

# Full Scope-of-Practice Regulation Is Associated With Higher Supply of Nurse Practitioners in Rural and Primary Care Health Professional Shortage Counties

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**Introduction:** Access to quality primary care is challenging for rural populations and individuals residing in primary care health professional shortage areas (HPSAs). The ability of nurse practitioners (NPs) to provide full care is governed by state scope-of-practice (SOP) regulation, which is classified into three types: full SOP, reduced SOP, and restricted SOP. Understanding how legislative and regulatory decisions can influence supply of NPs in underserved areas can help guide effective health policies to reduce disparities in access to care. **Objective:** To investigate the trends in NP supply in rural and primary care HPSA counties and their relationship with SOP regulation. **Methods:** The authors conducted longitudinal data analyses using an integrated county-level national data set from 2009 to 2013. A hierarchical mixed-effects model was performed to assess the relationship between state SOP regulation and NP supply in rural and primary care HPSA counties. **Results:** The number of NPs per 100,000 population increased in rural and primary care HPSA counties across states with various types of SOP regulation between 2009 and 2013. Compared with the NP supply in rural or primary care HPSA counties in states with reduced or restricted SOP regulation, NP supply in those counties in states with full SOP regulation was statistically significantly higher. **Conclusions:** State full SOP regulation was associated with higher NP supply in rural and primary care HPSA counties. Regulation plays a role in maximizing capacity of the NP workforce in these underserved areas, which are most in need for improvement in access to care. This information may help inform state regulatory policies on NP supply, especially in underserved areas.

*Keywords:* Access to care, health professional shortage areas, nurse practitioners, rural health, scope-of-practice regulation

Access to quality primary care, which has been linked to improved health outcomes (Friedberg, Hussey, & Schneider, 2010), is particularly challenging for rural populations and those residing in primary care health professional shortage areas (HPSAs), as designated by the Health Resources and Services Administration (HRSA). These areas face great challenges in meeting demand for primary care and are disproportionately affected by the worsening primary care physician shortage (Huang & Finegold, 2013).

The growing supply of nurse practitioners (NPs) presents a potential solution to address rising demand for primary care and primary care physician shortages (Streeter, Zangaro, & Chattopadhyay, 2017). However, a larger supply does not guarantee a fair geographic distribution of NPs in areas most in need. A recent HRSA analysis indicated that "...considerable effort has focused on examining the distribution of primary care physicians, but less research has focused on NPs and PAs (physician assistants)" (Streeter et al., 2017). The equitable distribu-

tion of NPs in relation to disease burden and health care needs is critical, given their important and evolving role in health care delivery (Naylor & Kurtzman, 2010).

The ability of NPs to provide care to the fullest extent of their education is governed by scope-of-practice (SOP) regulation, which varies from state to state. The American Association of Nurse Practitioners (AANP) classified SOP into three types:

- Full SOP regulation: "state practice and licensure law provides for nurse practitioners to evaluate patients, diagnose, order and interpret diagnostic tests, initiate and manage treatments including prescribe medications under the exclusive licensure authority of the state board of nursing";
- Reduced SOP regulation: "state practice and licensure law reduces the ability of nurse practitioners to engage in at least one element of NP practice. State requires a regulated collaborative agreement with an outside health discipline in order for the NP to provide patient care"; and

- Restricted SOP regulation: “state practice and licensure law restricts the ability of a nurse practitioner to engage in at least one element of NP practice. State requires supervision, delegation, or team-management by an outside health discipline in order for the NP to provide patient care” (AANP, 2016).

As of 2016, 21 states and the District of Columbia had full SOP regulation, 17 had reduced SOP regulation, and 12 had restricted SOP regulation (AANP, 2016).

Substantial evidence shows that SOP regulations affect NP workforce supply: states with full SOP regulations have more NPs per capita and exhibit greater growth of the NP workforce (Graves et al., 2016; Kuo, Loresto, Rounds, & Goodwin, 2013; Reagan & Salsberry, 2013; Stange, 2014). In addition, state SOP regulation has been associated with NPs’ migration, with NPs more likely to move from states without controlled substances prescription authority to states with this authority (Perry, 2012).

Few studies have examined the geographic distribution of NPs nationally and the effect of state SOP regulations on the geographic distribution of NPs (Graves et al., 2016; Lin, Burns, & Nochajski, 1997; Skillman, Kaplan, Fordyce, McMenamin, & Doescher, 2012). Some of these studies are outdated (e.g., Lin et al., 1997) given that major changes have occurred that transformed the NP workforce, including expansive adoption of NPs as primary care providers beginning in the early 1990s (DeAngelis, 1994) and enactment of direct Medicare and Medicaid reimbursement (Chapman, Wides, & Spetz, 2010). Other studies are cross sectional in design and do not provide insights for future trends (Graves et al., 2016; Skillman et al., 2012). In addition, none have directly examined the trends in NP distribution in primary care HPSAs. Research is needed on the extent to which state SOP regulation affects the geographic distribution of NPs.

The objective of this study was to investigate the trends in NP supply in rural and primary care HPSAs and their relationship with state SOP regulation. Understanding how legislative and regulatory decisions can influence supply of NPs in these underserved areas is essential for the development of effective health policy directives and levers to address increasing demand for care and to reduce disparities in access to care in underserved areas.

## Methods

### Study Design

This study used a longitudinal observational study design to investigate temporal trends in NP supply in rural and primary care HPSAs and to assess their relationship with state SOP regulation in 50 states and the District of Columbia. As NP supply can be affected by the supply of primary care physicians and PAs through either competition or collaboration in an area, we

studied NP supply together with primary care physician and PA supply. The study was approved by the University of Rochester Research Subjects Review Board.

### Data Sources

An integrated county-level national data set from 2009 to 2013 was constructed and included the Area Health Resources File (AHRF) and the National Provider Identifier Registry. The AHRF is one of the most extensive national data sets on the health care professions; health facilities; and population, economic, and environmental characteristics (U.S. Department of Health and Human Services, Health Resources and Services Administration, & Bureau of Health Professions, 2013). The National Provider Identifier Registry consists of all active health care provider identifier records. In addition, the integrated data set included American Medical Association Physician Masterfile data, American Hospital Association annual survey data, Bureau of Labor Statistics state-level NP wage data, HRSA data on health center and look-alike service delivery sites, and Henry J. Kaiser Family Foundation data on state-level health maintenance organization (HMO) enrollment. We also obtained annual state-level data on the number of NP graduates from the American Association of Colleges of Nursing and collected state-level NP SOP regulation from the AANP for the study period.

### Variables and Measures

The geographic variables include state, county, rural/urban, and primary care HPSAs. We defined “rural county” based on the 2013 rural/urban continuum code as having a designation of completely rural or an urban population of less than 2,500 people. We considered a county as a “primary care HPSA” if primary care HPSA status was designated for the entire county according to the code in each study year in the AHRF (U.S. Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, & National Center for Health Workforce Analysis, 2013).

County-level provider supply was measured as the number of providers per 100,000 population in a county, which was calculated separately for NPs, primary care physicians, and PAs in each study year. Primary care physician was defined in the AHRF as nonfederal physicians in the specialties of general family medicine, general practice, general internal medicine, or general pediatrics (U.S. Department of Health and Human Services, Health Resources and Services Administration, & Bureau of Health Professions, 2013). Because data for these providers were not available from the AHRF in 2009, we obtained physician data from the American Medical Association Physician Masterfile and extracted data on NPs and PAs from the National Provider Identifier Registry, the same data sources used by the AHRF.

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