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Rural And Nonrural Primary Care Physician Practices Increasingly Rely On Nurse Practitioners

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ABSTRACT The use of nurse practitioners (NPs) in primary care is one way to address growing patient demand and improve care delivery. However, little is known about trends in NP presence in primary care practices, or about how state policies such as scope-of-practice laws and expansion of eligibility for Medicaid may encourage or inhibit the use of NPs. We found increasing NP presence in both rural and nonrural primary care practices in the period 2008–16. At the end of the period, NPs constituted 25.2 percent of providers in rural and 23.0 percent in nonrural practices, compared to 17.6 percent and 15.9 percent, respectively, in 2008. States with full scope-of-practice laws had the highest NP presence, but the fastest growth occurred in states with reduced and restricted scopes of practice. State Medicaid expansion status was not associated with greater NP presence. Overall, primary care practices are embracing interdisciplinary provider configurations, and including NPs as providers can strengthen health care delivery.

Multidisciplinary configurations of providers are an important component of high-functioning primary care teams.¹ An appropriate and timely response to rising demand for primary care services within the United States requires better deployment of the existing workforce and greater use of interdisciplinary models of care. However, there are challenges to ensuring an adequate supply of primary care providers. The number of physicians choosing primary care careers remains insufficient to replace those retiring.^{2,3} This concern is especially acute in rural areas with long-standing provider shortages.⁴ Thus, it is plausible that practices will increase the use of providers other than physicians, such as nurse practitioners (NPs; registered nurses with advanced education and clinical training), to build workforce capacity and address ongoing supply concerns.³

Approximately 234,000 NPs are licensed in

the US.⁵ In primary care, NPs can deliver most of the services that physicians provide,⁶ and a series of studies has found that primary care delivered by NPs is safe and of high quality.⁷ Additionally, a study of Medicare beneficiaries revealed that primary care delivered by NPs costs less than that delivered by physicians.⁸ Patient satisfaction with care provided by NPs is high, and patients' willingness to be seen by NPs is growing.^{7,9} Thus, there is potential for greater use of NPs in primary care settings to meet increasing demand.

Two timely and relevant policy contexts pertaining to primary care NP workforce issues are NP scope of practice and expansion of eligibility for Medicaid. Scope of practice is regulated by states and determines an NP's ability to practice and prescribe medications with or without physician collaboration or supervision. The Institute of Medicine¹⁰ and others^{11,12} have called for the removal of scope-of-practice restrictions for NPs as one way to optimize the workforce. Research

has found that the least restrictive practice environments are associated with greater NP availability,¹³ especially in primary care.^{14,15} Importantly, no research has shown an erosion of quality when scope-of-practice restrictions are removed.^{13,16} Recent state expansions of eligibility for Medicaid under the Affordable Care Act (ACA) have led to an increased number of newly insured people seeking care.¹⁷ This may put additional strain on the existing primary care workforce¹⁸ that could be alleviated, at least in part, through better use of NPs. Related evidence further suggests that NPs are more likely to care for Medicaid beneficiaries than primary care physicians are¹⁹ and can improve willingness to accept new Medicaid patients among physician practices employing NPs.²⁰

Despite this confluence of contemporary health care challenges and policy issues, little is known about whether and how NPs have been incorporated into primary care practices in recent years. We analyzed SK&A provider files for 2008–16 to examine the extent to which NPs were working in primary care physician practices in both rural and nonrural settings during that period. While the SK&A data provide extensive information on physician practices and have been used to examine practice attributes,^{20,21} this is the first study to leverage these data to capture changes in provider configurations over time.

We report trends for all providers (physicians, NPs, and physician assistants) within practices. Physician assistants are an important component of the primary care workforce, and the quality of care that they deliver has been found to be equivalent to that of care delivered by NPs and physicians.²² With the SK&A data, we had the opportunity to examine trends in NP and physician assistant presence separately. These data contrast with other sources that do not distinguish between the two groups and may fail to account for differences in aggregate supply and thus limit the evaluation of provider-specific state regulations.²³

Study Data And Methods

SK&A is a commercial data set that includes practice-level characteristics of office-based physician practices in all fifty states and the District of Columbia. Practices were determined to be primary care if at least two-thirds of their physicians had a primary care specialty.¹⁴ Primary care specialties included family practice, general practice, geriatrics, internal medicine, and pediatrics. We merged our SK&A data with information from the Area Health Resources Files to obtain each practice's rurality, as indicated by a binary variable developed using core-based sta-

tistical areas.²⁴

We created a three-category measure of NP scope of practice based on states' requirements for NPs to maintain a collaborative agreement with a physician for practice, prescriptive authority, or both.^{15,25–28} States were designated as having *restricted* scopes of practice if an NP was required to maintain collaborative agreements for practicing and prescribing, *reduced* scopes of practice if a collaborative agreement was required for prescriptive authority only, and *full* scopes of practice if no collaborative agreements were required (see online appendix exhibit A1).²⁹ Medicaid expansion was a binary variable that indicated whether or not a state expanded Medicaid at any time during the study period (appendix exhibit A2).^{29–31}

Analyses included the counts and proportions of NPs, physicians, and physician assistants in primary care, as well as the number and percentage of primary care practices that employed NPs. We used simple regressions, analysis-of-variance tests, and chi-square tests to compare differences in trends over time (see appendix exhibit A3 for practice summary statistics).²⁹ Scope-of-practice analyses did not include thirteen states that removed scope-of-practice restrictions in the period 2008–16: Colorado, Connecticut, Delaware, Hawaii, Maryland, Massachusetts, Minnesota, Nebraska, Nevada, New York, North Dakota, Rhode Island, and Vermont. Examining NP presence in states where policy did not change offered a consistent sample to use in observing trends.

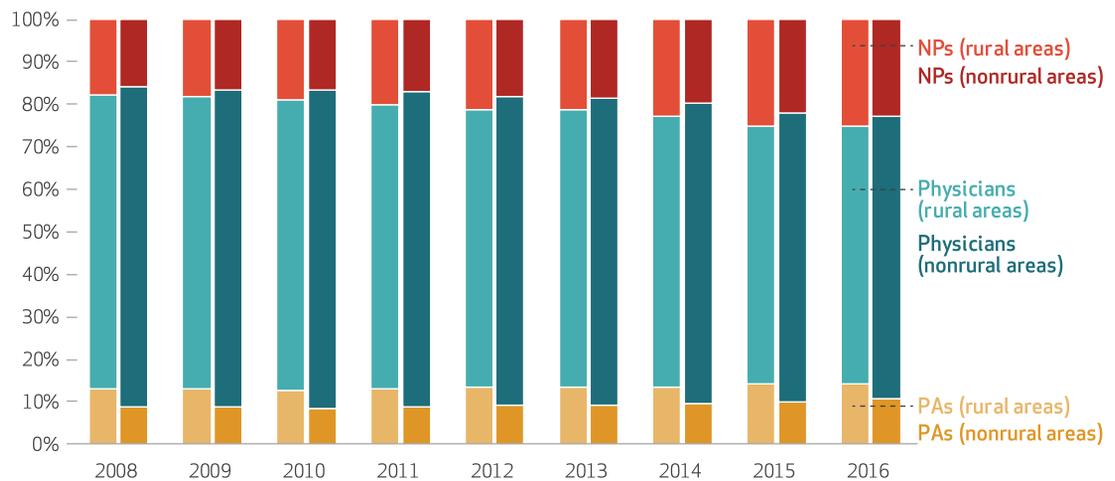
This study had a number of limitations. First, although SK&A data include close to the entire universe of US physician practices, they do not include NP-focused practices (that is, independent and nurse-managed practices). Data on such practices do not exist in any commonly available data source. Second, we could not determine whether an individual provider worked full or part time or what services they delivered within practices. However, these limitations did not undermine the strength of using these data to examine provider trends, as SK&A data have been used successfully in modeling physician supply³² and provide information about NPs separately from other providers, which allows for a more accurate examination of provider trends.

Study Results

PROVIDER CONFIGURATION We found a growing presence of NPs among rural practices. From 2008 to 2016, NPs increased from 17.6 percent of providers in rural areas to 25.2 percent (exhibit 1)—a significant increase of 43.2 percent from 2008. In comparison, physicians saw a rel-

EXHIBIT 1

Primary care provider mix in rural and nonrural settings, 2008–16



SOURCE Authors' analysis of data for 2008–16 from SK&A and the Area Health Resources Files. **NOTES** Rural location was established using core-based statistical areas from the Office of Management and Budget. Based on analysis-of-variance tests, the following changes in share of providers from 2008 to 2016 were significant: Nurse practitioners (NPs) increased in both rural and nonrural areas ($p < 0.001$), and physicians decreased in both rural and nonrural areas ($p < 0.001$). The changes over time in the share of physician assistants (PAs) were nonsignificant in rural areas and small in nonrural areas ($p < 0.01$).

ative decrease of 12.8 percent (from 69.4 percent to 60.5 percent), although they still accounted for the largest proportion of providers in rural areas. The percentage of physician assistants remained fairly consistent in rural areas: There was a nonsignificant increase from 13.0 percent to 14.4 percent during the study period.

Although NP presence remains limited in nonrural settings, an upward trend did occur in later years in nonrural settings, from 15.9 percent in 2008 to 23.0 percent in 2016 (an increase of 44.7 percent). The share of physicians in nonrural areas declined by 11.8 percent (from 75.2 percent to 66.3 percent). The share of physician assistants, the smallest provider group in our sample, increased only slightly (from 8.9 percent to 10.8 percent) (see appendix exhibit A4 for provider samples).²⁹

NURSE PRACTITIONER PRESENCE We also examined the increases in the percentage of practices with NPs and the average number of NPs per practice, since the increase in NPs among primary care providers could be driven by practices' increasing their number of NPs, hiring their first NP, or both.

Across all study years, a significantly higher percentage of rural practices employed at least one NP, compared to nonrural practices (exhibit 2). From 2008 to 2016, NP presence increased in rural practices from 31.4 percent to 43.4 percent and in nonrural practices from 18.3 percent to 26.5 percent; the trends were statistically different. The average number of NPs increased

significantly in both rural (from 1.34 to 1.64) and nonrural practices (from 1.47 to 1.67). Thus, both the fraction of practices with NPs and the number of NPs per practice had upward trajectories.

SCOPE OF PRACTICE From 2008 to 2016, rural practices in states with full scopes of practice generally had the highest percentages of practices with NPs, increasing from 35.0 percent to 45.5 percent (exhibit 3). Growth also occurred in rural practices in states with reduced (from 30.7 percent to 46.0 percent) and restricted scopes of practice (from 29.9 percent to 42.3 percent). The relative increases in rural practices with NPs were 30.2 percent in full, 49.8 percent in reduced, and 41.3 percent in restricted scope-of-practice states. Differences in trends were significant between states with full and reduced scopes of practice, but nonsignificant between states with full and restricted scopes of practice. By 2016, NP presence in rural practices in states with full scopes of practice was nearly equal to that in states with reduced scopes of practice.

Growth in NP employment also occurred in nonrural practices within each state scope-of-practice group, but the levels remained below those in rural practices. From 2008 to 2016, the highest percentages of nonrural practices with NPs were in states with full scopes of practice, increasing from 26.5 percent to 36.0 percent. The percentage of nonrural practices with NPs increased in states with reduced (from 17.4 percent to 27.6 percent) and restricted

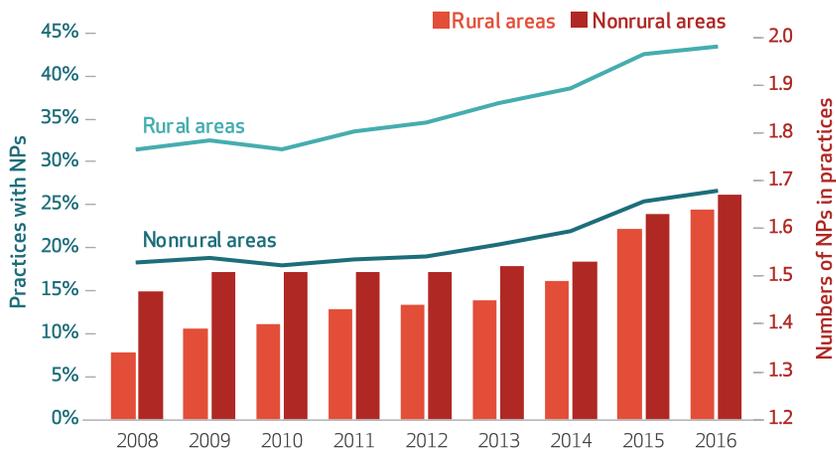
scopes of practice (from 17.4 percent to 25.8 percent). The relative increases in nonrural practices with NPs were 35.6 percent in states with full, 58.9 percent in states with reduced, and 48.8 percent in restricted scopes of practice. Mirroring results seen in rural practices, differences in nonrural practice trends were significant between states with full and reduced scopes of practice, but nonsignificant between states with full and restricted scopes of practice. Similar findings emerged when we included the thirteen states that removed scope-of-practice restrictions during the study period (appendix exhibit A5).²⁹

MEDICAID EXPANSION Next, we observed trend differences in NP presence in Medicaid expansion and nonexpansion states, which could reflect changing health care workforce needs among states. Again, rural status was associated with greater NP presence, but Medicaid expansion status had little bearing on it (exhibit 4).

Further, we considered relative changes in the percentage of a state's population on Medicaid from 2008 to 2016. We examined NP presence in states that experienced a big change (top quartile) in their Medicaid population compared to those with a small change (lower quartiles) (appendix exhibit A6).²⁹ Rural status remained associated with NP presence, but no clear pattern emerged between NP presence and changes in Medicaid population. Finally, when we strati-

EXHIBIT 2

Percentages of primary care practices with nurse practitioners (NPs) and average number of NPs in primary care practices in rural and nonrural areas, 2008-16

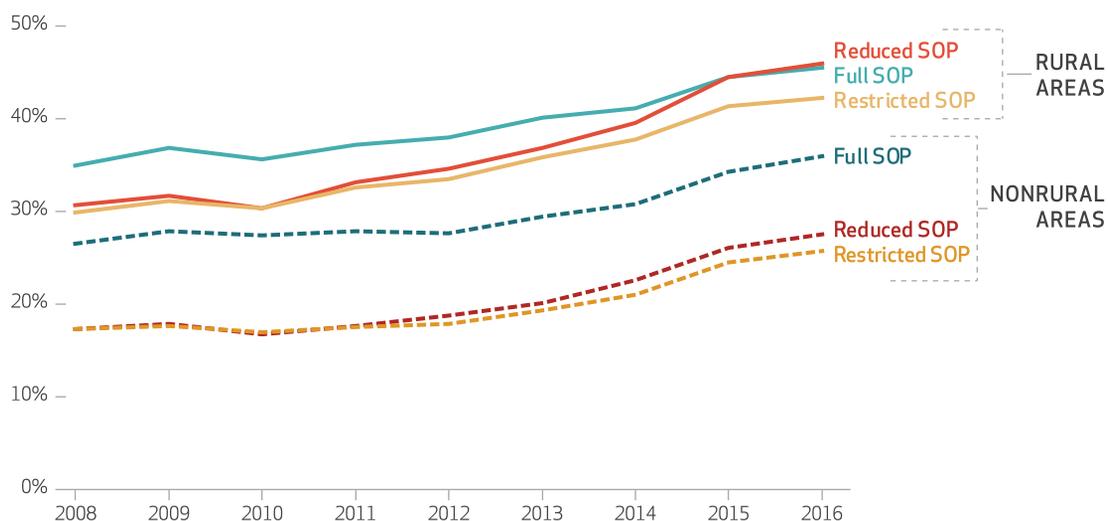


SOURCE Authors' analysis of data for 2008-16 from SK&A and the Area Health Resources Files. **NOTES** Rural location was established using core-based statistical areas from the Office of Management and Budget. Based on analysis-of-variance tests, differences in trends over time in the percentages of rural and nonrural practices with NPs and growth over time in the average numbers of NPs in rural and nonrural practices were significant ($p < 0.001$).

fied Medicaid expansion by NP scope of practice, we found results similar to those shown in exhibits 3 and 4 (see appendix exhibit A7).²⁹

EXHIBIT 3

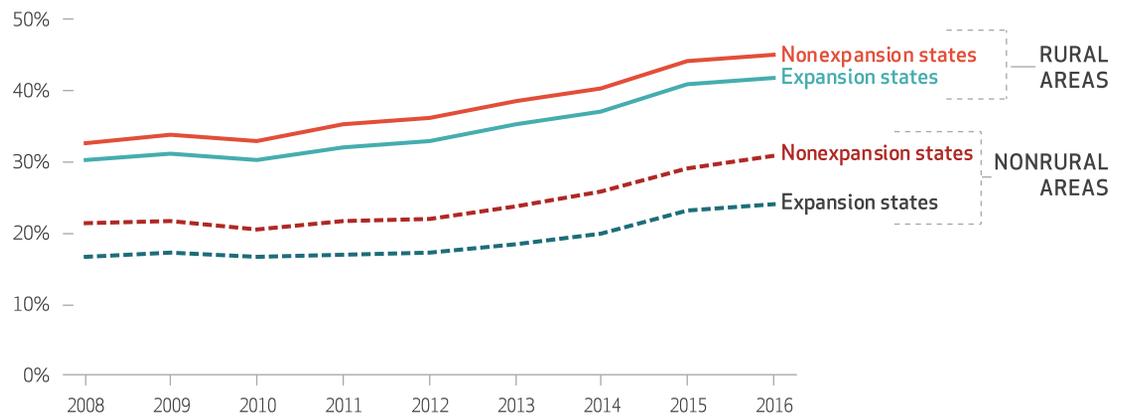
Percentages of primary care practices with nurse practitioners in rural and nonrural areas, by scope of practice (SOP), 2008-16



SOURCE Authors' analysis of data for 2008-16 from SK&A and the Area Health Resources Files. **NOTES** Thirteen states that adopted full or reduced SOP (with restricted SOP, explained in the text) during the study period were eliminated from the analyses (see the text for states). Rural location was established using core-based statistical areas from the Office of Management and Budget. Differences in trends over time were significant: in rural areas, full SOP versus reduced SOP ($p < 0.001$); in nonrural areas, full SOP versus reduced SOP ($p < 0.05$).

EXHIBIT 4

Percentages of primary care practices with nurse practitioners, by state Medicaid expansion status, 2008–16



SOURCES Authors' analysis of data for 2008–16 from SK&A and the Area Health Resources Files; Advisory Board. Where the states stand on Medicaid expansion (note 30 in text); and the Kaiser Commission on Medicaid and the Uninsured. States getting a jump start on health reform's Medicaid expansion (note 31 in text). **NOTES** Medicaid expansion status refers to whether or not a state expanded eligibility for Medicaid through the Affordable Care Act. Rural location was established using core-based statistical areas from the Office of Management and Budget. Differences in trends over time between expansion and non-expansion states were non-significant in rural areas and significant ($p < 0.001$) in nonrural areas.

Discussion

Using national, practice-level data for a period of nine years, we found increasing NP presence in rural and nonrural primary care practices. Additionally, provider configuration, especially in rural areas, has evolved to include more NPs, and there is some evidence that the pace has accelerated in recent years. The increase in NP presence seems to operate largely independent of state Medicaid expansion status. However, clear differences were seen across scope-of-practice environments, with faster NP growth in states with reduced and restricted scopes of practice, compared to states with full scopes of practice. These patterns could be due to the Medicaid expansion's being somewhat aligned with scope of practice. NP presence may be greater in non-expansion states because the majority of these states had restricted or reduced NP scopes of practice (this includes Nebraska, which had restricted scope of practice until 2015) (appendix exhibit A1).²⁹ Whereas, of the thirty-two states that expanded Medicaid, nineteen had full scopes of practice throughout the study period ($n = 8$) or adopted it during the period ($n = 11$). Thus, the relation between Medicaid expansion and NP scope of practice may reflect other changes in states' primary care workforces or population needs. As policy makers and clinicians promote efforts to improve care delivery and ensure efficient use of the workforce, particularly in settings that struggle to attract and retain providers, our results provide new evidence of the increasingly interdisciplinary character of primary care.

Our results are supported by findings from previous analyses that showed greater NP presence in rural than nonrural primary care.^{33–35} However, our study extends prior work through the use of data collected repeatedly over time, which allowed us to identify practice-level trends in NP presence. A strength of our analyses was our ability to identify and examine NPs separately, as opposed to examining total NP counts. In general, data limitations for conducting NP-focused research include lack of longitudinal information and the inability to identify individual NPs.^{35,36} Commonly used publicly available data provide national and regional counts of NPs³³ or pool NPs with other providers.^{23,34} Thus, these features of the SK&A data advance research focused on NPs.

In both rural and nonrural settings, a higher percentage of practices in states with full scopes of practice included NPs, compared to those in states with practice restrictions—a finding that is aligned with the results of prior studies.¹³ Although growth was seen across all environments, the slowest growth occurred in states with full scopes of practice, both rural and nonrural. As SK&A reports data only on physician practices, slower growth in states with full scopes of practice could reflect the existence of more employment opportunities for NPs, such as in independent or nurse-managed practices. However, without comprehensive data on such practices, this remains speculative.

Another intriguing finding from exhibit 3 is that the significant difference in trends was between states with full and reduced scopes of

practice, with the latter actually growing more quickly; states with restricted scopes of practice had lower NP presence and slower growth. Such differences across scope-of-practice environments could represent varying efficiency of NP use. With tighter regulatory constraints, there may be a productivity ceiling for practices and hence slower growth in demand for NPs in states with restricted scopes of practice. Laws specifying reduced scope of practice may allow for wider and more flexible use of NPs, making practices in states with these laws more willing to rely on NPs to meet growing patient needs. Future research exploring the limitations that practices place on NPs could provide deeper understanding of the differences across practices regardless of scope-of-practice laws.

Policy Implications

NPs appear to be playing an increasing role in primary care across states and policy settings. As value-based care increases, practices and physicians should consider using interdisciplinary configurations of providers to optimize productivity and improve care delivery.³⁷ The number of NPs continues to increase annually, and 87 percent of NP graduates are educated to provide primary care.² Thus, policy makers could further encourage these trends by continuing to invest in NP education and training and by facilitating direct reimbursement for NP-delivered care.

For example, the ACA's Graduate Nurse Education Demonstration was implemented in 2012 to increase the number of primary care NPs. Under the demonstration, the Centers for Medicare and Medicaid Services reimbursed five hospitals for the cost of NP clinical training in primary care. This effectively increased NP enrollments and graduations in demonstration sites, compared to others.³⁸ However, the demonstration will end in July 2018, and there are no plans to continue the funding.³⁸ Additionally, direct reimbursement of NP services gives practices financial incentives to use NPs to their maximum potential. Both strategies can be accomplished in ways that benefit a variety of stakeholders, including patients.

Conclusion

Nurse practitioners are a growing segment of the primary care workforce,² and their presence is increasing among both rural and nonrural primary care physician practices. Increased NP presence can also be seen in states with fewer practice restrictions. Adding NPs is a useful way for practices to align themselves with contemporary efforts to improve access and performance.^{1,20} Our findings imply that primary care practices are embracing a more diverse provider configuration, which may strengthen health care delivery overall. ■

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