits per 1,000 population (Table 3).

Table 3: ED Utilization Rates by Payer Category, FY 2006

Payer Category	# visits/1,000 population
Privately Insured	250
Uninsured Patients	455
Medicare	615
Medicaid Managed Care	791
Medicaid FFS	1,092
SAGA	1,578

Source: *Connecticut Hospital Association*

The Task Force focused on the volume of primary care visits as a major contributor to ED "over-utilization." According to CHA, nearly one quarter, or just under 1,000 ED patients, are treated for non-urgent care on a daily basis. CHA also reported that Medicaid patients are four times more likely and the uninsured are two times more likely than the privately insured to visit the emergency department for non-urgent care. This care could be more appropriately provided in more cost effective settings such as a physician's office or a medical clinic, which would improve the continuity of care since EDs are organized to deliver acute and episodic care, not to address disease management or prevention. The demand for primary care is not adequately being met elsewhere, and consequently hospitals are experiencing noticeable increases in demand for this service, especially during evening hours and on weekends. Some of our larger urban hospitals reported that on an evening shift between 3:00 p.m. and 11:00 p.m., there are approximately 30 patients daily that could have been seen in a clinic or a physician's office.

Connecticut is mirroring a national trend, where more people are becoming dependent on the emergency departments for their primary care. Some reasons patients are choosing the ED for non-urgent care include the shortage of primary care physicians, limited evening and weekend hours in private offices and the convenience of not needing an appointment to receive care. High ED utilization by the Medicaid population is also attributable to the decreased number of primary care physicians accepting Medicaid patients due to the state's low reimbursement rates and administrative difficulties; lack of information regarding the assignment of a primary care physician; and the overflow from Federally Qualified Health Centers (FQHC) due to lack of expanded hours and specialty services. The FQHCs could play a larger role in the care of these patients but they have limited evening and weekend hours during the period of highest utilization and often do not have specialists on staff. Although some FQHCs may be less accessible to the Medicaid population in some areas of the state (see Appendix E), concerted efforts may be needed to educate and direct patients to these facilities before they turn to emergency departments for their primary health care needs. As the demand for primary care continues to increase, the State should examine the number and locations of services and address redirecting non-urgent care from the emergency departments to more appropriate and cost effective settings.

Increased patient wait times are further exacerbated by a shortage of emergency department nurses and "on-call" physician specialists. It is not uncommon for a patient to wait up to two

hours for a specialist to arrive (e.g., a hand surgeon). In prior years, hospitals required physicians to provide a number of hours of on-call coverage, but due to a shortage of physicians, medical liability issues, competition among hospitals and physicians making "quality of life" choices, some physicians are now paid for "on-call" hours -- an additional cost to hospitals. Hospitals are also faced with the difficult challenge of recruiting and retaining nurses in high demand clinical areas such as the emergency department. Nurses in these settings are particularly challenged by high utilization and staffing shortages, complex patients with behavioral health and substance abuse needs, difficult patients who are violent or suicidal, and patients recently released from state prisons. The state contracts with the University of Connecticut to provide health care for inmates, but there are limited options for their health care needs once they are released, so they frequently seek care at emergency departments.

The American Hospital Association (AHA) states that behavioral health disorders are a major public health issue.[4] Hospital EDs are typically the only or the last alternative for patients with behavioral health or substance abuse needs. There is inadequate access to inpatient, residential, skilled nursing, specialized housing and other intermediate and "step-down" levels of care to meet the growing needs of this population. It is common that these patients will present with both mental health and substance abuse issues, as well as physical health problems. Numerous hospitals reported the complexity involved in caring for these patients -- high average length of stay in the emergency department, resource-intensive services, inadequate medical staff training to address their needs, lack of appropriate referral options and a need for more intermediate mental health beds. Hospital EDs are not structured for long stay admissions such as these, which require extensive care. Some of the State's larger hospitals gave anecdotal evidence of very long wait times to place patients in an appropriate mental health inpatient facility. The Task Force heard input that the behavioral health network is fragmented, lacks appropriate inpatient and outpatient facilities, mental health workers and continuity of care. Despite several successful initiatives by the Department of Mental Health and Addiction Services (DMHAS) over the past few years, and over $15 million in expenditures per year to hospitals for those efforts, there is consensus that significant challenges remain in ensuring timely access to preferred, less expensive and appropriate care for some persons presenting at EDs with psychiatric and/or substance abuse disorders.

Utilizing emergency departments for non-urgent care results in excessive waits, lack of continuity of care, costly duplication of testing and services, limited access to specialists, and detracts from the care for those with true medical emergency needs. The emergency departments cannot continue to be the safety net for primary care and mental health/substance abuse visits and maintain the quality care our citizens expect from our hospitals.

Along with the utilization of health care services, the Task Force members acknowledged and agreed that the state should look to the State Health Plan and a State Health Care Facilities Plan to chart the direction of the health care system in the future. Many states in the nation operate under an approved state health plan which provides guidance and direction for the expansion or the reduction of health care services and facilities.

State health planning is the process of assessing health services for and the health status of Connecticut residents and identifying needs for state, local, public and private resources to address identified gaps through policy development and program implementation. A State Health Plan provides the framework for program planning and evaluation with goals and objectives that focus on health status (to reduce death, disease, and disability), risk reduction (to

reduce the prevalence of risks to health), and services and prevention (to increase comprehensiveness, accessibility, and quality of preventive services and interventions). The Facilities Plan addresses the access issues regarding the functions and/or services that providers offer to patients based on the population and disease incidence, according to the State Health Plan, in a particular region of the state.

Having stated the need for more health planning, members did not feel that the financial condition of some of the hospitals was directly related to duplicative services or lack of regionalizing hospital resources. Given the disparity in inpatient bed utilization levels in some regions as noted in Table 2 of this report, this topic may warrant further review. There was some discussion at the subcommittee level that regionalizing certain functions and/or services would reduce competitive costs, overhead costs and may assist in the work force shortage issue. The Task Force felt that a more concentrated effort with state health planning, in particular the facilities component, would benefit the Certificate-of-Need (CON) process. Some states have adopted facilities plans that provide principles, criteria, standards and methodologies that serve as the basis for CON decision-making. Therefore, the current CON process would be adjusted to respond to such a plan.

C. Workforce supply and demand challenges

Workforce shortages are one of the leading factors influencing the rising cost of providing care in Connecticut's hospitals. Hospitals report struggling with expenses related to recruiting and retaining health professionals. The health care industry in Connecticut currently faces personnel shortages in physicians, surgeons, specialty areas, nurses and allied health professionals. The demand for health care services already exceeds the number of health care workers and the shortages are expected to continue into the foreseeable future, as baby boomers age and the need for health care grows. In addition to aging patients, many physicians and nurses are among the baby boomers who will retire in the next three to five years. The Task Force heard testimony that one third of Connecticut's practicing physicians are age 55 or above and the average age of registered nurses in Connecticut is in the mid-to-late forties.

Connecticut's physicians, along with representatives from the Connecticut State Medical Society, highlighted the severity of physician shortages in our state, particularly in subspecialty areas. The shortage is linked to several issues. Since Connecticut has one of the highest costs of living in the nation, it is difficult for the state to retain or attract recent medical student graduates, as they cannot afford to establish and maintain a practice, raise a family and pay back significant student loans. It is believed that physicians and recent medical school graduates are choosing to practice in other states with a lower cost of living, limitations on medical malpractice claims and fewer on-call requirements.

There is an inadequate health care workforce within the state to meet all the needs of every hospital. In some areas of the state, physicians and surgeons are affiliated with more than one hospital in an attempt to meet patient and hospital staffing needs. Consequently, physicians are required to be on-call at more than one institution (either as primary or backup), and when needed, must travel from hospital to hospital to provide on-call services. The Task Force heard anecdotal evidence that one Connecticut subspecialty practice spent five years trying to hire an additional surgeon, while its two surgeons served as backup to each other at two different hospitals.

Connecticut is unable to meet the growing need for surgeons and subspecialty surgeons mainly due to the high cost of malpractice premiums and the on-call burden. Attempting to decrease their liability risk, some surgeons and subspecialty surgeons with high malpractice premiums are either choosing to leave the state or are narrowing their practice by no longer providing surgical, emergency room and trauma care. On-call physicians are also burdened with the possibility of having to provide care in a subspecialty area that is not their area of expertise.

The President of the University of Connecticut (UCONN) provided additional written testimony stating that in the past three years, more of UCONN's medical school graduates receive their advanced training residencies in the state than anywhere else in the country (32% in 2007). It appears, however, that once residencies are completed, these newly-trained physicians may be choosing to practice outside of Connecticut. According to the Association of American Medical Colleges (AAMC), Connecticut ranks in the bottom quartile of physicians under age 40 and in the top quartile of physicians age 60 and older. So, Connecticut is faced with the dilemma of a limited number of new physicians to replace a large number of aging physicians as they retire.

Medical students stated at the public hearing that work/life balance is a top influencer of how they select a specialty; and that they are choosing areas with fewer hours and on-call obligations and higher salaries. Compounding the specialty shortage, aging physician workforce and high costs of living is the decreasing number of medical students choosing to practice in underserved areas. Medical students are also not specializing in primary care due to patient load, long hours, and lower wages.

The medical professional shortage facing the state is not limited to physicians. The federal government has projected that Connecticut will have the fifth highest nursing shortage in both 2015 and 2020.[5] While comprehensive data on hospital costs associated with recruiting and retaining health care employees are not available, preliminary findings from a recent survey by the CHA for the Task Force's Workforce Subcommittee found that hospitals reported significant annual expenditures on travel/agency nurses and other health care professional activities, continuing education, recruiter fees, sign-on bonuses, and tuition reimbursement.

Hospitals face several significant cost issues involving recruiting and the retention of nurses. First, hospitals are continuously competing for available nurses, offering sign-on bonuses and other incentives in an effort to attract staff. In addition, hospitals spend considerable dollars in the recruitment and training of newly hired nurses, whose turnover is the highest in the first two years. Moreover, many advanced degree nurses who are needed to manage and train new nurses move into non-hospital work settings that offer increased salaries, more appealing work hours and environment, and a less stressful workplace. Patient workload strains due to rising patient acuity levels sometimes associated with an aging population and inadequate staffing also contribute to the departure of nurses from hospital-based jobs. Hospitals need to become more desirable places to work and develop plans that take into consideration national "best practices." For example, additional physical challenges face hospital nurses who care for elderly, frail and obese patients. Hospitals that are financially distressed are unable to invest in equipment that may prevent worker injuries, such as specialized patient lifts and carriers. High vacancy rates are being seen in specialty fields such as emergency department and psychiatric nursing. These are specialty areas that often deal with challenging and complex patients and typically experience higher patient loads.

Compounding the problem is the fact that nursing colleges and universities face challenges to expand enrollment levels to meet the rising demand for nursing care. Traditionally, schools of nursing respond to workforce shortages by expanding enrollments. However, it is difficult for academic institutions to attract qualified nursing faculty because they must compete with higher nursing salaries offered in hospital settings or in non-clinical professional positions. Due to the shortage of nursing faculty, the Task Force heard that the state has had to deny a considerable number of nursing school applications. In 2005, Connecticut turned away 2,000 qualified nursing school applicants. Nationally, the number of denied applicants for nursing school is at its highest ever, increasing almost six fold since 2002.[6] According to the written testimony of UCONN's president, a 2005 report issued by the Connecticut League of Nursing Deans and Directors Council states that an additional 33 full-time faculty are needed to combat the current shortage. These positions are in addition to the existing 26 faculty vacancies that exist at UCONN today. The state will continue to see nursing shortages until it can adequately staff its nursing education programs to allow a sufficient number of people into the nursing program to meet the needs of the growing aged population.

Currently, there is no cohesive state action plan that looks at recruitment, retention, mentoring, marketing and education of health care professionals; the Task Force heard that Connecticut's current approach is fragmented. More than one agency is responsible for licensing and student loan forgiveness. Some allied health professionals in Connecticut are not required to be licensed (e.g., ultrasonographers and diagnostic imaging technicians), therefore it is difficult to assess the existing shortages in these fields without adequate data. The state cannot identify the numbers of *licensed and practicing* health professionals in order to accurately project the location, specific professions and extent of workforce shortages. It cannot currently determine if the health professionals being educated in Connecticut remain and work in the state or live here but work in neighboring states, or leave the state entirely. There is a clear need for better data on health care professionals that can be used for education, recruitment, marketing and forecasting purposes.

D. Financial status and challenges

The statewide average total margin for Connecticut hospitals in FY 2006 was 2.5% down from 3.3% in FY 2005. The operating margin average also declined in FY 2006 to 0.6% from 1.7% in FY 2005. Six of the 31 hospitals in FY 2006 reported negative total margins with an additional eight hospitals at or below 1.0% total margin. However, there is significant variation among the individual hospitals. For example, total margins for FY 2006 ranged between -8% and +9.1% (Table 4). The variation is due to the payer mix, reimbursement rates from those payers, investment income, and the competitive market forces faced by each hospital.

Table 4: Five Year Average Total Margin FY 2002 - FY 2006

	FY 2002-2006 5 YEAR AVERAGE	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006
CTCMC	-4.05%	-12.87%	-2.88%	1.95%	-3.54%	-4.61%
BRISTOL	-3.13%	0.08%	-0.22%	-3.00%	-3.89%	-7.99%
BRADLEY	-2.08%	-3.95%	-5.43%	-2.01%	-0.24%	0.16%
WATERBURY	-1.23%	-0.30%	-4.72%	1.17%	-0.01%	-2.39%
SAINT MARY	-1.15%	-10.48%	0.38%	7.33%	-4.32%	0.44%
WINDHAM	-0.85%	0.14%	-5.66%	-0.24%	0.79%	0.27%
JOHNSON	-0.45%	0.29%	-1.11%	2.02%	1.21%	-4.30%
SAINT RAPHAEL	-0.32%	-1.37%	1.27%	1.62%	-0.86%	-2.11%
MANCHESTER	0.20%	-0.90%	-2.50%	-0.81%	4.56%	0.12%
NEW MILFORD	0.38%	1.98%	0.94%	1.04%	1.16%	-2.42%
GRIFFIN	0.61%	1.98%	-1.80%	1.30%	0.35%	1.05%
NORWALK	0.84%	0.25%	0.99%	0.98%	1.82%	0.12%
ROCKVILLE	1.01%	5.45%	-0.12%	-2.12%	-4.33%	5.42%
MILFORD	1.10%	-0.63%	0.28%	1.73%	0.72%	2.94%
HARTFORD	1.17%	0.11%	0.26%	2.02%	1.61%	1.58%
SAINT FRANCIS	1.36%	3.02%	2.35%	0.02%	0.80%	0.96%
STAMFORD	1.70%	-2.52%	-5.06%	1.64%	5.13%	6.06%
HUNGERFORD	1.82%	-0.60%	2.86%	3.73%	1.75%	1.15%
DEMPSEY	2.14%	0.64%	1.89%	1.75%	3.85%	2.05%
BRIDGEPORT	2.31%	1.14%	0.41%	1.87%	3.43%	4.06%
NEW BRITAIN	2.31%	-0.97%	-3.73%	3.57%	6.04%	4.28%
DAY KIMBALL	2.61%	0.79%	3.55%	2.92%	4.11%	1.53%
BACKUS	3.50%	3.56%	3.52%	3.71%	2.17%	4.52%
MIDSTATE	3.84%	3.55%	3.86%	3.46%	5.64%	2.67%
LAWRENCE & MEMORIAL	4.31%	0.03%	1.56%	10.75%	2.78%	5.25%
GREENWICH	4.33%	5.80%	4.89%	3.71%	5.60%	2.16%
SHARON	4.48%	-1.44%	2.67%	7.14%	7.02%	2.97%
MIDDLESEX	4.58%	0.90%	2.63%	4.53%	8.46%	5.01%
YALE-NEW HAVEN	5.01%	5.27%	4.84%	4.87%	6.30%	3.88%
SAINT VINCENT	5.88%	-2.21%	-0.02%	7.90%	10.88%	9.10%
DANBURY	6.66%	6.17%	5.71%	5.56%	7.30%	8.04%
STATEWIDE (Note A)	**2.27%**	**0.85%**	**1.14%**	**3.06%**	**3.34%**	**2.51%**
AVERAGE (Note B)	**1.58%**	**0.09%**	**0.37%**	**2.59%**	**2.46%**	**1.68%**
Median (Note C)	**1.36%**	**0.14%**	**0.41%**	**1.95%**	**1.82%**	**1.58%**

Source: *Audited Financial Statements*

Note A: Weighted average by dollar amounts. Revenue in excess of expenses/(revenue from operations+(revenue in excess of expenses - gain/loss from operations))

Note B: Sum of margins divided by number of hospitals.

Note C: Middle margin in numerical order.

Connecticut hospitals are the safety net for the communities they serve and their ability to remain financially viable ensures continuous access to necessary services. Hospitals struggle with increasing expenses related to recruiting and retaining health professionals, acquiring advanced technology, improving and maintaining their facilities, and providing charity care for those without the means to pay for their care. They rely on patient revenue to cover their operating expenses.

Unlike other service industries, health care is an industry in which the patient receives a "service" prior to paying for it. Payment amounts vary by insurance plan and are often subject to negotiation. Rates paid to hospitals by state and federal programs are typically fixed and non-negotiable. Some payers reimburse above the cost of providing the care and some below the cost of providing care. A commonly-used measure that indicates the amount above or below hospitals' average costs and the reimbursement they receive is the "payment to cost" ratio. A ratio result that is higher than 1.0 is favorable (indicates reimbursement is greater than cost) and a ratio that is less than 1.0 indicates reimbursement is less than the cost of providing the service. In FY 2006, the statewide ratio of payment to cost was 0.95 for Medicare; 0.70 for Medicaid; and 1.21 for commercial/private payers. The variation of the payment to cost ratio among hospitals can be significant based upon their geographic location (e.g., two-hospital town, rural versus urban) and the degree to which patients from each of those payer sources utilize services. Hospitals with a large percentage of commercially covered patients and Medicare patients are typically financially stronger than those hospitals that provide services to a large percentage of Medicaid recipients and those without insurance. For a breakdown of inpatient discharges and percentage of total patient base by payer category, refer to Appendix F. The term "cost-shifting" refers to the shifting of reimbursement surplus (above costs) to cover reimbursement deficit (below costs). The Task Force discussed this topic extensively as one of the leading drivers to the financial instability of Connecticut's health care delivery system as it relates to utilization of the emergency departments, access to primary care services, behavioral health care services and inpatient care.

Of concern to the Task Force is the cost shifting to commercial or privately insured patients to cover the losses incurred from treating Medicaid Fee for Service (FFS), HUSKY and SAGA patients. The Task Force concluded that this is an unsustainable practice and leads to false expectation that employers will continue to pay higher premiums to cover shortfalls from public programs. Historically, Connecticut has had strong employer-sponsored insurance (ESI) coverage and a low uninsured rate. However, in recent years the state, like the nation, has seen the erosion of employer based coverage, with fewer employers offering health benefits, less comprehensive benefits packages and higher out-of-pocket costs for employees. If this pattern continues, hospitals' overall margins will be affected negatively by a decreasing share of commercial payers, as some of Connecticut's employers will no longer be able to offer their employees health care coverage. This is compounded by the fact that hospitals are also large employers and are faced with the same increases in employee benefits. It is vital to Connecticut's hospital system to maintain a strong commercial payer base.

Currently, about 60% of the state's residents have ESI, but with increasing premiums some employers, large firms in particular, either no longer provide health insurance coverage, have raised minimum eligibility requirements or have increased employee contribution requirements. Rising premiums are unsustainable for both employers and employees, rendering ESI inaccessible to employees and potentially adding to the ranks of the uninsured and potentially perpetuating the cycle of underpayments.

A close examination by the Financial Structure Subcommittee of costs and payments verified the gains and losses by each payer category. Table 5 shows the breakdown by payer on a statewide basis; however, there is significant variation among individual hospitals. For FY 2006, the losses experienced by hospitals totaled $-220.7 million for Medicaid programs and an additional $-98.3 million for other medical assistance programs. After considering Disproportionate Share Hospital (DSH) payments this $-319 million gap decreased to $-220 million. The loss attributed to Medicare patients was $-95.8 million; and the loss from patients without insurance was $-116.2 million. The only payer category where hospitals realized gains was from commercial payers, the statewide figure was $553.3 million. The statewide "bottom-line" for FY 2006 was a gain of $121 million from $6.4 billion of expenses.

Table 5: Statewide Acute Care Hospital Losses and Gains Attributable to Major Payers, FY 2006 (in Millions)

	Cost		Payment			
Payer	#	%	#	%	Gain/(Loss)	Payment to Cost
Medicaid	$746.9	12	$526.2	8	($220.7)	0.70
Other Medical Assistance	$188.4	3	$90.1	1	($98.3)	0.48
Total Medical Assistance Before DSH	$935.3	15	$616.3	9	($319.0)	0.66
UCP DSH	-	-	$57.5	-	-	-
Urban DSH	-	-	$31.6	-	-	-
Other DSH	-	-	$10.0	-	-	-
Hardship Fund	-	-	$0.0	-	-	-
Total Medical Assistance After DSH	$935.3	15	$715.4	11	($220.0)	0.76
Medicare	$2,659.4	41	$2,563.6	39	($95.8)	0.96
Tricare	$29.5	0	$29.2	0.4	($0.3)	0.99
Total Government Before DSH	$3,624.2	57	$3,209.1	49	($415.1)	0.89
Total Government After DSH	$3,624.2	57	$3,308.2	51	($316.1)	0.91
Commercial	$2,597.5	41	$3,150.8	48	$553.3	1.21
Uninsured	$189.1	3	$72.9	1	($116.2)	0.39
Total Nongovernment	$2,786.7	43	$3,223.7	49	$437.1	1.16
Total Before DSH	$6,410.9	100	$6,432.8	98	$22.0	1.00
Total After DSH	$6,410.9	100	$6,531.9	100	$121.0	1.02

Source: *CT Office of Health Care Access Hospital Budget System 12-Month Filings Schedule UCT & Department of Social Services*

Although the resulting payment to cost ratio was 1.02 (essentially a break-even) there is such variation among hospitals that this does not accurately reflect the individual hospital experience. The Task Force recommends conducting a comprehensive analysis of the current reimbursement system and of the multiple hospital reimbursement systems applicable to these state-funded programs in order to better align hospital reimbursement and costs associated with providing the care.

Today, the annual cost to operate all Connecticut hospitals is about $6.5 billion (Table 6). The single largest expense to a hospital is the people it employs to deliver the care patients need. The cost of employee salaries and benefits is 58% of overall cost. The largest increases to cost in the last five years are in non-physician salaries and benefits. It is this area where competitive tactics in recruiting nurses and other health professionals occur at significant cost to hospitals.

According to OHCA data, a review of the top hospital executive salaries shows an increase of 95% from an aggregated total of $22.9 million to $44.6 million between FYs 2002 and 2006 and a 200% increase (from $4.4 million to $13.7 million) in executive benefits; this accounts for a combined 2% of cost increases. Other areas that experienced significant increases are: "medical supplies and pharmaceuticals," (up 40%) which accounts for 17% of the increase in cost and "other than supplies and drugs," which includes leases and utilities, (up 27%) which also accounts for 17% of the increase in cost. Malpractice insurance grew by 66% and accounts for 3% of the five-year increase in cost. According to CHA, the average annual increase in hospital costs has been 6.3% for the last decade.

Table 6: Statewide Cost of Acute Patient Care

Expense Item	FY 2002 (in Millions)	FY 2002 % of Total	FY 2006 (in Millions)	FY 2006 % of Total	% Share of Increase in Total Expenses	% Change between '02 & '06
Physician Salaries	$184.3	4%	$238.3	4%	3%	29%
Physician Benefits	$41.7	1%	$64.0	1%	1%	54%
Non-Physician Salaries	**$2,124.7**	**44%**	**$2,680.5**	**41%**	**35%**	**26%**
Top Ten+	$76.4	2%	$96.4	1.5%	1%	26%
Executives*	$22.9	0.5%	$44.6	0.7%	1%	95%
Non-Physician Benefits	**$481.0**	**10%**	**$763.7**	**12%**	**18%**	**59%**
Top Ten+	$14.1	0.3%	$22.8	2%	1%	61%
Executives*	$4.4	0.1%	$13.7	0.2%	1%	213%
Physician Fees	$180.2	4%	$210.4	3%	2%	17%
Supplies & Drugs	**$686.6**	**14%**	**$963.3**	**15%**	**17%**	**40%**
Other Than Supplies & Drugs	**$1,021.6**	**21%**	**$1,298.3**	**20%**	**17%**	**27%**
Malpractice Expense	$78.4	2%	$130.4	2%	3%	66%
Depreciation Expense	$285.0	6%	$355.5	5%	4%	25%
Interest Expense	$65.8	1%	$64.1	1%	-0.1%	-2%
Expense Recoveries	($266.3)	-5%	($286.7)	-4%	-1%	8%
Total Expenses	**$4,883.1**	**100%**	**$6,482.0**	**100%**	**100%**	**33%**

Source: *CT Office of Health Care Access Hospital Budget System Schedule 300*

+ Includes both physicians and non-physicians

* Includes presidents, chief executive, operating, finance and operating officers, and (senior) vice presidents. Does not imply exact comparisons of titles and salaries were made.

Every year Connecticut hospitals must overcome three significant fiscal challenges: covering the annual $95.5 million in losses from serving seniors enrolled in the Medicare program; covering the annual $319 million in losses from serving the disabled, mothers and children enrolled in the Medicaid, HUSKY and SAGA programs; and covering the annual $116 million in losses from serving individuals without health insurance. Although these shortfalls vary among individual hospitals, the Task Force heard that some hospitals handle reimbursement shortfalls by postponing much needed investment in technology and infrastructure. Statewide revenue for hospital operations totaled $7 billion last year, just $100 million more than statewide operating expenses. This narrow margin does not allow hospitals to reinvest adequately in their aging physical plants or in new technology necessary to keep them competitive. Hospitals lack access to capital investment funds which limits their ability to reinvest into new technology or plant improvements.

III. Recommendations of the Task Force

The Task Force's recommendations are intended to address many of the obstacles that hinder the financial strength of many Connecticut hospitals and the system as a whole. Although a combination of many recommendations will result in a more stable environment, the one issue that was most widely discussed was the commercial payer essentially "subsidizing" the deficit created by the reimbursement shortfall of the federal and state-funded programs. On the cost side of the equation, hospitals' largest expense is associated with salaries and benefits. There is such competition for qualified health care professionals that hospitals must compete aggressively. When they are not able to fill vacancies, hospitals pay high prices for travel/agency nurse coverage as well as premiums for specialty physician ED coverage. The shortage of physicians in Connecticut and the reimbursement shortfall is leading to access issues resulting in increased utilization of the emergency departments for primary care services and behavioral health services. The following 29 recommendations were developed by the Task Force and Subcommittee members to target the issues of utilization and planning, workforce, and the financial structure of the health care delivery system.

Related to state-funded health care programs:

1. Conduct a comprehensive study of the multiple hospital reimbursement systems applicable to the Medicaid fee-for-service, HUSKY and State Administered General Assistance (SAGA) programs to determine the most appropriate system for Connecticut. This study should be completed by October 31, 2008.

2. Increase hospital reimbursement to reflect reasonable costs to provide care to patients in the Medicaid fee-for-service, HUSKY and SAGA programs to ensure continued access to health care services.

3. Adjust hospital reimbursement rates based on Recommendation #1.

4. Support system changes using financial or other incentives to promote cost-effective service delivery that maintains and improves the quality of care offered by hospitals. Such changes should include, but not be limited to, enhancements in information technology that promote the interoperability of systems and/or organizations, electronic medical records and revenue cycle software systems.

Related to federally-funded health programs:

5. The Department of Social Services (DSS) should explore an application to the federal Centers for Medicare and Medicaid Services (CMS) for the inclusion of SAGA in Medicaid so that hospitals can receive all available Medicare DSH dollars. In exploring this application, DSS should consider the impact on state expenditures, hospital reimbursement and federal revenue to the state and to hospitals, and the likelihood of success of such application.

6. The Administration, business, and insurance industries should support Connecticut hospital initiatives to obtain adequate funding from the Medicare program.

Related to Access to Capital:

7. The Connecticut Health and Educational Facilities Authority (CHEFA) should establish a program to provide proceeds from revenue bonds backed by contract assistance of the state that would assist in making needed investments. The revenue bonds would be issued by CHEFA and the debt service paid by the State of Connecticut. Criteria to access such funding will be established by the Department of Public Health (DPH), DSS, CHEFA and the Office of Health Care Access (OHCA) in consultation with the Office of Policy and Management (OPM). Such criteria may include, but not be limited to, the improvement of quality and safety of patient care, work force safety, financial need, and/or consistency with the State Health Plan to include the state facilities plan. Proceeds of bonds may be made available to hospitals and federally qualified health centers in the form of grants, forgivable loans and very low interest rate loans for investment in plant and equipment or to repay higher costing debt.

Related to Utilization & Planning:

8. Reduce the inappropriate use and/or the extended lengths of stay for emergency department patients waiting to receive mental health and/or substance abuse services by increasing the capacity to provide such services in the appropriate setting within identified "high-demand" areas. The Department of Mental Health and Addiction Services (DMHAS), the Department of Children and Families (DCF), and DSS should work collaboratively to accomplish this goal that should include but not be limited to the following:
    - Develop recommendations for each identified "high-demand" area that will include the appropriate combination of services and be measured based on cost and quality outcomes.
    - Assess the existing capacity and volume of community mental health services and other programs as necessary to identify the gaps in services and adjust the funding allocation, services designs and geographic service areas as appropriate.
    - DMHAS, DCF and DSS, in consultation with OHCA and working with the Connecticut Hospital Association, providers and other stakeholders, should identify effective and feasible models of care for psychiatric emergency assessment or crisis response centers in order to expand access to behavioral health crisis and/or emergency services for adults and children.

9. Reduce the number of primary care visits that are being provided by emergency departments. This reduction can only occur with the development or expansion of alternative locations for patients to access primary care services; therefore, recommendations include, but are not limited to:
    - Develop a program to educate and inform patients as to appropriate ways to access primary care services and the choices available to them to receive such care.
    - Develop a program to encourage a shift in patient behavior to utilize available primary care services rather than accessing emergency departments for such care.
    - Support the on-going expansion of hours of operations and locations of primary care services.
    - DSS should implement a pilot program to schedule primary care services in the most appropriate setting utilizing, to the maximum extent possible, federal and other available non-state funding sources.

- The state should implement programs to facilitate information technology initiatives to better enable primary care providers to interrelate with hospitals and other providers in terms of scheduling and patient care.
- DSS, in concert with the Department of Correction (DOC), DMHAS, and the Judicial branch, should identify gaps in services and explore primary care services and other programs available to serve persons recently released from prisons so that they are not inappropriately directed to hospital emergency departments and so that they can be appropriately served in the community.
- DSS should explore the development of and reimbursement structure for specialist services in addition to primary care at the Federally Qualified Health Centers (FQHC) as a way of helping to alleviate hospital emergency department patient traffic.
- OHCA, in collaboration with state agencies, providers and industry stakeholders will conduct a study to measure current capacity of primary care services to identify geographical locations or segments of the population that are in need of additional access. This study should be completed by October 31, 2008.

10. Reduce the number of inpatients that have extended lengths of stay within the emergency department. Due to the complexity of this issue and variation among hospitals, individual hospitals should be allowed the flexibility to develop a plan in conjunction with DPH and in accordance with state and federal regulations.

11. Develop a State Health Plan to identify short-term and long-term strategies to effectively address the issues of access, cost and quality of health care services in Connecticut. The Commissioners, or their designees, of DPH, DMHAS and OHCA, and in consultation with other state agencies as appropriate, should include in the planning process, but not be limited to the following:
    - Update such plan every 5 years.
    - Establish an advisory body (or use existing bodies) that will include, but not be limited to, other state agencies, health care providers, consumers and other stakeholders as deemed appropriate.
    - Consider the unmeet needs of groups at risk such as:
        i. Persons with behavioral health issues;
        ii. Medicaid recipients;
        iii. Uninsured persons;
        iv. Person with specific and/or chronic illnesses or disabilities such as HIV/AIDS, autism, diabetes, etc.
    - Consider and adopt, as appropriate, the advice, guidelines and recommendations of authoritative organizations such as the Institute of Medicine,[7] the American Hospital Association, [8] and others.
    - Develop a communication process for (1) hospitals to encourage incorporation of the health plan into the hospital long range planning process and hospital long range planning into the state-wide health care facilities plan; and (2) other state agencies to be aware of progress, changes and other information that may be necessary.
    - Recommend legislative changes that may be necessary to pursue this overall recommendation.

12. Hospital leaders should consider, for adoption, the American Hospital Association's Recommendations for Behavioral Health Challenges in the General Hospital, published in 2007. This report includes recommendations regarding community needs assessments, hospital behavioral health plans, community collaboration, adequate financing, employer practices and advocacy.

Related to work force issues:

13. Designate one state agency to coordinate all programs designed to increase the training, recruitment and retention of health care workers in conjunction with other work force initiatives such as Connecticut's Mental Health Transformation initiative and its Behavioral Health Workforce project.

14. All programs designed to enhance recruitment and retention of healthcare professionals in Connecticut should include a mechanism for monitoring and evaluation to determine program effectiveness, with an appropriate funding allocation.

15. Expand the capacity of the on-line licensure system approved during the 2007 legislative session to include all healthcare professionals by 2010 and establish a comprehensive database of licensed healthcare professionals that includes, but is not limited to, the following information about the licensee: type of license held, whether the licensee is working, position held, how long at current position, name of employer, employer's type of industry, highest level of education, number of hours providing direct patient care per week.

16. Prior to January 1, 2009, the Department of Public Health should complete a survey of all health care professionals licensed in Connecticut to initially populate the comprehensive database.

17. The State Health Plan should include a health care workforce planning component that includes analyzing projected trends in the health care workforce, identifying demographics of the health care workforce and the patient population, establishing priorities for allocation of resources and development of a strategic workforce plan that includes an evaluation by DMHAS and DPH of mental health services and access to such services as they relate to hospital EDs and the availability of inpatient, intermediate, residential, outpatient and other levels of care.

18. Expand current loan repayment and forgiveness programs for physicians in the following ways: i) Create a loan forgiveness program that links loan forgiveness to the number of years that a physician is "on- call" at a hospital; ii) Create a loan forgiveness program for physicians at the residency level. If a physician accepts a residency in a defined geographic or physician specialty shortage area, loan forgiveness will be linked to the number of years of post-residency, in-state practice in the defined shortage area.

19. Provide funding to medical schools for scholarships to physicians who are willing to practice in a defined geographic or physician specialty shortage area in the state for at least 5 years after completing their residency programs.

20. Create a pilot program, including loan forgiveness, for a community-based physician residency focusing on primary care to support FQHCs. The loan forgiveness component of such pilot program should require that the physician remain in a community-based primary care practice in Connecticut in collaboration with a FQHC for at least five years after completing the residency program. The purpose of this program is to train physicians in community-based primary care, to improve access to primary care and to alleviate pressure on hospital emergency departments.

21. Evaluate and make necessary adjustments to the Connecticut definition of a health care professional shortage area (contained in DPH regulations) to better reflect specific geographic, demographic and physician specialty shortages.

22. Expand current loan repayment and forgiveness programs for 1) nursing students and 2) advanced practice registered nurses in a primary care residency program.

23. Work with the joint standing committee having cognizance of higher education and employment advancement to ensure an adequate number of slots for nursing students in schools of nursing.

24. Establish a pilot nursing residency program to provide mentoring to first-year hospital-based nurses in order to increase nurse retention rates and to smooth their transition from school to clinical practice.

25. The University of Connecticut and the Connecticut State University System should establish Masters level programs to prepare baccalaureate nurses to serve as educators in nursing schools to address the shortage of nursing faculty.
    - Nurses who become educators under this program may be eligible for loan forgiveness programs if they remain members of the nursing faculty in Connecticut for at least five years.
    - Provide methods to increase compensation and/or the availability of nurse educators consistent with applicable state laws and collective bargaining agreements.

26. To increase the availability of health care services for persons covered by public health insurance programs or who are uninsured, we recommend the establishment of a pilot program to address the problem of recruiting and retaining physicians practicing at FQHCs.

27. Establish a working group consisting of representatives of physicians, hospitals, insurance industry, other stakeholders, state legislators and regulators to develop a comprehensive tort reform proposal for submission by January 1, 2009 to the Governor and the joint standing committees having cognizance of public health, judiciary, and insurance matters. This proposal would complement the review of professional liability insurance rates for physicians and surgeons, hospitals, advanced practice registered nurses and physician assistants in Connecticut to be conducted by the Insurance Commissioner pursuant to Public Act 05-275.

28. For each fiscal year from 2009 through 2013, allocate $500,000 to OHCA to provide matching grants to hospitals and FQHCs, not to exceed $50,000 per hospital or FQHC in any year, to be used to implement national "best practices" relating to recruitment and retention of staff. Such grants should be awarded on a competitive basis and should require that each hospital or FQHC awarded a grant provide matching funding equal to the amount of the state grant.

29. Review the composition and membership of the Connecticut Allied Health Workforce Policy Board to ensure that the work force needs of the entire health care field are represented. At a minimum, membership should be expanded to include physicians and representatives of organized labor. The new board should 1) assist the Office of Workforce Competitiveness (OWC) in developing and evaluating programs to increase training, recruitment and retention of physicians, nurses and other health care workers providing care in hospitals in Connecticut; 2) monitor employment satisfaction and attrition rates of all health care professionals in Connecticut; 3) provide support to DPH in its development of the hospital-based health care workforce planning component of the State Health Plan; 4) work with the State Department of Education (DOE) to develop programs at the middle school and high school levels to increase student enrollment in mathematics and science courses necessary to pursue a bachelor or post-graduate degree in health care fields; and (5) collaborate with the State DOE to develop programs aimed at middle school and high school students to encourage an understanding of and promote careers in health care.

Appendix A

M. JODI RELL
GOVERNOR

STATE OF CONNECTICUT
EXECUTIVE CHAMBERS
HARTFORD, CONNECTICUT 06106

FOR IMMEDIATE RELEASE
April 18, 2007

Contact:
Rich Harris
860-524-7313
Rich.Harris@ct.gov

Governor Rell Announces Task Force to Develop Strategies to Stabilize Connecticut Hospitals

Governor M. Jodi Rell today announced she is forming a task force to develop strategies to stabilize and chart the future course of hospitals in Connecticut, many of which face are facing financial hardship.

The Hospital Task Force will be co-chaired by Robert L. Genuario, Secretary of the Office of Policy and Management (OPM), and Christine A. Vogel, Commissioner of the Office of Health Care Access. Members will include state agency commissioners, legislators, industry representatives and labor leaders.

"All of us count on having a hospital available – close by, there when we need it and prepared for almost any kind of medical emergency, day or night," Governor Rell said. "Yet many of the hospitals in Connecticut are struggling. Some of the largest hospitals in some of our biggest cities, including Hartford and Waterbury, face serious financial problems, while smaller community hospitals battle daily to attract and retain doctors and nurses and buy the high-tech equipment that modern medicine requires.

"This panel will be charged with reviewing a number of issues," the Governor said. "We need to examine not only the current financial health of Connecticut's hospitals but residents' access to care. Another key issue, especially as we work toward making better health care available for all, is emergency room utilization, affordability and alternative delivery of primary care. And the 'Certificate of Need' process – the state permitting process for determining where certain medical services are provided, when hospitals may close or expand and so on – also needs to be reviewed."

The Governor said she like the panel to hold its first meeting no later than June 30 and to report its findings by December 31.

The task force is part of Governor Rell's broader efforts to ensure that all residents of Connecticut have access to quality, affordable health care. In December, the Governor announced her Charter Oak health care proposal, which would provide low-cost health insurance to single people and families who cannot now afford insurance of their own. The plan – targeted at low-income people, many of whom are employed but may not have access to employer-sponsored health insurance and do not qualify for programs such as HUSKY or Medicaid – is intended to provide health insurance for about $250 a month, and includes state subsidies to assist people who find the monthly premium too high.

In addition, Governor Rell has strongly supported Bond Commission funding for expansion and equipment at community health centers, announcing in September nearly $26 million for expanded medical and dental facilities in communities all across the state, enabling the centers to serve some 85,000 additional new patients.

Appendix B

Financial Structure Subcommittee, Facilitator: Cristine A. Vogel, Commissioner, Office of Health Care Access
Participants:
David Benfer, Hospital of Saint Raphael
Patrick Charmel, Griffin Hospital
Kevin DelGobbo, State Representative
Stephen Frayne, Connecticut Hospital Association
J. Robert Galvin, MD, MPH, Department of Public Health
Martin Gavin, Connecticut Children's Medical Center
Eric George, Connecticut Business & Industry Association
Richard Gray, Connecticut Health & Education Facilities Authority
Jennifer Jackson, Connecticut Hospital Association
Timothy Meyer, Connecticut Association of Health Plans
David Parrella, Department of Social Services
John Rathgeber, Connecticut Business & Industry Association
Gary Richter, Department of Social Services
James Staten, Yale-New Haven Hospital
Paul Storiale, Hospital of Saint Raphael
Keith Stover, Robinson & Cole, LLP, representing Connecticut Association of Health Plans
Michael Starkowski, Department of Social Services
Robert Trefry, Bridgeport Hospital
Katherine Yacavone, Southwest Community Health Center

System Wide Utilization & Planning Subcommittee, Facilitator: Robert L. Genuario, Secretary, Office of Policy & Management
Participants:
Evelyn Barnum, Connecticut Primary Care Association
Arthur Brodeur, Planning Committee, Windham Hospital
Christopher Dadlez, St. Francis Hospital & Medical Center
Stephen Frayne, Connecticut Hospital Association
J. Robert Galvin, MD, MPH, Department of Public Health
Meg Hooper, Department of Public Health
Jennifer Jackson, Connecticut Hospital Association
Kevin Kinsella, Hartford Hospital
Thomas Kirk, Jr., PhD, Department of Mental Health & Addiction Services
Paul Knag, Esq., Murtha, Cullina LLP
Lawrence Levine, MD, FACEP, Connecticut College of Emergency Physicians
David Parrella, Department of Social Services

Work Force Issues Subcommittee, Facilitator: Mary Anne O'Neill, Legal Counsel, Office of the Governor
Participants:
Polly T. Barey RN, MS, Executive Director, Connecticut Nurses Association
Elizabeth Beaudin, Connecticut Hospital Association
David Cappiello, State Senator
Joanne Chapin, American Federation of Teachers Labor Union
Ken Ferrucci, Connecticut State Medical Society
J. Robert Galvin, MD, MPH, Department of Public Health
Matthew Katz, Connecticut State Medical Society
Kevin Lembo, Office of Healthcare Advocate
Denise Merrill, State Representative
Kevin Murphy, Eastern Connecticut Health Network, Inc.
Arvind Shaw, Generations Family Health Center
Colleen Smith, RN, Middlesex Hospital
Kristin Sullivan, Department of Public Health

Appendix C

Connecticut Acute Care Hospitals, FY 2006

Hospital Name	Affiliation/Parent Corporation	Town	County	Teaching	Licensed Beds*	Staffed Beds*
Bradley Memorial**	Central Connecticut Health Alliance	Southington	Hartford		84	46
Bridgeport	Yale-New Haven Health Services Corporation	Bridgeport	Fairfield	√	425	334
Bristol	Bristol Hospital & Health Care Group	Bristol	Hartford		154	154
Charlotte Hungerford	Charlotte Hungerford Hospital	Torrington	Litchfield		122	101
CT Children's Medical Center	CCMC Corporation, Inc.	Hartford	Hartford		135	122
Danbury	Danbury Health Systems, Inc.	Danbury	Fairfield	√	371	251
Day Kimball	Day Kimball Healthcare Inc.	Putnam	Windham		122	72
Essent-Sharon	Essent Healthcare Inc. of Connecticut	Sharon	Litchfield		94	47
Greenwich	Yale-New Haven Health Services Corporation	Greenwich	Fairfield	√	206	201
Griffin	Griffin Health Services Corporation	Derby	New Haven	√	180	94
Hartford	Hartford Health Care Corporation	Hartford	Hartford	√	867	749
John Dempsey	University of Connecticut Health Center	Farmington	Hartford	√	224	224
Johnson Memorial	Johnson Memorial Corporation	Stafford	Tolland		101	85
Lawrence & Memorial	Lawrence & Memorial Corporation	New London	New London	√	308	249
Manchester Memorial	Eastern Connecticut Health Network, Inc.	Manchester	Hartford		283	140
Middlesex	Middlesex Health System, Inc.	Middletown	Middlesex	√	297	177
MidState Medical Center	Hartford Health Care Corporation	Meriden	New Haven		142	136
Milford	Milford Health and Medical Incorporated	Milford	New Haven		118	64
New Britain General***	Central Connecticut Health Alliance	New Britain	Hartford	√	362	321
New Milford	New Milford Hospital Holding Corporation	New Milford	Litchfield		95	72
Norwalk	Norwalk Health Services Corporation	Norwalk	Fairfield	√	366	224
Rockville General	Eastern Connecticut Health Network, Inc.	Vernon	Tolland		118	66
St. Francis & Medical Center	Saint Francis Care, Inc.	Hartford	Hartford	√	682	574
St. Mary's	Saint Mary's Health System, Inc.	Waterbury	New Haven	√	379	178
St. Raphael	Saint Raphael Healthcare System, Inc.	New Haven	New Haven	√	533	474
St. Vincent's Medical Center	St. Vincent's Health Services Corporation	Bridgeport	Fairfield	√	444	336
Stamford	Stamford Health System	Stamford	Fairfield	√	330	319
William W. Backus	Backus Corporation	Norwich	New London		233	188
Waterbury	Greater Waterbury Health Network	Waterbury	New Haven	√	393	271
Windham Community Memorial	Windham Community Memorial Hospital	Willimantic	Windham		144	87
Yale-New Haven	Yale-New Haven Health Services Corporation	New Haven	New Haven	√	944	875
		Statewide			**9,256**	**7,231**

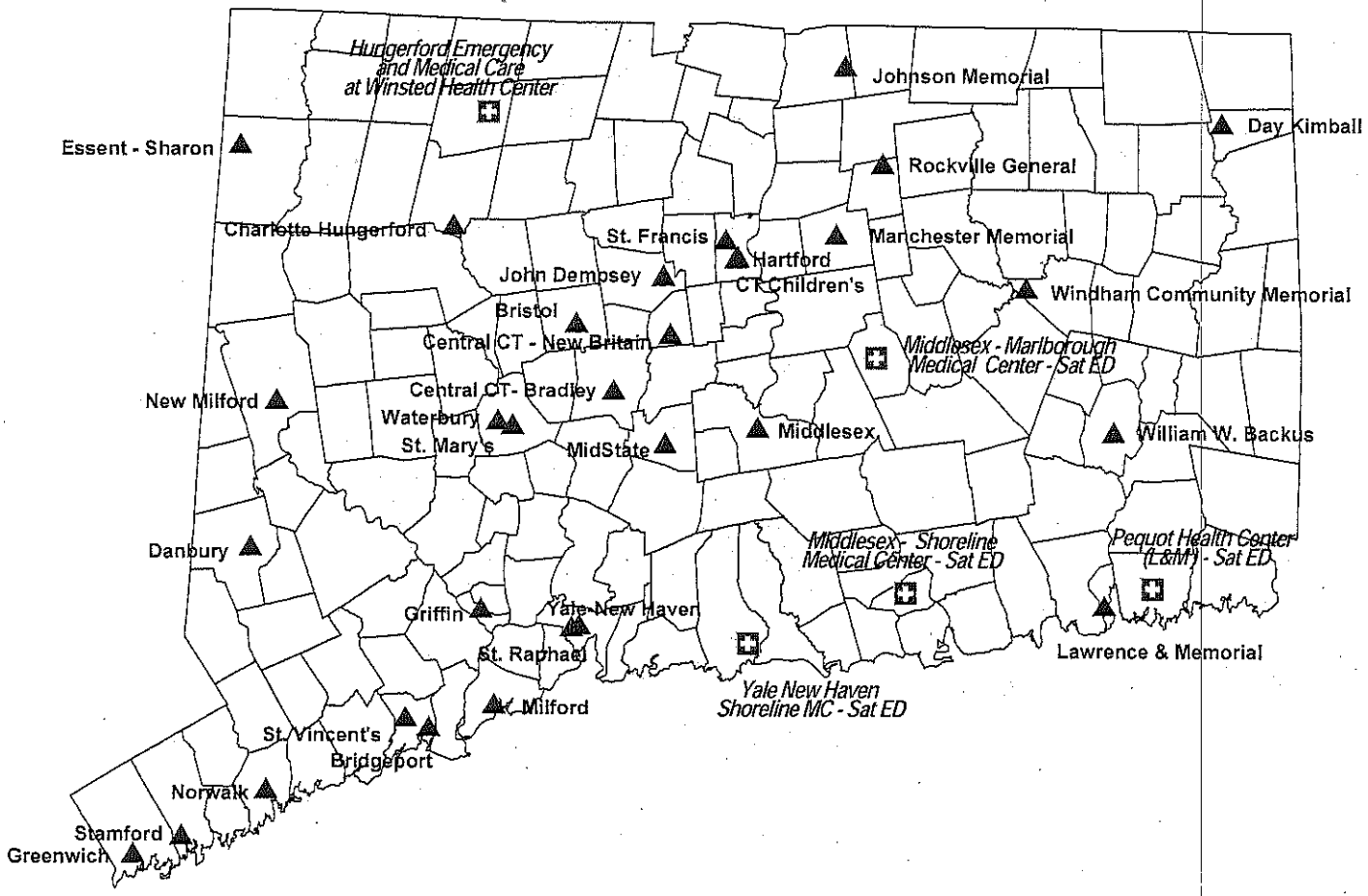
Source: CT Office of Health Care Access Budget System Schedule 500

*Includes newborn bassinets

** Effective 10/1/2007, the two hospitals merged to become the Hospital of Central Connecticut.

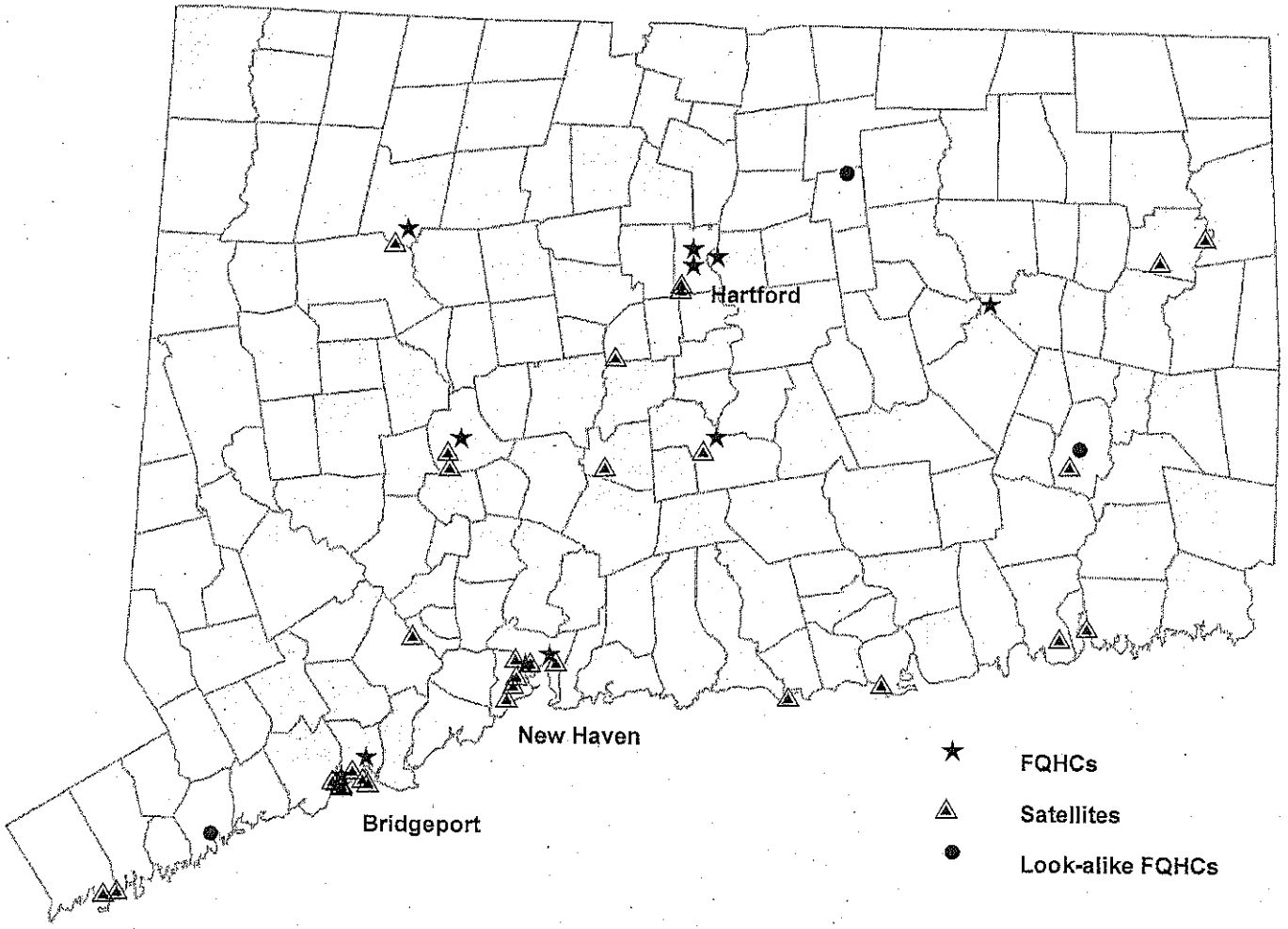
Appendix D

Acute Care Hospitals, Medical Centers and Satellite Emergency Centers



Appendix E

Connecticut Federally Qualified Health Centers (FQHCs), Satellites and Look-Alike FQHCs



Appendix E: Federally Qualified Health Centers (FQHCs), Satellites and Look-alike FQHCs, 2007

TYPE	NAME	STREET	TOWN	ZIP
Main	Bridgeport Community Health Center, Inc.	471 Barnum Avenue	Bridgeport	06608
Main	Charter Oak Health Center	21 Grand Street	Hartford	06106
Main	Community Health Center, Inc.	635 Main Street	Middletown	06457
Main	Community Health Services	500 Albany Avenue	Hartford	06120
Main	East Hartford Community Health Center	94 Connecticut Boulevard	East Hartford	06108
Main	Fairhaven Community Health Center, Inc.	374 Grand Avenue	New Haven	06513
Main	Generations Family Health Center, Inc.	1315 Main Street	Willimantic	06226
Main	Hill Health Center	400 Columbus Avenue	New Haven	06519
Main	Southwest Community Health Center	361 Bird Street	Bridgeport	06605
Main	StayWell Health Center	80 Phoenix Avenue	Waterbury	06702
Main	Community Health & Wellness Center of Greater Torrington	157 Litchfield Street	Torrington	06790
Satellites	Charter Oak Health Center	1 New Britain Avenue	Hartford	06106
Satellites	Charter Oak Health Center	282 Washington Street	Hartford	06106
Satellites	Community Health & Wellness Center of Greater Torrington	157 Litchfield Street	Torrington	06790
Satellites	Community Health Center, Inc.	114 Eat Main Street	Clinton	06413
Satellites	Community Health Center, Inc.	333 Long Hill Road	Groton	06340
Satellites	Community Health Center, Inc.	134 State Street	Meriden	06450
Satellites	Community Health Center, Inc.	635 Main Street	Middletown	06457
Satellites	Community Health Center, Inc.	1 Washington Square	New Britain	06051
Satellites	Community Health Center, Inc.	1 Shaw's Cove	New London	06320
Satellites	Community Health Center, Inc.	263 Main Street	Old Saybrook	06475
Satellites	Fair Haven Community Health Center	339 Eastern Street	New Haven	06513
Satellites	Generations Family Health Center, Inc.	330 Washington Street	Norwich	06360
Satellites	Generations Family Health Center, Inc.	54 Reynolds Street	Danielson	06239
Satellites	Generations Family Health Center, Inc.	23 Wauregan Road	Brooklyn	06234
Satellites	Hill Health Center	226 Dixwell Avenue	New Haven	06511
Satellites	Hill Health Center	232 Cedar Street	New Haven	06519
Satellites	Hill Health Center	62 Grant Street	New Haven	06519
Satellites	Hill Health Center	911 State Street	New Haven	06511
Satellites	Hill Health Center	285 Main Street	West Haven	06516
Satellites	Hill Health Center	121 Wakelee Avenue	Ansonia	06401
Satellites	Southwest Community Health Center	510 Clinton Avenue	Bridgeport	06605
Satellites	Southwest Community Health Center	1046 Fairfield Avenue	Bridgeport	06605
Satellites	Southwest Community Health Center	743 South Avenue	Bridgeport	06605
Satellites	StayWell Health Center	1302 South Main Street	Waterbury	06706
Satellites	StayWell Health Center	80 Phoenix Avenue	Waterbury	06702
Satellites	Bridgeport Community Health Center, Inc.	928 East Main Street	Bridgeport	06608
Satellites	Park City Primary Care Center, Inc.	64 Black Rock Avenue	Bridgeport	06605
Satellites	Ralphola Taylor Center	790 Central Avenue	Bridgeport	06607
Satellites	Stratford Community health Center	727 Honeyspot Road	Bridgeport	06615
Satellites	Stamford Community Health Center	137 Henry Street	Stamford	06902
Satellites	Stamford Community Health Center	245 Selleck Street	Stamford	06902
Look-alike	Norwalk Community Health Center, Inc.	121 Water Street	Norwalk	06854
Look-alike	United Community and Family Services Health Center	47 Town Street	Norwich	06360
Look-alike	Vernon Area Community Health Center	43 West Main Street	Vernon	06066

Source: *Community Health Center Association of Connecticut*

Appendix F:
Acute Care Hospitals Payer Mix, FY 2006

	Discharges						Share of Hospital Total					
Acute Care Hospital	Medicare	Medicaid	Other Public[1]	Private[2]	Uninsured[3]	Total	Medicare	Medicaid	Other Public[1]	Private[2]	Uninsured[3]	Total
Bridgeport	6,738	4,906	68	7,489	381	19,582	34%	25%	0%	38%	2%	100%
Backus	4,331	1,739	264	4,222	465	11,021	39%	16%	2%	38%	4%	100%
Bradley	1,728	65	< 6	530	43	2,369	73%	3%	0%	22%	2%	100%
Bristol	3,583	1,329	21	2,899	122	7,954	45%	17%	0%	36%	2%	100%
CTCMC	45	2,430	31	3,043	66	5,615	1%	43%	1%	54%	1%	100%
Danbury	8,257	2,367	20	9,271	488	20,403	40%	12%	0%	45%	2%	100%
Day Kimball	2,489	1,075	37	1,995	72	5,668	44%	19%	1%	35%	1%	100%
Greenwich	4,318	401	6	7,127	496	12,348	35%	3%	0%	58%	4%	100%
Griffin	3,603	1,131	23	2,588	85	7,430	48%	15%	0%	35%	1%	100%
Hartford	15,056	6,979	64	16,016	1,375	39,490	38%	18%	0%	41%	3%	100%
Hungerford	2,957	1,075	15	1,990	158	6,195	48%	17%	0%	32%	3%	100%
John Dempsey	4,048	1,546	41	3,583	705	9,923	41%	16%	0%	36%	7%	100%
Johnson	2,207	563	22	1,337	83	4,212	52%	13%	1%	32%	2%	100%
Lawrence &Memorial	6,097	2,455	1,069	4,612	463	14,696	41%	17%	7%	31%	3%	100%
Manchester	3,890	1,115	17	3,710	226	8,958	43%	12%	0%	41%	3%	100%
Middlesex	6,029	1,451	24	4,907	455	12,866	47%	11%	0%	38%	4%	100%
MidState	4,620	1,487	14	3,338	353	9,812	47%	15%	0%	34%	4%	100%
Milford	2,557	351	7	1,898	158	4,971	51%	7%	0%	38%	3%	100%
New Britain	7,625	3,995	13	6,452	538	18,623	41%	21%	0%	35%	3%	100%
New Milford	1,318	231	< 6	1,488	74	3,116	42%	7%	0%	48%	2%	100%
Norwalk	6,189	1,322	50	6,675	1,105	15,341	40%	9%	0%	44%	7%	100%
Rockville	1,556	531	26	1,388	99	3,600	43%	15%	1%	39%	3%	100%
Saint Francis	13,000	6,260	87	11,801	499	31,647	41%	20%	0%	37%	2%	100%
Saint Mary's	5,385	2,865	46	4,152	536	12,984	41%	22%	0%	32%	4%	100%
Saint Raphael	13,371	3,176	17	8,421	369	25,354	53%	13%	0%	33%	1%	100%
Saint Vincent's	9,098	2,684	21	6,792	1,077	19,672	46%	14%	0%	35%	5%	100%
Sharon	1,580	257		907	136	2,880	55%	9%	0%	31%	5%	100%
Stamford	5,900	2,686	7	7,791	619	17,003	35%	16%	0%	46%	4%	100%
Waterbury	6,768	2,726	13	5,207	289	15,003	45%	18%	0%	35%	2%	100%
Windham	2,388	907	33	1,742	315	5,385	44%	17%	1%	32%	6%	100%
Yale-New Haven	14,065	12,589	506	22,056	1,138	50,354	28%	25%	1%	44%	2%	100%
Statewide	170,796	72,694	2,570	165,427	12,988	424,475	40%	17%	1%	39%	3%	100%

Source: *CT Office of Health Care Access Acute Care Discharge Database*

[1] Other public includes primary payer categories Other federal, CHAMPUS/TRICARE and Title V

[2] Private includes primary payer categories commercial, Blue Cross , HMO, PPO & Workers' Compensation

[3] Uninsured includes primary payer categories self-pay, other and no charge.

Endnotes

[1] Office of Health Care Access, *Annual Report on the Financial Status of Connecticut's Short Term Acute Care Hospitals for Fiscal Year 2006.*

[2] Kaiser Family Foundation/statehealthfacts.org., 2005 AHA Annual Survey Copyright 2006 by Health Forum LLC, an affiliate of the American Hospital Association, special data request, March 2007. 2005 population data from Annual Population Estimates by State, July 1, 2005 Population, U.S. Census Bureau.

[3] Kaiser Family Foundation / statehealthfacts.org.

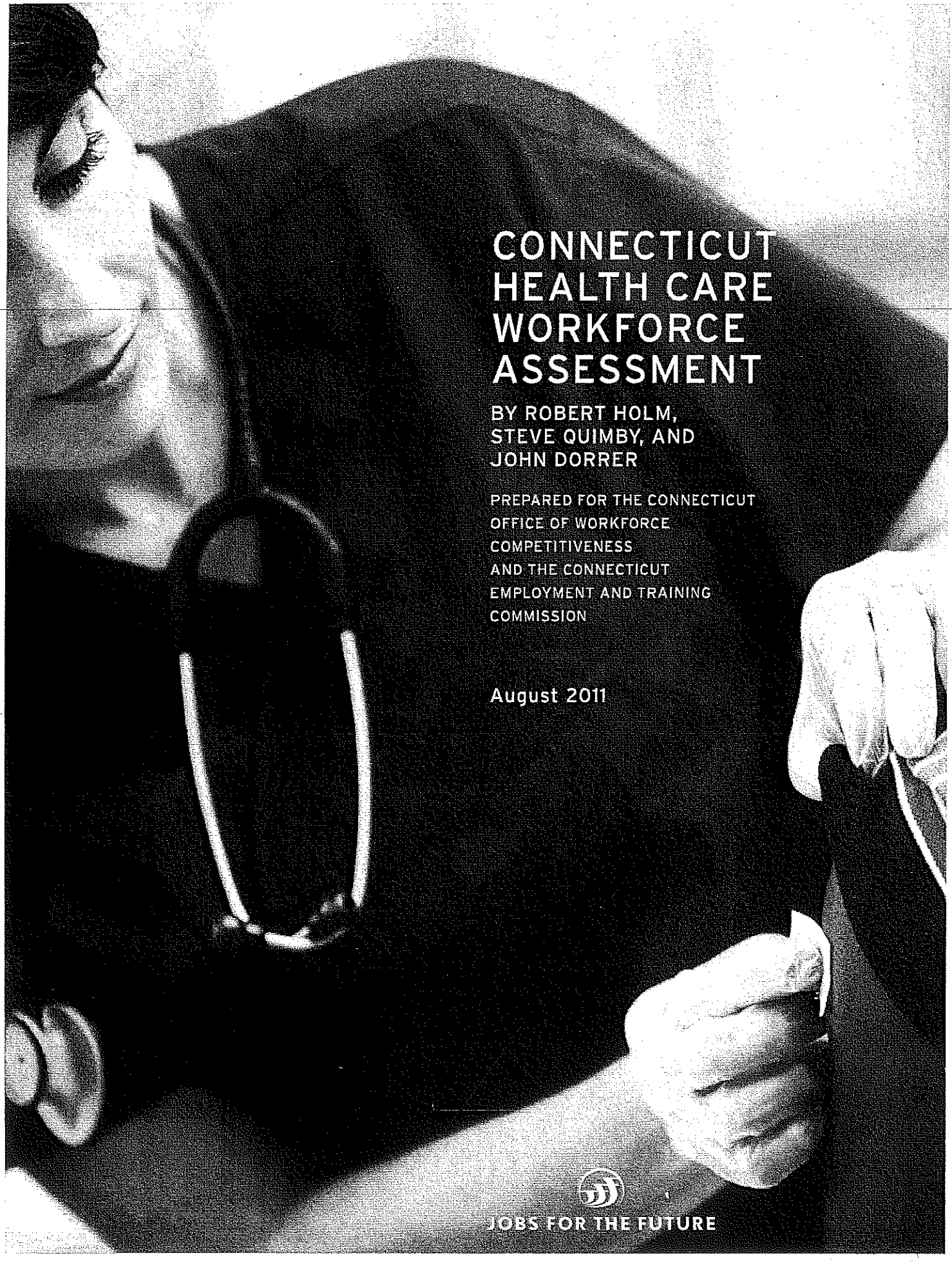
[4] American Hospital Association, *Behavioral Health Challenges in the General Hospital, Practical Help for Hospital Leaders, Recommendations*, February 2007, Page 2.

[5] Health Resources and Services Administration. *The Registered Nurse Population: Findings From the 2004 National Sample Survey of Registered Nurses*, Pages 17-18.

[6] PriceWaterhouseCoopers, What Works*Healing the healthcare staffing shortage, 2007, Page 1.

[7] http://www.iom.edu/CMS/3809/16107/35007/35040.aspx

[8] http://www.aha.org/aha/issues/Mental-Health-Services/taskforcereport.html



CONNECTICUT HEALTH CARE WORKFORCE ASSESSMENT

BY ROBERT HOLM, STEVE QUIMBY, AND JOHN DORRER

PREPARED FOR THE CONNECTICUT OFFICE OF WORKFORCE COMPETITIVENESS AND THE CONNECTICUT EMPLOYMENT AND TRAINING COMMISSION

August 2011

JOBS FOR THE FUTURE

ACKNOWLEDGEMENTS

Many people gave generously of their time and provided valuable insights and data for this assessment. We greatly appreciate their candor and contributions. First, the Allied Health Policy Workforce Board and WISH Strategy Group provided important design guidance and marshaled critical industry contacts for stakeholder interviews and industry focus groups. As a result, over 40 industry, education, labor, research, workforce, and economic development organizations granted interviews, and an additional 50 health care employers participated in JFF focus groups. These participating organizations are listed in Appendix II. Special thanks among these goes to Liz Beaudin of the Connecticut Hospital Association for extending the use of CHA facilities for most of the research groups. We appreciate the time all gave to represent their sectors and advance the state's health care workforce planning.

We also thank those who provided critical industry, workforce, and education data. The WISH Data Team provided valuable resources and consulted with JFF on final data-related recommendations. Andrew Condon of the Connecticut Department of Labor, Braden Hosch of the Department of Higher Education, and Jennifer Filippone and Kristin Sullivan of the Department of Public Health provided research expertise and multiple sources of supply and demand data essential to the assessment. Sue Goldberger and Yustina Saleh of Burning Glass Technologies provided unique new data tools, as well as diligent and rapid responses to our research needs and questions.

We extend special thanks to Alice Pritchard at the Connecticut Women's Education and Legal Fund, Mary Ann Hanley at the Connecticut Office of Workforce Competitiveness, and their team members who provided advisory, research, logistical, and problem-solving support. Those teams included Marita Shurkus, Maria Dynia, Carmen Celantano, Kelley Fitzgerald, and Kathy Mengacci.

Finally, JFF researchers Jeremy Kelley and Chinita Ray were critical in pulling together interviews, focus groups, and many sources of data essential to this report. Without their support, the assessment could not have been completed within our ambitious timeframe.

JOBS FOR THE FUTURE

JOBS FOR THE FUTURE identifies, develops, and promotes new education and workforce strategies that help communities, states, and the nation compete in a global economy. In over 200 communities across 43 states, JFF improves the pathways leading from high school to college to family-sustaining careers.

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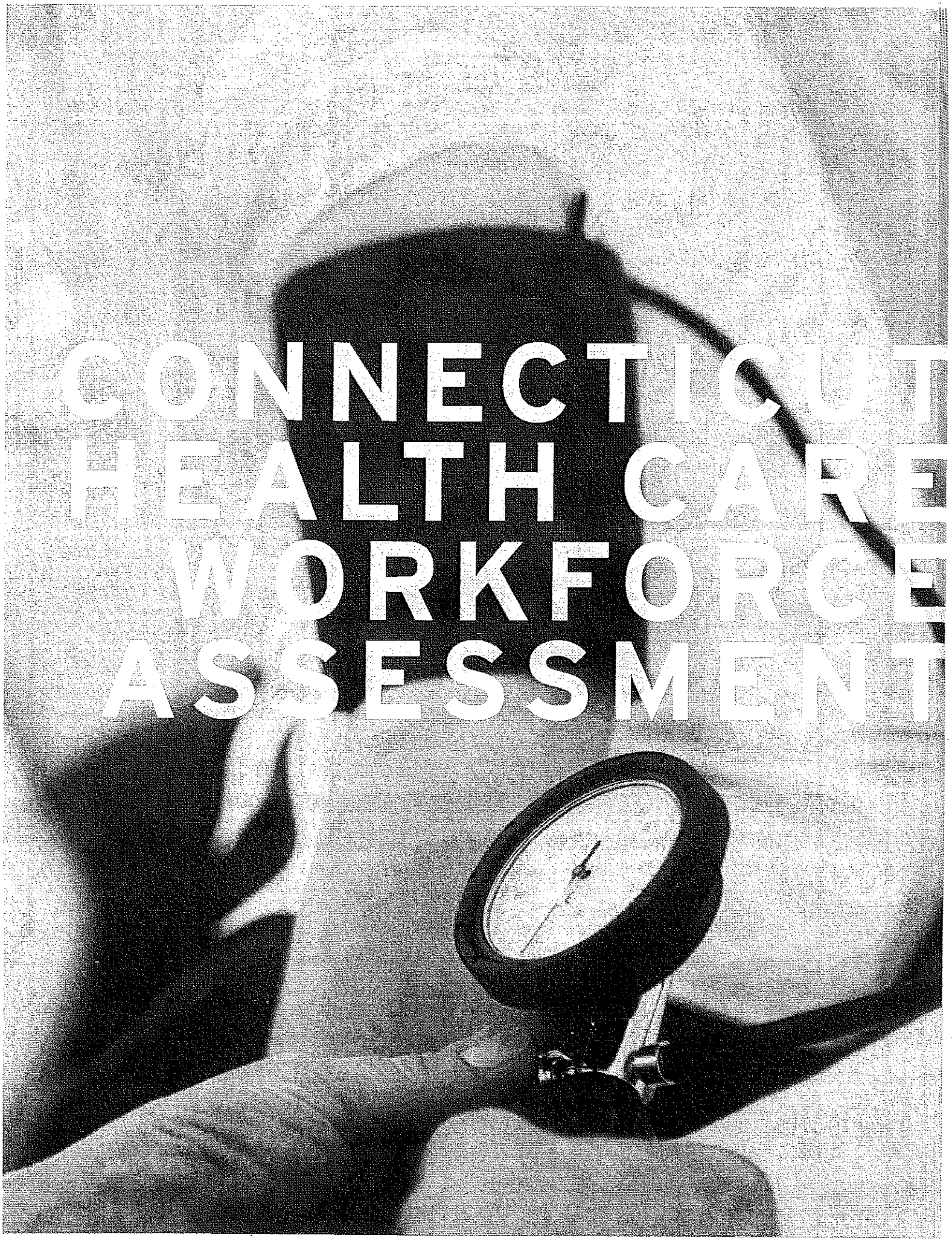
TABLE OF CONTENTS


CONNECTICUT
HEALTH CARE
WORKFORCE
ASSESSMENT

EXECUTIVE SUMMARY

During the current economic downturn, health care has been among the few industries to maintain its overall levels of employment, even increasing employment in some places and fields. At the same time, health care reform has opened to question many future projections for the health care workforce. Other major factors driving change, including technology, new reimbursement practices, and other factors, combine to make this a vital time to examine Connecticut's rapidly changing workforce environment in health care—and to formulate recommendations for responding to emerging conditions.

CHALLENGES

PRESSURES ON DEMAND AND SUPPLY

While workforce shortages in health care have lessened recently, industry employment will continue to experience solid growth because of several long-term drivers of demand, particularly Connecticut's *aging population*. At the same time, the state will be hard pressed to keep the supply of health care workers on pace because of the aging workforce, the outmigration of young adults, and flat (and by some measures declining) student achievement in the long-term pipeline. It will be crucial to maintain investment in training for traditional occupations, including nurse and primary care physician, as overall demand continues expanding.

TECHNOLOGY AND BUSINESS MODEL INNOVATIONS

Demand for new skills is emerging, driven by several factors. Recent advances in technology and new organizational models in the health care industry are creating demand for new and emerging occupations in health information technology and patient navigation. In addition, most traditional health occupations will require augmented and new skills in technology, problem solving, and customer management as technology and business models evolve.

LEGISLATIVE AND BUDGET CHANGES

The challenges above will combine with new health care legislation and the intensification of budget pressures to accelerate change and introduce more uncertainty in the short term. This will demand still more nimble market responsiveness by various types of institutions. Yet communication among employers and education and training institutions is lower than desired, according to some employers, and academic institutions face barriers to acting quickly when they do see changes in demand.

COORDINATING COMPLEX CHALLENGES AND RESOURCES

Connecticut possesses many valuable resources and initiatives for health care education and training, including a large number of strong institutions, and recent initiatives have laid a foundation for shared planning and action. However, the strategies of many institutions are as of yet uncoordinated. Major sectors of the health care industry face common workforce challenges that call for collaborative action. And while some sector and regional differences call for independent specialized action, there is much room for linked efforts that address cross-sector challenges.

FACILITATING AND IMPROVING THE CONSISTENCY OF MARKET ANALYSES

The many sources of health care workforce information are not coordinated in a way that supports complete analyses or shared understanding and strategy development. The departments of Labor, Higher Education, and Public Health, as well as other public and private institutions, maintain data systems that are integrated to some extent but not adequately. Standardization and quality control issues affect the interoperability of data systems for frequent comprehensive analyses. New sources of information, like real-time labor market information, are not capitalized upon to gain new insights, cross check assumptions, or monitor rapid change.

RECOMMENDATIONS

To meet these challenges, JFF's recommendations center on building Connecticut's capacity to continuously monitor, understand, and strategically respond to the state's growing and increasingly dynamic health care workforce demands. Part 4 provides further descriptions, along with recommendations specific to key stakeholders.

ORGANIZE HEALTH CARE WORKFORCE DATA FOR EFFECTIVE ANALYSIS AND PLANNING.

Balancing Connecticut's supply of professional, technical, and support workers will require coordinating employers, professional groups, legislators, licensure bodies, and education and training providers. Foundational to this is gaining a shared understanding based on highly accessible intelligence about workforce supply and demand. No central data repository exists to pull all the relevant sources together, despite valuable state efforts to collect data for this large sector and the existence of several specialized research resources.

This fragmentation limits health care workforce planning and investments.

We recommend the construction and maintenance of an *Internet-based health care workforce portal* to permit efficient and effective access to health care workforce information. Available through this portal would be: employment and wage data; occupational projections; real-time job postings data; licensure and certification data; education and training supply data; and health care workforce research studies. With a modest investment and the assignment of a lead agency to spearhead this effort, a coordinated information strategy would serve the needs of many public and private decision makers who need to make choices and investments related to the health care workforce. Sustainable funding to make those modest investments is also critical for improved consistency in the data and to encourage consumer use in decision making.

DEEPEN EMPLOYER ENGAGEMENT AND SPEED RESPONSIVENESS.

As health care employers and educators face accelerating change in technology and uncertainty in the health care system, they increasingly will need to rely on each other to keep up with shifting skills needs. Employer feedback indicates that while education institutions are addressing many of their traditional workforce needs, most of them also lack resources to respond quickly to the specialized and evolving skills demands that are projected for the coming years.

To build the capacity of health care employers and educators to respond, Connecticut should promote and train its institutions to use and apply findings from the health care workforce information portal JFF recommends. A leading-edge element of that portal is a system to report real-time data on job vacancies in order to cross-check traditional market assumptions and monitor rapid change in emerging occupations and skills demands. Faster response to this intelligence will require faster processes for approving and launching quality programs of study to meet new demands, perhaps allowing for a "Research and Development" level of approval for new courses and identifying effective organizational structures to support rapid change. Responsiveness can also be enhanced by promoting the use of online learning resources, as long as they are offered in tandem with expanded practical experience.

BUILD CAPACITY FOR BROADER COLLABORATION.

This assessment supports the recommendations of the Allied Health Workforce Policy Board to develop a health care workforce plan that identifies targets for in-demand health care occupations and to post a health care workforce scorecard on a public website. An addition that some employers suggest is to now shift the state focus from research and planning toward strategy consolidation and advocacy for resources to implement the plans. This would require high-level facilitation and support for consensus building, as well as bringing additional advocates on board for implementation planning. The board should continue to play its unifying role for the industry's workforce development, and effective sector groups, such as the Behavioral Health Collaborative, should be supported to organize in their arenas.

Among the advocates to include are economic and business groups that can bring additional resources and links to a politically potent priority in the current economy: business growth and job creation. Despite the potential for synergy, such stakeholders do not place a priority on health care jobs that is commensurate with the industry's contributions to Gross State Product. The Allied Health Workforce Policy Board should promote the importance of the health care sector to economic development and business association stakeholders. It should also engage with them in strategic planning for the growth of the sector, as well as with industry clusters that share related workforce needs. These include health information, insurance, biomedical lab, and diagnostic services, among others. These allies should also be involved in developing data tools about the health care workforce and learn about their potential uses in other industries.

TAILORED STAKEHOLDER RECOMMENDATIONS

Recommendations tailored to particular stakeholders are included in Appendix I. These include recommendations for education and training providers in general, as well as for stakeholders influencing the four major industry subsectors convened in this research: hospitals; ambulatory care; nursing and residential care; and behavioral health. The importance of the nursing labor market, which cuts across all these subsectors, merited an additional set of recommendations.

INTRODUCTION AND PURPOSE

During the current economic downturn, health care has been among the few industries that have maintained their overall levels of employment, with health care even increasing employment in some places and fields. At the same time, the passage of the Personal Responsibility and Affordable Care Act has opened many of the future projections for the health care workforce to question. Other major factors driving change include technology, new reimbursement practices, and challenges to the scope of practice laws for critical health care occupations. These factors combine to make now a vital time to examine Connecticut's health care workforce, with an eye toward policy and practice changes that respond to the rapidly changing health care and health care workforce environments.

This Connecticut Health Care Workforce Assessment is part of the Connecticut Workforce Investment Strategies in Health Care effort, organized by the Connecticut Employment and Training Commission in collaboration with the Allied Health Workforce Policy Board. These entities received a State Health Care Workforce Development Planning Grant to:

- Produce a statewide health care workforce plan, including a short-term action plan and a statewide Health Care Workforce Scorecard;
- Coordinate and streamline disparate health care workforce planning efforts and strengthen regional health care workforce planning processes; and
- Identify opportunities to improve data-collection and data-sharing capacity.

These activities will support the development of uniform data collection across states regarding licensed health professionals. This assessment is part of the planning efforts aimed at determining and developing solutions to Connecticut's health care workforce issues.

The research for this report examined strengths, weakness, opportunities, and threats in the state's health workforce supply and demand to produce:

- A health care workforce demand analysis;
- A health workforce supply analysis;
- A resource and program gap analysis; and
- A set of health care workforce recommendations that take into account capacity building, supply-demand mismatches, and issues identified in relation to Connecticut's education and training system.

This research demonstrates advances over traditional labor market analysis in two areas:

- **REAL-TIME DATA:** This research utilizes cutting-edge, real-time data on the labor market based on job postings over the past year. The data provide information on both jobs for which employers were actively advertising and the education and experience requirements for those jobs. While imperfect, these data offer a much earlier look at what is happening now in the labor market than do traditional sources of labor market information.
- **INCLUSION OF BEHAVIORAL HEALTH:** Traditional labor market analyses often ignore behavioral health as a health care subsector. This is in part because behavioral health does not have its own NAICS code and so data are subsumed in other categories and not readily available. The development and implementation of research methodologies aimed at exploring the behavioral health workforce is an advancement in the field and it contributes to the understanding of this important subsector in Connecticut.

METHODOLOGY

The guiding principle of JFF's "SWOT analysis"—Strengths, Weaknesses, Opportunities, Threats—is that no single data source or methodology will adequately address the labor market challenges Connecticut faces. To conduct the Connecticut health care SWOT analysis, we selected four health care industry subsectors for inclusion in all aspects of the research:

- Hospitals;
- Nursing and residential care facilities, including both traditional long-term care facilities and assisted living centers;
- Ambulatory care, which includes doctor's offices, outpatient clinics, and home health care services; and
- Behavioral health organizations, including both state and private employers.

The research began with a series of key stakeholder interviews and document reviews to identify possible additional informants. Secondary data were collected from the wide variety of sources outlined below, as well as from real-time job postings from Connecticut's health care employers. Focus groups and interviews were conducted with Connecticut health care employers in the four key industry subsectors, as well as with education and training providers that serve these employers.

BACKGROUND STAKEHOLDER INTERVIEWS AND DOCUMENTATION REVIEWS

JFF conducted interviews with key stakeholders in a variety of areas. These interviews served three main purposes. First, the interviews helped the members of the research team enhance their understanding of the health care labor market in Connecticut and of issues related to labor market information in the state.

Second, they helped identify key respondents for participation in focus groups. Third, they helped target the focus group questions on the areas of most interest to participants. Stakeholder interviewees included:

- Twelve leaders of key associations;
- Ten education and training providers;
- Three experts on Connecticut labor market information;
- Four leaders from Connecticut's higher education system;
- Five labor representatives;
- Two experts in the behavioral health workforce; and
- Three economic development stakeholders.

The research team also reviewed numerous reports, briefing materials, and other documentation provided by a wide range of health care workforce stakeholders in Connecticut. These materials have been incorporated into the final assessment to ensure that JFF has built upon, but does not duplicate, prior work.

SECONDARY DATA ANALYSIS

The research team analyzed secondary data on industry and occupational trends in health care and data on education and training programs. Industry trend data for Connecticut on total state employment and regional employment were provided by the Connecticut Department of Labor, which the team combined with data from the ES-202 and Local Employment Dynamics datasets. An analysis of all these data was conducted to determine long-term trends in health care employment, critical industry sectors, and occupations in Connecticut, as well as occupational areas where significant growth is anticipated over the next six to eight years.

Data on education programs and completers come from the Integrated Postsecondary Education Data System (IPEDS) and the Connecticut Training and Education Planning System (TEPS). These data were analyzed to examine the current supply of training and education to meet the projected labor market demand for specific occupations, as derived from both secondary and primary data analyses.

REAL-TIME LABOR MARKET DATA

This analysis takes advantage of newly available technology to measure occupational demand by collecting information on all online job advertisements. Burning Glass Technology's proprietary data-collection program identifies jobs from over 16,000 websites. These represent a full span of employers, from small to large and both public and private. This sample also includes information from traditional job-posting boards (e.g., Career Builder, Monster.com), newspapers, and individual company job boards. While there is no way to guarantee 100 percent coverage, this new data source provides strong coverage and closer-to-real-time data than do traditional labor market information sources.

The Burning Glass real-time data analysis examined job postings from January 1, 2010 to December 31, 2010. The firm analyzed six specific areas:

1. Demand for health occupations overall on a statewide basis in the last 12 months.

- > Total demand from job postings for health care occupations
- > Comparison total demand from job postings of all Connecticut occupations
- > Demand for the top 30 health occupations

2. Job postings demand for behavioral health jobs on a statewide basis.

- > Demand for the 100+ lay titles submitted by JFF as possible behavioral jobs
- > Aggregation of those lay titles into SOC occupational codes
- > Aggregation of those lay titles into categories recommended by JFF content experts

3. Job-posting information on the experience requirements and education, certification, and licensing requirements of the top 30 health occupations aggregated in the state.

4. The industry distribution of health care jobs overall by three-digit SOC industry subsectors (ambulatory care, hospitals, and nursing and residential care) and the behavioral health category within the health care and social assistance NAICS industry group.[1]

5. Total national demand in the last six months for the 30 top health care occupations in Connecticut for use in calculating supply/demand ratios based on OES national and state data.

6. Demand for health care jobs by county, Workforce Investment Area, and NAICS code.

See the Appendix III for these analyses.

The three main industry subsectors and their occupations were identified by traditional methods using NAICS industry codes and OES occupational codes. The behavioral health sector is not identified by a single NAICS code, and many of its occupations cross over with non-behavioral health occupations. Many of the occupations also lack standard titles and descriptions within the industry. The JFF research team and Burning Glass Technologies worked with Yale University's Dr. Michael Hoge and Dr. Jessica Wolf to identify job titles and search terms to improve the capture of behavioral health job postings.

INDUSTRY FOCUS GROUPS

The primary data collection conducted in this research centered on a series of focus groups. Focus group questions helped the research team develop an understanding of how Connecticut health care employers recruit, train, and retain their talent, the nature and extent of their human resources investments, what they perceived to be the strengths and limitations of the public workforce investment system's engagement in health care, and what gaps they felt existed in the state and regional talent development systems. Each focus group included six to twelve business representatives. We conducted two focus groups

in each of three industry subsectors: hospitals, nursing and residential care facilities, and behavioral health. We conducted an additional small group discussion in the nursing and residential care facilities subsector. For ambulatory care, we conducted one focus group, focused on community health centers. Because of the difficulties encountered in scheduling further ambulatory care focus groups, the remaining information for this sector comes from interviews with ambulatory care employers in the home health care and physician's practice subsectors.

EDUCATION AND WORKFORCE SYSTEM INTERVIEWS AND FOCUS GROUPS

The research team conducted interviews with ten health care education and training program providers, including community college and university deans and representatives from the Connecticut Technical High School System and proprietary training program providers. The research team also conducted a focus group with key leaders in health care from the state's five Workforce Investment Boards. The WIBs are both key players in the state's labor exchange system and funders of health care training programs for low-income, dislocated, and incumbent workers.

CAVEATS

Care must be taken in interpreting the results of any research and in using those results in formulating recommendations. In considering the results of this research and the recommendations derived from it, we offer these specific caveats.

- Although we took care to obtain focus group participants from across the state of Connecticut, there was an over-representation of employers and other key stakeholders from the state's central and more urban regions. This may add a bias to the results.
- Participation in the focus groups and employer interviews was based on self-selection to some extent. We widely distributed invitations to participate, but only a small portion of those invited were available and willing to participate. It is possible that participants differ in some relevant way from those who were unable or chose not to participate.
- The real-time data collection from Internet job postings included scans of over 16,000 websites and 234,000 job postings and included the use of recent Internet "spidering" technology, as well as processes of de-duplication and auto-coding to classify occupations and, to a lesser extent, industries. Yet the data rely on job postings created by thousands of individuals with little standardization. Over 99 percent of the job titles have an occupation code. Approximately 85 percent of codings produced through our proprietary auto-coder are accurate at the two-digit SOC level; 70 to 75 percent are accurate at the eight-digit level.
- Industry data are less reliable. Over 30 percent of job postings do not contain an employer name. By combining use of company name where available with artificial intelligence algorithms to infer industry from company descriptions within the text of the job posting, we could assign an industry code to 85 percent of the postings. These codes are 75 percent accurate at the two-digit level and 65 percent accurate at the four-digit level.

- Posting habits among employers affect the volume of those counted. For instance, some employers indicated that they continuously post advertisements for nurses, even when no positions are currently open. Thus, employers in regional follow up meetings thought that the nurse postings counts for the year were much higher than expected. Job postings also often appeared without stating education and experience requirements, although industry workers commonly assume such requirements implicitly.

See Appendix III for more detailed methodology on the Burning Glass real-time vacancy data.

PART 1. CONNECTICUT'S HEALTH CARE WORKFORCE DEMAND

OVERALL DRIVERS OF DEMAND

Growth in health care spending, the adoption of new technologies, shifts in health care policy, and major demographic changes will all impact the demand for health care workers in Connecticut over the next several years and beyond. Although the economic downturn has slowed growth in health care spending, most of these workforce trends are long term and will have far-reaching effects.

HEALTH CARE SPENDING

A fundamental driver of the growth in demand for health care workers in Connecticut, as for the nation, is the growth in spending for health care services. U.S. health care spending has increased steadily over the past half-century, rising from 5 percent of the Gross Domestic Product in 1960 to 16 percent in 2008 (second only to East Timor among all United Nations countries). This spending was projected to jump further in 2009, to over 17 percent of GDP, making it the largest one-year increase in history (simultaneous with a 1.1 percent decline in GDP for the year).[2] The U.S. Health and Human Services Department expects the health care share of GDP to continue to rise, reaching nearly 20 percent by 2017.[3]

- In 2009, national health expenditures grew 4.0 percent, to $2.5 trillion—or $8,086 per person—and accounted for 17.6 percent of GDP.
- In 2004, the highest per capita health care spending among the states occurred in Massachusetts, Maine, New York, Alaska, and Connecticut, with spending 20 percent or more above the U.S. average.[4]

While the most dramatic effects of the recession did not immediately reach the health care sector, the shrinking economy eventually did affect the industry, particularly in regard to private health insurance spending. Growth in private health insurance spending slowed after 2009, as millions of workers lost their employer-based insurance coverage and delayed treatment. Medicare spending increases, driven by higher

unemployment, offset the decline in private spending.[5] However, the overall result has been slower growth in demand for skilled workers, according to Connecticut employers interviewed for this assessment.

Subsector Spending Comparisons: Connecticut and the United States

Within the expanding U.S. health care industry, the largest share of spending is for hospital care, followed by physician care and other professional services (*see Table 1*). Together, these subsectors make up over half of health care spending. Pharmaceuticals and nursing home care are the next largest subsectors in terms of spending. Based on the most recent comparable data, Connecticut's spending pattern is similar to that of the nation. However, the state devoted a larger share to nursing home care by the mid-2000s than did the United States as a whole, and a slightly smaller share to hospital care.

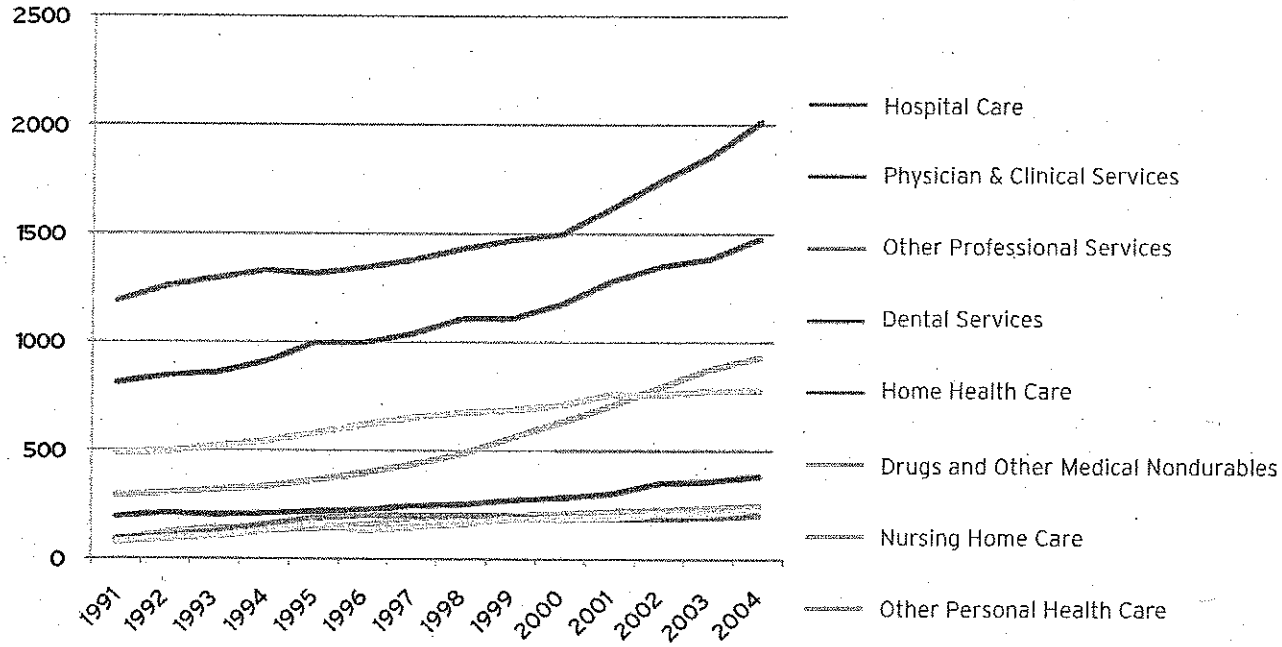
TABLE 1.
HEALTH CARE EXPENDITURES BY SERVICE, 2004 (MILLIONS OF DOLLARS)

	CONNECTICUT		UNITED STATES	
Hospital Care	31.7%	$7,029	37.7%	$566,886
Physician and Other Professional Services	27.1%	$6,010	28.2%	$446,349
Drugs and Other Medical Nondurables	14.6%	$3,246	13.9%	$222,412
Nursing Home Care	12.2%	$2,711	7.4%	$115,015
Dental Services	6.0%	$1,336	5.2%	$81,476
Home Health Care	3.2%	$708	2.3%	$42,710
Medical Durables	1.4%	$317	1.5%	$23,128
Other Personal Health Care	3.7%	$810	4.0%	$53,278
TOTAL	100.0%	$22,167	100.0%	$1,551,255

SOURCE: Health Expenditure Data, Health Expenditures by State of Residence, Centers for Medicare and Medicaid Services, Office of the Actuary, National Health Statistics Group, released September 2007. Available at http://www.cms.hhs.gov/NationalHealthExpendData/downloads/res-us.pdf

While spending in all categories of health care in Connecticut have risen, hospital care, ambulatory care, and pharmaceutical spending have increased the fastest since the early 1990s (*see Figure 1 on page 10*). Pharmaceutical spending overtook nursing home care spending in the early 2000s, although private nursing home construction and operations expanded rapidly in the mid-2000s. The state's per-capita spending growth stems primarily from the aging of Connecticut's population: older residents require more nursing home care and home-based care than do younger residents, as well as more medications and other health services in general.

FIGURE 1.
CONNECTICUT PER CAPITA HEALTH CARE EXPENDITURES



Public vs. Private Spending

Medicare, Medicaid, and other government programs account for a large share of health care spending, although these have grown more slowly than private insurance. Medicare per capita spending grew at an average of 6.8 percent annually between 1998 and 2008, while private health insurance spending grew at 7.1 percent per year on average.[6] More recently, the effects of unemployment, along with the enrollment of aging baby boomers in Medicare, have tilted the balance of health spending toward public dollars. Some researchers expect the growth of public spending for hospital care, physician and clinical services, and prescription drugs to exceed the growth of private spending for these services in 2011. By 2012, they project, public spending will account for more than half of all U.S. health care spending.[7]

- Medicare spending grew 7.9 percent in 2009, to $502.3 billion (20 percent of total national health expenditures).
- Medicaid spending grew 9.0 percent, to $373.9 billion (15 percent of total national health expenditures).[8]

MERGERS, PARTNERSHIPS, AND BUSINESS MODEL CHANGES

While Connecticut traditionally has had proportionately more small health care providers, particularly small physician offices, than have other states, increasing financial pressure is leading to mergers, partnerships, and new business models across the state, as it is across the country. Twenty percent more U.S. hospital mergers occurred in the third quarter of 2010 than in the same period in 2009, according to the private consulting firm Irving Levin Associates of Norwalk, Connecticut. The firm anticipates that health care companies will continue to merge to achieve economies of scale.[9]

Physicians and hospitals also are partnering in greater numbers. Many of the physicians are joining larger health systems in order to manage bundled payments more efficiently and to work with Accountable Care Organizations under development by the Centers for Medicare and Medicaid Services.[10] These trends will increase demand for workers with "patient navigation" skills, as well as skills in medical billing, health information technology, and other management, customer service, and administrative areas. These changes also will require additional training of current and new health care workers.

At the same time, increasing pressures to control health care costs and insurance reimbursement rates could dampen employment growth across the industry. Innovations in health care service delivery—including the expansion of walk-in clinics and health service centers embedded in pharmacies and retail stores—also may change the types of entities providing health care services. Policymakers and workforce analysts will need to monitor these innovations and market developments if they are to anticipate worker demand accurately.

TECHNOLOGY AND HEALTH INFORMATION SYSTEMS

Health care organizations are adopting advances in information technology to improve productivity, research, learning, and customer care. The multiple levels of health information technology—from electronic recordkeeping to digital communication, Web-based health information, and remote diagnosis tools—are empowering clinicians and patients alike to make more collaborative and better informed decisions based on real-time information. Moreover, the resulting explosion of health data is transforming the breadth and pace of clinical research and analysis to inform further advances.[11]

Other technology shifts are affecting the industry as well. For example, the development of automated medical labs in hospitals has dramatically changed the job of hospital medical technologist. With such advances, health care organizations and employees face growing pressure to identify and learn new skills to adapt to the rapid technological changes. Connecticut health care employers report anxiety about their workers' readiness to adopt new technologies and keep pace with change. At the same time, employers hope that the adoption of new technologies will help them reduce costs and improve services. They also hope that younger workers more comfortable with technology will ease the transition. However, these changes will place a burden on education and training providers to purchase new equipment and develop new curricula to keep up with technological change, requiring significant investments.

POLICY ENVIRONMENT

The above assessments are based primarily on current data and direct employer and educator feedback about workforce demand and supply, rather than on predictions of the impact of complex proposals for policy change. However, major public policy issues—such as changes in the health insurance industry and the 2010 passage of the Patient Protection and Affordable Care Act—are clearly on the minds of the stakeholders interviewed. Given the likelihood of significant state and federal policy changes—and their expected impact on demand for specific worker skills—these areas must be monitored.

The Patient Protection and Affordable Care Act

The act almost certainly will have a dramatic impact on health care occupations over the next three to five years. However, there is uncertainty surrounding the details of the act's implementation, so its precise effects are unclear. That said, the centrality of health information technology and a move toward electronic medical recordkeeping are likely to drive increased employment in information technology positions in all of the critical health care sectors.

Similarly, although the specifics and workforce consequences of the medical home model and Accountable Care Organizations are still emerging, both are likely to significantly affect health care employment. ACOs will certainly heighten the emphasis on performance and productivity measurements for providers, which will likely increase demand for health care information professionals. The question is the extent to which current practitioners will be retrained with these skills or new occupations will be created and staffed by specialists. Given that the purposes of ACOs are to increase efficiency and reduce the cost of care, it is also entirely possible that their implementation may depress the growth of health care employment.

Health Information Technology

Many health care providers are implementing health information technology systems to improve efficiency and the quality of care, and policy changes have begun to accelerate this shift, thus increasing the need for workers with strong IT skills. The federal government has further stimulated demand by funding multiple grants to pilot and promote the use of interoperable health records systems. Connecticut is following suit with the implementation of Health Information Exchanges, "E-Health Connecticut," and, potentially, the Sustinet strategy proposed for Medicaid customers and state employees. The impact of such policies will require new partnerships between educators and health care providers, as well as an examination of how much of the demand for new skills will be met through retraining incumbent workers versus training new workers. Some analysts expect these pressures to encourage more doctors to join larger practices in order to share the costs of IT and administrative tasks.

Patient-Centered Medical Home

The Patient-Centered Medical Home model, a federal effort that Connecticut Governor Dannel P. Malloy is backing with pilots among a few small providers, will contribute to the need for health IT skills and training. It also will increase demand for skills in care planning, coordination, and patient education, particularly among workers taking on the role of "patient care coordinators/navigators." It has yet to be determined whether these coordinators should be Registered Nurses or have particular experience or connections with the local community. But it is clear that the job will require individuals with new customer, information, and management skills. There also will be an impact on employer organizational structures: small practices will have more difficulty than larger ones in absorbing the medical home functions that may be expanded.

Broadening Medical Insurance Coverage

Policy changes that are expected to expand the number of Connecticut residents covered by medical insurance also will increase workforce demand. For instance, when more of the previously uninsured are covered, demand may increase for the services of community health centers, which typically serve large numbers of lower-income and minority residents. Health centers report higher demand for case managers than do other providers, along with a greater need for culturally competent care skills among all workers.

Long-term Care Rebalancing Toward Home Care

According to long-term care advocates, about 60 percent of Medicaid spending in the long-term care subsector goes to nursing homes, and 40 percent is devoted to home-based care. Because home care costs less per person, approximately 54 percent of consumers are served in that setting. A goal of the Connecticut Commission on Aging and other advocates is to serve 75 percent of people in the home, and Connecticut has joined a $56 million federal demonstration project, "Money Follows the Person," that seeks to give states incentives to transition more people from nursing homes to home care.

However, the situation remains in flux. Moreover, it is difficult to find accurate measurements of home care employment because the variety of contract types and "off book" arrangements between patients and service providers complicate the calculations.

One implication of the move toward home care is the challenge of training practical Certified Nursing Assistants. Most new CNAs are trained in nursing home facilities, with an experienced nurse overseeing up to eight trainees. This kind of supervision is not typically available in a home care environment, suggesting the need for another model for training and mentoring home health workers.

In addition, the demand for home-based workers is more difficult to measure than demand for institutional employees because many are hired directly by the customer and are subject to fewer reporting requirements. The difficulty in classifying and providing basic training for Personal Care Assistants—many who have formal training as a CNA and whose duties overlap but differ from those of CNAs—also will increase as a result of the shift toward home care. Workforce and community college leaders are working to address the PCA educational challenge, potentially by creating certificates requiring very short-term training.

While there are indications of the likely impact of some public policy changes on demand for new skills, other policy proposals present less certain outcomes. Stakeholders have cited the move toward "Prior Authorization" and the Affordable Care Act's Accountable Care Organizations as concerns, and well as the federal government's plans to raise Medicaid reimbursement rates by 2014. At the state level, budget problems worry providers, although Governor Malloy is expected to avoid deep cuts in health care and to maintain a "health care safety net."

DEMOGRAPHICS

Aging Population

New England states have fewer young adults (ages 25 to 34) relative to the general population than does the rest of the country (*see Table 2*). In fact, the percentage of young people in each New England state falls below the U.S. average (13.5 percent), and all New England states except Massachusetts rank in the bottom 10 in the percentage of total population in this cohort. New England appears to have relative difficulty attracting and retaining younger people, and this will affect health care supply and demand needs as the population ages.[12]

TABLE 2.
CONNECTICUT POPULATION, 2000-2030

AGE	2000		2030		CHANGE 2000-2030	
	NUMBER	PERCENT OF POPULATION	NUMBER	PERCENT OF POPULATION	CHANGE	PERCENT CHANGE
65+	470,183	13.8	794,405	21.5	324,222	69
45-64	789,420	23.2	852,893	23.1	63,473	8
25-44	1,032,689	30.3	935,506	25.4	-97,183	-9
18-24	271,585	8.0	282,390	7.7	10,805	4
Under 18	841,688	24.7	823,436	22.3	-18,252	-2.2

SOURCE: U.S Bureau of Census, http://www.censusscope.org

Older citizens, especially those over age 65, tend to use much higher levels of medical services than do their younger counterparts, so the rapid aging of the population will continue to drive demand for medical services. One bellwether of this dynamic is the demand for physician services by age group, outlined by the Health Resources and Services Administration (*see Table 3 on page 15*).

These data are consistent with national projections that demand for physicians and Registered Nurses will increase over the next decade because of the aging of the population.[13] In 2000, physicians spent an estimated 32 percent of patient care hours serving the age 65 and older population, a figure that is projected to increase to nearly 40 percent by the end of the decade. As the health workforce ages along with the state's general population, and the proportion of young people continues to decline, it raises concerns about the ability of a shrinking workforce to keep up with projected increases in demand.

Minority and Foreign-born Populations

By 2020, the percentage of total patient care hours physicians spend with minority patients is projected to rise from 31 percent in 2000 to 40 percent.[14] Meanwhile, research suggests that Hispanics and non-whites have different patterns of health care use compared to white residents, and demand for health care services by minorities is increasing as the state's minority population grows.

TABLE 3.
ESTIMATED REQUIREMENTS FOR PATIENT CARE PHYSICIANS PER 100,000 POPULATION, BY PATIENT AGE AND PHYSICIAN SPECIALTY, 2000

PATIENT AGE	PRIMARY CARE	MEDICAL SPECIALTIES	SURGERY	OTHER CARE	TOTAL
0-17 years	95	10	16	29	149
18-24 years	43	15	54	48	159
25-44 years	59	23	52	62	196
45-64 years	89	41	59	81	270
65-74 years	175	97	125	145	543
75+ years	270	130	161	220	781
ALL	95	33	55	70	253

SOURCE: http://bhpr.hrsa.gov/healthworkforce/reports/physicianworkforce/requirements.htm

Primary care includes general and family practice, general internal medicine, and pediatrics. Medical specialties includes cardiology and other internal medicine subspecialties. Surgery includes general surgery, obstetrics/gynecology, ophthalmology, orthopedic surgery, otolaryngology, urology and other surgical specialties. Other care includes anesthesiology, emergency medicine, pathology, psychiatry, radiology, and other specialties.

Connecticut's immigrant population is growing as well. According to the U.S. Census Bureau, 12.5 percent of Connecticut's population is foreign born, the 12th highest proportion in the nation.[15] A large proportion of individuals who are leaving the state are being replaced by immigrants from other countries. Immigrants of all skill levels can and do help to fill gaps in the health care workforce, but many require intensive support services and customized training programs. Language barriers and cultural, economic, and educational differences all impact these needs.

INDUSTRY SUBSECTOR DEMAND

WHAT DO THE DATA TELL US?

No one source of data can reliably answer the more detailed questions facing subsectors of the health care industry. This assessment has made use of multiple data sources as well as direct dialogue with employers to cross check assumptions and conclusions that might be suggested in one source. The data below derive from both traditional occupational projections of the sort typically available to state labor market information offices, as well as from real-time job-posting data that capitalizes on recent technology advances to analyze the content of online job advertisements. To this data review, we add intelligence gathered from structured conversations with employers.

Traditional Projections

Four major subsectors make up the Connecticut health care industry: ambulatory health care services; hospitals; nursing and residential care facilities; and social assistance.[16] Together, these sectors reported average employment of 261,786 in 2008. Industry projections for 2018 indicate this figure will rise to 298,913, an increase of 14 percent (37,117 jobs).

Ambulatory health care is projected to add nearly 13,000 jobs during this period, an increase of 16 percent. Hospitals are projected to add more than 6,500 jobs, an increase of nearly 10 percent. Nursing and residential care facilities are projected to add 6,387 jobs, and the social assistance sub-sector is expected to add 11,300 jobs.

These projections assume growth rates similar to those of recent years. However, a number of factors could significantly affect actual job growth in the health care industry and its subsectors. Demographic shifts, including the aging of the population, will continue to increase demand for health services such as nursing and residential care. Growth in chronic diseases, such as obesity and diabetes, are generating increasing demand for health services, including ambulatory care and hospitalization. The combination of these factors may increase worker demand in these subsectors.

Conversely, pressure to control health care costs and limit reimbursement rates may have the opposite effect. Innovations in health care services—such as the growth in the number of walk-in clinics and of health services embedded in pharmacies and other retail stores—may shift the locus of some health care employment. Policymakers and health care workforce analysts will need to stay abreast of innovations and market developments.

New Hires and Turnover

New data systems cooperatively developed by states and the U.S. Census Bureau provide a deeper look at employment dynamics, including hiring volume and worker separations. In Connecticut, over 100,000 new hires were reported in 2000 across the four major health care subsectors. In 2009, at the bottom of the economic downturn, some 81,100 hires—or 31 percent of 2008 employment—filled new positions and replaced workers who left the industry. "New hire rates" (2009 new hires as a percentage of 2008 employment) ranged from a high of 51 percent for the social assistance sector to 11 percent for hospitals. The rates were 33 percent for ambulatory health care services and 31 percent for nursing and residential care facilities. These rates reflect a steady increase in the provision of services outside hospitals, shifting hiring activity to the ambulatory care subsector.

The growing proportion of elderly residents will further stimulate hiring in nursing and residential care facilities. However, the growth in long-term care employment will shift somewhat toward home care, a change that is taking shape in Connecticut and the nation. This trend is not apparent using traditional labor market information tools because many home-care nurses are hired as contractors in new business models or directly (and often off the books) by patients and their families in an informal market.

While Connecticut's health care industry reported consistent employment increases over the past decade, significant numbers of workers left the industry each year, contributing to job churning (typically measured as an average of the number of new workers and the number leaving.) In 2000, more than 181,000 workers left the industry, and over 97,000 workers left in 2009. The tough economy in 2009 certainly contributed to higher rates of worker retention across all four subsectors, but recovery should lead to a gradual resumption of the previous level of churning. This will require education and training program providers to not only take account of future demand spurred by new growth but also recognize the relatively instability of the health care workforce as a driver of demand.

Real-time Job Postings

Another way to gauge employment demand is to look at the hiring intentions of employers. Real-time job postings aggregated from the Internet provide an indication of the number of jobs that employers are seeking to fill. For 2010, the four major health care subsectors reported a total of 16,239 job postings (*see Table 4*). Ambulatory health services accounted for 8,531, or over half of total postings; hospitals reported 4,381 job postings, or 27 percent of all postings; nursing and residential care facilities reported 2,538 job postings, or 16 percent of the total; and social assistance reported 789 job postings.

This relatively new data series, which is based on private rather than the traditional public sources of data, provides an innovative means to track employment developments. However, the data must be interpreted with caution: neither all open jobs nor all company recruitment efforts appear in these figures. *(See the occupational analysis sections of this paper for a more detailed analysis of Internet job postings.)*

TABLE 4.
OCCUPATIONAL DEMAND MEASURES:
TOP 30 HEALTH OCCUPATIONS, BY PROJECTED OPENINGS

							Real Time
OCCUPATIONAL GROUP/ OCCUPATION TITLE	2008 EMPLOYMENT	2018	ANNUAL OPENINGS 2008-18	GROWTH	REPLACEMENT	PERCENT DUE TO REPLACEMENT	TOTAL POSTINGS 2010
Registered Nurses	36,715	42,049	1,174	533	641	55%	8,668
Home Health Aides	13,600	18,248	600	465	135	23%	383
Nursing Aides, Orderlies, Attendants	25,835	27,767	450	193	257	57%	647
Licensed Practical and Licensed Vocational Nurses	8,969	9,531	337	56	281	83%	738
Medical Assistants	6,421	7,553	185	113	72	39%	712
Dental Assistants	3,529	4,330	146	80	66	45%	
Pharmacy Technicians	3,303	3,936	146	63	83	57%	156
Dental Hygienists	2,767	3,389	118	62	56	47%	
Emergency Medical Technicians and Paramedics	3,011	3,501	110	49	61	55%	
Physical Therapists	3,727	4,377	110	65	45	41%	2,728
Radiologic Technologists Technicians	2,966	3,364	83	40	43	52%	296

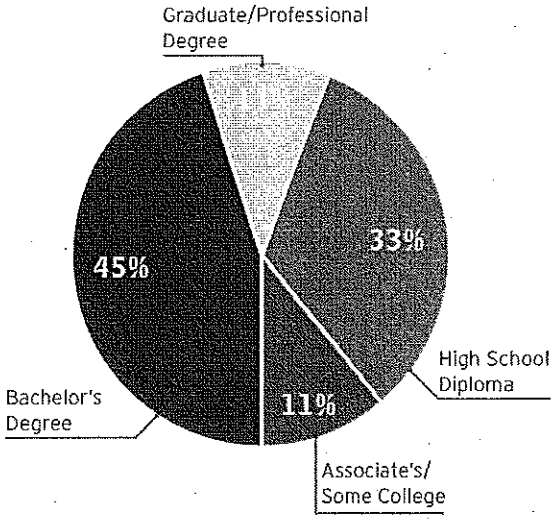
OCCUPATIONAL GROUP/ OCCUPATION TITLE	2008 EMPLOYMENT	2018	ANNUAL OPENINGS 2008-18	GROWTH	REPLACEMENT	PERCENT DUE TO REPLACEMENT	TOTAL POSTINGS 2010
Pharmacists	2,729	2,939	82	21	61	74%	596
Medical and Clinical Laboratory Technologists	2,700	2,981	79	28	51	65%	418
Physicians and Surgeons, All Other	2,793	3,042	74	25	49	66%	707
Veterinary Technologists and Technicians	1,200	1,614	71	41	30	42%	
Physician Assistants	1,592	1,961	66	37	29	44%	704
Occupational Therapists	1,734	1,985	57	25	32	56%	1,612
Massage Therapists	2,368	2,553	51	19	32	63%	199
Medical and Clinical Laboratory Technicians	1,910	2,041	49	13	36	73%	898
Medical Records and Health Information Technicians	1,603	1,741	47	14	33	70%	413
Speech-Language Pathologists	1,482	1,656	44	17	27	61%	662
Surgical Technologists	1,042	1,224	44	18	26	59%	202
Psychiatric Aides	1,675	1,935	43	26	17	40%	
Psychiatric Technicians	1,390	1,438	40	5	35	88%	231
Respiratory Therapists	1,140	1,333	40	19	21	53%	
Dentists, General	1,190	1,250	39	6	33	85%	285
Veterinarians	777	1,027	39	25	14	36%	168
Internists, General	1,238	1,359	34	12	22	65%	
Diagnostic Medical Sonographers	1,071	1,208	30	14	16	53%	180
Veterinary Assistants and Laboratory Animal Caretakers	917	1,099	28	18	10	36%	
Dietitians and Nutritionists	796	794	27	0	27	100%	219

Education, Certification, and Experience Demand

An additional benefit of real-time labor market information generated from job-vacancy postings is the intelligence it provides about requirements in demand behind the sheer occupational numbers. Such data can signal a need for deeper inquiry with employers about hiring requirements. However, there are limitations to the reliability of information about skill requirements, just as with other elements of real-time data. Foremost among the limitations are that only a portion of analyzed vacancies indicate skill requirements at all, and among those that do, requirements are not stated in a standardized way.

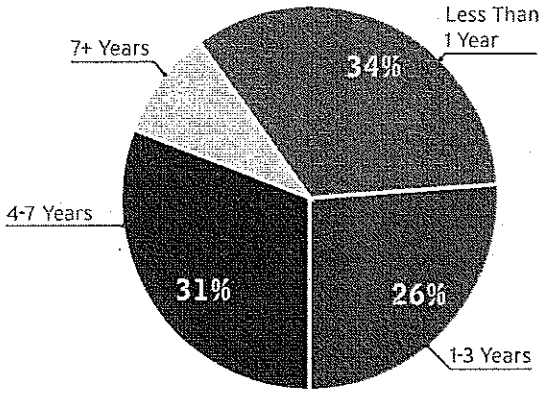
Among the 25,845 "Top 30 Health Care Job" postings reviewed, over 19,000 did not specify education requirements; 16,000 did not specify the years of experience required. Figures 2 and 3 summarize the proportion reported for the job listings that did specify years of experience and education.

FIGURE 2.
EDUCATION REQUIREMENTS FOR TOP 30 HEALTH CARE AND HEALTH CARE SUPPORT JOBS



Total Postings=25,845; Unspecified Education=19,445

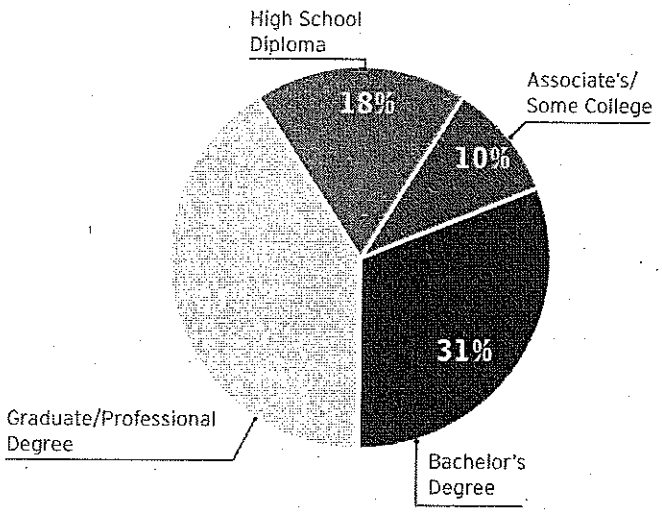
FIGURE 3.
EXPERIENCE REQUIREMENTS FOR TOP 30 HEALTH CARE AND HEALTH CARE SUPPORT JOBS



Total Postings=25,845; Unspecified Education=16,359

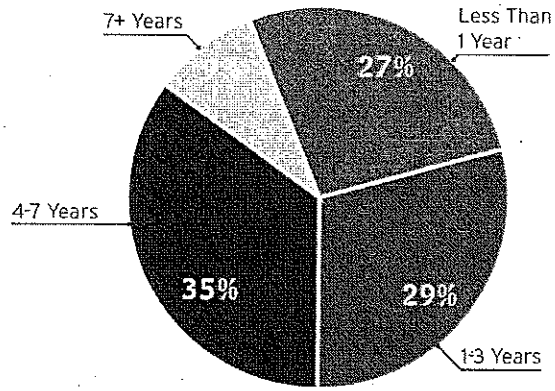
While these numbers may not present great surprises, they suggest some scale of employer expectations for various levels of education and experience. And when contrasted with those for the behavioral health subsector, telling information emerges. The demand for graduate and professional degrees was much larger in job postings for behavioral health positions than for the top health care jobs overall—41 percent versus 11 percent. And fewer of the behavioral health jobs posted were open to workers with less than one year experience than was the case for the top health jobs overall—27 percent versus 34 percent (*see Figures 4 and 5 on page 20*).

FIGURE 4.
EDUCATION REQUIREMENTS FOR BEHAVIORAL HEALTH JOBS



Total Postings=2,655; Unspecified Education=1,501

FIGURE 5.
EXPERIENCE REQUIREMENTS FOR BEHAVIORAL HEALTH JOBS



Total Postings=2,655; Unspecified Education=1,420

Another indication of educational and skills demand that can be extracted from job-vacancy postings come from the certificates and certifications requested (*see Figure 6 on page 21*). These requirements for the top 30 health care occupations in Connecticut reveals a disproportionally high demand for RN certification compared with all other certifications. It also suggests a strong interest in employees with management and supervisory training.

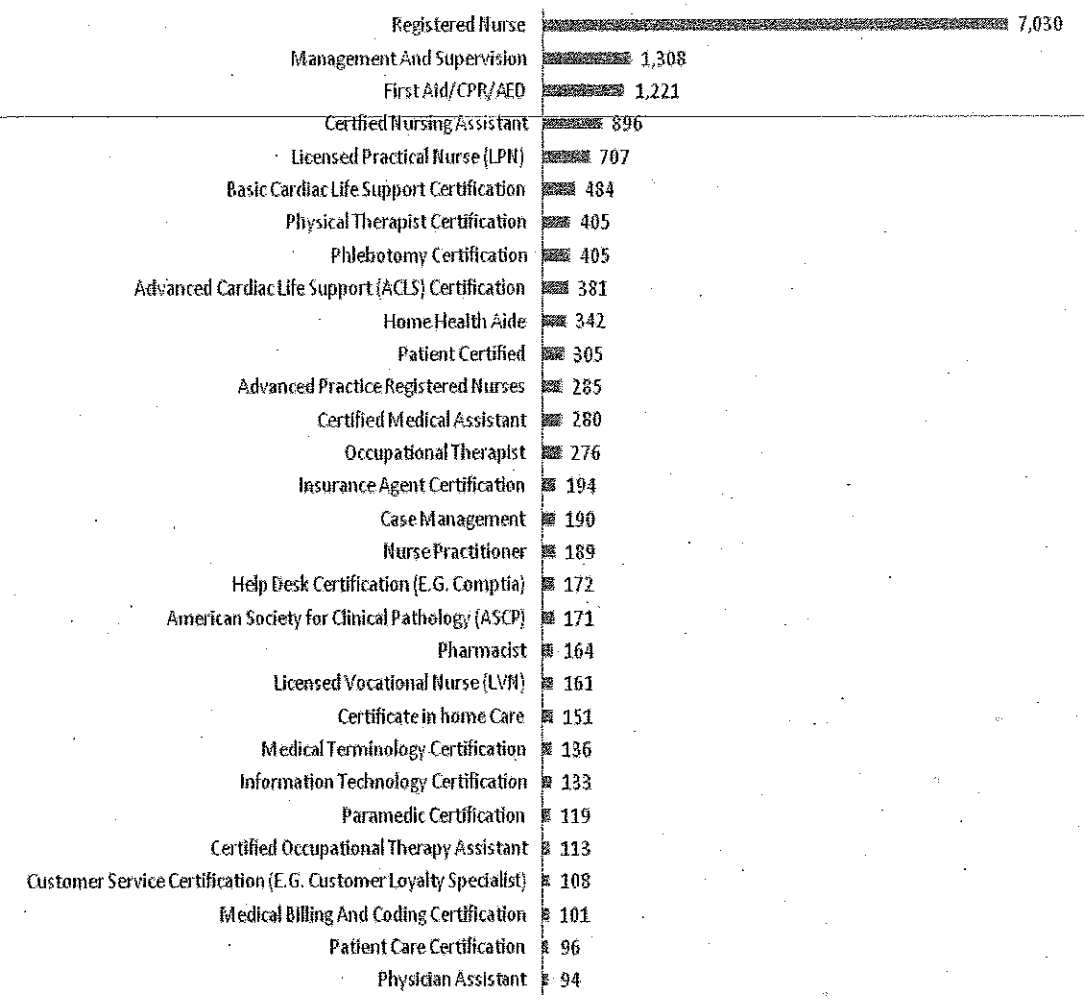
WHAT DO EMPLOYERS TELL US ABOUT DEMAND?

Hospitals

The hospital sector has little unmet demand for workers in most occupations. One of the critical exceptions is primary care physicians. The primary care physician shortage is exacerbated in Connecticut by the state's high cost of living. Some employers report that even when they can attract primary care physicians, it can be difficult to retain them due to the cost of living. Connecticut is also wedged between the Boston and New York health care markets, which are perceived to be higher status and therefore often more attractive to newly trained physicians.

A particular area of concern for many hospitals is that high school and college students are unaware of the full range of occupations in health care. The widespread perception is that health care is only about doctors and nurses, but demand will also increase for staff in allied health occupations. While the latter demand may not rise significantly, many hospitals are concerned about the future availability of

FIGURE 6.
CERTIFICATE/CERTIFICATIONS REQUESTED IN POSTINGS FOR TOP 30 HEALTH CARE OCCUPATIONS



medical technologists to replace retiring employees. Demand for skilled technicians is also anticipated to increase in the areas of sterile processing, radiology, nuclear medicine, respiratory therapy, and X-ray, mammography, and MRI.

Health information technology is an area of workforce concern that will become more important over the next three to five years. Demand will also grow for workers in medical billing and coding positions, which are increasingly integrated within hospitals' IT systems. Currently, many IT workers in health care have come from the nursing ranks. The challenge for the hospital subsector is, in the words of one respondent, "As soon as you train them, they end up working for consulting companies." Not only may a nurse be lost from the bedside, but that nurse may also be lost from the institution where she or he has worked for many years.

A broad area of new occupational demand, and one that is likely to increase significantly over the next three to five years, is that of patient navigator and case manager. As the medical and reimbursement systems become more complex, patients will need professionals who can help them get the care they need. These new positions also will be critical to the ability of hospitals to receive insurance reimbursements for the services they provide. These occupations will require people with project management skills, as well as the ability to work effectively with patients.

Currently, most hospitals train their own employees for IT-related tasks and occupations, primarily staffing them from the ranks of critical care nurses. However, it seems unlikely that enough incumbent workers will transition to new positions to meet the increased demand. Therefore, the development of new methods of training and developing these workers should be a priority going forward.

On the organizational side, many hospitals have begun hiring people with expertise in quality control and process engineering. These workers have the skills to examine how process problems can be reduced and quality increased in the complex medical environment. Demand for such occupations will increase as hospitals begin exploring and implementing new management system practices (e.g., Six Sigma, Toyota). The challenge in developing employees who can take on these jobs is to combine their quality-assurance and process-improvement capabilities with the requisite medical knowledge. This is another area that should be considered for new program development in the near future.

Long-term Care

The workforce demands of the long-term care subsector differ significantly from those of the hospital subsector. The direct care career ladder from Certified Nursing Assistant to Licensed Practical Nurse to Registered Nurse encompasses the vast majority of direct care workers in long-term care. Of these, CNAs are by far the largest group; their recruitment and retention is one of the greatest workforce challenges in this subsector, and will likely remain so over the next three to five years. Turnover is substantial, even in the current economic climate.

Much of the long-term projected demand for CNAs is due to replacing workers who leave their jobs rather than the creation of additional CNA positions. As in every health care subsector, there is substantial economic pressure for every employee to do more with less. It is difficult to get approval for additional CNA positions without a substantial increase in either insurance reimbursement rates or the number of clients served.

The LPN has been the traditional nursing care provider in long-term care. However, this is changing. Few long-term care facilities are intentionally phasing out LPNs, but as LPNs retire or move on to new positions, employers are replacing many of them with RNs. In part, this is due to the increasing proportion of long-term care patients with chronic conditions, which require a higher level of skilled care. In addition, although the pay for LPNs is less, RNs add depth to the staff of a long-term care facility and are more flexible in terms of the services they can provide. Having additional RNs on staff also makes it easier to accommodate their personal scheduling needs and preferences, while still complying with regulatory requirements to have at least one RN on site at all times. One of the key areas of demand for education and training is for bridge programs to help incumbent LPNs become RNs.

"There are more LPNs than we need. The problem is they go from CNA to LPN, but then they get stuck. I wish there were a faster way to go to RN. And it's too bad, because some of the LPNs are better than the RNs."
–Connecticut Long-Term Care Employer

Another area of critical demand in the long-term care subsector is for therapist's assistants, particularly physical therapy assistants and certified occupational therapy assistants. Turnover is high: these positions are well paying, but the people in them do not necessarily feel a sense of allegiance to their employers, given the wide variety of options open to them in facilities and through contract services.

Behavioral Health

A very diverse subsector, behavioral health has significant employment opportunities in the for-profit, nonprofit, and state government sectors. Across all three of these employer types, the occupations that are most difficult to fill require Master's degrees or above. There are many employment opportunities for psychiatrists, occupational therapists, pharmacists, social workers, and psychiatric and other advanced care nurses, and this situation is likely to continue over the next three to five years. Many employers anticipate that demand will rise across the board in behavioral health because of health care reform and the aging of the baby boomers, who tend to be more comfortable seeking out behavioral health services than were their parents.

In addition to filling direct-care positions, finding high-level managers with the requisite certifications and experience is anticipated to be a large challenge over the next three to five years. Asked about the projected demand in critical occupations, one interviewee responded by noting the need to replace "me, my COO, and my CFO. We'll be retiring." Initiatives to train managers and supervisors are common casualties of cost containment. Some employers are instituting mentorship programs to train the next generation of leaders internally. However, staff can be reluctant to take on additional training when it requires taking on additional hours and responsibility without commensurate pay increases.

Ambulatory Care

Ambulatory care encompasses three distinct subsectors with dramatically different skill requirements: community health centers; doctors' offices; and home health care. For community health centers, one of the most significant challenges over the next three to five years will be the development of leadership. Many key leaders are nearing retirement, and it is not clear where their successors will come from. Many of the same issues that community health centers face today will persist. Advanced practice RNs, physician's assistants, nurse practitioners, and family physicians will be among the most difficult positions to fill over the next several years.[17]

In the doctors' offices subsector, two occupations are likely to see significant growth over the next three to five years. The first is primary care physician. As difficult as it can be now to find a primary care physician accepting new patients, it is likely to become more so in the future. The implementation of the Affordable Care Act, with its emphasis on the medical home model, gives primary care physicians an especially central role. The second area of growth will be medical assistant. If the scope of practice for medical assistants is enhanced so they can administer medications, this occupation will see significant growth, and it will come largely at the expense of LPNs, who currently provide the medications and vaccinations

that are a staple of many office practices. This potential change was described as extremely beneficial by several employers in the physician's offices and long-term care sectors. Although no recent changes have occurred, interviewees noted current efforts in the legislature, which merit monitoring.

One of the most significant areas of hiring difficulty in office practices is mid-level management. With increased reporting requirements and issues relating to reimbursement, these responsibilities can no longer be handled by a receptionist. Increasingly, group practices have felt they must pay more attention to the business side of the work. The support occupations needed to keep up with this trend will be in significant demand in the near future.

Another support occupation likely to see significant growth is in the area of health information technology. Regulators are requiring office practices to have IT systems available, but many practices have limited financial and personnel resources to support the technology. Most practices rely on outside vendors for IT support, but this may not be a sustainable expense.

As noted, a critical emerging job is that of patient navigator. Navigators help patients and their families access the medical system and get care across multiple practices, hospitals, and other providers. There are relatively few training programs for this occupation. Most people who become patient navigators have experience in other direct-care occupations, such as nursing or medical assistant. These positions will be in great demand as the medical and reimbursement procedures driving demand for navigation assistance become more complex.

In home health, employment growth is likely to be substantial across all occupations as the subsector expands in response to new state policies. The largest occupational group in the subsector is home health aide, a job that is generally filled by a CNA trained for work in long-term care. In that subsector, CNAs have backup and support from RNs, LPNs, and others CNAs, but this is not available in home health. Therefore, another model of training for home health aides may have to be developed as this sector expands.

An emerging occupation in home health is the personal care assistant. It is challenging to classify the PCA occupation because people hire them in their homes, expecting to train them in the specific activities that need to be done. Connecticut does not have a model training program to develop or certify PCAs. As more and more people receive health care in their homes, it will become more important to develop such a program.

Finally, as noted, there may be a rise in demand for medical assistants in home health if the law changes to allow medical technicians to administer medications. Currently, only LPNs and RNs can administer medications. This is a crosscutting issue that affects all subsectors of ambulatory care.

SPECIAL DEMAND ISSUE: REGISTERED NURSING

For at least two decades and across the nation, the Registered Nursing occupation has been the subject of much conjecture, analysis, and research. The U.S. Bureau of Labor Statistics has consistently projected growth in the nursing job market. Employers frequently have paid substantial bonuses to attract and retain nurses, and many employers have developed in-house training programs to advance incumbent workers from less-skilled care-giving occupations to nursing. Outside training programs have felt pressure to increase their capacity and develop flexible options.

During the current recession, much has changed (as it has periodically in the past). More incumbent nurses who might have retired in better economic times have remained employed, perhaps because of financial uncertainty or perhaps because a spouse has lost a job. Whatever the reason, demand is down for new nurses across the country.

In Connecticut, few employers currently offer signing bonuses to newly trained nurses. Further, employers report they can ask for higher levels of experience in new hires. While most education stakeholders interviewed for this study say their graduates all find jobs, most acknowledge discouraging trends: it is taking much longer than just a few years ago for graduates to find jobs; new graduates often do not immediately move into their preferred positions or into full-time work; and signing bonuses are a thing of the past.

The employment environment for Registered Nurses varies significantly by industry subsector. Hospitals, as the preferred workplace of many newly trained nurses, report they can hold out for higher levels of experience in this time of labor surplus. Hospitals typically require work experience of at least one year (usually in long-term care). Some hospitals report being willing to take on the best new graduates who had done their clinical studies at that hospital, but most require paid work experience. Long-term care facilities report hiring more RNs than they had in the past due to the increased level of care their patient populations now require. However, due to national and state economic conditions, they generally report little difficulty finding the RNs they need. Ambulatory care employers hire relatively fewer RNs than employers in other sectors and generally have had little difficulty finding RNs, most likely due to the appeal of the hours and working conditions. The behavioral health sector, in contrast, has had significant demand for RNs, primarily at the advanced practice and specialty levels. Finding and retaining these highly skilled nurses is—and will likely continue to be—a challenge, as discussed below.

In assessing the supply of RNs, a critical issue is the increasing numbers of nurses being hired in fields outside health care and in non-care-giving roles at health care employers. Insurance and biotechnology are two of the largest non-health care employers of nurses, according to qualitative information provided by key stakeholders. However, we could not confirm these findings due to the nature of the annual nurse registration information available from the Connecticut Department of Public Health. One recommendation for improving the value of labor market information collected is to require that information on industry of employment be provided with each nursing registration. This will enable stakeholders in Connecticut's health care industry to identify the proportion of nurses in non-health care industries and enable them to better predict supply-demand mismatches for this critical occupation.

The issue of nursing "drawdown" from direct care to other occupations is complex. To some extent, this situation is not new. Historically, nurses have moved from direct care to supervisory positions to management positions on a regular basis, but these moves have affected relatively few nurses, and most health care businesses have managed the changes easily. However, the number of health care occupations drawing nurses from the bedside is growing. For example, IT positions, particularly in hospitals, require a strong medical background and the capacity to interact effectively with health care providers—qualifications that experienced nurses are well positioned to meet. As the health care industry moves toward a medical home model and to comply with the requirements to become Accountable Care Organizations, the role of case manager becomes more critical; again, experienced nurses are particularly qualified to fill these jobs.

Although Connecticut's unmet demand for nurses is not "system-critical," there are important reasons to continue to focus on nursing and support the long-term growth of training:

- Demand for nurses remains strong in the state. RNs were the largest single health care occupation advertised for in 2010, with 8,668 postings. The U.S. Bureau of Labor Statistics also projects strong employment demand in this occupation through 2018, projecting over 1,100 annual average openings.
- Demography eventually will become destiny. Currently, the average age of an RN in Connecticut is 47.[18] Even if nurses postpone retirement, they will retire at some point. If the state does not increase the supply of nurses in time, the industry will face shortages.
- Changes in health care practice are demanding both increased numbers of RNs and the training of RNs to higher levels, including advanced practice nurses, Master's degree nurses, and nurse practitioners. As experienced nurses move to these higher-level jobs, demand will increase for nurses at the entry and mid-levels.
- As more nurses are siphoned off from direct care to other positions in health care and non-health care employers, there will be an increased demand for new nurses to fill the gap.

What are the options for Connecticut?

- Maintain—and expand, if at all possible—existing training programs. Because Connecticut is a high-cost-of-living state and faces significant competition from New York and Boston for newly trained nurses, "grow-your-own and retain them" strategies offer Connecticut the best opportunity to meet the projected demand for nurses.
- Examine the possibility of increasing the number of RN training programs, especially in rural areas that have difficulty recruiting RNs, particularly in long-term care.
- Health care employers should work closely with training programs to ensure that new nurses have the clinical and organizational skills required to perform their jobs effectively. The development of nurses from the ranks of the lower-skilled health care workforce will be critical to filling the anticipated demand for RNs.

In the past, there have been many efforts to train CNAs, patient care technicians, and other entry-level caregivers to become nurses. However, health care stakeholders in Connecticut generally have considered these ineffective. It is a long road from an entry-level position to becoming an RN.

The educational barriers to gaining entry into an RN program can be high. LPN-to-RN bridge programs are seen as better options, targeting incumbent LPNs. An LPN has demonstrated the ability to complete one challenging training program and so has a better-than-average chance to succeed in RN training. However, Connecticut stakeholders have seen bridge programs as ineffective as well due to high costs and poor clinical support. Therefore, locally based bridge programs, developed in close cooperation with critical industry stakeholders, will be critical to advancing Connecticut's LPNs to becoming RNs.

EDUCATION LEVELS AND SKILL REQUIREMENTS

The health care industry is unique in that most of the critical occupations have well-defined education, certification, and licensure requirements. However, employers in the most critical subsectors report seeking applicants with skills beyond the minimum requirements. In today's economy, employers can be more selective than usual in hiring for most positions, so they are more able to demand preferred skills—those they report correlate highly with success on the job. Therefore, training and education providers are strongly urged to integrate the development of these skills into their training programs to offer their graduates the best possible chance of getting the job they want.

Hospitals

While hospitals are not experiencing any shortage of applicants for CNA or Patient Care Technician positions, there is a great deal of concern about the skills of newly trained staff and their ability to handle the technical requirements and social roles of the institution. Hospitals find that CNA and PCT candidates often do not understand the reality of their roles when they enter the field and generally require 6 to 12 months experience before they are truly prepared for a hospital job. The limited clinical requirements of CNA training programs, which do not include internships, for example, are seen as insufficient to meet the needs of employers. When workers come from long-term care positions such as home care providers, prospective employers can be skeptical that they desire an acute care environment, when they might simply be interested in the stronger benefits hospitals offer. Another difficulty stakeholders cited was that CNA candidates typically come from a lower socioeconomic level than other hospital caregivers. Many face basic daily challenges, such as being single parents, accessing transportation, and getting to work on time.

A consistent challenge across the vast majority of health care positions is the growing use of information technology. "The need to be able to use technology in your job will go up 100-fold," reported one interviewee. Even for positions requiring less than a college education, the amount of information that must be processed and relayed electronically is huge. Many workers have significant technology skill gaps. Training and education programs should work with employers in all of the critical health care sectors to ensure that the latest IT systems and skill demands are incorporated into education and training at all levels.

Long-term Care

The greatest challenge in the long-term care subsector is that certification requirements do not necessarily guarantee that an applicant has the necessary skills. CNAs face this issue more than any other occupational group in health care. There is broad agreement among long-term care focus group participants that few CNAs are adequately prepared for jobs at nursing homes. A broad spectrum of training leads to certification as a CNA, but there is state and federal standardization only for placement on the CNA registry (nurse aides who work in nursing homes). Many nursing assistants and technologists that are sometimes referred to as CNAs are not required to meet registry standards. So many "CNAs" come to the long-term care with little knowledge of what their jobs will require. They need to be better trained to understand their responsibilities as a prerequisite to receiving certification so that they can make informed decisions about what work is right for them.

Too many entry-level employees and applicants also lack a number of basic workforce and educational skills, such as how to interview for a job and how to fulfill their patient care responsibilities. CNAs and other direct caregivers now require high levels of general and computer literacy in order to complete the paperwork required for health care documentation and reimbursement. This is considered a major weakness among recent program graduates, particularly in long-term care. Skills for clinical tasks that require math, such as calculating mileage or dosages, also are generally lacking. Moreover, customer service skills are increasingly important but are often inadequate in recent graduates. Overall, the skill requirements for all levels of caregivers in the long-term care sector are increasing dramatically, and training programs are struggling to keep up.

Behavioral Health

Many behavioral health occupations require documented levels of education and licensure. However, even with these gatekeeper requirements, employers note the lack of a number of critical skills. Across the board, the number-one weakness is in writing. Writing ability among its employees is critical to the ability of the employer to document services provided, demonstrate care to regulatory bodies, and provide the backup information necessary to obtain reimbursement.

COMMENTS BY BEHAVIORAL HEALTH EMPLOYERS

"If you can't document, articulate, and justify why you're doing what you're doing to a regulatory body or a payer, you're going to be in trouble."

"I would start with writing. We get people who can't write an org [organizational] chart on clients."

"Coming out of college, we get people without a clue about documentation. They need to know how to write a treatment plan."

Another skill often lacking in new hires and candidates for behavioral health jobs is the ability to conduct group counseling effectively. Even at the Master's level, employers have noticed a surprising lack of training on leading and supervising groups and understanding group dynamics. Much of the work of an entry-level clinician centers on group work, so it is essential that these skills be well-developed.

Other weaknesses among many new entrants into the field, according to employers, are the technical skills of developing treatment plans and documenting care in the specialized ways that state agencies and other reimbursement organizations require. Some new employees quickly become disillusioned by the amount of required documentation. This response can only be magnified when they are poorly trained for the task.

Many other skill gaps relate not to technical abilities but to work habits. For example, with the increasing prevalence of the fee-for-service business model, time management becomes more critical, as do productivity and efficiency. Many new entrants to the field are not prepared for a high-pressure work environment, yet employers feel they need to keep the pressure high for business reasons. The challenge of working nontraditional schedules and the demands of clients with more severe and more complex problems than ever before also present challenges to new workers. As one respondent says, "Everyone wants to be a school social worker to get the 9-to-5 [schedule], weekends off."

Ambulatory Care

In the ambulatory care subsector, community health centers face a unique challenge. Many clinical staff are well trained technically and have received the necessary certifications. However, many are also unfamiliar with the community health center model and find it difficult to adjust to this setting. Specific education and skill gaps arise most often among entry-level staff. Reception can be a challenge, for example: these positions require computer skills, customer service capabilities, and often the ability to speak Spanish.

Physician Offices

In physician offices, certification and other regulatory requirements drive education levels and skill standards. A key challenge now, and likely in the future, is transitioning from the educational setting into the real world of providing care. Stakeholders report that, many students coming out of medical assisting programs are not well trained for mid-level occupations. In particular, there is concern that training programs too rarely provide practical experience and that new medical assistants require excessive orientation when they enter the workforce.

Because physician practices report that they run on thin reimbursement levels and at a hectic pace, there is little time to bring new hires up to speed. In general, respondents thought that the state technical schools do the best job of providing medical assisting training. However, some respondents report concern that if the technical schools were put under the control of local school boards, medical assisting programs might be cut to balance local budgets. This would be a significant problem for this subsector. There is also a need for more IT education below the Bachelor's or Master's degree levels.

Home Health Care

In the home health subsector, most care-giving staff have received minimal formal education—usually earning only a high school diploma or less. However, there are substantial skills requirements for workers caring for individuals in their homes on a one-on-one basis. People need skills in both health care and personal service. There is also a need for better training in ethics and in the concepts and skills of person-centered care in general.

TALENT DEVELOPMENT NEEDS FOR INCUMBENT WORKERS

Skill requirements for many of the critical occupations in health care have changed frequently. Recently, this phenomenon has been driven by changes in technology and, increasingly, by changes in reimbursement policies for health care services. New and emerging occupations in health care create additional talent development needs for incumbent workers.

At the entry level, there is a substantial demand for programs that increase the skills of newly trained and certified workers. Across the four health care subsectors that are the focus of this report, employers are in widespread agreement that licensing and certification requirements are no guarantee that workers are adequately prepared to enter the health care workforce. One specific need is to increase students' knowledge about the real-world jobs for which they are training. Too many employees enter health care unprepared for the demands of even entry-level positions. Among the options for programs that would

improve this are enhanced internships, longer clinical rotations, standardized curricula for training CNAs and staff for other occupations, and closer collaboration between training providers with employers.

Nor does the need for training end when newly trained students start their entry-level jobs in health care. Employers agree about the need for ongoing training for incumbent workers, both to bring them up to speed with employer needs and to meet the continuously changing demands of health care occupations. Unfortunately, the lack of funding for this lifelong learning presents a major obstacle. Another challenge is the need to provide—and pay for—substitute caregivers when workers take time off from their regular duties to participate in training.

Changes in technology also drive demand for talent development. In some cases, technology vendors provide training on their products at no cost to employers. Yet even though such arrangements offer clear advantages to employers, they do not address how businesses can afford release time for employees, nor the amount of time it takes for workers to integrate new technology into the regular operations of the facility.

As noted above, three new areas of need for talent development are widely shared across the four critical health care subsectors.

First, the increasing importance of health information technology is transforming the entire health care industry. Full adoption of IT processes includes—but requires much more than—redefining medical billing and coding jobs. It also involves systems that have the ability to share a patient's medical record among many different providers. To work in this emerging area, employees need relatively high levels of both IT and medical skills. Connecticut lacks training programs that would provide workers with both skill sets.

Second, the increasing complexity of the practice and reimbursement systems in health care is making it difficult for many patients to get the care they need. This challenge is leading to high demand for case managers and patient navigators. Currently, most workers in these positions have come from other direct-service health care positions, particularly nursing. However, as the demand for case managers and patient navigators increases, the state will need to establish training programs that develop the specific skills required to fill these occupations.

Finally, as medical systems become more complex, there is a need for process engineers who also have medical expertise to help health care businesses make their systems as efficient and fail safe as possible. Again, Connecticut has no training programs to translate specialized knowledge about process engineering and quality assurance into the health care field.

CAREER DEVELOPMENT AND ADVANCEMENT OPPORTUNITIES

Within health care, the hospital subsector, employing a large workforce encompassing a wide diversity of occupations, has been considered to offer the greatest opportunities for career advancement. The classic example is the movement from CNA to LPN to RN. Many hospitals have invested in programs to help entry-level incumbent workers pursue these career opportunities. However, the economy has made it increasingly difficult to maintain these programs. Hospitals generally have retained tuition-reimbursement and flexible-transfer policies, but the task of obtaining career ladder training has fallen to the individual worker.

A critical element in the implementation of career ladders and career advancement programs is career and education counseling. One hospital reported that a full-time career counselor works with employees who want to develop and advance their careers. The counseling focuses on training workers to become RNs, but other career options are available. However, such support is far from the norm. Like the medical care and reimbursement systems, the education system has become more complex, with a widening variety of training providers offering both traditional and online options. Entry-level workers can find it challenging to navigate these choices, and the presence of career counselors would be a great asset to employees seeking to advance. Community college health career advisors do some of this work, but only a limited number serve the entire state and their funding was ending June 2011.

In long-term care, the traditional career ladder has been the same as in hospitals: from CNA to LPN to RN. But in long-term care; it often has been a greater challenge to get workers to continue to move from LPN to RN. The additional education and clinical requirements have often been daunting, and the LPN position has offered decent pay and benefits. Today, with fewer career opportunities for LPNs, it is more important for people who want to stay in a direct-care career to become an RN. In the absence of interventions, this reduction in the LPN career advancement bridge for CNAs is likely to reduce the ability of incumbent nursing workers to advance.

To advance in nursing overall, entry-level jobs could be followed by jobs requiring a Bachelor's of Science in Nursing. With a BSN, a number of rapid advancement opportunities appear. Overall, the niche that is hardest to break out of is the paraprofessional.

Nonclinical areas offer some growth opportunities. For example, dietary aides and receptionists can advance either within their occupational fields or pursue a clinical track by obtaining CNA certification. Once a person becomes an RN, they have more career options. Certified and experienced RNs can move into management, become staff developers, or pursue a variety of ancillary opportunities.

In behavioral health, career ladders are still more difficult to create for those at lower education levels, although this is not the case for behavioral health staff with professional degrees. A person can work in direct care or become a supervisor without a professional degree, but that is as far as one can go without additional education. After obtaining a Master's degree and licensure, more career opportunities open up. Those who perform well as licensed clinicians often have opportunities to create programs, for example. Many companies groom people at this level for advancement. Many of the focus group employees in behavioral health started out as clinicians and moved up the ladder to management and supervisory positions.

In behavioral health, career ladders truly begin at the Master's level. A critical step in the clinical career ladder is earning a Master's in Social Work, but this can be a long road. One way to shorten the path is to earn a Bachelor's in Social Work, after which it takes just a year to complete requirements for a Master's. The MSW is the ticket to entry-level clinical positions in both the state and private systems. Unfortunately, many incumbent workers are unaware of this potential pathway.

In the ambulatory care subsector, community health centers may offer the greatest opportunity for career development and advancement due to their size and diversity of the occupations. A key entry point into employment at a community health center is reception. Many receptionists want to become medical

assistants, although such a move is not actually advantageous for career development: it is a lateral move, with little room for career expansion. However, receptionists who gain enough skills can become office managers—an area of critical need at community health centers. Social care and case management services coordinators also are natural moves from reception, but they require employees to gain additional education.

The job of medical assistant is considered a dead end, yet many people begin it because they want to be in the medical field and believe it is the only position open in ambulatory care to those without a college degree. Community health centers generally offer tuition reimbursement and a flexible time schedule to assist people in accessing career advancement opportunities. However, the lack of formal, well-developed career ladders makes it important for the individual worker and his or her supervisor to identify career advancement options and pursue those opportunities as best they can. Further development of career ladders within the community health center and ambulatory care subsectors would assist incumbent workers significantly in accessing training and career enhancement opportunities.

Doctors' offices offer relatively few opportunities for career advancement. People who begin as CNAs or LPNs can advance to become RNs. People who enter the field as receptionists can move up to office managers.

In the home health subsector, career ladders and career advancement opportunities are extremely truncated. An entry-level employee can become a supervisor after acquiring experience and perhaps some additional training. Care-giving employees who are trained as CNAs can pursue LPN and RN degrees, but there may be limited options for advancement even with these new credentials. If the scope of practice for medical assistants in any sector were to expand to allow medication administration, that would create an additional career advancement opportunity for entry-level CNAs and home health aides.

PART 2. CONNECTICUT'S HEALTH CARE WORKFORCE SUPPLY

One of the most fundamental challenges confronting policymakers and health care workforce planners is to ensure that an adequate supply of workers is available to meet demand across all occupations. This challenge is extraordinarily complex: the health care workforce is made up of a huge number of occupations requiring an extensive range of knowledge, skills, education, and training. Other factors—including scientific and technological advances, treatment innovations, public policies, and demographic changes—profoundly influence the delivery of health care services and the quantity of workers needed, as well as the specific knowledge and skills required. Monitoring developments in the supply-demand balances of the health care workforce requires a well-defined, consistent stream of reliable information.

HEALTH CARE WORKFORCE SUPPLY IN THE CONTEXT OF DEMAND

In analyzing Connecticut's health care workforce, JFF consulted a number of sources, including the state's departments of Labor, Higher Education, Education (technical high schools) and Public Health. We also drew on a newly emerging source of data: Internet job postings. Combining these and other data sources, as in the illustrative supply-demand matrix in Table 5, can help workforce decision makers examine multiple measures of both demand and supply in one "dashboard."

This dashboard can be constructed using any number of variables for which reliable data is collected, depending on the priorities of the stakeholders who will use it. This illustration selects a small number of key variables organized by standard occupational titles, starting with those for which we expect the largest number of annual openings. On the demand side of this dashboard, we examine employment projections, including projected annual openings and the count of Internet job postings for each occupation. The supply side includes current workers in each occupation, current license holders, and the output from related education and training programs.[19]

As the table shows, the data are incomplete for some occupations, a factor we discuss in our recommendations, along with the need for "cleaning up" the data that do exist. Putting the various data sources side-by side also enables the providers of labor market information to identify areas where more data coordination is needed, as in the differences between IPEDS data collected by the Connecticut Department of Higher Education and TEPS data available on the Department of Labor website. *(See Appendix IV for an expanded supply-demand dashboard.)*

TABLE 5.
ILLUSTRATIVE SUPPLY-DEMAND DASHBOARD

				Real Time	IPEDS	TEPS		
OCCUPATIONAL GROUP/ OCCUPATION TITLE	2008 EMPLOYMENT	ANNUAL OPENINGS 2008-18	PERCENT DUE TO REPLACEMENT	TOTAL POSTINGS 1/10-12/10	DEGREES AWARDED 2008-09	DEGREES AWARDED 2006-07	ACTIVE LICENSES	LICENSEE AVERAGE AGE
Registered Nurses	36,715	1,174	55%	8,668	1,428	1,250	54,834	50
Home Health Aides	13,600	600	23%	383		0		
Nursing Aides, Orderlies, and Attendants	25,835	450	57%	647	422	1,975	21,335	44
Licensed Practical and Licensed Vocational Nurses	8,969	337	83%	738	513	658	12,799	49
Medical Assistants	6,421	185	39%	712	1,053	914		
Dental Assistants	3,529	146	45%		97	229		
Pharmacy Technicians	3,303	146	57%	156		0		
Dental Hygienists	2,767	118	47%		160	111	3,561	46
Emergency Medical Technicians and Paramedics	3,011	110	55%		45	252	13,420	40
Physical Therapists	3,727	110	41%	2,728	109	185	4,446	44

OCCUPATIONAL GROUP/ OCCUPATION TITLE	2008 EMPLOYMENT	ANNUAL OPENINGS 2008-18	PERCENT DUE TO REPLACEMENT	TOTAL POSTINGS 1/10-12/10	DEGREES AWARDED 2008-09	DEGREES AWARDED 2006-07	ACTIVE LICENSES	LICENSEE AVERAGE AGE
Radiologic Technologists and Technicians	2,966	83	52%	296		132	4,029	46
Pharmacists	2,729	82	74%	596	110	202		
Medical and Clinical Laboratory Technologists	2,700	79	65%	418		36		
Physicians and Surgeons, All Other	2,793	74	66%	707			16,648	52
Veterinary Technologists and Technicians	1,200	71	42%		10	17		
Physician Assistants	1,592	66	44%	704	71	77	1,693	39
Occupational Therapists	1,734	57	56%	1,612	54	29	1,966	

Such a dashboard can discourage reliance on one source of demand information, something that busy leaders of programs or institutions may be tempted to do. For instance, in this illustrative model covering a few occupations, note that over 8,000 de-duplicated job postings were identified for Registered Nurses in 2010, while traditional analyses anticipate less than 1,200 openings each year. Even starker opening-versus-posting differences emerge for physical therapists, occupational therapists, and other occupations. Though the measures are very different (future average openings versus advertisements for openings), such differences call for deeper dialogue with employers to determine if this indicates difficulty in recruiting or simply differences in hiring practices or some other factors.

The data in such a supply-demand matrix are dynamic and should be updated regularly. JFF will recommend that health care workforce planners in Connecticut maintain such a matrix in order to aggregate pertinent supply and demand data on critical occupations and to monitor how changing demographics, public policies, and labor market developments are affecting supply-demand balances.

In light of inherent analytical limitations, we offer an important qualification for examining this information: It is not a comprehensive assessment of supply and demand; rather, it is a set of reasonable approximations offered as an illustration. Many additional factors influence supply and demand in the labor market for health care workers. For example, health care practitioners and technical workers are frequently recruited from national and international pools of professionals and schools that qualify them.

Health care support occupations, particularly those at the lower end of the wage scale, tend to draw from local labor markets, which are better represented in this particular dashboard model.

With these limitations in mind, the following highlights important indicators of Connecticut's health care workforce and some of the key occupational needs that can be drawn from the matrix.

HEALTH CARE PRACTITIONERS AND TECHNICAL OCCUPATIONS (STANDARD OCCUPATIONAL CODE 29-0000)

Employment for health care practitioners and technical occupations is expected to increase over 13 percent between 2008 and 2018, from 97,622 to 110,431. Registered Nurses, along with Licensed Practical Nurses and Vocational Nurses, will comprise an estimated 51,580 employees, or nearly 50 percent of the workforce included among health care practitioners and technical occupations. The data suggest strong demand for qualified nurses, with 1,174 projected annual openings for Registered Nurses. Internet job postings for 2010 showed the highest number of job postings for any professional occupation—8,668 postings for Registered Nurses—suggesting a highly active labor market. Further analysis indicates that replacements represent about 55 percent of all demand for new workers between 2008 and 2018. This is not surprising, given that the average age of Registered Nurses with active Connecticut licenses is 50 years old, according to state licensure data.

Supply data on nursing is encouraging, with over 54,000 active holders of Registered Nurse licenses reported for 2010 and 1,250 degrees issued in the 2006-07 school year. However, we expect it will become more difficult to keep up with demand as the rate of retirements rises.

Employment for physicians, surgeons, and other physician specialties is expected to increase between 2008 and 2018, including high rates of replacement demand due to retirements. The average age was 52 for license holders in 2010. Assessing the supply and demand balance for this highly educated and skilled group of professionals is challenging in part because recruiting and training occur on a national and international scale. Internet job postings may understate demand: health care employers may use more active mechanisms to recruit these professionals. However, it is clear that this highly educated and skilled segment of the health care workforce in Connecticut, as throughout the United States, is aging and will need to be replaced in the not-too-distant future.

Given the inherent challenges of all labor market data in health care, it is important to "triangulate" various data sources and employer feedback. In the case of these high-demand occupations, the U.S. Health Resources and Services Administration offers some corroborating intelligence. HRSA data also indicate shortages of three crucial high-skilled health professionals in Connecticut: primary-care physicians; dentists; and mental health providers. While Connecticut's shortages are relatively less acute as a percentage of the population than for the nation overall, figures 7 and 8 (*see page 41*) indicate HRSA shortage measures.

Such indicators of national shortages are also important for Connecticut because the labor market for highly trained professions is more national than it is for lower-paid occupations, and these workers are more likely to relocate across state lines.

FIGURE 7.
HEALTH PROFESSIONAL SHORTAGES, CONNECTICUT, MAY 2010

PRACTITIONERS NEEDED TO MEET THE NEED FOR PRIMARY CARE PROVIDERS

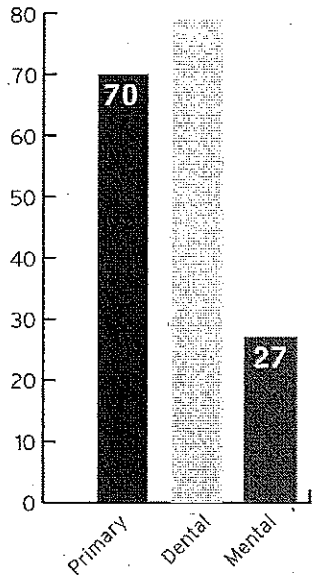
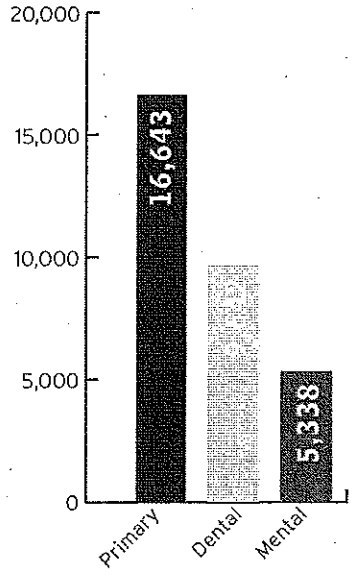


FIGURE 8.
HEALTH PROFESSIONAL SHORTAGES, UNITED STATES, MAY 2010

PRACTITIONERS NEEDED TO MEET THE NEED FOR PRIMARY CARE PROVIDERS



HEALTH CARE SUPPORT OCCUPATIONS (SOC CODE 31-0000)

Employment in health care support occupations is expected to increase by nearly 10,000 workers between 2008 and 2018. Home health aides, nursing aides, orderlies, and attendants made up nearly two-thirds of the 60,000 workers in this occupational sector in 2008. With a growth rate of 15 percent for these occupations between 2008 and 2018, it will be challenging to ensure a trained and qualified supply of workers for Connecticut. Low pay and stressful working conditions will make it increasingly difficult to fill these jobs, especially as the economy recovers and overall employment demand picks up. There is considerable turnover and churning in this labor market, despite data showing training output equivalent to total employment numbers, along with a lower average age for license holders in these occupations. As Connecticut's workforce ages along with the general population, it may become more problematic to keep up with constant demand for new employees to fill these occupations.

CURRENT SUPPLY/DEMAND MISMATCHES

Currently, the worst supply/demand mismatch is for primary care physicians. Nationally and in Connecticut, the education system produces fewer primary care physicians than the health care system needs to hire. This situation is likely to worsen as health care reform, with its emphasis on primary care, is implemented. While the development of Quinnipiac University's new medical school may help address this issue to a certain extent, changes in funding and reimbursement systems will be needed to expand the primary care physician workforce. Currently, specialist services are reimbursed at much higher rates that primary care services. When doctors are in training, their mounting student loan debt often forces them to reconsider their initial decision to pursue primary care medicine in favor of more lucrative specialty practice. If reimbursement practices are changed to bring primary practice reimbursement into closer alignment with specialty practice, then more physicians may go into primary care practice. Without this change, there will likely continue to be a primary care physician shortage.

Currently, there is little supply/demand mismatch for Registered Nurses, but demand will increase as the economy recovers and the nursing workforce ages. It is not clear that the current supply system in Connecticut can meet that future demand. This situation will only be exacerbated by the increased pressure on LPNs to get their RN degrees. There is also pressure on Associate's-degree nurses to complete their BSNs. Therefore, it is important to maintain the existing nursing programs—and to augment them if at all possible, particularly at a Bachelor's-degree level.

For allied health programs, the economic climate has alleviated some supply/demand mismatches. However, as the economy recovers, employers expect to face difficulties in finding enough physical and occupational therapy assistants, radiologic technicians, and other technicians. The level of potential supply for these occupations appears barely able to meet current demand. The current supply system is likely to fall short if demographic changes and improved access to health care through health care reform increase demand for health care services.

Supply/demand mismatches also arise in newly emerging occupations. Many health care stakeholders feel that the state's education system has been slow to respond to demand in the area of health information technology. There are no formal training programs in this area. Employers are faced with training their own staff to meet these needs, which only shifts the demand. The education system should work closely with health care employers and vendors over the next year to develop training programs that meet the increasing demand for IT training.

Similarly, little training is available for the case manager/patient navigator position. Currently, the most common place where health care employers send their staff for training and certification for these occupations is the Harold P. Freeman Patient Navigation Institute in New York City. However, this represents a substantial expense. Having a local option for such training would be beneficial. The demand for case managers and patient navigators will only increase as health care reform is implemented.

HEALTH CARE OUTPUT OF CONNECTICUT'S EDUCATION SYSTEM

Connecticut health care stakeholders cite the state's rich educational system as one of its primary strengths for preparing the sector's workforce. The university system includes many elite institutions and medical training facilities. The community colleges cover the array of traditional health care professions at the pre-baccalaureate level and have systematically developed articulation agreements in their health care training fields. Until recently, the state's K-12 education had long outpaced the nation as a whole in student testing, and it has devoted important resources to both youth and adult health career training.

THE TECHNICAL HIGH SCHOOL SYSTEM

At the secondary level, the Connecticut Technical High School System offers a health technology career track for high school students, as well as adult health care training programs at six high schools across the state. For the 2009-10 academic year, 480 adults completed training for six occupations, with the vast majority concentrating on the state's LPN course. Over 600 students completed a concentration on medical careers as part of their high school degree education (*see Table 6*).

TABLE 6.
CONNECTICUT TECHNICAL HIGH SCHOOL SYSTEM HEALTH CARE TRAINING, 2009-10

ADULT PROGRAM COMPLETERS	
Dental Assistant	59
Dental Laboratory Tech	10
Home Health Aide/Certified Nurse Assistant	19
Licensed Practical Nurse	326
Medical Assistant	28
Surgical Technician	38
YOUTH PROGRAM COMPLETERS	
High School Medical Careers Education Concentrators (Youth)	622
TOTAL	1,102

POSTSECONDARY INSTITUTIONS

At the postsecondary level, Connecticut institutions awarded 5,090 health-related certificates in the 2009-10 school year, a figure that has increased each year since 1990-2000 (*see Table 7 on page 40*). Not only has the total number of all degrees risen over the period, but the share of degrees in health- and fitness-related majors has increased, rising from 10 percent to 13 percent of all degrees.

TABLE 7.
DEGREES AND CERTIFICATES COMPLETED AT CONNECTICUT COLLEGES AND UNIVERSITIES, BY YEAR

YEAR	ALL DEGREES	HEALTH AND FITNESS	PERCENT OF TOTAL
1999-2000	29,757	2,979	10.0%
2000-01	29,687	3,053	10.3%
2001-02	30,498	3,150	10.3%
2002-03	32,499	3,118	9.6%
2003-04	33,659	3,411	10.1%
2004-05	34,582	3,631	10.5%
2005-06	35,694	3,928	11.0%
2006-07	36,045	4,033	11.2%
2007-08	36,634	4,301	11.7%
2008-09	38,047	4,661	12.3%
2009-10	38,912	5,090	13.1%

SOURCE: Connecticut Department of Higher Education, www.ctdhe.org/info/pdfs/2010/2010DegreesConferredReport.pdf

Strong growth in graduate output has also occurred for the critical occupational area of nursing (see *Table 8*). Associate's and Bachelor's degrees awarded in nursing rose from 594 in the 2000-01 academic year to 1,202 in 2009-10. The Department of Higher Education expects these completion numbers to increase even further because of added programs and increased enrollments.

TABLE 8.
COMPLETIONS OF NURSING DEGREES ASSOCIATE'S AND BACHELOR'S DEGREES AT CONNECTICUT HIGHER EDUCATION INSTITUTIONS, 2000-10

CLASSIFICATION OF INSTRUCTIONAL PROGRAMS DESCRIPTION	IPEDS CLASS	2000-01	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
REGISTERED NURSING, NURSING ADMINISTRATION, NURSING RESEARCH AND CLINICAL NURSING (51.38)	Associate's degree	249	354	510	554	541	571	532
	Bachelor's degree	345	485	544	593	577	632	670
	TOTAL	594	839	1,054	1,147	1,118	1,203	1,202

SOURCE: Connecticut Department of Higher Education Completions Database
CIP codes are all mapped to 2010 and listed at the four-digit level.

Though the growth in nursing graduate numbers look strong in relation to the annual openings forecast by the Connecticut Department of Labor for 2008-18, employers suggest, and the assessment team concurs, that careful attention should be paid to this balance. In addition to a history of swings in demand, many factors affect the transfer of training output to the supply of nurses. For example, not all program completers will work in the field for which they train or remain in state upon acquiring certification. Many find the working conditions more challenging than expected and drop out, and many employers express a preference for experienced nurses over new graduates.

LEVELS OF HEALTH CERTIFICATES AND DEGREES

Health-related degrees and certificates awarded in Connecticut can also be broken out by the level of training required. IPEDS data indicate how many certificates were awarded at each level in the last two academic years (*see Table 9*).

TABLE 9.
CONNECTICUT HEALTH-RELATED CERTIFICATES AWARDED

	2008-09	2009-10
Postsecondary award, certificate, or diploma of less than 1 academic year	293	459
Postsecondary award, certificate, or diploma of at least 1 but less than 2 academic years	22	55
Associate's degree	1,212	1,209
Bachelor's degree	1,471	1,541
Post-baccalaureate certificate	28	85
Master's degree	925	898
Post-Master's certificate	86	93
Doctor's degree–professional practice	422	520
Doctor's degree–research/scholarship	39	36
TOTAL	4,498	4,896

SOURCE: IPEDS data

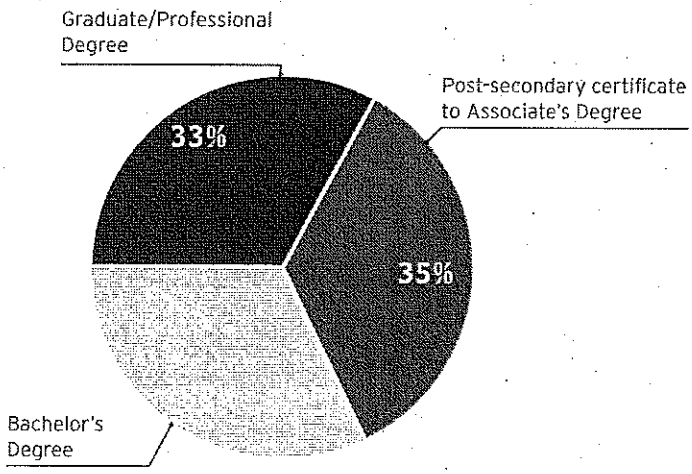
Grouping these certificates into three primary levels–postsecondary certificate to Associate's degree; Bachelor's degree; post-baccalaureate studies–the output of the levels are almost evenly matched (*see Table 10 and Figure 9 on page 42*). While educational demand requirements as indicated in job postings is a very imperfect measure, a quick comparison suggests deeper inquiry into the appropriate balance of Associate's, Bachelor's, and graduate degrees, as well as, among other things, the bridges between Associate's and Bachelor's degrees.[20] For example, a far greater percentage of job postings required a Bachelor's degree (45 percent) in 2009-10 than either an Associate's/some college (11 percent) or a graduate/professional degree (11 percent).

TABLE 10.
CONNECTICUT POSTSECONDARY HEALTH GRADUATES

	2009-10
Postsecondary Certificate to Associate's Degree	1,723
Bachelor's Degree	1,541
Graduate/Professional Degree	1,632
TOTAL	4,896

SOURCE: IPEDS Data

FIGURE 9.
CONNECTICUT HEALTH-RELATED CERTIFICATES AWARDED, 2009-10



SOURCEe: IPEDS data; Table 10.

GENDER MAKEUP OF HEALTH PROGRAM GENDER MAKEUP OF HEALTH PROGRAM COMPLETERS

Over the past two academic years, about 7,000 more women than men received certificates in health-related fields, or, stated differently, women earned about 80 percent of all degrees awarded (*see Table 11*).

TABLE 11.
HEALTH CARE DEGREES AWARDED, BY GENDER

2008-09		2009-10	
MEN	WOMEN	MEN	WOMEN
885	3,613	884	4,012

SOURCE: IPEDS data

Although certificates awarded are skewed toward women, this reflects the gender balance of the workforce in each health care subsector. In Connecticut's health care and social assistance subsector, 80 percent of the workforce is female, and there is only small variation in the industry subsectors (*see Table 12*).

TABLE 12.
HEALTH CARE DEGREES AWARDED, BY GENDER AND INDUSTRY SUBSECTOR

INDUSTRY SUBSECTOR	TOTAL	WOMEN	MEN	PERCENT WOMEN
621 Ambulatory Health Care Services	79,187	64,496	14,691	81%
623 Nursing and Residential Care Facilities	61,219	48,700	12,519	80%
622 Hospitals	56,217	43,992	12,225	78%
624 Social Assistance	43,580	35,224	8,356	81%
TOTAL 62 HEALTH CARE AND SOCIAL ASSISTANCE	240,203	192,412	47,791	80%

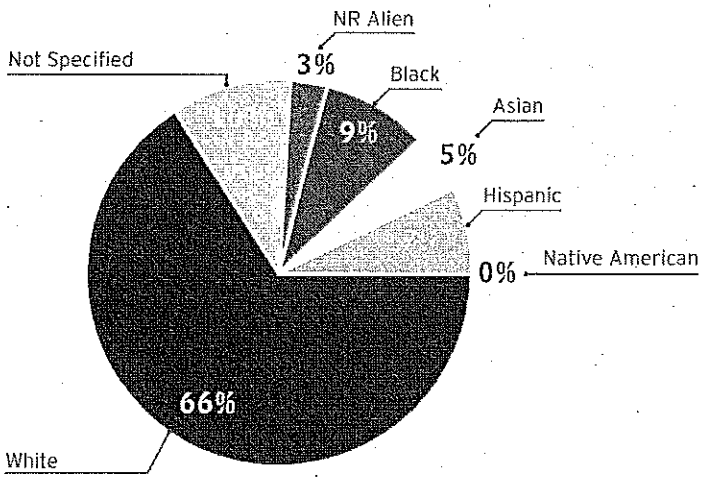
SOURCE: http://lehd.did.census.gov/

It should be noted that these data do not indicate that equity has been reached in health care occupations. While minority enrollment in professional programs has increased in the last 20 years, women and minority workers remain over-represented in lower-paying and lower-status occupations.[21] Nearly half of medical school students are women, yet most female physicians are concentrated in family specialties. And minority medical students are more likely to anticipate working in organizations and areas that provide services to underserved populations.[22] Working in specialties that focus on family services or underserved populations reduces income potentials compared to providing private or specialized services.[23]

RACIAL MAKEUP OF CONNECTICUT HEALTH PROGRAM COMPLETERS

Among Connecticut health-related program graduates, 66 percent were white in 2009-10 (*see Figure 10 on page 44*). Black graduates were 9 percent of the total, and Asian graduates represented 5 percent, both within 1 percentage point of their representation in the state population. Non-resident, foreign-born citizens represented an additional 3 percent of completers, while Native Americans and other racial groups made up the remainder of health care graduates.

FIGURE 10.
HEALTH CARE DEGREES AWARDED, BY RACE



The area of concern that emerges in looking at this aspect of the labor supply is that Hispanics accounted for just 7 percent of health-related graduates. This proportion is far short of the 13.4 percent they represented in Connecticut's 2010 population. Given the state's general population needs and the expected expansion of health insurance coverage, the gap in the supply of culturally competent practitioners may grow, particularly for those with Spanish language fluency.

LEADING SUPPLIERS OF HEALTH WORKER SKILLS DEVELOPMENT

Table 13 (*see page 49*) lists the higher education institutions that awarded health-related certifications over the past two academic years. The University of Connecticut, Storrs is the largest provider of health degrees, although Goodwin College, Yale University, Quinnipiac University, Fairfield University, the University of Bridgeport, Gateway Community College, St. Vincent's College, and Western Connecticut State University added the largest numbers of graduates from the 2009 to the 2010 academic year.

BARRIERS FOR ENTRY INTO EDUCATION AND TRAINING PROGRAMS

Students confront a number of barriers to entry into education and training programs for health-related occupations.

First, weak math, science, or English language communication skills delay or prevent many students from entering training programs, particularly those such as nursing that have waiting lists. Many students end up trapped in developmental education courses for semesters or years before they can get into training.

TABLE 13. CONNECTICUT HEALTH DEGREES AWARDED, 2008-10, BY INSTITUTION

INSTITUTION	2009-10	2008-09	PERCENT CHANGE
University of Connecticut, Storrs Campus	783*	670	17%
Quinnipiac University	568	510	11%
Yale University	509	437	16%
Goodwin College	424	280	51%
Southern Connecticut State University	264	253	4%
Gateway Community College	211	185	14%
Sacred Heart University	210	199	6%
University of Hartford	195	198	-2%
Naugatuck Valley Community College	173	162	7%
Fairfield University	162	119	36%
University of Bridgeport	158	130	22%
Capital Community College	156	156	0%
Norwalk Community College	99	120	-18%
St. Vincent's College	97	71	37%
Western Connecticut State University	97	75	29%
University of New Haven	95	109	-13%
Saint Joseph College	94	82	15%
Manchester Community College	84	95	-12%
Central Connecticut State University	75	77	-3%
Middlesex Community College	66	57	16%
Housatonic Community College	65	65	0%
Tunxis Community College	63	60	5%
Quinebaug Valley Community College	51	48	6%
Briarwood College	48	51	-6%
Three Rivers Community College	48	75	-36%
Northwestern Connecticut Community College	36	26	38%
Graduate Institute, The	27	54	-50%
Asnuntuck Community College	19	12	58%
Albertus Magnus College	12	6	100%
Charter Oak State College	7		
University of Connecticut Health Center*	*	116	-100%

** The University of Connecticut combined reporting for all campuses including the University of Connecticut Health Center, under the Storrs campus beginning in 2009-10. The UCHC awards degrees only in dentistry (51.0401) and medicine (51.1201). In 2009-10, there were 115 completions in medicine and dentistry at the UCHC. Thus, UConn Storrs' total would reduce to 668 if separated.*

*** Charter Oak, an online degree-aggregating college, offers over 40 concentrations inside of the liberal arts degree. However, those are not classified as majors and thus not recognized as programs.*

As a result, they spend much of their financial aid and other resources simply preparing to begin the core coursework.

Second, many prospective students face challenges in finding time to pursue additional education. Workers in some positions in health care, such as CNA, often work more than one job to make enough to support their families. Yet, over the long run, people in entry-level, low-wage occupations are the ones who most need education to move ahead, and a high proportion of employees in these roles are single parents. For many people, particularly parents, balancing work-life issues can be a serious barrier to pursuing further education, even for those who earn a decent wage working one job.

Third, obtaining financial resources to enter training is a challenge. Most employers reimburse workers for job-related tuition expenses, but these programs often do not support developmental education, which is a barrier to getting into degree and certificate programs. Even people who wish to take classes that are eligible for tuition reimbursement may not be able to pay the upfront cost of tuition and books. Where feasible, tuition advancement programs would help to address this problem.

Finally, an indirect barrier can be that many people, whether currently employed in health care or not, may be unaware of the diversity of occupational opportunities in the sector. They might be under the impression that health care is mainly about doctors and nurses and overlook the sector's many other in-demand career opportunities. A good marketing program to high schools and postsecondary institutions could help to improve knowledge of the variety of opportunities.

OTHER SUPPLY FACTORS

THE CHALLENGE OF AN AGING WORKFORCE

Connecticut's workforce is aging, a phenomenon that is particularly challenging for the health services industry. Ambulatory health care services reported that 31 percent of the workforce in this subsector was under the age of 34 in 2000, and nearly 40 percent was over the age of 45. By 2009, workers over age 45 comprised nearly 50 percent of all workers in the subsector. For hospitals, 28 percent of workers were under the age of 34 in 2000, while 40 percent were over the age of 45, but by 2009, workers over the age of 45 again represented 50 percent of all workers. Similar trends characterize the workforce in nursing and residential care facilities and the social assistance subsector.

The health care sector is expected to continue to grow and will need more workers to provide vital health care services. Planners will also need to increasingly focus on the aging workforce issues. Aging baby boomers will retire in greater numbers with each passing year, leaving behind not only jobs that need to be filled but expertise, knowledge, and competence that need to be replaced.

REGIONAL SUPPLY AND DEMAND DIFFERENCES

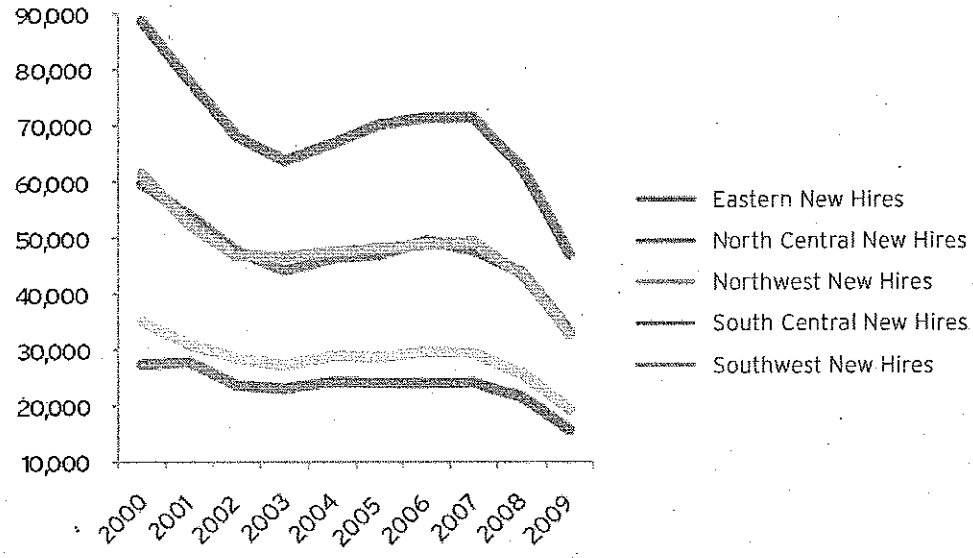
Although Connecticut is geographically small, there are differences among its major regions and among its rural, urban, and suburban areas when it comes to supply and demand in the health workforce. These differences merit further research by Connecticut workforce leaders who face regional planning needs.

Some of the necessary regional interview and focus group research with employers is underway by the Connecticut WISH team. As context, we provide initial elements of the intelligence available from JFF' employer interviews and from the data below.

Overall, total employment is significantly weighted toward the North Central workforce region of Connecticut, with a base of approximately 550,000 jobs until the recent recession. The Southwest and South Central regions are second and third, respectively, at between 325,000 and 380,000 jobs each over the past decade. The Northwest region reached just over 220,000 jobs in 2008, and the Eastern region had 180,000 just before the recession took full effect.

The regions have had fairly stable employment over the decade, but all five have faced a downward trend in annual new hires since 2000 (*see Figure 11*). And each has been especially hard hit since 2007, with over 20,000 fewer annual new hires in the North Central region in 2009 compared to 2007.

FIGURE 11.
ANNUAL REGIONAL NEW HIRES



While total employment differs in each WIB region, so does the share of health care employment as a percent of the total (*see Table 14 on page 48*). Average employment data for 2009 suggest that while their health care jobs are absolutely fewer compared with the North Central Region, health care played a bigger role in the economy of the South Central region and slightly more yet in the Northwest region.

TABLE 14.
HEALTH CARE SHARE OF EMPLOYMENT, CURRENT EMPLOYMENT DATA, BY WIB AREA, AVERAGE Q1-Q4, 2009

	SOUTHWEST	NORTH CENTRAL	NORTHWEST	EASTERN	SOUTH CENTRAL
Total Employment in WIB Area	347,711	531,963	204,466	170,264	328,313
Health Care & Social Assistance	48,926	79,632	38,152	25,162	57,294
HEALTH CARE AS PERCENTAGE OF TOTAL EMPLOYMENT	14.1%	15%	18.7%	14.8%	17.4%

The real-time data on 2010 job postings give another indication of how regional differences manifest themselves in the current economy (*see Table 15*). As might be expected by virtue of its overall employment, the North Central region had the largest absolute numbers of unduplicated health care job postings. However, as a share of total job postings, the Eastern, South Central, and Northwest areas had larger concentrations of advertisements in health care. As always, the job-postings data are not a final statement of demand, but in this case they suggest that health care may play a more important role in employment recovery in the smaller regions, even if the absolute job numbers are lower.

TABLE 15.
HEALTH CARE SHARE OF DEMAND: REAL-TIME JOB POSTINGS CURRENT EMPLOYMENT DATA, BY WIB AREA, 2010

	SOUTHWEST	NORTH CENTRAL	NORTHWEST	EASTERN	SOUTH CENTRAL
Total Postings in WIB Area	71,404	86,250	22,154	12,476	30,783
Health Care & Social Assistance	6,906	11,563	3,943	3,742	6,060
HEALTH CARE AS PERCENTAGE OF TOTAL POSTINGS	10%	13%	18%	30%	20%

In addition to scale and share differences, the types of jobs in demand in each region also differ. According to the Connecticut Department of Labor's Training and Education Planning System, some health care occupations were included among the top 13 occupations projected to be "Hot Jobs" in all regions. However, there was a fair amount of variation. Note that the Hot-Jobs rankings differ from rankings based solely on the quantity of jobs: they also take into account some elements of job quality (particularly wages). These Hot Jobs were based on a combination of weighted factors, including current employment, projected employment growth rates, and wages among other criteria.

Registered Nurses were the Hot Job with the most annual projected openings in all five regions for 2006-16 (*see Table 16*).[24] The South Central and Northwest regions listed four additional health occupations in their top 13, while the Eastern region listed only Registered Nurses. The South Central region was unique in listing two behavioral health occupations among its top Hot Jobs.

TABLE 16.
"TOP JOBS" IN HEALTH CARE, 2006-16, BY WIB REGION

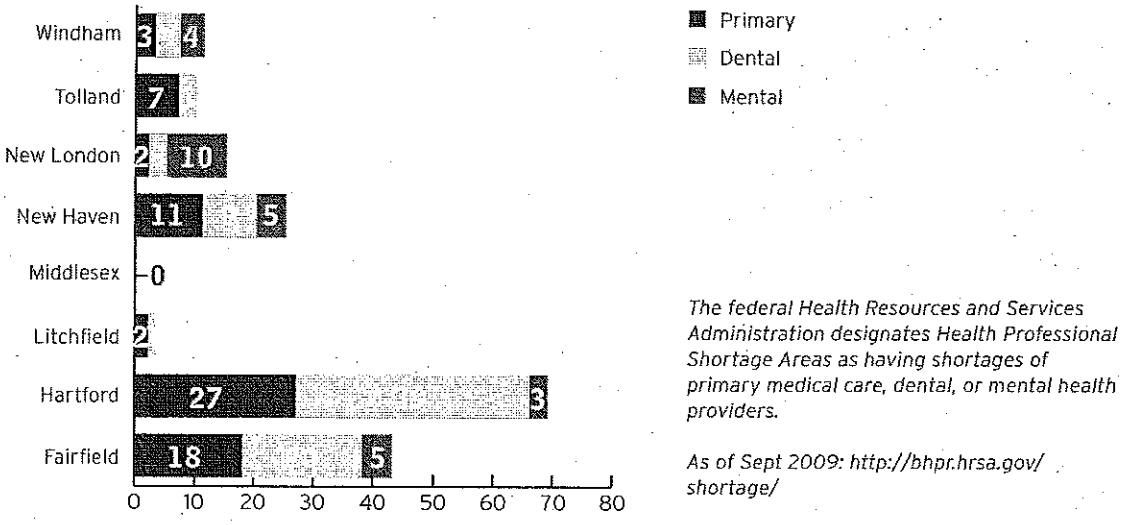
	2006-16 ANNUAL PROJECTED OPENINGS	HOT-JOB RANKING
North Central		
Registered Nurses	354	11
Home Health Aides	109	5
Personal & Home Care Aides	80	3
Northwest		
Registered Nurses	154	1
Home Health Aides	54	5
LPN & LVN	51	6
Personal & Home Care Aides	45	9
Medical Assistants	34	10
Eastern		
Registered Nurses	107	4
South Central		
Registered Nurses	279	4
Personal & Home Care Aides	66	7
Medical Assistants	47	8
Mental Health and Substance Abuse Social Workers	33	12
Mental Health Counselors	28	13
Southwestern		
Registered Nurse	219	13
Personal & Home Care Aides	74	4
Medical Assistant	46	7
Pharmacy technicians	35	10

SOURCE: http://www1.ctdol.state.ct.us/lmi/forecast2006-2016/nwopen.asp

Employers cite additional regional differences in demand and more marked differences in supply. Such regional dynamics also intersect with differences between urban and rural labor markets. Some employers in the Eastern and Northwestern regions note that their distance from popular metropolitan areas makes it more difficult to attract some workers, including entry-level workers.

The Health Resources and Services Administration provides another source to examine shortages of primary care physicians, dentists, and mental health providers by county. Figure 12 indicates HRSA estimates the gap between expected population needs for primary care physicians, dentists, and mental health doctors and the number of professionals available in each county. Based on HRSA shortage measures, only Middlesex County has an adequate supply of these professionals, and Hartford and Fairfield counties far outstrip other areas in size of the gaps, although this is in the context of relatively large populations.

FIGURE 12.
HEALTH PROFESSIONAL SHORTAGES BY COUNTY, CONNECTICUT, MAY 2010



The federal Health Resources and Services Administration designates Health Professional Shortage Areas as having shortages of primary medical care, dental, or mental health providers.

As of Sept 2009: http://bhpr.hrsa.gov/shortage/

Beyond these professional shortages, regional differences affect hiring at lower skill levels. Some employers in long-term care and other subsectors view their competition for low-skill workers (e.g., CNAs) to be broader than the health care industry alone. This means, for example, that health care employers in the Eastern region see potential candidates and even current employees choosing to work in the growing casino sector instead, where wages are similar but shift hours are less demanding.

Employers in urban regions cite special challenges regarding the supply of entry-level workers. Large numbers of the potential urban workforce appear to live in concentrated areas of poverty and low educational attainment. This affects basic technical skills, social supports for consistent attendance, and employability skills for those with little exposure to working peers. This urban-rural-suburban dynamic should be considered in the regional research to follow this assessment.

PART 3. STRENGTHS AND GAPS IN THE EXISTING SYSTEMS

Connecticut's capacity to monitor, understand, and respond to supply and demand challenges in the labor market for skilled health care workers depends upon reliable and accessible information systems. In addition, the state's ability to analyze long-term trends and the many new developments affecting demand depends upon elements of the education and delivery system that affect the pipeline, as well as partnerships between educators and health care employers and the partnerships with other important stakeholders at the state and regional level.

CAPACITY TO PRODUCE HEALTH CARE WORKFORCE SUPPLY AND DEMAND DATA

When analyzing Connecticut's health care workforce, JFF found an extensive array of data describing supply and demand factors across the spectrum of occupations and related training programs. However, we found no single or comprehensive, ongoing measure of supply or demand for all occupations. Too many factors influence occupational supply and demand for most individual stakeholders to track on their own. And monitoring some factors requires assistance beyond state lines. Most lower-skill/lower-wage health care occupations draw workers from state and local labor markets, so incumbent workers and new entrants that come through local training programs are identified in current state data systems. However, most professional and technical occupations are recruited through regional, national, and even international recruiting strategies. Thus, occupational mobility for health care professionals makes the determination of absolute supply and demand indicators difficult to determine.

On the whole, the Connecticut Department of Labor has done impressive work in assembling the various data sets and series describing industry and occupational employment related to the health care industry and occupations. The Department of Higher Education maintains counts of enrollments and completers across the various postsecondary programs supplying the health care industry. Further, by joining these employment, education, and training supply data sets, the Department of Labor's Office of Research has

sought to calculate supply-demand indicators in order to identify where critical occupational shortages might appear. The Department of Labor's Training and Education Planning System (TEPS) is a well-organized resource for projecting demand based on a series of traditional labor market data sources. It has a robust website that makes these data accessible to users on an industry, occupational, regional, or state basis and that enables researchers to customize tables for particular needs.

JFF did find that data generated through professional licensing and certification processes were less well developed or less accessible: Connecticut relies on other states to capture important information on the supply of workers in key occupations, including vital demographic data about license holders. Nevertheless, Connecticut is well on its way to creating a practical health care workforce planning information system with the currently available data sources and analytics. We recommend that more attention be given to licensure and certification data as a critical source for workforce planning and analysis.

Connecticut also conducts specialized research on various subsectors of the health care workforce. The Connecticut Workforce Collaborative on Behavioral Health provides a strong example in its recent report, *Career Pathways in Behavioral Health*, and the Connecticut State Medical Society has commissioned detailed surveys and analyses to address challenges presented by the shortage of primary care physicians. In addition, the Connecticut Hospital Association regularly surveys its members (most of the state's hospitals) on workforce and other issues.

However, more needs to be done to assemble, integrate, and distribute data on Connecticut's health care workforce. We recommend the creation of a health care workforce portal, a place where those seeking information about this powerful sector of the economy could find data, analytical tools, and research. Such a portal should be designed with the active participation of users, including representatives from industry and professional groups, educators and training professionals, workforce experts, research analysts, and policymakers. It is discussed in more detail in the Recommendations section of this report.

EDUCATION AND TRAINING

Connecticut health care employers, researchers, and other stakeholders cite the state's educational system as one of its primary strengths for preparing the health care workforce. In addition to the state's high-quality public and private universities, Connecticut's community college system annually trains people in nursing, numerous allied health professions, and some health care support occupations. The state's technical high school system is an important educator of LPNs and medical assistants. Generally, the quality of graduates of these systems is rated very high. Connecticut also has an extensive network of proprietary schools that provide training for LPNs, CNAs, allied health professionals, and health care support staff. The Allied Health Workforce Policy Board's annual legislative report details the array of these resources thoroughly.

At the same time, stakeholders and workforce supply data indicate that the state's talent development pipeline faces several challenges.

THE TALENT PIPELINE

From a long-term pipeline perspective, scores on the National Assessment of Educational Progress suggest that Connecticut ranks relatively high in educational performance, but it no longer leads the country in K-12 mathematics and reading (as it had in the early 1990s). Larger percentages of Connecticut high school graduates reportedly require remedial coursework when they enter college, while many other high school students drop out and enroll in adult education programs instead of graduating with their peers. In 2010, the State Board of Education summarized student achievement as remaining flat since 2002. Moreover, literacy levels appear to be declining, and achievement gaps between whites and other racial groups have grown in recent years.[25]

These trends affect the health care workforce pipeline in two ways.

First, many students who struggle in school or drop out turn to health care jobs that have relatively low entry requirements (e.g., CNA), require short-term training, and appear to be in relatively abundant supply. Many of the academic problems that such school-leavers face are exacerbated by economic and social circumstances that affect their success in the workforce. With little exposure to expected work behaviors and few emotional or practical supports, they struggle to meet the demands of typical work shifts in health care. Such challenges, combined with their lower academic skills and credentials, slow their entry into further education once employed, and thus their advancement to higher-skilled health careers.

Second, many high school graduates are unprepared to meet the requirements for entering the postsecondary training that is the common path to higher skills and wages in health care. Half of Connecticut State University's first-year students and 80 percent of community colleges' first-year students test into remedial math or reading. These students are less likely to graduate college than their peers who enter with solid basic skills. The result is that only one of every four Connecticut ninth graders will earn a college degree. While this rate is better than the national average, it will need to increase significantly to help the state meet the growing employer demand for workers with postsecondary credentials.

Employers find themselves unsure of what skills a particular certified CNA can offer because of the varying level and quality of skills development among CNA training programs. Some courses last only two weeks, while others are considerably more comprehensive. Programs also offer varying levels and amounts of clinical experience and employer engagement. Employers, particularly in long-term care, cite the challenge they have in orienting new CNAs to the day-to-day demands of the workplace. Intensifying and standardizing CNA training would be helpful to both employers and program graduates who are seeking employment.

HIGHER EDUCATION

Connecticut's institutions of higher learning are graduating growing numbers of people from their health care programs (*see Part 2*). Such growth brings challenges, and changes in demand are likely to accelerate. This makes it important to vigilantly monitor and adjust the direction of higher education's growth in health care programs. As one employer puts it, the current capacity to meet demand should not let us "fall asleep at the wheel." For example, it will be important to monitor the long-term demand for RN training, as well as the capacity of higher education to meet it.

More broadly, the state should examine the mix of levels of higher education output in relationship to demand. Connecticut's output of sub-baccalaureate, baccalaureate, and post-baccalaureate certificates and degrees are almost evenly spread, but job-posting data suggest further inquiry into whether this distribution matches demand. A far greater percent of job postings required a Bachelor's degree (45 percent) than either an Associate's degree/some college (11 percent) or a graduate/professional degree (11 percent). This could indicate a need to help more students bridge from certificates or Associate's degrees to Bachelor's degrees.[26]

While some employers highlight exceptional relationships with higher education institutions, insufficient employer engagement in training programs is a common problem. Most programs have employer advisory groups, but many of the employer stakeholders we interviewed and who participated in focus groups feel they could not convey all that they seek from program graduates in the time available. Several employers echo the sentiment that educators have too little time off campus to understand employer needs. As discussed further below, training and education providers should consider working with employers to develop new ways to deepen their engagement.

Finally, many training and education programs find it difficult to hire staff with sufficient practical and clinical experience. Students need real-world, internship-type experiences to help them prepare for the work in which they will engage, and faculty from industry are one important link to that. It should be noted that although the dearth of faculty is often seen as the root cause of health worker shortages, interviewees for this assessment did not express it as a strong theme.

HOW EDUCATION AND WORKFORCE STAKEHOLDERS MONITOR DEMAND

Despite the wealth of labor market research to be found in a variety of sources and in recent health care workforce studies in Connecticut, few education providers interviewed report using such data regularly to predict demand. There are notable exceptions, particularly among large public institutions, but those institutions also most often report encountering impediments to responding quickly to the results of such research. Smaller institutions, which are seen as having more flexibility to respond, generally focus on anecdotal employer feedback and student demand for particular kinds of training in order to set program directions.

Some educators conduct research on occupational demand using data from Connecticut Department of Labor projections and from statewide industry associations, such as the Connecticut Hospital Association and the Connecticut League for Nursing. State community colleges report conducting customized feasibility studies that integrate such data with employer feedback when planning more novel program expansions, particularly those funded by the federal government and requiring demand research.

Yet many of the educators interviewed do not conduct any rigorous research on occupational demand. Instead, they rely on student registration data and informal conversations with employers to determine the need for new or continued study programs. Some solicit demand predictions from advisory boards on a quarterly basis. The smaller organizations typically do not review occupational growth data to estimate

market demand for their graduates or particular skills courses, even occasionally. While they consider such research valuable, these educators feel they have little time to conduct it and do not know which data sources would most help them reliably predict changes in market demand.

Gateway Community College and Charter Oak State College, which provides in-person and online courses from Connecticut institutions and a national network of trainers, were cited as academic institutions that are more responsive than most to employer needs. However, many employers report a perception that higher education generally is unaware of the health care sectors' special skills needs. Even when employers consider colleges to be aware, they find them slow to respond. State policies and procedures tend to corroborate this assessment. For example, the Connecticut Board of Governors' academic approval process requires at least nine months to make decisions on course proposals.[27] In this regard, the proprietary schools view the Affordable Care Act as providing opportunities for their growth because of their capacity to adapt quickly as the legislation drives occupational and employment changes.

Overall, the Department of Higher Education approved 17 new degree programs and 1 certificate program in the health sciences in 2009, significantly fewer than in previous years, perhaps reflecting awareness of the slowdown in worker demand. In 2008, the state approved 31 new health sciences programs.

EMPLOYER ENGAGEMENT AND COLLABORATION

Health care employers often face challenges in recruiting and developing workforce talent. However, many such challenges have lessened in intensity during the current economic climate. Some incumbent workers who might otherwise have expected to retire have chosen to continue working. People with skills that are in demand who might otherwise have been tempted to move from company to company have been more likely to seek stability and remain with their current employers. This makes it especially challenging to determine what tactics will work best for health care employers who seek to recruit, develop, and grow their workforce talent as the economy improves. Some guidance comes from the focus groups and stakeholder interviews regarding current recruitment and talent development methods and projected opportunities going forward.

Generally, Connecticut's health care employers have invested little in workforce development during the economic downturn. In interviews, many employers in all four health care subsectors recognize that this strategy will not succeed over the long term, and they identify investments they are making or plan to make to help their workforces to remain competitive.

HOSPITALS

For the hospital sector, a great deal of investment has continued in the recruitment and development of workforce talent in critical occupational areas. The recruitment of primary care physicians receives the largest investment in terms of dollars spent, according to hospital employers we interviewed or who participated in focus groups. There will also continue to be substantial investment in the recruitment of Registered Nurses even though the employers did not report critical shortages in those areas.

Hospitals traditionally make substantial investments in developing their workforces. While this trend appears to have receded slightly during the economic crisis, hospitals still make major investments. The training and initial orientation of physicians, nurses, and allied health professionals is a six- to eighteen-month process requiring substantial investments in both technical training and orientation to the processes and cultures of each hospital. This investment is cited as an absolute requirement. There also have been investments in training incumbent workers to take on new roles and new responsibilities in response to reimbursement and technology changes. One of the most commonly cited examples is training Registered Nurses in the use of new electronic medical records and other health information technology so they can oversee the implementation of electronic medical record systems over the next several years.

Investments in incumbent worker training designed to move people up career ladders or provide additional options along enhanced career lattices vary considerably from hospital to hospital. One traditional area of growth and advancement has been for incumbent workers at the CNA level to move through the allied health professions up to LPN or RN positions. At various times, several employers interviewed have had formal programs aimed at helping these workers advance to the much-needed RN positions. Many of these programs have been cut back, but all employers continue to offer tuition reimbursement (and in some cases tuition advancement) aimed at assisting workers at all levels to advance and potentially help hospitals meet shortages in critical occupations such as nursing.

NURSING AND RESIDENTIAL CARE FACILITIES

Employers in the long-term care subsector face an ongoing challenge in recruiting frontline workers, particularly CNAs. Turnover has declined in recent years, but it is still substantial and requires significant investment in outreach and recruitment. Employer investments in this subsector generally aim at providing new CNAs with a substantial but short-term orientation to their roles and responsibilities. More than half of the employers in this subsector offer tuition reimbursement for their employees, but few offer on-site training opportunities beyond short-term workshops. These workshops primarily focus on regulatory requirements rather than providing additional skills that would enable people to advance. Employers in this subsector more than any other cite a challenging economic climate—not just in general but also in their industry due to low reimbursement rates—as a substantial barrier to investing more in developing workforce talent.

BEHAVIORAL HEALTH

Recruiting is an ongoing challenge in the behavioral health subsector as well. One employer reports going "anywhere and everywhere" to search out new staff. Many behavioral health employers have affiliations with medical schools where interns and residents do rotations and get to know the employer. Some hospitals hire up to 90 percent of their needed staff through this process. Companies place ads on the major career sites, on their own websites, in major medical journals, and even on Craigslist. In some cases—for example, for recruiting Advanced Practice Registered Nurses—the situation has become desperate enough for employers to use costly recruiting firms. The most productive method for some employers has been getting current staff to return to school to develop the skills and gain the certifications and licensure required for higher-skilled jobs.

The behavioral health subsector is particularly challenged in making investments for incumbent mid-level workers, with a substantial amount of internal training required to meet licensing and reimbursement requirements. Employers acknowledge the importance of providing opportunities for incumbent workers to gain additional education. This is particularly important in a sector where a graduate degree is a requirement for advancement to positions that pay family-sustaining wages. However, most employers in this subsector operate on tight budgets. Employers report they would be eager to make investments in their workers if they had an adequate funding or reimbursement source.

AMBULATORY CARE

There are substantial differences among the three major areas of the ambulatory care subsector in terms of engagement in recruiting and developing workforce talent. Community health centers offer the greatest opportunities for both the employment and the development of incumbent workers. In part, this is due to the fact that community health centers see themselves as both health care providers and also as community-based organizations dedicated to serving the communities from which most of their employees come. Community health centers face similar challenges to hospitals in the recruitment of primary care physicians, nurses, and other professionals. However, even greater than their recruiting concerns is the issue of retention for these professionals. Because they do not offer competitive wages, community health centers are disadvantaged with respect to their competition with other health care sectors for highly qualified professionals.

In doctors' offices, recruiting generally occurs through advertisements online and in local papers. Recruiting for primary care physicians is the most challenging. Some employers in this subsector offer tuition reimbursement for employees seeking education to develop their careers. Almost all employers provide workshops and other training, both in house and through vendors and other outside organizations. These workshops generally focus on regulatory requirements and changes in health insurance and Medicare and Medicaid reimbursement requirements.

Overall, it seems clear there are substantial untapped opportunities for employers in the critical health care subsectors to deepen their engagement with the education and training community and the public workforce investment system. At the community college level, most if not all programs have employer advisory boards, and many rely on health care employers to serve as clinical or internship sites. However, many employers cite a need for increased communications and engagement with community colleges to ensure that graduates are better prepared to begin work on day one of their new jobs.

For proprietary schools, most employer engagement is informal and often centers on recruiting students. Several employers specifically cite lack of engagement as a problem in hiring graduates of proprietary schools. Lack of engagement is particularly a problem for programs producing graduates in occupations that do not require state licensure. When licensure is required, the licensing process itself documents the achievement of a reasonable standard of competence on the part of graduates. When licensure is not required, it is more challenging for employers to verify that the standards that they require of new employees are being met. Increased engagement between employers and training school staff and instructors could help address this issue.

In terms of internal resources invested in training, health care employers face serious challenges. Citing changes and uncertainty in reimbursement practices, employers report having a hard time making substantial investments in training for career advancement. Yet most employers make large investments in training aimed at meeting regulatory requirements or developing the skills needed to utilize new, in-demand technologies. This is a bit of a paradox since the health care industry has a tradition of helping employees move up to better jobs that are in demand. Overall, this appears to speak to the need to increase resources devoted specifically to longer-term training for incumbent workers, given that most in-demand occupations require at least an Associate's degree.

REGIONAL HEALTH WORKFORCE PARTNERSHIPS

The extent of regional workforce partnerships bringing together health care employers and economic development stakeholders varies across the state but appears low overall. Economic development and business associations in regions with higher-profile health care institutions generally appear more likely to recognize the importance of health care to economic growth. In the Southwest and North Central regions, larger concentrations of health employers and large, high-visibility health care employers provide a stronger environment and leadership for collaboration.

In the South Central region, the New Haven Economic Development Corporation, for instance, recognizes health care as extremely important to the economy, although it has focused on the hospital support subsector and biomedical research and development. In the past year, the EDC has established relationships with many health care (and biomedical) employers, with a focus on hospital and medical support services, such as customer service and billing services, laboratory services, and diagnostic support services. EDC also partners with New Haven's regional Workforce Investment Board, the Workforce Alliance, to develop sales and marketing training for entry and low- to intermediate-level workers. This has been mainly for biomedical companies but will be extended into health care.

The Business Council of Fairfield County has initiated numerous initiatives to support the health care industry, although mostly with a focus on issues other than workforce development. However, the "One Coast, One Future" economic integration initiative, a consortium with the Bridgeport Regional Business Council, has supported job growth in health care as well as a Health Care Workforce Initiative to develop a strategic workforce plan to strengthen the competitiveness of the region.[28] Both business councils are concerned about the problems of course-credit articulation between colleges (a challenge that affects career training and advancement), as well as shared scheduling systems for clinical placements to improve access to clinical experiences.

Health Care Councils have been formed by other regional business and economic development groups, but these primarily center on preparing for expected policy reforms and their potential impacts on non-health care employers. Some regional leaders report that health care typically is not high on the radar screen of economic development stakeholders as a growth industry, and it tends to be a low priority with economic developers in Connecticut in comparison with insurance and university employers. These leaders suggest that a marketing campaign to economic developers about the wide variety of jobs health care creates, and the multiplier effect of hospital and nursing home spending locally, would raise its profile as an industry and as a major employer.

A similar recommendation from a long-term care employer focus group is to support more true partnerships among workforce investors, educators, and employers. The participants in the group note that employers and even educators typically do not know what workforce system resources exist or what the system is.

STATE PARTNERSHIPS

At the state level, the Allied Health Workforce Policy Board recently inventoried a number of current initiatives that address Connecticut's pipeline and workforce shortages.[29] Many of them focus on partnerships among education institutions, such as the Department of Higher Education's career pathway and transfer initiatives in health-related fields that resulted in articulation agreements among the Connecticut Community College System, the Connecticut State University System, and the University of Connecticut. Other state-level initiatives address partnerships among postsecondary and secondary institutions and workforce organizations. Such collaborations are improving career guidance, engaging high school students in STEM and health career studies, and providing young people with scholarships, retention services, and exposure to health care workplaces and mentors.

Many of the state-level initiatives engage employers as advisors, and partnerships led by Workforce Investment Boards necessarily consult employers as board members. However, most of these connections appears to occur through local or regional partnerships between colleges and health care providers. State officials recognize that partnerships are best implemented at those levels. In contrast, state-level engagement of employers is most common in strategic planning—for example, in collaboration with the Allied Health Workforce Policy Board or the Connecticut Employment and Training Commission. Some stakeholders suggest that these bodies do a good job of studying the issues, but in order to begin implementing major strategies, they must now gain more visibility for findings and engage additional partners. A number of important studies have assessed various aspects of the health care workforce and offer useful recommendations that require political will, particularly in the current financial climate.

Connecticut continues to enjoy numerous resources and initiatives to build its capacity and address some of the challenges above. Many of those are enumerated in the Connecticut Allied Health Policy Workforce Board's recent policy brief on the health care workforce and other targeted studies summarized in that report.[30] To build further on that work, the Recommendations section of this report highlights additional capacity building to coordinate and enhance what stakeholders currently do and to make additions that address particular gaps.

PART 4. RECOMMENDATIONS

JFF's research, interviews, and focus groups yielded a number of critical findings about Connecticut's health care workforce and its challenges and opportunities, leading to a set of key recommendations emerging from the investigation.

WORKFORCE CHALLENGES AND OPPORTUNITIES

PRESSURES ON DEMAND AND SUPPLY

While health workforce shortages have diminished, employment in the sector will continue to grow in response to several long-term drivers of labor demand, particularly Connecticut's aging patient population. At the same time, the state will be further pressed to keep the supply of health workers on pace because of the aging worker population, the outmigration of young adults, and flat or declining student achievement in the long-term pipeline. As a result, certain staple occupations (e.g., nurses, primary care physicians) will remain crucial to nurture as overall demand continues expanding.

TECHNOLOGY AND BUSINESS MODEL INNOVATIONS

Not only is the size of demand increasing, but the type of demand is shifting based on a set of recent powerful dynamics. Technology advances and health care changes are creating demand for emerging occupations in health information technology and patient navigation. The workforce will also require new skills in traditional occupations: many existing jobs will require greater skills in using technology, solving problems, and managing customers.

MULTIFACETED CHANGE AND THE NEED FOR INSTITUTIONAL RESPONSIVENESS

The first two challenges will combine with significant shifts in health care legislation and intense budget pressures to both accelerate change and heighten uncertainty. Joining these pressures will be the perception among many employers that their local training and education providers are insufficiently responsive to current workforce demand or to changes in it. The level of communication between employers and education and training institutions is lower than would be desired for responsiveness, and academic institutions face barriers to acting quickly when they do encounter changing demand.

COORDINATION OF COMPLEX CHALLENGES AND RESOURCES

Connecticut possesses many valuable resources and initiatives for health care education and training. The state has a large number of strong institutions, and recent efforts have laid a foundation for shared planning and action. However, these institutions have yet to adequately coordinate their workforce preparation strategies. The major sectors of the state's health care industry face some shared workforce challenges that call for collaborative action. Yet the presence of some challenges unique to each sector and regional differences also creates needs for independent action. Unique challenges may need to be addressed in sector approaches but linked in umbrella efforts that address cross-sector challenges.

EASE AND CONSISTENCY OF MARKET ANALYSIS

The many sources of health workforce information are not coordinated in a way that supports complete analysis or shared understanding and strategy development. The departments of Labor, Higher Education, and Public Health, as well as other public and private institutions, maintain data systems that are integrated to some extent but not adequately. Standardization and quality control issues affect the interoperability of data systems for frequent comprehensive analyses. There is no funding for collecting or using new sources of information, like real-time labor market information, or to gain insights, "cross check" assumptions, and monitor rapid change.

RECOMMENDATIONS

JFF's recommendations center on building Connecticut's capacity to continuously monitor, understand, and strategically respond to the state's growing health workforce demands, which are accelerating in their pace of change. In Appendix II, we include recommendations specific to key stakeholders in order to convey many of the valuable insights that employers and others in our focus groups and interviews shared during the course of this assessment.

ORGANIZE HEALTH CARE WORKFORCE DATA FOR EFFECTIVE ANALYSIS AND PLANNING.

To ensure access to high-quality, affordable health care for Connecticut residents in the years ahead, public and private institutions providing services must be able to staff critical functions and services with well-prepared professional, technical, and support workers. An effective balance of supply and demand must be maintained for the hundreds of occupations that comprise the health care workforce. Maintaining

this complex balance will require coordination, communication, and planning among employers, professional groups, legislators, licensure bodies, and education and training providers.

As JFF analyzed Connecticut's health care industry, it became apparent that state agencies are making considerable efforts to systematically collect important information related to the supply and demand of the spectrum of occupations in this vast sector. However, our efforts to assemble this critical information in one place required intensive labor in the absence of a clear road map or central data repository to guide our search.

Furthermore, we discovered a number of excellent research efforts focused on Connecticut's health care workforce issues. Such studies should be inventoried and made readily accessible to those focused on health care workforce issues.

Fragmentation of and impediments to collecting data and research on the health care workforce constrain planning. Workforce-related investments need to be guided with sound data and research if Connecticut is to maintain the supply-demand balance essential for an effective health care delivery system.

We recommend the construction and maintenance of an Internet-based health care workforce portal to permit efficient and effective access to health care workforce information, including:

- Employment and wage data;
- Occupational projections;
- Real-time job postings data;
- Licensure and certification data;
- Education and training supply (program of study of enrollments and completions); and
- Compilation of health care workforce research studies.

Given the vital importance of this sector, along with the critical near-term workforce challenges confronting it in Connecticut, ongoing monitoring of workforce data developments is essential. We recommend a modest investment in—and the assignment of a lead agency to spearhead—a coordinated information strategy that would serve the needs of many public and private decision makers who need to make choices and investments related to the health care workforce. Sustainable funding to make those modest investments is also critical for improved consistency in both the data and to encourage consumer use in decision making.

DEEPEN EDUCATOR ENGAGEMENT WITH EMPLOYERS TO SPEED RESPONSIVENESS.

Given the rapid change and uncertainty facing health care employers and educators alike, they must rely on each other to keep up with shifting skills needs. Employer feedback indicates that education institutions are addressing many of their traditional workforce needs yet lack resources to understand and respond quickly to specialized and evolving skills demands. Because technology and health reform will accelerate changes in demand, educator-employment engagement is a strategic capacity-building need for Connecticut.

Elements of this capacity building include:

- Support education institutions to speed the process of approving and launching quality new programs of study to meet new demands.
- Rapidly evaluate, based on the employment outcomes of graduates, courses that have been approved on a "research and development"-level.
- In tandem with expanded practical experience, promote the use of online learning that accesses national resources for responding to new demand and capitalizes on technological advances.
- Explore and identify the effectiveness and market-responsiveness of institutional governance, organizational, and staffing structures. Identify strategies that existing institutions could incorporate.
- Design and maintain systems to regularly monitor real-time data in order to gain new insights, cross-check this assessment's assumptions, and monitor rapid change in emerging occupations and skills in demand, as suggested in the Health Workforce Portal recommendation.
- Build training on a Health Workforce Portal, enabling education institutions, planners, economic developers, students, workers, and career counselors to use the analysis and tools in making decisions.

BUILD CAPACITY FOR BROADER COLLABORATION.

JFF's assessment supports the Allied Health Workforce Policy Board's recommendations to develop a health care workforce plan that identifies targets for in-demand occupations and to post a workforce scorecard on a public website. An addition suggested by some employers is to shift the focus of state collaborations toward strategy consolidation and advocacy for resources to implement such plans. This would require high-level facilitation and consensus-building support, as well as engaging additional advocates during implementation planning.

One set of advocates to include are economic and business groups with broader agendas for investment and job creation. As such, economic developers, chambers of business, and other employer associations have unique connections to employers and potential synergy with health care workforce initiatives. However, economic development stakeholders do not currently place a priority on health care jobs commensurate with its employment levels and contributions to the Gross State Product.

- Consider an information campaign to highlight the importance of the sector to economic development stakeholders.
- Engage with economic developers and business leaders (beyond strictly health care employers) in strategic planning for the growth of the health care sector as well as industry clusters that share related workforce needs (e.g., health information, insurance, biomedical lab and diagnostic services).
- Involve economic growth stakeholders in developing the shared information portal for the health care workforce. The coordinated information strategy would educate stakeholders on the potential of this workforce and demonstrate potential uses in other industries.

APPENDIX I RECOMMENDATIONS TAILORED TO PARTICULAR STAKEHOLDERS

EDUCATION AND TRAINING PROVIDERS

- Ensure that all training providers have the maximum possible flexibility to tailor training programs to the needs of working adults, including evening, part-time, and weekend options.
- Create additional programs that train people reflecting the linguistic diversity of the communities being served, particularly as home health care accounts for an increasingly large portion of the health care landscape.
- Continue to invest in raising student achievement in general to keep the pipeline strong, but also address literacy gaps between white and minority students.
- Encourage education and training providers to work with public workforce stakeholders in order to ensure that students have the support services (e.g., transportation, child care) they need to complete programs and enter employment.
- Maintain the priority on employability skills for entry-level workers, given that employers express widespread problems maintaining consistent work attendance.
- Monitor and strengthen CNA training programs to ensure that completers meet employer standards, not just minimum requirements. A more comprehensive training program with a longer clinical component will better prepare candidates for the work that they will be expected to do on the job, particularly in long-term care.

NURSING LABOR MARKET STAKEHOLDERS

- Maintain nurse training programs, particularly those serving long-term care, even though there is no current shortage of nurses. It will face one when the economy improves. The state cannot afford to close programs, as happened with LPN programs.

- Increase the emphasis on training for advanced practice nursing. This will be the focus on demand for nurses, particularly by hospitals.
- Encourage local programs for training nurses because the Connecticut catchment area for nurses is regional.
- Enhance the system for recruiting and retaining nurses. Because Connecticut is a high cost of living state, many nurses start out here and then leave after a few years.
- WISH stakeholders should continue to monitor nurse education hiring requirements to ensure that nursing education in Connecticut remains responsive to employer needs. It is not clear whether or not Associate's degree nurses will continue to have strong levels of employment opportunities, as some employers indicated a strong preference for Bachelor's degree prepared nurses.

AMBULATORY CARE SUBSECTOR

- The workforce investment system should consider encouraging the development of specific curricula and certifications that meet the needs of home health industry. The demand for home health workers is likely to increase significantly, mostly through contract or 1099 workers.
- Increase the scope of practice of medical assistants to administer medicine (especially vaccinations), thereby increasing their employment opportunities and the viability of some physician's practices. (However, this could also decrease the number of LPNs employed in this sector.)[31]

NURSING AND RESIDENTIAL CARE SUBSECTOR

- Maintain nurse training programs, particularly those serving long-term care, even though there is no current shortage of nurses. It will face one when the economy improves. The state cannot afford to close programs, as happened with LPN programs.
- There will be strong demand for occupational therapy and physical therapy assistants, particularly because physical therapists must have Ph.D.s. Some of these assistants will be employed by homes directly and some by contract agencies.
- Give special consideration to the evolving role of the LPN in long-term care.[32]
- Rethink the career advancement options for entry-level staff in the subsector, which generally lacks career ladders.
- Improve pay, preparation, and retention support (e.g., child care, transportation, life planning) of CNAs in the private sector.
- Monitor faculty supply and demand on a data driven basis as demand for new nurses rebounds and modulates over the long term.

HOSPITALS SUBSECTOR

- Employers should work with community stakeholders and education and training providers to develop pipelines for bilingual health care staff. Bilingual staff, particularly bilingual nurses, will be in great demand and there is a need to increase the supply.

- There needs to be a variety of enhanced training options for Associate's degree nurses to get their Bachelor's degree.
- Identify a funding mechanism to support the training and retention of health information technology staff. Currently, when hospitals train them, consulting companies quickly hire them away.
- Promote enhanced preceptorships to integrate new nurses as experienced nurses retire.

BEHAVIORAL HEALTH SUBSECTOR

- Behavioral health training programs at all levels should develop closer relations with employers to ensure that training programs address their practical needs as well as the requirements established by licensing and credentialing bodies.
- Upgrade the state's IT capacity and create electronic medical records to lessen the administrative responsibilities of clinical behavioral health care providers.
- Explore options to address the salary disparity between state and private providers for clinicians at all levels.
- Explore the development of graduate school options targeted to upgrading the skills and credentials of incumbent behavioral health workers.
- Enhance loan relief to behavioral workers serving the most disadvantaged populations.

APPENDIX II ORGANIZATIONAL PARTICIPATION IN INTERVIEWS

ASSOCIATIONS

Connecticut Association of Health Care Facilities
Connecticut Association of Nonprofit Providers
Connecticut Assisted Living Association
Connecticut Commission on Aging
Connecticut Community Providers Association
Connecticut Community Health Center Association
Connecticut Hospital Association
Connecticut League for Nursing
Connecticut Medical Society
Connecticut Nurses Association
Proprietary Schools Association
Yale Medical Group

SUPPLEMENTARY EMPLOYERS

(in addition to almost 50 focus group members)

Pediatric Healthcare Associates
Cardiology Associates of New Haven
St. Francis Hospital

EDUCATION INSTITUTIONS

Charter Oak State College
Gateway Community College
Manchester Community College
Quinnipiac Medical School

Educational Training of Wethersfield
OIC of New London County
Quinebaug Valley Community College
Porter and Chester Institute of Branford
American Professional Educational Services
Connecticut Technical High School System
University of Connecticut, Department of Pharmacy

ECONOMIC DEVELOPMENT AND COUNCIL OF GOVERNMENT

New Haven Economic Development Corporation
Capital Region Council of Governments
Business Council of Fairfield County

LMI STAKEHOLDERS

Connecticut Department of Labor
Connecticut Department of Higher Education
Connecticut Department of Public Health

LABOR ORGANIZATIONS

1199 SEIU
1199 SEIU Training & Upgrading Fund
AFSCME Local 4
American Federation of Teachers
United Labor Agency

STATE HIGHER EDUCATION

Department of Higher Education
Connecticut Community College System
Southern Connecticut State College

WORKFORCE DEVELOPMENT

The Workplace, Southwest WIB
South Central WIB
Northwest Region WIB
North Central Connecticut WIB/Capital Workforce Partners

OTHER

Universal Health Care Foundation
Connecticut Health Policy Project

APPENDIX III
BURNING GLASS TECHNOLOGIES REAL-TIME DATA ANALYSIS

CONNECTICUT'S HEALTHCARE WORKERS: UNDERSTANDING EMPLOYER EXPECTATIONS
AN ANALYSIS BASED ON REAL-TIME JOB POSTINGS DATA BETWEEN JANUARY AND DECEMBER 2010

Submitted by Burning Glass Technologies to Jobs for the Future
April 18, 2010

OVERVIEW OF METHODOLOGY

Burning Glass's system for aggregating and reporting on online job postings is designed to populate a comprehensive database of real-time job opportunity information in a manner that provides as accurate a representation as possible of the full scope of advertised labor demand.

Burning Glass's proprietary data collection program identifies jobs from over 16,000 websites, generating the largest database of current job opportunities in the industry. The two critical elements of online job aggregation are data collection (intelligent "spidering" programs that search the Internet for job listings) and deduplication (ensuring the integrity and consistency of the data set according to client-configured parameters).

DATA COLLECTION/SPIDERING

Burning Glass identifies viable websites with employment opportunity related content on a regular schedule utilizing spider technology to search those sites for employment opportunities. We maintain two kinds of spiders, which: 1) continually monitor or scout websites to identify those that include employment opportunities; and 2) continually spider and extract employment opportunity related information from a master list of websites.

The use of "scout" spiders is an important distinction between Burning Glass and other job data collectors. Other solutions rely on limited, manually-collected lists of job boards. As a result, they search fewer sites and they update their master list only occasionally as third-party data is released. By contrast, Burning Glass recognizes new sites almost as soon as they are launched and our master list is added to more often. We also add new spiders whenever a customer notifies us of a new website or our dedicated team of researchers finds a new site.

This sophisticated, two-step process enables Burning Glass to retrieve job listings from a much broader range of sources, including job boards, government agencies, educational institutions, and thousands of employers of all sizes, locations, and industries. It is especially significant that our spiders visit private and public employer websites directly. This enables Burning Glass to aggregate the most representative jobs database in the industry, because it includes a full span of employers, from small to large. Other solutions' exclusive reliance on job boards means that their datasets are biased against jobs posted by small- and mid-sized businesses (the primary source of economic and job growth) because the cost of job board advertisements can prove prohibitive to many employers. This is also true of sources which aggregate jobs predominantly from large corporations. While retrieving content from a wider variety of sources does increase the burden on deduplication routines (*see below*), Burning Glass believes that the wholesale elimination of certain categories of sources (as others do—choosing to rely primarily on data from a handful of secondary sources or solely from designated large corporate sources) is not a statistically valid method for assuring data accuracy.

In order to ensure that our database represents the most up-to-date view of the labor market, Burning Glass's spiders check each site at least once per week. Sites that add new postings most frequently are checked daily.

DEDUPLICATION

Because Burning Glass's database is a full reflection of job listings posted across the Internet, robust processes are required to identify and remove duplicate listings.

Rooting out duplicates is a highly sensitive task because there can be substantial ambiguity as to what constitutes a duplicate record. For example, if an employer posts a vacancy on a job board, fills it, and then advertises an identical vacancy the following week, is this a second opening or a duplicate?

Burning Glass applies a unique two-step approach to deduplication that results in more than half of all jobs we collect being deduplicated. The initial deduplication screen is undertaken on a source-level basis, with intelligence contained within the spiders themselves to identify and refrain from collecting records that have previously been aggregated. However, because duplicates can occur across sources, our next phase involves a thorough and ongoing analysis of the full database of aggregated content. This deduplication analysis is rendered possible because our advanced parsing engine extracts and normalizes an unparalleled number of data elements from each job listing, each of which can function as an individual duplicate screen or in concert with other variables, e.g. job title, job ID, source, posting date, employer name, location, job description text, etc.

As a result, the data we deliver to our clients is not only the most comprehensive representation of online hiring but also the most reliable.

REPORT SCOPE AND DEFINITIONS

This report is based on the total number of deduplicated jobs in Connecticut between January 2010 and December 2010. In this report, healthcare and behavioral health jobs are identified and analyzed based on the following parameters:

1. Healthcare jobs: Defined as all jobs within the BLS occupational groups of Healthcare Practitioners (2 digit SOC code 29) and Healthcare Support (2 digit SOC code 31).

2. Behavioral Health jobs: Defined using a mix of occupation coding and job title search based on titles provided by JFF and the Yale Group on Workforce Development. Using the list of 100 lay titles provided by JFF, we undertook an initial search for job postings which contained those lay titles.

3. That list was then reviewed and refined by the Yale Group on Workforce Development which refined the list of job titles to those that were unambiguously behavioral health. *(See end of this appendix for a full list).*

4. Burning Glass then searched all Connecticut job postings from its database for those with job titles from the revised list of behavioral job titles, as well as the following occupation codes:

21-1021.00	Child, Family, and School Social Workers
21-1012.00	Educational, Vocational, and School Counselors
21-1013.00	Marriage and Family Therapists
21-1014.00	Mental Health Counselors
21-1023.00	Mental Health and Substance Abuse Social Workers
31-1013.00	Psychiatric Aides
29-2053.00	Psychiatric Technicians
29-1066.00	Psychiatrists
21-1011.00	Substance Abuse and Behavioral Disorder Counselors

5. Occupational codes are generated using Burning Glass's proprietary autocoder. Over 99% of the job titles have an occupation code. Approximately 85% of codings produced through our proprietary autocoder are accurate at the two-digit SOC level and between 70 and 75% are accurate at the 8-digit level.

6. Industry data are less reliable. Over 30 percent of job postings do not contain an employer name. And in a good proportion of the employers (exact statistic not available) the company name provided by the employer is not its official name available in lookup tables. To address this problem, Burning Glass uses its artificial intelligence capabilities to infer the type of industry from the company background data included within the job posting text. By combining use of company name, where available, and artificial intelligence algorithms to infer industry from company descriptions within the text of the job posting, we are able to assign an industry code for 85 percent of the job postings. These codes are 75 percent accurate at the two-digit level and 65 percent accurate at the four-digit level.

ANALYSIS OF DEMAND FOR HEALTH OCCUPATIONS ON A STATEWIDE BASIS IN 2010

- Total Demand for Healthcare Practitioners and Healthcare Support Jobs=28,917 openings.
- This represents 12.3% of Connecticut's 234,201 Job Openings posted between January and December 2010.
- Openings Broken down as follows:

TABLE 1.
HEALTHCARE PRACTITIONERS AND HEALTHCARE JOB OPENINGS IN CONNECTICUT
JANUARY 2010 TO DECEMBER 2010

OCCUPATION GROUP	NUMBER OF OPENINGS JAN-DEC 2010	PERCENTAGE OF TOTAL OPENINGS
Healthcare Practitioners & Technical	25,879	11%
Healthcare Support	3,038	1%
Total Number of Openings	234,201	100%

TABLE 2.
DEMAND FOR TOP 30 HEALTH OCCUPATIONS AND NUMBER OF BEHAVIORAL HEALTH JOBS IN EACH OF THE TOP 30
JANUARY 2010 TO DECEMBER 2010

RANK	OCCUPATION CODE	OCCUPATION TITLE	TOTAL POSTINGS	NUMBER OF BEHAVIORAL HEALTH JOBS
1	29-1111.00	Registered Nurses	8,668	278
2	29-1123.00	Physical Therapists	2,728	0
3	29-1122.00	Occupational Therapists	1,612	0
4	29-2012.00	Medical and Clinical Laboratory Technicians	898	5
5	29-2061.00	Licensed Practical and Licensed Vocational Nurses	738	7
6	31-9092.00	Medical Assistants	712	0
7	29-1069.00	Physicians and Surgeons, All Other	707	0
8	29-1071.00	Physician Assistants	704	0
9	29-1127.00	Speech-Language Pathologists	662	0
10	31-1012.00	Nursing Aides, Orderlies, and Attendants	647	2
11	29-1199.03	Nurse Practitioners	600	43
12	29-1051.00	Pharmacists	596	1
13	31-2021.00	Physical Therapist Assistants	480	0
14	29-2011.00	Medical and Clinical Laboratory Technologists	418	1

RANK	OCCUPATION CODE	OCCUPATION TITLE	TOTAL POSTINGS	NUMBER OF BEHAVIORAL HEALTH JOBS
15	29-2071.00	Medical Records and Health Information Technicians	413	0
16	31-1011.00	Home Health Aides	383	0
17	29-2034.01	Radiologic Technologists	296	0
18	29-1066.00	Psychiatrists	288	288
19	29-1021.00	Dentists, General	285	0
20	29-1069.03	Hospitalists	282	2
21	31-2011.00	Occupational Therapist Assistants	250	0
22	29-2053.00	Psychiatric Technicians	231	231
23	29-2099.00	Health Technologists and Technicians, All Other	231	0
24	29-1031.00	Dietitians and Nutritionists	219	0
25	29-2055.00	Surgical Technologists	202	0
26	31-9011.00	Massage Therapists	199	0
27	29-2081.00	Opticians, Dispensing	185	0
28	29-2032.00	Diagnostic Medical Sonographers	180	0
29	29-1131.00	Veterinarians	168	0
30	29-2052.00	Pharmacy Technicians	156	0

ANALYSIS OF DEMAND FOR BEHAVIORAL HEALTH JOBS ON A STATEWIDE BASIS IN 2010

> Between January and December 2010, 2,655 openings were for Behavioral Health Jobs according to the definition/methodology outlined above. This represents 1.1 percent of the total job postings.

> About two thirds of Behavioral Health Jobs (65%) of Behavioral Health jobs were in occupations outside of the BLS healthcare occupation groups. 34% of all Behavioral Health Jobs were within the healthcare occupation, as defined by the BLS. 1% had a healthcare management occupation.

> 3% of the 25,879 Healthcare Practitioners postings were for Behavioral Health Jobs.

> 1.7% of the 3,038 Healthcare support jobs were for Behavioral Health Jobs

TABLE 3.
CROSSTABULATION OF HEALTHCARE JOBS BY BEHAVIORAL HEALTH JOBS

IS THIS A HEALTHCARE JOB? (SOC2=29 OR 31)?	IS THIS A BEHAVIORAL JOB?		TOTAL
	No	Yes	
No	203,537	1,747	205,284
Yes	28,009	908	28,917
TOTAL	231,546	2,655	234,201

TABLE 4.
BEHAVIORAL HEALTH JOBS BY OCCUPATION GROUP

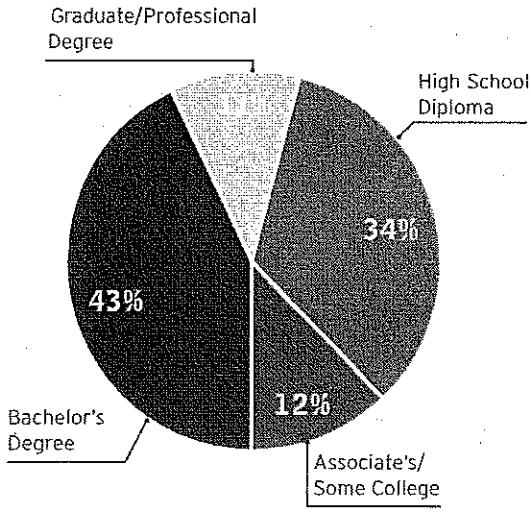
OCCUPATION GROUP	NUMBER OF POSTINGS	PERCENTAGE OF TOTAL BEHAVIORAL HEALTH JOBS
Management	32	1%
Business/Financial Operations	1	0%
Community & Social Services	1689	64%
Education, Training, & Library	11	0%
Arts, Design, Entertainment, Sports, & Media	6	0%
Healthcare Practitioners & Technical	857	32%
Healthcare Support	51	2%
Protective Service	1	0%
Personal Care & Service	1	0%
Office & Administrative Support	6	0%

TABLE 5.
TOP 20 BEHAVIORAL JOB POSTINGS BY OCCUPATION

RANK	ONET	OCCUPATION TITLE	NUMBER OF POSTINGS
1	21-1023.00	Mental Health and Substance Abuse Social Workers	616
2	21-1014.00	Mental Health Counselors	504
3	29-1066.00	Psychiatrists	288
4	29-1111.00	Registered Nurses	278
5	29-2053.00	Psychiatric Technicians	231
6	21-1011.00	Substance Abuse and Behavioral Disorder Counselors	211
7	21-1013.00	Marriage and Family Therapists	172
8	21-1021.00	Child, Family, and School Social Workers	88
9	31-1013.00	Psychiatric Aides	49
10	21-1093.00	Social and Human Service Assistants	48
11	29-1199.03	Nurse Practitioners	43
12	21-1022.00	Medical and Public Health Social Workers	33
13	11-9111.00	Medical and Health Services Managers	24
14	25-1194.00	Vocational Education Teachers, Postsecondary	9
15	29-2061.00	Licensed Practical and Licensed Vocational Nurses	7
16	21-1099.00	Community and Social Service Specialists, All Other	6
17	21-1015.00	Rehabilitation Counselors	5
18	27-2012.00	Producers and Directors	5
19	29-2012.00	Medical and Clinical Laboratory Technicians	5
20	43-1011.00	First-Line Supervisors/Managers of Office and Administrative Support Workers	5

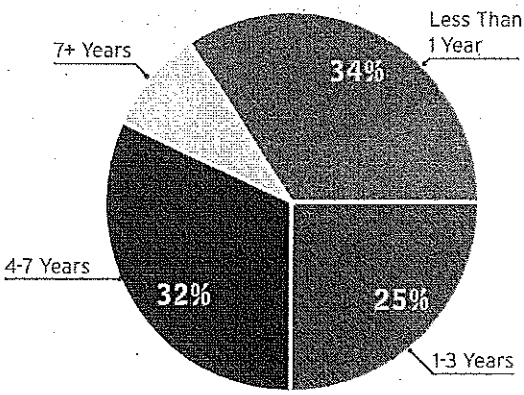
DISTRIBUTION OF EDUCATION AND EXPERIENCE REQUIREMENTS OF HEALTHCARE OCCUPATION JOB POSTINGS AND BEHAVIORAL HEALTH JOB POSTINGS

FIGURE 1. DISTRIBUTION OF EDUCATION IN ALL HEALTHCARE AND HEALTHCARE SUPPORT JOBS



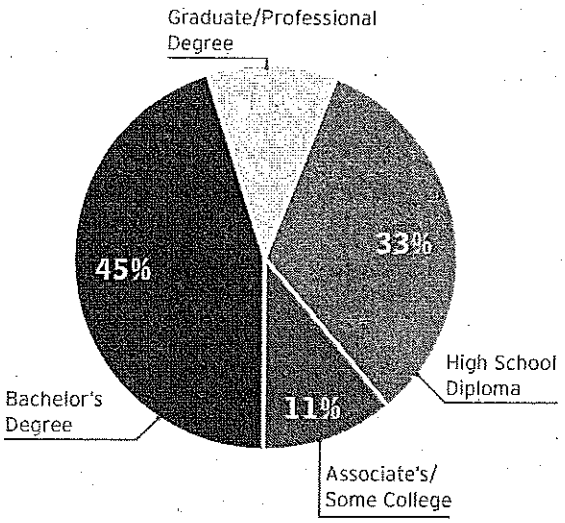
Total Postings=28,917; Unspecified Education=21,500

FIGURE 2. DISTRIBUTION OF EXPERIENCE IN ALL HEALTHCARE AND HEALTHCARE SUPPORT JOBS



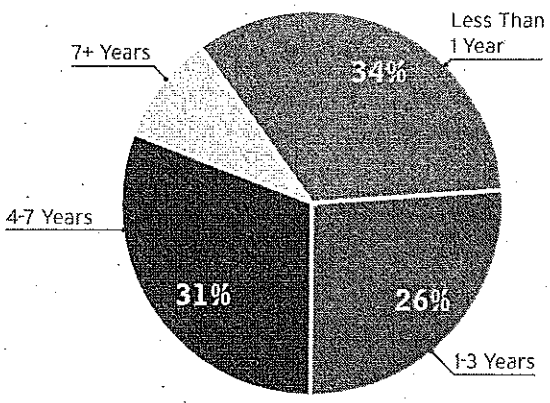
Total Postings=28,917; Unspecified Education=18,274

FIGURE 3.
DISTRIBUTION OF EDUCATION IN TOP 30 HEALTHCARE AND HEALTHCARE SUPPORT JOBS



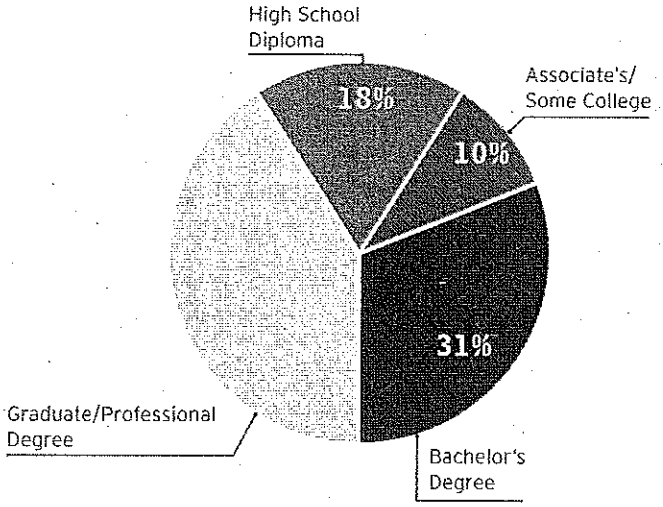
Total Postings=25,845; Unspecified Education=19,445

FIGURE 4.
DISTRIBUTION OF EXPERIENCE IN TOP 30 HEALTHCARE AND HEALTHCARE SUPPORT JOBS



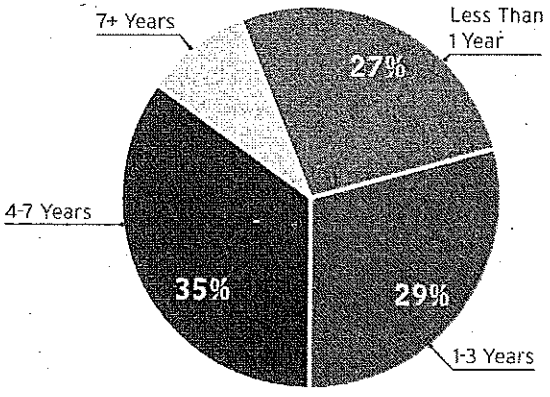
Total Postings=25,845; Unspecified Education=16,359

FIGURE 5.
DISTRIBUTION OF EDUCATION IN BEHAVIORAL HEALTH JOBS



Total Postings=2,655; Unspecified Education=1,501

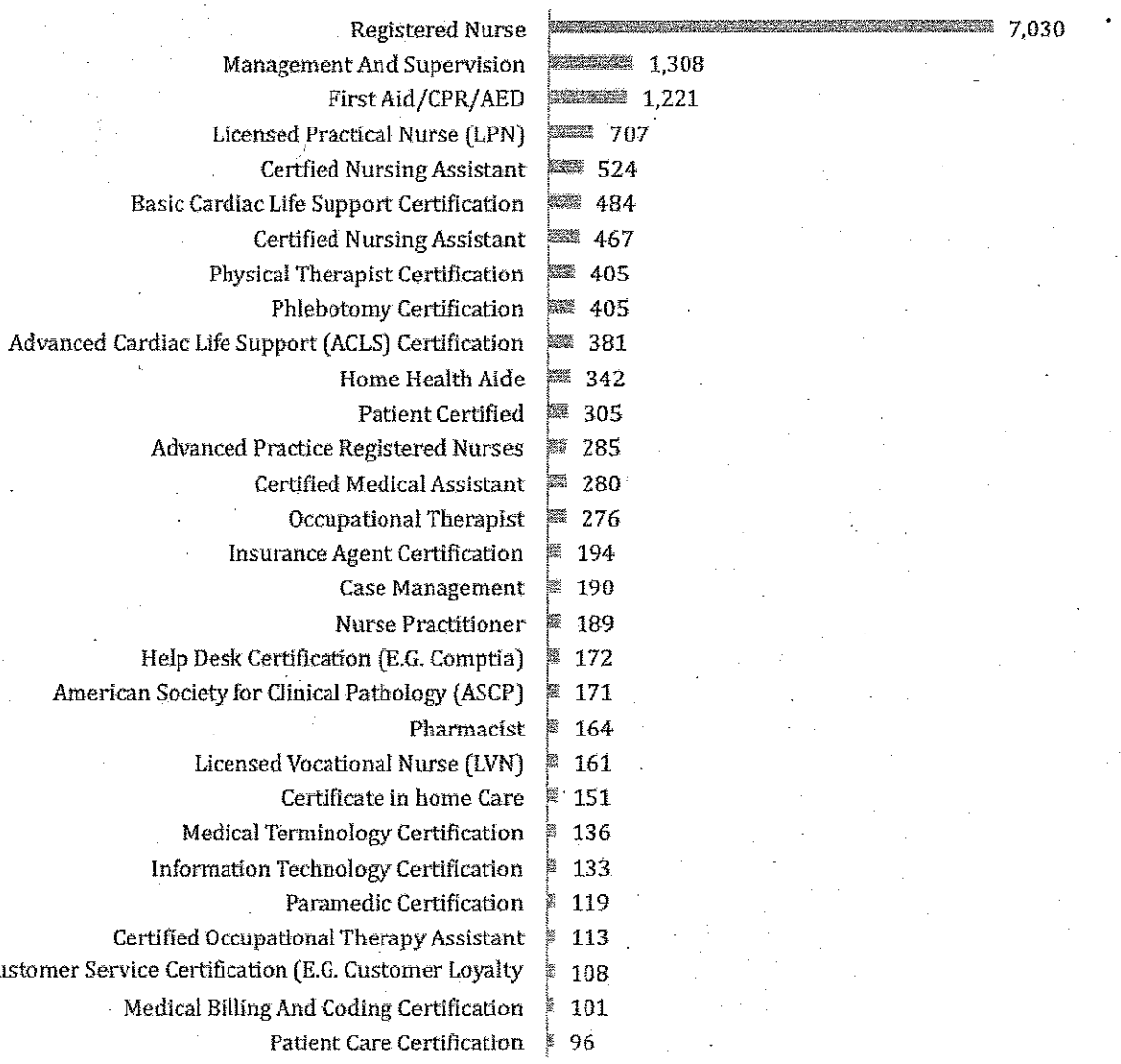
FIGURE 6.
DISTRIBUTION OF EXPERIENCE IN BEHAVIORAL HEALTH JOBS



Total Postings=2,655; Unspecified Education=1,420

TOP CERTIFICATIONS LISTED IN JOB POSTINGS FOR THE TOP 30 HEALTHCARE OCCUPATIONS

FIGURE 7.
TOP 30 CERTIFICATE/CERTIFICATIONS FOR TOP 30 HEALTHCARE OCCUPATIONS



DISTRIBUTION OF HEALTHCARE JOBS AND BEHAVIORAL HEALTH JOBS THREE 3-DIGIT INDUSTRY SUB-SECTORS AND TOP OCCUPATIONS FOR SELECTED HEALTHCARE SECTORS

TABLE 6.
TOP INDUSTRIES HIRING HEALTHCARE PRACTITIONERS AND HEALTHCARE SUPPORT WORKERS
JANUARY 2010 TO DECEMBER 2010

NAICS3	NAICS3 TITLE	NUMBER OF POSTINGS
621	Ambulatory Health Care Services	8,531
622	Hospitals	4,381
623	Nursing and Residential Care Facilities	2,538
541	Professional, Scientific, and Technical Services	1,309
611	Educational Services	876
624	Social Assistance	789
524	Insurance Carriers and Related Activities	587
446	Health and Personal Care Stores	457
561	Administrative and Support Services	313
921	Executive, Legislative, and Other General Government Support	235

TABLE 7.
TOP INDUSTRIES HIRING BEHAVIORAL HEALTH JOBS
JANUARY 2010 TO DECEMBER 2010

NAICS	NAICS TITLE	NUMBER OF POSTINGS
621	Ambulatory Health Care Services	596
622	Hospitals	471
611	Educational Services	282
541	Professional, Scientific, and Technical Services	134
624	Social Assistance	114
623	Nursing and Residential Care Facilities	84
921	Executive, Legislative, and Other General Government Support	45
813	Religious, Grantmaking, Civic, Professional, and Similar Organizations	37
561	Administrative and Support Services	22
923	Administration of Human Resource Programs	11

STATE DEMAND AS A % OF NATIONAL DEMAND FOR TOP 30 HEALTHCARE OCCUPATIONS

TABLE 11.
STATEWIDE AND NATIONAL DEMAND FOR TOP 30 HEALTHCARE OCCUPATIONS
JANUARY 2010 TO DECEMBER 2010

RANK	ONET	OCCUPATION TITLE	CT POSTINGS	NATIONWIDE POSTINGS	CT OPENINGS AS PERCENTAGE OF NATIONAL JOBS
1	29-1111.00	Registered Nurses	8,668	376,296	2%
2	29-1123.00	Physical Therapists	2,728	117,850	2%
3	29-1122.00	Occupational Therapists	1,612	87,674	2%
4	29-2012.00	Medical and Clinical Laboratory Technicians	898	41,986	2%
5	29-2061.00	Licensed Practical and Licensed Vocational Nurses	738	49,211	1%
6	31-9092.00	Medical Assistants	712	35,838	2%
7	29-1069.00	Physicians and Surgeons, All Other	707	37,464	2%
8	29-1071.00	Physician Assistants	704	23,517	3%
9	29-1127.00	Speech-Language Pathologists	662	34,892	2%
10	31-1012.00	Nursing Aides, Orderlies, and Attendants	647	47,640	1%
11	29-1199.03	Nurse Practitioners	600	30,044	2%
12	29-1051.00	Pharmacists	596	43,844	1%
13	31-2021.00	Physical Therapist Assistants	480	18,172	3%
14	29-2011.00	Medical and Clinical Laboratory Technologists	418	18,844	2%
15	29-2071.00	Medical Records and Health Information Technicians	413	21,196	2%
16	31-1011.00	Home Health Aides	383	12,630	3%
17	29-2034.01	Radiologic Technologists	296	13,082	2%
18	29-1066.00	Psychiatrists	288	10,844	3%
19	29-1021.00	Dentists, General	285	12,019	2%
20	29-1069.03	Hospitalists	282	16,987	2%

RANK	ONET	OCCUPATION TITLE	CT POSTINGS	NATIONWIDE POSTINGS	CT OPENINGS AS PERCENTAGE OF NATIONAL JOBS
21	31-2011.00	Occupational Therapist Assistants	250	13,287	2%
22	29-2053.00	Psychiatric Technicians	231	15,782	1%
23	29-2099.00	Health Technologists and Technicians, All Other	231	11,783	2%
24	29-1031.00	Dietitians and Nutritionists	219	15,634	1%
25	29-2055.00	Surgical Technologists	202	11,091	2%
26	31-9011.00	Massage Therapists	199	9,231	2%
27	29-2081.00	Opticians, Dispensing	185	4,623	4%
28	29-2032.00	Diagnostic Medical Sonographers	180	6,041	3%
29	29-1131.00	Veterinarians	168	3,108	5%
30	29-2052.00	Pharmacy Technicians	156	17,627	1%

DEMAND FOR HEALTHCARE JOBS BY COUNTY

TABLE 12.
JOB POSTINGS BY COUNTY
BY HEALTHCARE OCCUPATIONS, HEALTHCARE INDUSTRY, AND BEHAVIORAL HEALTH JOBS
JANUARY 2010 TO DECEMBER 2010

COUNTY	TOTAL NUMBER OF POSTINGS	NUMBER OF POSTINGS IN HEALTHCARE OCCUPATIONS (SOC2 = 29 OR 31)	NUMBER OF POSTINGS IN HEALTHCARE INDUSTRY (NAICS2 = 62)	NUMBER OF POSTINGS IN HOSPITALS, AMBULATORY SERVICES, & NURSING/ RESIDENTIAL FACILITIES (NAICS3 = 621,622,623)	BEHAVIORAL HEALTH JOBS
Fairfield	83,985	7,992	8,656	6,504	539
Hartford	86,413	9,903	11,512	9,267	993
Litchfield	4,204	652	618	407	73
Middlesex	5,219	923	1,140	953	121
New Haven	35,108	5,463	6,738	5,631	431
New London	14,099	3,004	3,797	2,531	305
Tolland	2,320	462	530	354	55
Windham	2,721	518	707	604	138

DEMAND FOR HEALTHCARE JOBS BY WIB AREA

TABLE 13.
JOB POSTINGS BY WIB AREA
BY HEALTHCARE OCCUPATIONS, HEALTHCARE INDUSTRY, AND BEHAVIORAL HEALTH JOBS
JANUARY 2010 TO DECEMBER 2010

COUNTY	TOTAL NUMBER OF POSTINGS	NUMBER OF POSTINGS IN HEALTHCARE OCCUPATIONS (SOC2=29 OR 31)	NUMBER OF POSTINGS IN HEALTHCARE INDUSTRY (NAICS2=62)	NUMBER OF POSTINGS IN HOSPITALS, AMBULATORY SERVICES, & NURSING/ RESIDENTIAL FACILITIES (NAICS3=621,622,623)	BEHAVIORAL HEALTH JOBS
WIA 1: Southwest	71,661	6,246	6,906	5,113	401
WIA 2: North Central	86,431	9,955	11,563	9,289	1,009
WIA 3: Northwest	22,185	3,598	3,943	3,102	306
WIA 4: Eastern	12,483	2,842	3,742	2,585	312
WIA 5: South Central	30,832	4,925	6,060	5,120	431
TOTAL	234,201	27,566	32,214	25,209	2,459

BEHAVIORAL HEALTH JOB TITLES

SEARCH STRATEGIES

1. Use occupational titles from Career Pathways Report.

2. Use the Search terms: behavioral health, mental health, psychiatric, psychological, addiction, and substance abuse.

3. Below is a list of job titles that emerged from a thorough review. These may be informative regarding potential titles not captured via the above strategies. We are not suggesting that you search on all of these terms.

Addiction counselor

Addiction nurse

Addiction services specialist

Addictions treatment specialist

Administrator, mental health services

Administrator, substance abuse services

Adolescent mental health worker

Assertive case management (ACT) team member

Behavioral health services CEO, COO

Behavioral health services staff

Case management aide

Child and family social worker

Child psychiatrist

Children and youth mental health services worker

Client advocate

Clinical administrator

Clinical coordinator

Clinical psychologist

Clinical therapist – mental health

Cognitive behavioral therapist

Community mental health center CEO

Community outreach worker

Community support worker

Consulting psychologist

Counseling psychologist

Crisis clinician

Crisis intervention team member

Detoxification counselor

Family advocate

Family educator

Family therapist

Forensic case manager

Forensic psychiatrist

Forensic psychologist

Forensic social worker

Geriatric mental health services specialist

Gerontology aide

Geropsychiatrist

Hispanic mental health services director

Homeless outreach worker

Inpatient mental health staff

Latino mental health services director

Lead mental health authority CEO or Director or Associate Director

Life skills counselor

Life skills specialist

Local mental health authority CEO or Director or Associate Director

Marriage and family therapist

Mental health advocate

Mental health aide

Mental health assistant

Mental health case manager

Mental health case worker

Mental health clinician

Mental health counselor

Mental health nurse clinician

Mental health recovery coach

Mental health rehabilitation coordinator

Mental health services Chief Operating Officer

Mental health services program director

Mental health team leader

Mental health worker

Mobile crisis team member

Motivational therapy counselor

Nurse clinician

Outpatient mental health services staff

Outreach worker

Parent Advocate

Parent educator

Peer counselor
Peer engagement specialist
Peer support specialist
Program coordinator – Mental health
Program coordinator – Substance abuse
Program development coordinator
Project coordinator, mental health
Project coordinator, substance abuse services
Psychiatric aide
Psychiatric APRN
Psychiatric clinician
Psychiatric hospital administrator
Psychiatric hospital CEO
Psychiatric inpatient team member
Psychiatric nurse
Psychiatric social worker
Psychiatric technician
Psychological aide
Psychosocial rehabilitation counselor
Psychosocial rehabilitation program counselor
Psychotherapist
PTSD specialist
Pupil services specialist
Recovery support specialist
Rehabilitation counselor
Residential specialist
Residential staff person
Social rehabilitation counselor
Social services aide
Social work assistant
Substance use counselor
Substance abuse counselor
Substance abuse treatment staff
Supported education coordinator
Therapist
Trauma-informed services specialist
Vocational counselor
Vocational rehabilitation counselor
Volunteer coordinator, mental health
Volunteer coordinator, substance abuse
Work/life skills coach – mental health
Young adult services coordinator
Youth services professional
Youth worker – mental health

APPENDIX IV
SUPPLY-DEMAND DASHBOARD

TABLE 5.
ILLUSTRATIVE SUPPLY-DEMAND DASHBOARD

				Real Time	IPEDS	TEPS		
OCCUPATIONAL GROUP/ OCCUPATION TITLE	2008 EMPLOYMENT	ANNUAL OPENINGS 2008-18	PERCENT DUE TO REPLACEMENT	TOTAL POSTINGS 1/10-12/10	DEGREES AWARDED 2008-09	DEGREES AWARDED 2006-07	ACTIVE LICENSES	LICENSEE AVERAGE AGE
Registered Nurses	36,715	1,174	55%	8,668	1,428	1,250	54,834	50
Home Health Aides	13,600	600	23%	383		0		
Nursing Aides, Orderlies, and Attendants	25,835	450	57%	647	422	1,975	21,335	44
Licensed Practical and Licensed Vocational Nurses	8,969	337	83%	738	513	658	12,799	49
Medical Assistants	6,421	185	39%	712	1,053	914		
Dental Assistants	3,529	146	45%		97	229		
Pharmacy Technicians	3,303	146	57%	156		0		

OCCUPATIONAL GROUP/ OCCUPATION TITLE	2008 EMPLOYMENT	ANNUAL OPENINGS 2008-18	PERCENT DUE TO REPLACEMENT	TOTAL POSTINGS 1/10-12/10	DEGREES AWARDED 2008-09	DEGREES AWARDED 2006-07	ACTIVE LICENSES	LICENSEE AVERAGE AGE
Dental Hygienists	2,767	118	47%		160	111	3,561	46
Emergency Medical Technicians and Paramedics	3,011	110	55%		45	252	13,420	40
Physical Therapists	3,727	110	41%	2,728	109	185	4,446	44
Radiologic Technologists and Technicians	2,966	83	52%	296		132	4,029	46
Pharmacists	2,729	82	74%	596	110	202		
Medical and Clinical Laboratory Technologists	2,700	79	65%	418		36		
Physicians and Surgeons, All Other	2,793	74	66%	707			16,648	52
Veterinary Technologists and Technicians	1,200	71	42%		10	17		
Physician Assistants	1,592	66	44%	704	71	77	1,693	39
Occupational Therapists	1,734	57	56%	1,612	54	29	1,966	
Massage Therapists	2,368	51	63%	199	494	573	4,327	
Medical and Clinical Laboratory Technicians	1,910	49	73%	898	53			
Medical Records and Health Information Technicians	1,603	47	70%	413	23	20		
Speech-Language Pathologists	1,482	44	61%	662	76	45	2,367	47

OCCUPATIONAL GROUP/ OCCUPATION TITLE	2008 EMPLOYMENT	ANNUAL OPENINGS 2008-18	PERCENT DUE TO REPLACEMENT	TOTAL POSTINGS 1/10-12/10	DEGREES AWARDED 2008-09	DEGREES AWARDED 2006-07	ACTIVE LICENSES	LICENSEE AVERAGE AGE
Surgical Technologists	1,042	44	59%	202	31	53		
Psychiatric Aides	1,675	43	40%					
Psychiatric Technicians	1,390	40	88%	231	181	15		
Respiratory Therapists	1,140	40	53%		64	53	1,723	47
Dentists, General	1,190	39	85%	285	52	46	3,279	52
Veterinarians	777	39	36%	168		0	1,236	
Internists, General	1,238	34	65%					
Diagnostic Medical Sonographers	1,071	30	53%	180	8	9		
Veterinary Assistants and Laboratory Animal Caretakers	917	28	36%			12		
Dietitians and Nutritionists	796	27	100%	219	35	166	709	

ENDNOTES

[1] The "Health Care and Social Assistance" NAICS industry group includes 39 industries, from those providing the most intensive health care to those providing minimal health care with social assistance to those providing only social assistance.

[2] Source: U.S. Health and Human Services Department, http://www.cms.gov/nationalhealthexpenddata

[3] "National Health Expenditure Data: NHE Fact Sheet," Centers for Medicare and Medicaid Services. http://www.cms.gov/NationalHealthExpendData/25_NHE_Fact_Sheet.asp#TopOfPage. Accessed April 20, 2011; "OECD Health Data 2009, Frequently Requested Data." OECD. http://www.oecd.org/document/16/0,3343,en_2649_33929_2085200_1_1_1_1,00.html. Accessed April 20, 2011.

[4] "National Health Expenditure Data: NHE Fact Sheet," Centers for Medicare and Medicaid Services. http://www.cms.gov/NationalHealthExpendData/25_NHE_Fact_Sheet.asp#TopOfPage. Accessed March 18, 2011.

[5] Truffer, Christopher J., et al. 2011. "Health Spending Projections Through 2019: The Recession's Impact Continues." *Health Affairs*. Vol. 30. No. 4. Abstract. http://content.healthaffairs.org/content/early/2010/02/04/hlthaff.2009.1074.abstract. Accessed April 20, 2011

[6] See: http://www.kaiseredu.org/Issue-Modules/US-Health-Care-Costs/Bacground-Brief.aspx.

[7] Truffer et al. 2011.

[8] "National Health Expenditure Data: NHE Fact Sheet," Centers for Medicare and Medicaid Services, Referenced, March 18, 2011

[9] Wood, Debra. 2011. "Top Trends in Healthcare Delivery." AMN Healthcare website, http://www.amnhealthcare.com/News/news-details.aspx?id=36046, accessed April 20, 2011.

[10] Wood 2011.

[11] Institutes of Medicine. Digital Infrastructure for a Learning Health System: The Foundation for Continuous Improvement in Health and Health Care - Workshop Summary. Available at http://www.iom.edu/Reports/2010/Digital-Infrastructure-for-a-Learning-Health-System.aspx, accessed April 28, 2011.

[12] The Carsey Institute, Demographic Alert Update: Mid-Decade Population Trends in New England. October 2007, www.carseyinstitute.unh.edu.

[13] U.S. Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, National Center for Health Workforce Analysis. 2003. "Changing Demographics: Implications for Physicians, Nurses, and Other Health Workers." Spring. http://www.hwic.org/resources/details.php?id=1591

[14] U.S. Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, National Center for Health Workforce Analysis. 2003. "Changing Demographics: Implications for Physicians, Nurses, and Other Health Workers." Spring. http://www.hwic.org/resources/details.php?id=1591.

[15] Gittel, Ross & Timothy Lord. 2009. "New England's Foreign-Born Population Today." *Communities and Banking*. Winter.

[16] The NAICS defined "Social Assistance" subsector includes a wide variety of social assistance services, such as those for children, the disabled, elders, immigrants and others. They do not include residential services, except on a short stay basis. The NAICS classification is grouped with Health Care because the services are frequently intertwined.

[17] Though "Nurse Practitioners" and APRNs are not distinct in State of Connecticut licensure, employers consider these to be different and hire for them differently. In particular, Nurse Practitioner is generally considered a sub-set of APRN, albeit one requiring more education than other specialties.

[18] O'Leary, Sean. 2008. "State Nursing Programs Face Faculty Shortage." *Hartford Business Journal*.

[19] Educational program codes were roughly cross-walked with occupational codes solely for illustrative purposes.

[20] See Figure 2, Educational Requirements of the Top 30 Health Care Jobs.

[21] Gabard, Donald L. 2007. "Increasing Minority Representation in the Health Care Professions." *Journal of Allied Health*. Vol. 36, No. 3, pp. 165-175.

[22] Weeks, William B. & Amy Wallace. 2006. "The Influence of Race and Gender on Family Physicians' Annual Incomes." *Journal of the American Board of Family Physicians*. Vol. 19, No. 2. pp. 548-556.

[23] Tiemeyer, Stacy & Hill, Twyla. 2010. 2010. "Health Care Occupations: Road to Success or Path to Dead End?" Proceedings of the 6th Annual GRASP Symposium.

[24] The TEPS system reports 2006-16 projections, thus differing in the primary projections we use elsewhere, from 2008-18. Thus, projected annual openings for RNs were slightly lower, at 1,113 versus 1,174 for 2008-18.

[25] www.sde.ct.gov/sde/lib/sde/pdf/.../CTHighReformQandA_Jan10.pdf

[26] See Figure 2, Educational Requirements of the Top 30 Health Care Jobs.

[27] Connecticut Department of Higher Education. "Regulations for Licensure and Accreditation of Institutions and Programs of Higher Learning." Available at: www.ctdhe.org/Regs/RegsAcad.htm, accessed April 26, 2010.

[28] One Coast, One Future: Southwest Economic Integration Initiative. 2007. *Health Care Industry Cluster Study*. New Haven: Holt, Wexler & Farnam, LLP.

[29] Allied Health Policy Workforce Board Annual Legislative Report 2010.

[30] Policy Brief: Connecticut's Healthcare Workforce: Under Construction, Sustinet Healthcare Workforce Taskforce. May 2010.

[31] This scope of practice recommendation is based on employer feedback and a workforce shortage and employment perspective. A medical safety analysis requires knowledge of the specific practices considered, and is beyond the expertise of the workforce assessment team.

[32] Some employers have reported needing to hire more RNs and fewer LPNs due to the increasing level of chronic conditions in their population. Others have reported that as current LPNs retire, they are being replaced with RNs.

AUTHOR BIOS

John Dorrer, a program director at Jobs for the Future, leads JFF's work in labor market analysis and workforce research. He is working with a network of community colleges demonstrating the application of real-time labor market information for planning and analysis. He previously served as acting commissioner of the Maine Department of Labor and director of the Center for Workforce Research and Information.

Robert Holm is a program director for workforce and economic development in JFF's Building Economic Opportunity Group. Mr. Holm manages the *Regional Growth and Opportunity Initiative*, assisting regions to align economic and talent development. He also leads projects to help workforce institutions to analyze labor market needs and collaborate with economic developers and employers in the United States and abroad. Previously, with the National Center for Education and the Economy, he helped manage projects funded by the U.S. Dept. of Labor, American Association of Community Colleges, and foundations to learn and apply the lessons of regional collaboration for economic growth and talent development.

O. Steven Quimby is a workforce development research and planning consultant. Dr. Quimby has more than 15 years of experience in labor market research, workforce investment system implementation, and program evaluation in the public and nonprofit sectors. He has consulted with Jobs for the Future on the *Jobs to Careers* initiative as well as the *National Fund for Workforce Solutions*. As director of planning and policy research for the Merrimack Valley Workforce Investment Board, he authored several studies on local labor markets and on the impact of "grow your own" workforce development strategies.

JOBS FOR THE FUTURE

TEL 617.728.4446 FAX 617.728.4857 info@jff.org

88 Broad Street, 8th Floor, Boston, MA 02110
2000 Pennsylvania Avenue, NW, Suite 5300, Washington, DC 20006