



Nurse Practitioners

A SOLUTION TO AMERICA'S
PRIMARY CARE CRISIS

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SEPTEMBER 2018

Executive Summary

For the past few decades, the United States has not produced enough primary care physicians. Moreover, too few physicians practice in rural and medically underserved areas, and the number of people lacking adequate access to primary care has increased. Meanwhile, studies have piled up pointing to the high quality of care that nurse practitioners (NPs) provide, and increasing numbers of policy-influencing bodies have recommended expanding the use of NPs in primary care. Yet, barriers to the expanded use of NPs persist, and, consequently, tens of millions of Americans lack adequate access to primary care services. This report describes and integrates new evidence from a research program focused on the primary care workforce, NPs' role in primary care, and the potential for NPs to help solve the problem of Americans' access to quality primary care.

Among other things, the research summarized in this report establishes that it is unrealistic to rely on the physician workforce alone to provide the primary care Americans need, particularly for Americans in rural areas, who are generally older, less educated, poorer, and sicker. Many primary care physicians are expected to retire over the next decade, while demand is increasing for primary care. So current shortages of primary care are projected to worsen, with even fewer physicians practicing in rural areas. And as the proportion of physicians who are married to highly educated spouses increases, the already formidable challenges of attracting physicians to Health Professional Shortage Areas will become even more daunting.

Our findings examine trends in the supply of NPs and physicians, showing that the NP workforce has increased dramatically and is projected to continue growing while the physician workforce will grow minimally. Further, we find, as do other studies, that compared to primary care medical doctors, primary care nurse practitioners (PCNPs) are more likely to

practice in rural areas, where the need for primary care is greatest.

Our research shows that people living in states with laws that reduce or restrict NPs' scope-of-practice had significantly less access to PCNPs. This finding indicates that such state regulations have played a role in impeding access to primary care. This alone should be cause for concern among policymakers seeking to improve public health.

Using different data and methods, the studies described in this report consistently show that NPs are significantly more likely than primary care physicians to care for vulnerable populations. Nonwhites, women, American Indians, the poor and uninsured, people on Medicaid, those living in rural areas, Americans who qualify for Medicare because of a disability, and dual-eligibles are all more likely to receive primary care from NPs than from physicians. NPs, whether they work independently of primary care physicians or with them, are more likely to accept Medicaid recipients, provide care for the uninsured, and accept lower payments than are physicians who do not work with NPs.

Another major finding is that, after controlling for differences in patient severity and sociodemographic factors, the cost of care provided to Medicare beneficiaries by NPs was significantly lower than primary care provided by physicians. Even after accounting for the lower payment NPs receive relative to physicians, the cost of NP-provided care was still significantly lower.

However, the viability of increased reliance on NPs still depends on the simple question at the core of this project: Can NPs provide health care of comparable quality to that provided by primary care physicians? Our studies showed that beneficiaries who received their primary care from NPs consistently received significantly *higher-quality* care than physicians' patients in several respects. While beneficiaries treated by

physicians received slightly better services in a few realms, the differences were marginal. These results held when vulnerable populations of Medicare beneficiaries were analyzed separately and compared to those cared for by physicians, aligning with the findings of many other studies conducted over the past four decades.

Furthermore, state-level NP scope-of-practice restrictions do not help protect the public from subpar health care. Analysis of different classifications of state-level scope-of-practice restrictions provided no evidence that Medicare beneficiaries living in states that imposed restrictions received better-quality care. Some physicians and certain professional medical associations have justified their support for state regulations to limit NP scope-of-practice on the grounds that they are necessary to protect the public from low-quality providers and to assert that physicians must be the leaders of the health care team. We found no evidence to support their claim.

Further, our analysis showed that Medicare beneficiaries living in states with reduced or restricted NP scope-of-practice were more likely to use more resources than were beneficiaries in states without such restrictions. This indicates that these beneficiaries had less access to the positive contributions of NPs.

Despite this body of evidence, our national survey of primary care clinicians revealed that around one-third of primary care physicians believe increasing the number of NPs would impair the safety and effectiveness of care. This could indicate that physicians are not aware of the findings of research. Or alternatively, it is an excuse for a barrier to entry, meant to protect some physicians' narrow interests at the expense of accessible primary care for many Americans who need it.

The evidence leads to three recommendations that can help overcome the growing challenges facing the delivery of primary care in the US. First, private policymakers such as hospital boards and credentialing bodies should allow NPs to practice to the fullest extent of their training and ability. Second, physicians must understand that NPs provide quality health care to those in need. NPs and physicians should work together to build relationships that allow for their respective roles and practices to evolve, respecting each other's strengths and ultimately leading to a workforce that is more responsive to communities' health needs. Third, public policymakers should remove restrictions on NPs that limit their scope-of-practice.

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The doctors are fighting a losing battle. The nurses are like insurgents. They are occasionally beaten back, but they'll win in the long run. They have economics and common sense on their side.

—Uwe Reinhardt, Professor of Economics at Princeton University¹

Nearly 30 years ago, in 1991, well-known physician and thought leader Gordon Moore wrote in the *Journal of the American Medical Association*: “Primary care is the most affordable safety net we can offer our citizens.”² The National Academy of Medicine defines primary care as “the provision of *integrated, accessible health care services* by clinicians who are *accountable* for addressing a large *majority of personal health care needs*, developing a *sustained partnership with patients*, and practicing in the *context of family and community*.”³

Primary care clinicians typically treat a variety of conditions, including high blood pressure, diabetes, asthma, depression and anxiety, angina, back pain, arthritis, thyroid dysfunction, and chronic obstructive pulmonary disease. They provide basic maternal and child health care services, including family planning and vaccinations. Primary care lowers health care costs, decreases emergency department visits and hospitalizations, and lowers mortality.⁴

Primary care is a crucial component of American health care, but it faces steep challenges, beginning with ever-increasing demand for primary care services. Demand for primary care has been growing for decades and is expected to increase.⁵ The Affordable Care Act (ACA) expanded the number of people with health insurance and increased access to primary care services by eliminating patient cost sharing for a wide array of preventive services and screenings.⁶

Demand for primary care will continue to increase as the 76 million baby boomers age into the Medicare program. Currently, 54 million people are enrolled in Medicare, the nation’s health insurance program for citizens 65 and older and those with end-stage renal disease and other qualifying disabilities. As baby boomers age, Medicare enrollment is expected to increase to 80 million by 2030.⁷

Not only are baby boomers expected to live longer than previous generations, but also the prevalence of multiple chronic diseases is increasing. By 2030, four in 10 baby boomers are expected to have heart disease or diabetes, and 25 percent will have cancer. The percentage of those enrolled in Medicare with three or more chronic diseases will increase from 26 percent in 2010 to 40 percent in 2030.⁸ Add to this the increasing number of people with Alzheimer’s disease (a leading cause of death in the US) and other dementias, and it is clear that the demand for primary care will increase in coming decades, especially the need for care geared toward the elderly.⁹

If the growth in demand for primary care is a challenge, the current and projected shortages of primary care physicians only make matters worse. The Association of American Medical Colleges (AAMC) estimates that by 2030 we will have up to 49,300 fewer primary care physicians than we will need (an even-larger estimate than the AAMC reported in 2016).¹⁰ Many specialist physicians also provide considerable primary

care, but projected shortages of such physicians (by as many as 72,700 by 2030) only adds to concerns over the adequacy of the primary care physician workforce.¹¹ Despite decades of effort, the graduate medical education system has not produced enough primary care physicians to meet the American population's needs.¹²

When geographic distribution of primary care medical doctors (PCMDs) is taken into account, the problem begins to feel like a crisis. In 2018 the federal government reported 7,181 Health Professional Shortage Areas in the US and approximately 84 million people with inadequate access to primary care, with 66 percent of primary care access problems in rural areas.¹³

Thankfully, there is a solution. Increasingly, researchers, workforce analysts, and organizations that influence health policy support expanding the role of nurse practitioners (NPs) to fill the void left by the lack of primary care physicians and to improve the uneven geographic distribution of primary care. This report presents results from original research projects that support this view and document the evidence base for an expanded role for NPs in remedying these pressing and growing access problems.

Nurse Practitioners: A Regulated Solution

After practicing as a professional nurse for several years, many registered nurses acquire advanced clinical knowledge, training, and patient care responsibilities to become nurse practitioners. In the words of the American Association of Nurse Practitioners (AANP): “All NPs must complete a master’s or doctoral degree program, and have advanced clinical training beyond their initial professional registered nurse preparation.”¹⁴ Didactic and clinical courses prepare NPs with specialized knowledge and clinical competency to practice in primary care, acute care, and long-term health care settings.

NPs assess patients, order and interpret diagnostic tests, make diagnoses, and initiate and manage treatment plans.¹⁵ They also prescribe medications, including controlled substances, in all 50 states and DC, and 50 percent of all NPs have hospital-admitting privileges.¹⁶

The AANP reports that the nation’s 248,000 NPs (87 percent of whom are prepared in primary care) provide one billion patient visits yearly.¹⁷ NPs are prepared in the major primary care specialties—family health (60.6 percent), care of adults and geriatrics (21.3 percent), pediatrics (4.6 percent), and women’s health (3.4 percent)—and provide most of the same services that physicians provide, making them a natural solution to the physician shortage.¹⁸ NPs can also specialize outside primary care, and one in four physician specialty practices in the US employs NPs, including psychiatry, obstetrics and gynecology, cardiology, orthopedic surgery, neurology, dermatology, and gastroenterology practices.¹⁹

Further, NPs are paid less than physicians for providing the same services. Medicare reimburses NPs at 85 percent the rate of physicians, and private payers pay NPs less than physicians.²⁰ On average, NPs earn \$105,000 annually.²¹

NPs’ role in primary care dates to the mid-1960s, when a team of physicians and nurses at the University of Colorado developed the concept for a new advanced-practice nurse who would help respond to a shortage of primary care at the time.²² Since then, numerous studies have assessed the quality of care that NPs provide (see Appendix A), and several policy-influencing organizations (such as the National Academy of Medicine, National Governors Association, and the Hamilton Project at the Brookings Institution) have recommended expanding the use of NPs, particularly in primary care.²³ Even the Federal Trade Commission recognizes the role of NPs in alleviating shortages and expanding access to health care services.²⁴ Most recently, the US Department of Veterans Affairs amended its regulations to permit its nearly 5,800 advanced-practice-registered nurses to practice to the full extent of their education, training, and certification regardless of state-level restrictions, with some exceptions pertaining to prescribing and administering controlled substances.²⁵

Nonetheless, physicians have met such efforts with mixed response. Many physicians favor the use of NPs, at least in theory. A 2012 national survey of PCMDs found that 41 percent reported working in

collaborative practice with primary care nurse practitioners (PCNPs) and 77 percent agreed that NPs should practice to the full extent of their education and training. Additionally, 72.5 percent said having more NPs would improve timeliness of care, and 52 percent reported it would improve access to health services.

However, about one-third of PCMDs said they believe the expanded use of PCNPs would impair the quality and effectiveness of primary care.²⁶ The survey also found that 57 percent of PCMDs worried that increasing the supply of PCNPs would decrease their income, and 75 percent said they feared NPs would replace them.

Although PCMDs generally favor using NPs at current levels, they seem to fear that increased PCNP-based care will usurp them or make them obsolete. These PCMDs are rationally self-interested, and understandably so. But for the good of patients around the country, hospital boards and state lawmakers should prioritize patients over PCMDs' concerns and relieve the shortage of primary care providers with PCNPs.

Current Restrictions on PCNP Practice

To protect the interests of PCMDs, the American Medical Association, American Academy of Family Physicians, and some state and county medical associations favor state-level legal restrictions on the services that an NP may provide, whether in primary care or acute care delivery settings. In fact, many states impose varying degrees of legal restrictions on NPs, which the AANP has classified as follows.²⁷

- **Full Practice.** State practice and licensure laws allow all NPs to evaluate patients, diagnose patients, order and interpret diagnostic tests, and initiate and manage treatments—including prescribing medications and controlled substances—under the exclusive licensure authority of the state board of nursing. The National Academy of Medicine and National Council of State Boards of Nursing recommend this model.
- **Reduced Practice.** State practice and licensure laws reduce NPs' ability to engage in at least one element of NP practice. State law limits the setting of one or more elements of NP practice or requires a career-long regulated collaborative agreement with another health care provider in order for the NP to provide patient care.
- **Restricted Practice.** State practice and licensure laws restrict NPs' ability to engage in at least one element of NP practice. State law requires career-long supervision, delegation, or team management by another health care provider in order for the NP to provide patient care.

Over the past two decades, the trend among states has been to remove scope-of-practice restrictions.²⁸ As shown in Table 1, in 2018, 23 states allowed the full practice of NPs, 16 states reduced certain areas of NP practice, and 12 states were classified as restricting NP practice.²⁹

These restrictions infringe on the clinical activities NPs are trained to perform. In 1992, Yale Law School Associate Dean Barbara Safriet made a compelling case for increasing NPs' roles in primary care:

Advanced practice nurses have demonstrated repeatedly that they can provide cost-effective, high-quality primary care for many of the neediest members of society, but their role in providing care has been [*sic*] severely limited by restrictions on their scope of practice, prescriptive authority, and eligibility for reimbursement. Eliminating these restriction [*sic*] would enable advanced practice nurses to increase access to health care while preserving quality and reducing costs.³⁰

Safriet contends that scope-of-practice restrictions on NPs impede their ability to practice to the full extent of their education and training, which is undesirable for both NPs and PCMDs. Eighteen years later, she again argued for removing these regulatory obstacles to allow Americans better access to care at a more affordable cost and to reform the health care regulatory framework to enhance all providers' abilities and

Table 1. State-Level Scope-of-Practice Regulatory Restrictions on Nurse Practitioners, 2018

Full Practice	Reduced Practice	Restricted Practice
Alaska	Alabama	California
Arizona	Arkansas	Florida
Colorado	Delaware	Georgia
Connecticut	Illinois	Massachusetts
District of Columbia	Indiana	Michigan
Hawaii	Kansas	Missouri
Idaho	Kentucky	North Carolina
Iowa	Louisiana	Oklahoma
Maine	Mississippi	South Carolina
Maryland	New Jersey	Tennessee
Minnesota	New York	Texas
Montana	Ohio	Virginia
Nebraska	Pennsylvania	
Nevada	Utah	
New Hampshire	West Virginia	
New Mexico	Wisconsin	
North Dakota		
Oregon		
Rhode Island		
South Dakota		
Vermont		
Washington		
Wyoming		

Source: American Association of Nurse Practitioners, "State Practice Environment," <https://www.aanp.org/legislation-regulation/state-legislation/state-practice-environment/66-legislation-regulation/state-practice-environment/1380-state-practice-by-type-restricted-practice>.

competencies.³¹ This report builds on Safriet's argument and adds a potential framework for reform that would allow NPs to best practice according to their abilities and allow Americans more affordable access to health care, especially in rural areas.

Research

The concept of expanding the use of NPs and removing restrictions on their practice has gained traction since the ACA was being developed. Health workforce analysts have long been concerned with the shortage of primary care physicians and the persistent inability of graduate medical education programs to produce

enough physicians to make up the difference. Indeed, the ACA contains many provisions aimed at addressing these and other workforce-supply problems.

One such provision was the establishment of the National Health Care Workforce Commission to advise Congress and the administration on national health workforce policy. I was appointed to the commission and agreed to serve as its chairman. Anticipating that the commission would be asked to address the shortage of primary care physicians, I assembled teams of investigators to assess the feasibility and desirability of expanding PCNPs' roles in primary care.

The workforce issues discussed most frequently among health policymakers, members of Congress, state legislators, and their staffs concern the quality

and costs of NPs and their potential to alleviate the shortage of primary care physicians. These issues guided the assessment of whether NPs can fix the labor supply problems among primary care providers. The specific questions on the minds of the policy community included:

- Geographically, where do primary care physicians practice, and where do PCNPs practice?
- How large are current shortages of primary care physicians? Will the primary care physician workforce increase or decrease in the future?
- Will the NP workforce grow in the future?
- Are PCNPs willing to accept people enrolled in Medicaid?
- How do the services that PCNPs provide compare to the services that PCMDs provide?
- Are there differences in the characteristics of people who are treated by PCNPs and PCMDs?
- What is the potential for NPs to increase access to primary care and help alleviate shortages and uneven distribution of primary care physicians?
- Do state-level regulatory restrictions placed on NPs limit Americans' access to primary care?

The answers to the above questions will help bring us toward a framework for more effective primary care.

This report describes key results of research conducted since 2011 that aimed to answer these questions. It integrates the studies' findings with the results of other published research and makes recommendations for both public and private policymakers on improving the capacity of the nation's primary care workforce. The results of these studies are presented as further proof of the benefits of using NPs to provide more Americans in more places with the primary care they need.

Solutions: Study Results

To address these questions, the research was divided into three areas of analysis: (1) assessing the contributions of NPs providing primary care, (2) projecting the supply of physicians and NPs while assessing the geographical disparities of the primary care workforce, and (3) revealing perceptions of the PCNP workforce. Each area focused on a different element of primary care shortages and how well NPs could address them. The focuses of each of these areas parallel the questions we set out to answer:

- The analysis of NP contributions identified the types, quantity, costs, and quality of primary care that NPs and physicians provide to Medicare beneficiaries. It also assessed whether state-level NP scope-of-practice restrictions affect the quality of primary care that Medicare beneficiaries receive.
- The projections and geographical analyses examined the geographic locations of the primary care physician and NP workforce, investigated barriers physicians face in locating their practice in rural locations, and projected the future supply of physicians and NPs.
- Assessing perceptions of NPs involved conducting a national survey of PCMDs and PCNPs to identify their practice characteristics and examine their attitudes, knowledge, and behavior on various themes, including shortages of primary care professionals, expanding the number of PCNPs, quality of care provided by PCNPs, responsibility for providing specific services and procedures, and career recommendations.

The most obvious and crucial question is whether NPs can provide the same quality and types of care that physicians currently provide. Driving down the cost of and increasing accessibility to health care is a worthwhile goal. But if the quality of primary care

provided by PCNPs is not up to par, they present a far less attractive remedy.

For these reasons, this report begins with the findings of the NP analysis team, which asked: What are the types, costs, and quality of primary care services provided by PCNPs, and how do they compare to the primary care provided by PCMDs? Are there differences in the characteristics of people treated by PCNPs versus PCMDs? And do state-level scope-of-practice restrictions on PCNPs affect the quality of primary care?

While hundreds of studies have assessed different ways that NPs contribute to providing primary care, there are lingering questions about the costs and quality of NP-provided care, questions not fully answered by prior studies. Consequently, it is difficult to generalize the results from many of these studies to broader populations, let alone make apples-to-apples comparisons between the care provided by NPs and physicians. In all, despite the large number of studies that showed favorable results for the care delivered by NPs (see Appendix A), there is room to learn more, improve and expand the measurement of primary care, make more direct comparisons between primary care clinicians, use different data to enable better generalization of results, and apply advanced statistical techniques to overcome methodological shortcomings.

What Types of Primary Care?

The analysis of NP contributions to primary care began with using Medicare claims and other Medicare administrative data to identify the number and distribution of PCNPs throughout the US who billed for care provided to Medicare beneficiaries. This was then used to describe the types, quantities, and overall costs of services that PCNPs provide and compare them to those that PCMDs provide.³²

Results showed that in 2008 approximately 45,000 NPs were providing services to Medicare beneficiaries and billing under their own national provider identification (NPI) number. NPs in rural states had the highest rates of billing under their own NPI numbers.

Findings also indicated that just over 80 percent of the payments that both PCNPs and PCMDs received were for evaluation and management services (i.e., new patient and established patient office visits, home visits, and nursing home visits). Relative to PCMDs, NPs had a significantly greater proportion of payments associated with procedures (9.1 vs. 4.6 percent), billed for fewer tests (4.8 vs. 5.8 percent), and had a lower proportion of their payments associated with imaging (1.3 vs. 3.9 percent). Overall, findings indicated there was great overlap in the types of primary care provided.

Who—what kind of American—was receiving PCNP-provided primary care through Medicare? Compared to beneficiaries receiving primary care from PCMDs, beneficiaries receiving primary care from PCNPs were significantly more likely to be female, younger, American Indian, nonwhite, dually eligible for Medicare and Medicaid (an important proxy for poverty), and qualified for Medicare due to a disability.

And where are these patients and providers located? The study revealed that PCNPs caring for Medicare beneficiaries were significantly more likely to practice in a federally designated Health Professionals Shortage Area and in rural areas compared to PCMDs. These findings are supported by the results of other investigators (see Appendix A), who have also found that NPs provide primary care to vulnerable populations and that PCNPs are more likely to practice in rural and underserved areas.

Costs of Primary Care

Because enrollment in Medicare will expand rapidly as baby boomers age, total Medicare spending will increase substantially in the years ahead. Consequently, providing access to health care without bankrupting the Medicare program is a growing concern.

The next study was undertaken to determine whether PCNPs can help address this concern, aiming to compare the costs of PCNPs and PCMDs providing primary care to Medicare beneficiaries. The study analyzed Medicare payment claims during a 12-month

period (2010), including claims for inpatient and outpatient care. It examined five measures of the cost of care, adjusted for differences in payment rates and severity of a patient's health condition.³³

Across all five measures, the study found that the cost of PCNP-provided care ranged between 11 percent and 29 percent less than the cost of PCMD-provided care. The gap was most pronounced for evaluation and management services—composing 80 percent of claims that PCMDs and PCNPs bill to Medicare. Beneficiaries treated by PCNPs who received such services cost Medicare 29 percent less than beneficiaries who received their primary care from PCMDs. The large differences in costs between PCNPs and PCMDs persisted even after taking into account that Medicare pays NPs at 85 percent of the rate of physicians for the same services.

Due to limitations inherent in using claims data, we could not fully investigate the reasons for the differences in costs. But we believe they may be explained in part by differences in the style of NP practice, as NPs tend to provide more holistic care relative to the more disease-and-cure orientation of many physicians. Preliminary evidence from ongoing analysis also suggests that PCNPs order about one-third fewer services, and they are more likely than physicians to use less expensive services.³⁴ Of course, if that reflected decreased quality of care, it would be a major problem for a proposal to expand NP practice.

As noted in Appendix A, this study is not the first to find that NPs provide cost-effective care.

Quality of Care

While numerous studies have concluded that NP-provided care is comparable and in some cases better than PCMD-provided care (see Appendix A), some of these studies analyzed a limited number of clinical conditions, did not adequately control for patient-selection biases and disease severity, and assessed quality measures over brief time periods, which makes it difficult to generalize results to broader populations. To address these concerns, the next study used national Medicare claims data from

2012 and 2013 to assess 16 indicators of the quality of primary care that PCNPs and PCMDs provided to Medicare beneficiaries. To include beneficiaries who may have received care by a team of PCNPs and PCMDs, the analysis covered a third group of beneficiaries who had received primary care services from both types of clinicians over a 12-month period.³⁵

Across all five measures, the study found that the cost of PCNP-provided care ranged between 11 percent and 29 percent less than the cost of PCMD-provided care.

Overall, study findings indicated that specific types of care were better when provided by PCNPs, and others were better when provided by PCMDs. For example, Medicare beneficiaries who received primary care from PCNPs were less likely than those cared for by PCMDs to have preventable hospital admissions, all-cause hospital readmissions within 30 days of being discharged, inappropriate emergency department visits, and low-value MRIs associated with low back pain. On the other hand, beneficiaries who received their primary care predominantly from PCMDs were more likely to receive slightly more of recommended chronic disease management services and cancer screenings (such as mammography screenings for breast cancer and colonoscopies for colorectal cancer).

The third group of beneficiaries, which received primary care from both PCNPs and PCMD, was expected to have received higher-quality care than those who received care from either a PCNP or PCMD alone. However, results indicated that in only one measure

was primary care improved: cancer screening. This suggests that the care these beneficiaries received was fragmented and not well coordinated.

Quality of Care Provided to Vulnerable Medicare Beneficiaries

As noted above, the first study using Medicare claims data found that PCNPs were significantly more likely than PCMDs to provide primary care to beneficiaries who had a disability or who were dually eligible for Medicaid and Medicare, a strong indicator of poverty.³⁶ With approximately 38 million Americans living with disabilities and several million in poverty, providing high-quality health care at a reasonable cost to the poor and disabled is a major and growing challenge.³⁷

Medicare and Medicaid often work in tandem to pay for dually eligible Americans. This kind of health care is disproportionately expensive: Dually eligible beneficiaries make up 20 percent of the Medicare population, but they account for 34 percent of Medicare spending.³⁸ They are also at increased risk of serious health problems, as they are more likely to have multiple comorbidities, such as diabetes, chronic lung disease, and Alzheimer's disease, and to self-report lower health status.³⁹

For all these reasons, the need for effective and cost-efficient solutions for primary care is particularly salient for dually eligible patients, whether disabled or simply low income. People with disabilities are less likely to receive recommended preventive care such as screenings for breast and cervical cancer.⁴⁰ On average, people with disabilities receive differential treatment for cancer and are more likely to receive potentially inappropriate medications.⁴¹ Similarly, low-income patients face significant access barriers to care and receive fewer screenings (such as colonoscopies) and preventive services (such as vaccinations).⁴²

Could increased practice by PCNPs help remedy this inequity? This question was addressed by using 2012 and 2013 Medicare claims data to identify and compare the quality of care provided by PCNPs and

PCMDs and received by beneficiaries in three subpopulations: (1) those who initially qualified for Medicare based on a disability, (2) dually eligible beneficiaries, and (3) beneficiaries who qualified initially by having a disability and were also dually eligible for Medicare and Medicaid.⁴³ The quality of primary care that these subpopulations received was examined across the same four domains of primary care noted above: chronic disease management, the incidence of adverse outcomes, preventable hospitalizations, and cancer screenings.

Results showed that when PCNPs cared for Medicare beneficiaries who were dually eligible or qualified for Medicare due to a disability, the beneficiaries had similar results to the larger study of Medicare beneficiaries reported above. Specifically, these vulnerable Medicare beneficiaries had a lower risk of preventable hospitalizations and emergency department use than those cared for by PCMDs. They also used fewer of other health care resources such as low-value imaging for low back pain. In addition, being managed by a PCNP helped beneficiaries in the area of chronic disease management, as these beneficiaries were no less likely than those treated by PCMDs to receive health care services consistent with established guidelines.

However, diabetic patients across these subpopulations who were cared for by PCNPs were less likely than those cared for by PCMDs to have eye screenings. The subpopulations served by NPs also received fewer cancer screenings.⁴⁴ These findings may be explained by unmeasured differences in patient characteristics, preferences for clinician type, clinician practice style, geographical access to screening technology (such as ease of obtaining mammograms in rural areas), care delivery patterns, organizational characteristics, and performance incentives that could not be measured and analyzed in the Medicare claims data.

Overall, the study's results suggest that increasing PCNP involvement in care could be a key policy strategy to expand access to primary care at a lower cost while not compromising quality for Medicare's most vulnerable beneficiaries.

Forecasts of Primary Care Workforce Supply and Location

The key findings of the studies we conducted, briefly summarized in this section, are:

- On the eve of the 2014 ACA insurance expansions, rural areas throughout the country had the highest numbers of uninsured people, particularly in non-Medicaid-expanding states.
- PCNPs, though fewer in number than PCMDs, are more likely to practice in rural areas than are physicians.
- People living in states that do not restrict NP scope-of-practice had significantly greater geographic access to primary care.
- Between 2016 and 2030, the size of the NP workforce will increase dramatically, growing 6.8 percent annually, compared to 1.1 percent growth of the physician workforce. Combined, the physician and NP workforce will increase by approximately 400,000 by 2030. NPs will account for 61 percent of this growth (240,000 workers).
- The number of physicians practicing in rural areas has been decreasing since 2000, and this decline will continue through 2030 while rural populations age and need more health care.
- The proportion of physicians married to highly educated spouses has grown dramatically over the past 50 years, and these physicians are significantly less likely to practice in rural shortage areas.
- The supply of physicians practicing in rural areas decreased by 15 percent between 2000 and 2016 and is forecasted to decline further through 2030.

Can PCNPs help remedy the acute shortage of primary care in rural areas? The first study conducted to

answer this question focused on identifying the geographic location of individuals who were newly eligible for the ACA's insurance expansions starting in January 2014. It assessed whether geographic access to primary care clinicians differed across urban and rural areas and across states with varying scope-of-practice laws.⁴⁵ The study also constructed a detailed understanding of the geographic location of primary care clinicians—physicians, NPs, and physician assistants (PAS)—on the eve of the ACA's insurance expansions.

Findings showed that, in 2014, large urban areas had 131 uninsured people per primary care clinician, whereas the most rural areas of the country had 357 uninsured people per primary care clinician. The number of uninsured was considerably higher in the states that did not expand Medicaid enrollment as of January 2015: Rural areas of non-expanding states averaged 441.1 uninsured per primary care clinician compared with 192.8 per primary care clinician in similar areas of Medicaid-expanding states. Furthermore, and importantly for our policy prescriptions, primary care physicians were more likely to be concentrated in urban areas, while PCNPs were more likely to be located in rural areas with more uninsured people.

Finally, geographic access to primary care was significantly higher in states that did not restrict NP scope-of-practice compared to those that did: 63 percent of people living in nonrestrictive states had geographic access to counties with a high capacity of primary care clinicians compared to 34 percent of people living in states that restricted NP scope-of-practice. Results also showed that states with restricted NP scope-of-practice had 40 percent fewer NPs compared to those without. These findings suggest that lifting state-level scope-of-practice restrictions on NPs would, over time, increase access to primary care, particularly in rural areas. As shown in Appendix A, other studies have also reported similar findings.

Two additional economic studies focused on projecting the future national supply of physicians and NPs. Applying a peer-reviewed cohort supply model developed in 2000 and used in many studies of the nurse and physician workforces, we analyzed trends

since 2000 in the supply of physicians, NPs, and PAs, and forecasted changes in the supply of each profession through 2030.⁴⁶

Results show healthy numbers of NPs entering the workforce, with minimal growth in the physician population. The study found that between 2010 and 2016, the rate of growth for NPs accelerated to 9.4 percent annually, while growth in the number of PAs slowed to 2.5 percent. During this same period, annual growth in the number of physicians dropped to 1.1 percent. Since 2001, the combined number of NPs and PAs per 100 physicians nearly doubled, increasing from 15.3 to 28.2.⁴⁷

Results also showed that states with restricted NP scope-of-practice had 40 percent fewer NPs compared to those without.

As for the future, regarding the physician shortage that concerns workforce analysts, we found that, between 2016 and 2030, the number of physicians is expected to grow slightly more than 1 percent annually due to the aging and retirement of the physician workforce and the lack of younger physicians to replace them. However, the number of NPs and PAs is projected to grow 6.8 percent and 4.3 percent, respectively, due largely to the number of young people entering these professions. As a result, the workforce will add an estimated combined 477,000 physicians, NPs, and PAs. NPs will contribute nearly 50 percent of this total growth. The combined number of NPs and PAs per 100 physicians will double to about 56.4 by 2030.⁴⁸

In a different study, we focused on the location of the physician workforce, examining a different factor:

whether a physician has a highly educated spouse and whether such physicians were less likely to work in rural and underserved areas.⁴⁹ Guiding the study was the hypothesis that highly educated dual-career households would more easily accommodate both spouses in large metropolitan areas.

Analyzing data going back to 1960, the study found that physicians were increasingly likely to be married to highly educated spouses—those with an M.D., Ph.D., or graduate degree. The proportion of married physicians whose spouse was highly educated increased steadily from 9 percent in 1960 to 54 percent in 2010. In every year over this period, approximately one-third of physicians' spouses who held graduate degrees were themselves physicians. The increased likelihood of having a spouse with a graduate degree occurred partly because women were a growing proportion of married physicians (from 4 percent in 1960 to 31 percent in 2010) and because female physicians were far more likely than male physicians to be married to a spouse with a graduate degree (68 percent of women versus 48 percent of men in 2010).

Study results showed that physicians married to a highly educated spouse were significantly less likely to live and practice in rural shortage areas. Further, the study found that younger physicians were more likely to be married to a highly educated spouse than physicians born before the 1980s.⁵⁰ Taken together, these findings point to an increasingly strong demographic headwind facing rural health workforce policy. Overcoming the challenges in enticing physicians to move to rural and medically underserved areas will be an increasingly steep uphill climb.

The final physician forecasting study that the economics team conducted examined trends in the number of physicians who practice in rural versus non-rural areas.⁵¹ Results showed that the number of physicians per capita in rural areas declined 15 percent between 2000 and 2016 compared to 8 percent growth in non-rural areas.

This is due largely to the aging of physicians working in rural areas and the scarcity of new, younger physicians in rural areas. The number of physicians under 50 practicing in rural areas declined from 9.4 physicians per 10,000 residents to 5.6 physicians

per 10,000 people, a decrease of over 40 percent. As a consequence, the number of physicians practicing in rural areas decreased from 14 per 10,000 people in 2000 to 12 per 10,000 people in 2016.

Looking ahead, we forecast that the number of physicians practicing in rural areas will continue decreasing to 9.0 physicians per 10,000 people in 2030, a drop of 35 percent from 2000 and 23 percent relative to 2016 when the rate was 11.7 physicians per 10,000 people. Meanwhile, the number of non-rural physicians is projected to remain steady at just under 31 per 10,000 people, roughly the same proportion observed for 2016.

How Do State-Level Restrictions Affect Access to and Quality of Care?

Health care economist Paul Feldstein describes at least five types of legislative or regulatory strategies a health care professional association may pursue to further its members' self-interest. These strategies include (1) securing policies that increase demand for services provided by its members, (2) maximizing reimbursement or payment for services provided by its members, (3) decreasing the price or increasing the quantity of complementary health professionals, (4) decreasing the availability or increasing the price of substitute providers, and (5) restricting the supply of professions that may compete with its members. These policies are often justified on the grounds of protecting the public from low-quality health care.⁵²

Regarding NPs, this framework suggests that some primary care physicians would conceivably support state regulations that limit the supply of NPs, restrict the types of services NPs provide to decrease possible competition with physicians, and require that physicians supervise NPs, so that NPs practice as an economic complement rather than as a substitute. A new study on physician political spending and state-level occupational licensing supports these hypotheses. Results showed that increased spending by physician interest groups increased the probability that a state maintains licensing laws that restrict NPs' practice.⁵³

This conceptual framework led us to investigate two means by which a state's NP scope-of-practice laws could influence the quality of care that PCNPs provide. First, the study assessed whether the quality of primary care provided by PCNPs was better in states that either reduced or restricted NP practice than in states with no such restrictions. Higher-quality care in reduced and restricted states would suggest that restrictions do protect quality of care—a position that some physician groups advocate. Drawing on the above studies—which found that beneficiaries receiving care from NPs had lower rates of preventable hospitalization, hospital readmissions, emergency department visits, and low-value care—this study also investigated whether beneficiaries living in restrictive states would have less access to NP-provided primary care and more preventable hospital admissions, readmissions, emergency department use, and low-value care than those living in nonrestrictive states.⁵⁴

We used the AANP's system to divide states into the three aforementioned categories: full practice for NPs, reduced practice, and restricted practice. The AANP classification system is useful for several reasons. It is well established, is updated annually or more often, uses generally consistent definitions of a regulation's level of restrictiveness over time, started in the same year (2013) as the Medicare claims data used in the study, and captures the full range of activities and supervision requirements states have regulated.

Overall, using the AANP classification system, results provided no evidence that state-level scope-of-practice restrictions were related in any consistent or discernable way to the quality of care that PCNPs provide. There was no difference in the quality of care that Medicare beneficiaries received between states that reduced or restricted NP scope-of-practice and states that did not restrict NP scope-of-practice. To ensure the robustness of this result, a sensitivity analysis using each of five different scope-of-practice classification systems reported in the literature also found no consistent or discernable pattern.

Finally, study results showed greater use of outpatient services for beneficiaries cared for by both

PCNPs and PCMDs in full practice states, as well as lower rates of hospitalization, readmission, and emergency department use.⁵⁵ These findings provide further evidence that beneficiaries living in full scope-of-practice states have greater access to care.

The Future of Primary Care Providers: Attitudes, Knowledge, and Behavior

Understanding the future of PCMDs and NPs relies on projections for their fields: What kind of people are, and will grow to be, PCMDs and NPs? Where, how much, and for what pay do they work?

Our national survey of PCNPs and PCMDs (the first national survey of both types of clinicians) provides information to help address these questions.⁵⁶ The survey (61.2 percent response rate) gathered information on the practice characteristics of PCNPs and PCMDs. It also collected data on the attitudes, knowledge, and behavior of both types of clinicians toward shortages in the primary care workforce, the impact of expanding the number of PCNPs, NP scope-of-practice, quality of care, responsibility for providing specific services and procedures, job satisfaction, willingness to recommend a career in health care, and other issues. Key characteristics of sampled PCNPs and PCMDs include:

- On average, PCNPs are older but have five fewer years of experience than PCMDs.
- PCNPs work in a greater variety of health care delivery settings (community clinics, schools and universities, offices, parishes, prisons, etc.) than do PCMDs.
- The majority of PCNPs (81 percent) reported working with PCMDs, while 13 percent work independently of physicians. Additionally, 41 percent of PCMDs said they work with PCNPs.
- On average, PCNPs work fewer hours per week than PCMDs (37 hours versus 46 hours) and see fewer patients per week (67 patient visits versus 89 patient visits).

- PCNPs, alone and working with PCMDs, are more likely to treat vulnerable populations, including those on Medicaid, and to accept new Medicaid patients.
- Both types of primary care clinicians spend their time in nearly identical ways and provide similar services, but 56 percent of PCNPs received a fixed salary versus 24 percent of PCMDs. Only 14 percent of PCNPs had their salary adjusted for productivity or quality performance, whereas 50 percent of PCMDs received such salary adjustments.
- PCNPs reported that government and local regulations impede their ability to admit patients to hospitals, make hospital rounds on patients, and write treatment orders in hospitals and long-term care facilities.

In several areas, survey results indicated that physicians' attitudes as individuals do not match their behaviors as a group. Regarding NP scope-of-practice, most PCMDs (77 percent) agree that PCNPs should practice to the full extent of their education and training. However, they do not agree that a primary care practice led by an NP should be eligible to be certified as a medical home, that NPs should be legally allowed to have hospital-admitting privileges, or that they should be paid the same as physicians for providing the same services.

Asked whether expanding the supply of NPs would affect quality of care (measured by the Institute of Medicine's six aims for improving quality of health care and Triple Aim goals), large majorities of PCNPs reported that all dimensions of quality would be better. PCMDs' responses were more diverse and less enthusiastic, with about one-third saying that expanding the supply of NPs would make the safety and effectiveness of care worse. Surprisingly, when asked, "Given what you know about the state of health care, would you advise a qualified high school or college student to pursue a career as a PCNP or PCMD?" PCMDs were more likely to recommend being a PCNP than they would a PCMD (65 versus

51 percent), possibly reflecting physician burnout and dissatisfaction. But perhaps the survey finding that tells the story best is this: When asked how increasing the number of NPs would affect physician employment, 57 percent of PCMDs said their income would decrease, and three-quarters agreed they could be replaced by PCNPs.

Why Removing Restrictions on NPs Helps Remedy the Primary Care Shortage

From this overview of the research program conducted on the primary care NP and physician workforces, supported by the studies listed in Appendix A, several conclusions and observations are apparent.

First, it is unrealistic to rely on or expect the physician workforce alone to provide the primary care Americans need. Significant time, effort, and resources have been spent over many decades on various public and private policies to increase the supply and geographic reach of primary care physicians, yet today there is a growing national shortage of such physicians and continued uneven geographic distribution of primary care. These realities mean tens of millions of Americans lack adequate access to beneficial primary care services, often enduring significant delays before obtaining care. Hit particularly hard are people in rural and underserved areas, who are generally older, less educated, poorer, and sicker—the very populations who need primary care the most.

As large numbers of primary care physicians retire over the next decade and demand increases for primary care, current shortages of primary care are projected to worsen, and fewer physicians will be practicing in rural areas. The even-larger projected shortage of specialist physicians will only make matters worse, as many specialists provide considerable amounts of primary care. And, as the proportion of physicians who are married to highly educated spouses increases, the already formidable challenges of attracting physicians to rural and Health Professional Shortage Areas will become even more daunting.

In contrast, studies of the PCNP and PCMD workforces find that the number of PCNPs has been growing much more quickly than the physician workforce.

The number of PCNPs will increase dramatically, while the number of PCMDs will grow little through 2030. And PCNPs are more likely to practice in rural areas, where the need is greatest.

When assessing state-level restrictions on NPs, our study showed that populations in states with reduced or restricted practice of NPs had significantly less geographic access to PCNPs. This finding has also been reported by others, indicating the role state regulations have in influencing access to primary care (Appendix A).⁵⁷ Clearly, state-level restrictions impede access to and quality of primary care. This alone should be cause for concern among policymakers seeking to improve public health.

Using different data and methods, the studies described in this report consistently show that PCNPs are significantly more likely than PCMDs to care for vulnerable populations. Nonwhites, women, American Indians, the poor and uninsured, people on Medicaid, those living in rural areas, Americans who qualified for Medicare as a disability, and dual-eligibles are all more likely to receive primary care from PCNPs than from PCMDs. PCNPs working independently of PCMDs and those working with them are more likely to accept Medicaid recipients, take care of those without insurance, and accept lower payments than are PCMDs who do not work with PCNPs.

Another major finding of this body of research is that, after controlling for differences in patient severity and sociodemographic factors, the cost of care provided to Medicare beneficiaries by PCNPs was significantly lower than primary care provided by PCMDs. Even after accounting for the lower payment PCNPs receive relative to PCMDs, the cost of PCNP-provided care was still significantly lower. Taken together, these findings paint a favorable picture of PCNPs' contributions.

However, the viability of increased reliance on PCNPs still depends on the simple question at the core of this project: Can PCNPs provide health care of comparable quality to that provided by PCMDs? Our studies showed that beneficiaries who received their primary care from PCNPs consistently received significantly higher-quality care than PCMDs' patients with respect to decreasing hospital admissions,

readmissions, emergency department use, and ordering of low-value care (specifically, MRI images for low back pain). While beneficiaries treated by PCMDs received slightly more services involved in managing chronic diseases than those receiving primary care from PCNPs, the differences were marginal.

State-level NP scope-of-practice restrictions do not help protect the public from subpar health care.

These results held when vulnerable populations of Medicare beneficiaries were analyzed separately and compared to those cared for by PCMDs. In fact, the differences in quality of chronic disease management between PCMDs and PCNPs narrowed considerably, and some disappeared altogether. These results align with the findings of many other studies conducted over the past four decades.

Furthermore, state-level NP scope-of-practice restrictions do not help protect the public from subpar health care. Analysis of different classifications of state-level scope-of-practice restrictions provided no evidence that Medicare beneficiaries living in states that imposed restrictions received better quality of care.⁵⁸ Some physicians and certain professional medical associations have justified their support for state regulations to limit NP scope-of-practice on the grounds that they are necessary to protect the public from low-quality providers and to assert that physicians must be the leaders of the health care team. We found no evidence to support their claim, as others have also recently reported.⁵⁹ Further, our analysis showed that Medicare beneficiaries living in states with reduced or restricted NP scope-of-practice used more resources (hospitalizations, readmissions, and emergency department admissions sensitive to

primary care) than did beneficiaries living in states without such restrictions, indicating that these beneficiaries had less access to the positive contributions of PCNPs.

Despite this body of evidence, our national survey of primary care clinicians revealed that around one-third of PCMDs believe increasing the number of PCNPs would impair the safety and effectiveness of care. This could indicate that physicians are not aware of the findings of research. Alternatively, it should be called what it is: an excuse for a barrier to entry, meant to protect some physicians' narrow interests. And it comes at the expense of effective primary care for many Americans who need it.

The evidence leads to three recommendations that can help overcome the growing challenges facing the delivery of primary care in the US. Each recommendation is geared toward a different group: public policymakers, private policymakers, and PCMDs and PCNPs themselves.

1. Private policymakers—including hospital boards of directors, established and emerging integrated health care–delivery systems (e.g., large hospital-based systems and accountable care organizations), private commercial and not-for-profit insurers, health care and hospital associations, health education associations, and health care foundations—should develop forums to bring PCNPs, PCMDs, and their respective state and local associations together to engage in meaningful dialogue. Hospital boards and credentialing bodies should allow NPs to practice to the fullest extent of their training and ability. The evidence suggests this will be a great service to people lacking access to care and to the solvency of Medicare. Doctors (as individuals) overwhelmingly favor allowing NPs to practice to the full extent of their education and training. This can become a reality on a hospital-to-hospital, health-system-to-health-system basis.
2. Physicians must understand that NPs, too, are providing health care to those in need. NPs and physicians should work together to better

understand each other. It may behoove individual physicians and nurses to discuss how, together, disagreements can be better managed, even resolved. This could be a first step toward building a relationship that allows for roles and practices to evolve—that *respects* each other’s strengths and ultimately leads to a workforce that is *more responsive* to communities’ health needs, particularly in rural and underserved areas and among vulnerable populations.

3. Public policymakers: Drop the restrictions on PCNP scope-of-practice! These are regressive policies aimed at ensuring that doctors are not usurped by NPs, which is not a particularly worthwhile public policy concern, especially if it comes at the expense of public health. The evidence presented here suggests that scope-of-practice restrictions do not help keep patients safe. They actually decrease quality of care overall and leave many vulnerable Americans without access to primary care. It is high time these restrictions are seen for what they are: a capitulation to the interests of physicians’ associations.

Conclusion

The evidence discussed in this report points to a commonsense solution to primary care workforce-supply problems. The NP workforce is growing, far outpacing

the growth of the primary care physician labor force. NPs are more likely to work in rural areas, which already do and will increasingly need more primary care providers. They are more likely to serve poor and vulnerable Americans, and their services cost less. Most importantly, they provide primary care of equal or better quality compared to physicians.

For all those reasons, scope-of-practice restrictions should be lifted in states across the country, and health care administrators should allow NPs to take on expanded roles in primary care settings. For the health of Medicare and millions of people, NPs must be allowed to provide primary care to more Americans.

About the Author

Peter Buerhaus is a health care economist and professor of nursing at Montana State University and a member of the American Academy of Nursing and the National Academy of Medicine.

Acknowledgments

The author acknowledges the extraordinary team of researchers who worked so hard to carefully conduct the studies described in this report and the many physicians, nurse practitioners, and physician assistants who work together seamlessly to provide the primary care needed by so many people in this country.

Appendix A

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