2021 NCSBN
Scientific Symposium
March 22, 2021 | Virtual
*From Data to Policy*

# Scope-of-Practice Regulation and Nurse Practitioners as Usual Source of Care Providers

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# Access to Care and the NP Workforce

- Improving access to care is a top priority of the national and state healthcare agenda
- Several trends suggest that the nurse practitioner (NP) workforce has untapped potential to expand healthcare capacity to increase access to care

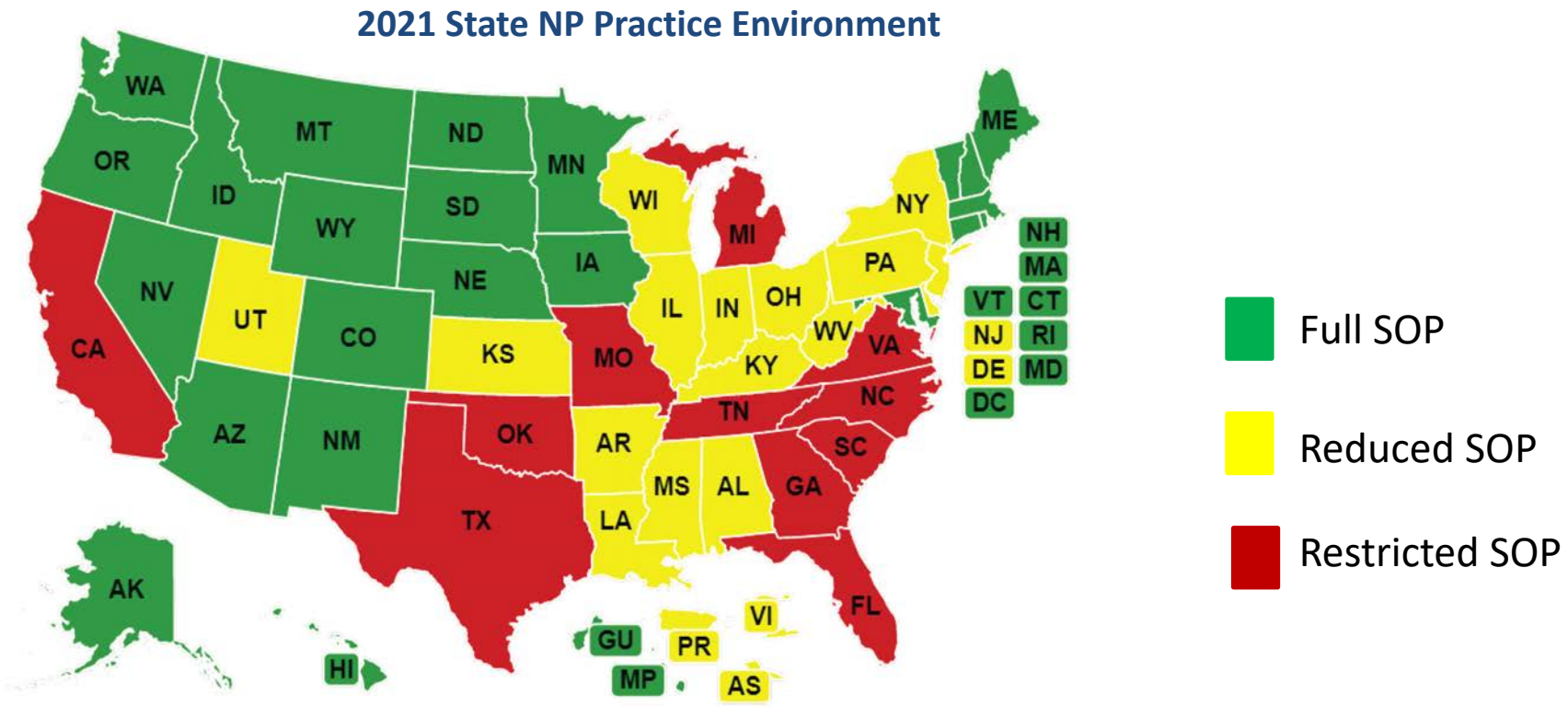
1) The NP workforce has grown significantly over the past decade
2) The growth of the NP workforce is evident in all states
3) NP supply has increased substantially in rural and low-income areas
4) NPs demonstrate clinical performance comparable with primary care physicians with regard to process of care, reduction of symptoms, improvement in health and functional status, and decrease in mortality. In addition, studies have reported higher patient satisfaction among patients seen by NPs than those seen by primary care physicians

# Role of NPs in Access to Care

- Complementary/supplemental role
  - They perform tasks delegated by physicians. Through teamwork with physicians, they expand capacity and increase efficiency of healthcare delivery
- Substitution role
  - They serve as a usual source of care provider as an alternative to physicians
  - In this role, NPs have primary responsibility for their patients, though they may consult with and refer patients to physicians

# State NP Scope-of-Practice Regulation

NP practice is governed by state scope-of-practice (SOP) regulation, which varies from state to state



# Research Gaps

- The extent to which NPs serve in substitution role as a usual source of care provider nationally and whether this is associated with state SOP regulations is not well understood
  - Most studies have used claims data, however claims data do not consistently identify NP provision of care
  - Two recent studies used patient survey data or patient electronic medical records; however, they either did not provide separate estimates for NP care or the study setting had limited generalizability

# Study Objectives

1. To provide an estimate on NPs as usual source of care providers
2. To examine their relationship with state SOP regulations

# Study Design and Data Sources

- Retrospective analyses on a sample of U.S. adults (18 years and older) from 2010 to 2016
- The national datasets
  - The restricted version full-year consolidated household component data of the Medical Expenditure Panel Survey (MEPS),
  - Area Health Resources File (AHRF)
  - National Provider Identifier (NPI) registry, and
  - State NP practice environment data

# Variables and Measures

- The usual source of care provider was determined from the MEPS adult sample for those who had a usual source of care and identified the type of usual source of care as a person or person-in-facility (provider working in a facility)
  - This measure excludes individuals who report their primary source of care is a hospital emergency room
- NP as a usual source of care provider was identified by respondents' reporting an NP as their usual source of care provider

# Variables and Measures

- Based on Aday and Anderson's framework for the study of access to medical care, included the following covariates
  - County-level primary care NP supply, primary care physician supply, physician assistant supply
  - Individual-level demographic variables
  - Health insurance coverage, perceived physical and mental health status
  - The geographic location of respondents including U.S. census region and metropolitan status of the county location of residence

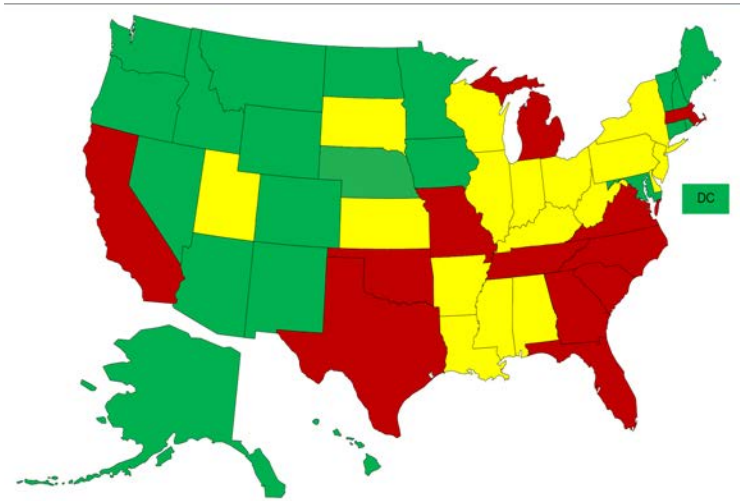
# Statistical Analyses

- Applied sample weights at individual level and accounted for the sample design
- Calculated annual estimates of the number and the proportion of adults whose usual source of care was an NP
- To examine the relationship between NP as a usual source of care provider and state SOP regulations while controlling for covariates
  - We used the pooled 7 years of data due to the small sample size of adults who had an NP as their usual source of care provider in each year,
  - Performed a multilevel survey analysis using a generalized linear mixed model
  - The data have a three-level hierarchical structure: state, county, and individual
  - We applied intercept random effects and unstructured covariance structure
- Analyses were performed using SAS version 9.4

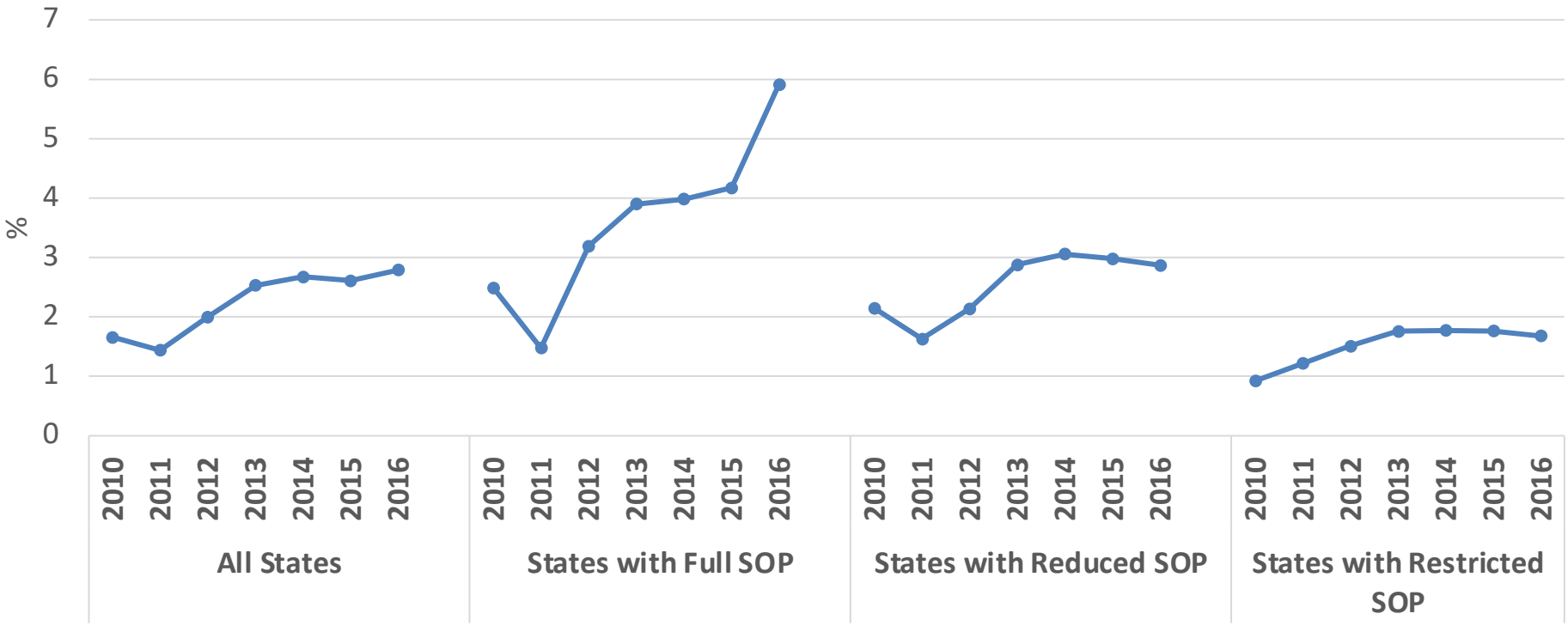
# STUDY RESULTS

# Change in State Regulation for NP Practice, 2010-16

- 7 states changed from reduced to full SOP between 2010 – 2016
  - Connecticut, Maryland, Minnesota, Nebraska, Nevada, North Dakota, and Vermont
- In year 2016:
  - Full SOP: 21 states and DC
  - Reduced SOP: 17 states
  - Restricted SOP: 12 states



# Estimates of NPs as a Usual Source of Care Provider Nationally and by State SOP Regulation



**Characteristics of the Sample Whose Usual Source of Care Provider Was an NP, Overall and by State NP SOP Regulation, MEPS 2010-2016**

| | Overall (n=1134) | By State NP SOP Regulation | | | |
|---|---|---|---|---|---|
| | | Full SOP (n=211) | Reduced SOP (n=579) | Restricted SOP (n=344) | *p* value |
| Age (year, mean ± SD) | 49.33 ± 17.41 | 49.57 ± 17.54 | 49.46 ± 17.60 | 48.98 ± 17.06 | .90 |
| Male, % | 30.25 | 30.33 | 32.30 | 26.74 | .21 |
| Race/Ethnicity, % | | | | | |
| Hispanic | 7.41 | 10.43 | 2.07 | 14.53 | <.0001 |
| Non-Hispanic, White | 72.05 | 79.62 | 73.58 | 64.83 | |
| Non-Hispanic, Black | 15.61 | 4.27 | 20.55 | 14.24 | |
| Other | 4.94 | 5.69 | 3.80 | 6.40 | |
| Married, % | 47.62 | 48.34 | 47.84 | 46.80 | .93 |
| Education, % | | | | | |
| Less than high school | 17.76 | 14.22 | 18.89 | 18.02 | .0002 |
| High school | 40.90 | 37.91 | 46.10 | 34.01 | |
| Higher than high school | 41.34 | 47.87 | 35.01 | 47.97 | |
| Health insurance, % | | | | | |
| Private insurance | 60.41 | 63.51 | 54.58 | 68.31 | .0001 |
| Public insurance | 31.75 | 32.70 | 35.58 | 24.71 | |
| Uninsured | 7.85 | 3.79 | 9.84 | 6.98 | |
| Perceived physical health status | | | | | |
| Excellent | 13.14 | 13.74 | 13.99 | 11.34 | .39 |
| Very good | 30.69 | 32.23 | 29.88 | 31.10 | |
| Good | 30.69 | 30.33 | 28.50 | 34.59 | |
| Fair/poor | 25.49 | 23.70 | 27.63 | 22.97 | |
| Perceived mental health status | | | | | |
| Excellent | 25.75 | 26.07 | 24.01 | 28.49 | .0057 |
| Very good | 29.01 | 32.70 | 27.46 | 29.36 | |
| Good | 30.51 | 21.33 | 33.33 | 31.40 | |
| Fair/poor | 14.73 | 19.91 | 15.20 | 10.76 | |
| Non-metropolitan residence, % | 40.04 | 31.75 | 53.20 | 22.97 | <.0001 |
| US Census Region, % | | | | | |
| Northeast | 12.70 | 17.06 | 15.37 | 5.52 | <.0001 |
| Midwest | 23.46 | 15.17 | 27.46 | 21.80 | |
| South | 46.83 | 5.21 | 55.09 | 58.43 | |
| West | 17.02 | 62.56 | 2.07 | 14.24 | |

**Weighted GLIMMIX modeling of the relationship between NPs as a usual source of provider and state NP scope-of-practice regulation**

| | AOR | 95% CI | | *p* value |
|---|---|---|---|---|
| Intercept | 0.0040 | 0.0004 | 0.0430 | <.0001 |
| SOP | | | | |
| Reduced | 1.1770 | 0.4894 | 2.8306 | 0.7158 |
| Restricted | 0.1290 | 0.0332 | 0.5008 | 0.0031 |
| Full | ref | | | |
| County-level number of primary care NPs per 100k population | 1.0283 | 1.0075 | 1.0496 | 0.0074 |
| County-level number of primary care physicians per 100k population | 0.9954 | 0.9750 | 1.0162 | 0.6615 |
| County-level number of PAs in general practice per 100k population | 1.0142 | 0.9640 | 1.0671 | 0.5863 |
| Age | 0.9844 | 0.9824 | 0.9865 | <.0001 |
| Male | 0.5249 | 0.4445 | 0.6198 | <.0001 |
| Race/Ethnicity | | | | |
| Hispanic | 0.9979 | 0.6472 | 1.5386 | 0.9924 |
| Non-Hispanic, Black | 0.7695 | 0.5541 | 1.0685 | 0.1178 |
| Other | 0.9462 | 0.5611 | 1.5957 | 0.8358 |
| Non-Hispanic, White | ref | | | |
| Married | 0.9047 | 0.7256 | 1.1278 | 0.3732 |
| Education | | | | |
| Less than high school | 0.9588 | 0.7191 | 1.2781 | 0.7740 |
| High school | 1.1616 | 0.9311 | 1.4492 | 0.1844 |
| Higher than high school | ref | | | |
| Health insurance | | | | |
| Public insurance | 1.1502 | 0.9105 | 1.4528 | 0.2407 |
| Uninsured | 1.3857 | 0.8818 | 2.1773 | 0.1572 |
| Private insurance | ref | | | |
| Perceived physical health status | | | | |
| Very good | 1.3549 | 0.9668 | 1.8986 | 0.0778 |
| Good | 1.3947 | 0.9785 | 1.9877 | 0.0657 |
| Fair/poor | 1.6962 | 1.2082 | 2.3817 | 0.0023 |
| Excellent | ref | | | |
| Perceived mental health status | | | | |
| Very good | 0.8816 | 0.6813 | 1.1409 | 0.3380 |
| Good | 0.8220 | 0.6293 | 1.0737 | 0.1504 |
| Fair/poor | 1.0126 | 0.6938 | 1.4777 | 0.9483 |
| Excellent | ref | | | |
| Non-metropolitan residence | 0.9813 | 0.3234 | 2.9770 | 0.9733 |
| US Census Region | | | | |
| Midwest | 0.1289 | 0.0110 | 1.5059 | 0.1024 |
| South | 0.2407 | 0.0483 | 1.1997 | 0.0822 |
| West | 1.0505 | 0.1975 | 5.5868 | 0.9539 |
| Northeast | ref | | | |

# Discussion

- Our analyses showed that 2.79% of adults in the U.S. reported an NP as their usual source of care provider in 2016, which was an increase from 1.65% in 2010
  - States with full SOP regulation:  2.48% to 5.91%
  - States with reduced SOP regulation: 2.14% to 2.87%
  - States with restricted SOP regulation: and 0.92% to 1.68%
- The increase in having an NP as usual source of care provider, though moderate, may be helping to address the growing demand for primary care and to expand access to care
- Despite the growth of NP care, the national average of the percentage of adults who had an NP as their usual source of care provider was small, indicating majority of NPs practiced in collaborative/supplemental role

# Discussion

- Adults cared for by NPs were often on public insurance (32%), uninsured (8%), or resided in non-metropolitan areas (40%) across states with various SOP regulation
- Our previous work indicated that NP supply was higher and grew faster in low-income and rural areas where primary care physician supply was low
- Our findings about usual source of care suggest that NPs may serve as substitutes for physicians in areas with a high proportion of vulnerable populations

# Discussion

- We found the odds of having an NP as usual source of care provider in states with restricted SOP regulation was 87% lower than in states with full SOP regulation. Several explanations:
  - SOP regulation may be associated with organizational hiring practices for NPs
  - State SOP regulations have been shown to be associated with the role of NPs in care delivery. NPs were more likely to have their own patient panel in states with full SOP regulation than in states with reduced or restricted regulation
  - Restricted SOP regulation requires physician supervision, which might limit how and where NPs can practice, as they depend on the availability of physicians

# Discussion

- This study also found that higher county-level NP supply, independent of state SOP regulation, was associated with greater likelihood of having an NP as usual source of care provider
- To our knowledge, this is the first study to provide empirical evidence on the association between NP supply and NPs as a usual source of care provider
- This finding supports the notion that higher NP supply expands access to care

# Study Limitations

- Potential recall bias due to the self-reported MEPS measures
- Due to the small sample size of adults with an NP as their usual source of care provider in each study year, we were not able to analyze the multi-year data using a time series approach thereby capturing changes in SOP regulations over time, which would have permitted stronger causal inference on the relationship between SOP regulations and the likelihood of having an NP as usual source of care provider
- We were not able to test the hypothesis of mediation and moderation effects among state SOP regulations, NP supply, and NPs as a usual source of care provider
- State SOP regulation was broadly classified into three groups, which did not take into consideration nuanced provisions of state-level legislation

# Implications

- Our study provides empirical evidence on the link between full SOP regulation and increased care provided by NPs
- Particularly, this increase benefited adults who were on public health insurance, uninsured, and those residing in non-metro areas
- Such information can assist state legislators and stakeholders in their decision-making concerning whether or not to expand NP SOP regulation

# Acknowledgements


- Funding: NCSBN #R101004
- Research team
  - Ying Xue, DNSc, RN (PI)
  - Teraisa Mullaney, PhD (c)
  - Brian Smith, MSW
  - Xueya Cai, PhD
  - Joanne Spetz, PhD
- The data analyses in this study were conducted at the Center for Financing, Access and Cost Trends (CFACT) Data Center, and the support of Agency for Healthcare Research and Quality (AHRQ) is acknowledged. The results and conclusions in this article are those of the authors and do not indicate concurrence by the AHRQ or the U.S. Department of Health and Human Services.


Questions or comments?