

NBER WORKING PAPER SERIES

TOWARD A UNIFORM CLASSIFICATION OF
NURSE PRACTITIONER SCOPE OF PRACTICE LAWS

Benjamin J. McMichael
Sara Markowitz

Working Paper 28192
<http://www.nber.org/papers/w28192>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
December 2020, Revised May 2022

Alicia Gilbert provided excellent research assistance for this paper. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

NBER working papers are circulated for discussion and comment purposes. They have not been peer-reviewed or been subject to the review by the NBER Board of Directors that accompanies official NBER publications.

© 2020 by Benjamin J. McMichael and Sara Markowitz. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

Toward a Uniform Classification of Nurse Practitioner Scope of Practice Laws
Benjamin J. McMichael and Sara Markowitz
NBER Working Paper No. 28192
December 2020, Revised May 2022
JEL No. I1,K0

ABSTRACT

Many states' scope of practice laws limit the ability of nurse practitioners to deliver care by requiring physician supervision of their practices and prescribing activities. A robust literature has evolved around examining the role of these scope of practice laws in various contexts, including labor market outcomes, healthcare access, healthcare prices, and the delivery of care for specific diseases. Unfortunately, these studies use different, and sometimes conflicting, measures of scope of practice laws, limiting their comparability and overall usefulness to policymakers and future researchers. We address this salient problem by providing a recommended coding of nurse practitioner scope of practice laws over a 24-year period based on actual statutory and regulatory language. Our classification of scope of practice laws solves an important problem within this growing literature and provides a solid legal foundation for researchers as they continue to investigate the effects of these laws.

Benjamin J. McMichael
School of Law
University of Alabama
101 Paul W. Bryant Drive, East
Tuscaloosa, AL 35487
bmc michael@law.ua.edu

Sara Markowitz
Department of Economics
Emory University
Rich Memorial Building
1602 Fishburne Dr.
Atlanta, GA 30322
and NBER
sara.markowitz@emory.edu

Toward a Uniform Classification of Nurse Practitioner Scope of Practice Laws

Benjamin J. McMichael¹ and Sara Markowitz²

Abstract

Many states' scope of practice laws limit the ability of nurse practitioners to deliver care by requiring physician supervision of their practices and prescribing activities. A robust literature has evolved around examining the role of these scope of practice laws in various contexts, including labor market outcomes, healthcare access, healthcare prices, and the delivery of care for specific diseases. Unfortunately, these studies use different, and sometimes conflicting, measures of scope of practice laws, limiting their comparability and overall usefulness to policymakers and future researchers. We address this salient problem by providing a recommended coding of nurse practitioner scope of practice laws over a 24-year period based on actual statutory and regulatory language. Our classification of scope of practice laws solves an important problem within this growing literature and provides a solid legal foundation for researchers as they continue to investigate the effects of these laws.

Introduction

Over a decade after the passage of the Affordable Care Act (ACA), access to healthcare remains an important policy priority at the national and state levels, and the recent COVID-19 pandemic has only reinforced the importance of access to care. One policy option that facilitates access to healthcare providers, and thus access to care, is the greater use of advanced practice registered nurses (APRNs) to care for patients with the full extent of their knowledge and training. APRNs are registered nurses (RNs) with advanced degrees and training in primary and specialty care. APRNs are certified to practice in one of four roles: certified registered nurse anesthetists (CRNAs), certified nurse-midwives (CNMs), clinical nurse specialists (CNSs) and nurse practitioners (NPs). These nurses examine patients, provide diagnoses, order tests, provide treatment, and prescribe medications.

¹ Corresponding author. University of Alabama School of Law, 101 Paul W. Bryant Drive, East, Tuscaloosa, AL 35487, bmc michael@law.ua.edu. Alicia Gilbert provided excellent research assistance for this paper.

² Emory University Department of Economics and NBER, 1602 Fishburne Drive, Atlanta, GA 30322, sara.markowitz@emory.edu

According to the Bureau of Labor Statistics (BLS), in 2019 there were 251,100 employed nurses working as NPs, CRNAs and CNMs (BLS 2019). NPs, the largest group within the APRN category, represent a substantial portion of primary care providers. The 2019 data show 153,980 general practice physicians (including family practitioners, internists, and general practitioners) compared to 200,600 NPs. These nurses play critical roles in the health care system by performing many of the same tasks as primary care physicians and often practice in areas where physicians are in short supply (McMichael 2018). This paper focuses on laws regulating the NP practice, which has implications for access to primary care.

Although they are nationally certified, the practices of NPs are governed by state scope of practice (SOP) laws. These laws govern the legal ability of licensed health care professionals to provide medical services. They define providers' roles, articulate oversight requirements (if any), and govern practice and prescriptive authorities. State laws vary along all these dimensions, but foremost is the oversight requirement imposed on individual providers. In many states, NPs must practice under the supervision of or in collaboration with physicians, and these requirements may be imposed through various means, such as practice protocols or other collaborative agreements. Other states allow NPs to practice to the full extent of their training, education, and experience without oversight from physicians. This is termed "full practice authority" (FPA). Over the past few decades, state SOP laws have been evolving from different forms of oversight towards FPA. Currently, 32 states have adopted SOP laws that grant FPA to NPs.

Given the importance of these laws and that the variation in time and state generates a viable "natural experiment" for policy analysis, it is no surprise that the academic literature evaluating the effects of changing SOP laws is proliferating. Outcomes studied include the quality of care, health care costs and prices, employment, wages, and patient access to care. However, one

troubling feature of the literature published to date is that many authors rely on different categorizations of SOP laws. Some authors examine laws that only pertain to practice authority, while others focus only on prescription authority. Still others combine practice and prescription authority. The sources for the laws also vary, with some authors using classifications that are meaningful to nurse advocacy groups but not necessarily appropriate for studying economic or public health outcomes. The disparate classifications make interpreting, summarizing, and comparing results across studies rather difficult. We seek to provide some clarity on this issue.

New Contribution

In this article, we first describe the features of the laws, followed by a description of the different legal categories used by researchers. Next, we present a database of SOP law changes over time that we believe will be useful to academic researchers. Our legal research has been conducted and verified by legal scholars, and we provide citations to current SOP laws to facilitate the continued development of a consistent classification scheme. Our goal here is to provide a resource to the academic community for consistency in SOP law definitions and the timing of adoption for SOP laws. Consistency in these definitions serves two important functions. From the perspective of researchers, consistency will facilitate the comparison of different results and provide greater context for interpreting results more generally. From the perspective of policymakers, consistency will provide clearer guidance on which SOP laws are most salient and better insight into which laws should be changed to achieve specific outcomes.

Main Components of SOP laws

SOP laws are a subset of occupational licensing laws. They regulate what services members of a profession may provide and the conditions under which they may provide those services. With respect to NPs, not all SOP laws are equally relevant to the economic and public

health outcomes that are the focus of most academic and policy-related work. For example, the ability to sign disabled person placards and death certificates falls within the ambit of SOP laws. But the ability to sign such documents is only relevant in limited situations. The two most important—and two most studied—aspects of NP practice governed by SOP laws are physician oversight requirements and prescriptive authority.

Physician Supervision Requirements

At their most basic level, physician oversight requirements come in two categories: (1) some amount of physician involvement in an NP’s practice is required and (2) an NP may practice independently of any physician involvement. Within the first category, states differ in how they require physician involvement in NPs’ practices. States may require physician “supervision” of NP practices or they may require that NPs “collaborate” with physicians as a condition of treating patients. While the details of a “collaboration” system generally differ from the details of a “supervision” system, neither system permits an NP to provide healthcare without physician involvement.

Collaboration and supervision often come with legislated administrative responsibilities including chart review, chart certification, and on-site supervision requirements. The specific nature of these requirements may be relevant for individual providers,³ but the existence of some or all of these legally mandated responsibilities is key for economic and public health outcomes in general. The legal requirement of maintaining a relationship with a physician—even if the specifics of the relationship are not particularly arduous—necessarily tethers NPs to physicians and undermines their ability to compete in markets for healthcare services. Accordingly, whether

³ It is relevant to note that though, there is no systematic evidence suggesting that providers actually comply with these requirements.

physician involvement is legally mandated as “collaboration” or “supervision” matters relatively little: both forms of involvement have the same legal effect.

Prescriptive Authority

Laws governing prescriptive authority determine what medications NPs may prescribe to patients. Prescription drugs are classified into two main groups of controlled and non-controlled substances. Under the Controlled Substances Act, drugs may be placed on one of five schedules depending on their potential for abuse and accepted medical uses.

Classifying NP SOP laws pertaining to prescriptive authority presents a different set of challenges than classifying physician oversight requirements. These challenges stem from differences in how medications themselves are regulated. One option is to classify NP prescriptive authority as including all medications other than Schedule I controlled substances (which are illegal for all providers to prescribe) or not. This option, however, faces several problems. First, certain drugs—such as buprenorphine and clozapine—require all providers to obtain additional certifications to prescribe them. Second, some states permit providers to recommend cannabis—a Schedule I controlled substance—and some states treat NPs and physicians differently in their ability to recommend it. Third, some states restrict NPs from prescribing very specific medications (such as weight loss drugs). Complicating this problem is the fact that many states have their own version of the federal Controlled Substances Act, and states need not perfectly duplicate the federal scheduling process.

Given these issues, simply classifying NPs as being allowed to prescribe all non-schedule-I drugs may or may not yield an entirely accurate classification. A clearer approach is to consider what NPs may prescribe and the supervision requirements for that prescribing in the context of the research question under consideration. Defining NP prescriptive authority in this way avoids the

problem that laws not directly related to SOP may impact the ability of NP to prescribe certain medications. This approach is also consistent with the goals of research that seeks to evaluate the impact of NP-specific restrictions on outcomes related to NP provided care.

Literature Review

Table A1 in the appendix lists twenty-one studies from the economics, legal, and public health literatures that evaluate the effects of changing state SOP laws for NPs and other APRNs on a variety of related outcomes. Table A1 does not contain an exhaustive list, rather it reports recent high-quality studies that utilize difference-in-difference methodologies to draw conclusions. The studies covered use either state-based panel data sets or individual-level datasets that span multiple years. The focus of Table A1 is how each study classifies the SOP laws.

The different coding schemes used in this literature can be summarized as follows: (1) Practice authority only, (2) Prescription authority only, (3) Controlled substances allowed, (4) Practice authority and prescription authority included in models separately, and (5) Practice authority and prescription authority considered jointly. Of the studies in the list, 4 studies examine either only practice authority in the models, or include practice and prescription authority separately. Six studies include models that examine prescription authority only. Seven studies examine FPA versus less than FPA. This distinction is the most relevant for the current policy debate regarding the movement to FPA. However, this trend is fairly recent and may not provide enough variation for studies using older data. In addition, using the category of less than FPA results in the loss of information within those state laws. Although we do not present this finer level of detail in the table of laws below, we urge researchers to consider whether these details are relevant to and important for the outcomes and time periods under consideration.

Each categorization scheme has advantages and disadvantages. Before offering recommendations on the best approaches, however, it is important to accurately identify which law was in place in each state and year. And prior studies have not always relied on accurate sources of legal information when classifying laws.

Classifying Scope of practice Laws

When classifying SOP laws, many researcher rely on the Nurse Practitioner Annual Legislative Update (NPALU) as the source for the SOP laws. This source publishes annual state-by-state summaries of SOP laws pertaining to practice, reimbursement, and prescription. While this source offers a long history of changes to SOP laws—the first version was published in 1989—it is not aimed at researchers. The publication offers insights for practicing NPs and for those engaged in political activities to change SOP laws. Using this publication in research presents salient problems. The enactment dates given in the publication may not necessarily coincide with the dates that certain laws become effective. It also does not appear to track all sources of law for all states. The annual updates sometimes refer to changes in rules and regulations—in addition to statutes—but not every regulatory change is captured by the annual updates. Our goal is not to criticize this source—it offers valuable information that appears to be quite useful to its primary audiences. We only mean to highlight some potential problems with using the annual updates as the sole source of SOP law changes for the purpose of academic research into the effects of the laws on various outcomes.

Indeed, having independently classified state laws ourselves, we are sympathetic to the difficulties of accurately classifying SOP laws over 51 jurisdictions and multiple decades. To begin to fill the need for a consistent legal classification scheme based on the review of statutes, regulations, and court cases, we have compiled a new categorization of state SOP laws. Our

categorization meets the need for a consistent classification scheme that is based on primary legal sources and that aligns with the current policy discussion, i.e., FPA.

Table 1 presents our classification of the SOP laws pertaining to NPs from 1998 to 2022. Our data sources are state statutes, state board of nursing rules and regulations, and other regulations. We begin our classification in 1998 because, prior to 1998, Medicare did not directly reimburse NPs for their services. Instead, Medicare paid them only for services provided incident to physician services, and many private insurers maintained similar restrictions. Thus, NPs were effectively tethered to physicians under federal law even if state law granted them autonomy. Following the passage of the Balanced Budget Act of 1997, Medicare (and many private insurers) began directly reimbursing NPs (Frakes and Evans 2006).

The second column in Table 1 lists the month and year a state first granted full practice authority to NPs. This is the primary piece of information for researchers to utilize. States are classified as granting NPs FPA if they do not legally mandate any form of supervision by or collaboration with physicians as a condition of NPs practicing and they do not restrict the prescriptive authority of NPs. If a state requires either supervision or collaboration, it is classified as restricting the practices of NPs. Similarly, if a state does not grant NPs prescriptive authority without requiring physician supervision, it is not classified as granting FPA. If a state has allowed NPs to practice with FPA since before 1998, it is classified as always allowing FPA. If a state has never granted NPs FPA between 1998 and 2022, Table 1 states that directly. For those states that have changed their laws since 1998 to grant FPA, Table 1 reports the month and year that the relevant statute or regulation first became effective.

It is relevant to note that this effective date may differ from the date the legislature passed the bill and the date the governor signed the bill. Additionally, the legal effective date for statutes

may not match the practical effective date. For example, many states require state agencies or boards to pass regulations or implement new application or certification systems to fully implement FPA statutes. In these states, NPs may not acquire FPA in practice until several months after the legal effective date of the relevant statute.

The third column in Table 1 notes whether a state has allowed NPs to practice without physician oversight under the condition that they do not prescribe. Six states have granted this type of practice independence at some point in time. The fourth column regards prescription of controlled substances. This column indicates the states that grant NPs the authority to prescribe controlled substances along with information on whether the controlled substance authority requires physician oversight. We do not provide information on the top level of schedule allowed (II vs III) since as stated above, there are many nuances to the drugs scheduling and many states have different rules for some specific Schedule II drugs. The last few columns of the Table include the current statutory and regulatory citations, and notes about state laws that researchers working on specific questions may find useful.

Table 1 focuses on NPs since they are the largest group (76 percent) of APRNs (BLS 2018). While some types of occupational licensing laws often apply to all four types of APRNs—NPs, CNMs, CNSs, and CRNAs—this is not generally true of laws conferring independent practice authority and full prescriptive authority. We recommend that any researcher focusing on CNMs, CNS, or CRNAs conduct the legal research relevant to the nurses and outcomes under consideration. We note, however, that CNMs are often treated the same or similarly as NPs, whereas CNSs and CRNAs are often treated quite differently.

Table 1 does not specifically include information on whether NPs must sign collaborative practice agreements, supervision agreements, or protocols as a condition of practicing. Legally,

these are different mechanisms by which states require physician involvement in NP practices and all amount to requiring physician supervision of NPs. However, researchers focusing on questions in certain contexts may want to consider the nature of the collaborative practice agreements required by the states of interest.

In general, the SOP-law classification reported in Table 1 represents the best available information for academic researchers on which states maintained specific SOP laws in the first two decades of this century. We provide current statutory and regulatory citations to current SOP laws in Table 2 so that these citations can be used as the basis for both validating and updating the coding of SOP laws. A comparison of the laws and dates presented in Table 2 with those used in prior work and from other sources will reveal a number of differences. These may involve differences stemming from the date of passage, the law's effective date, and the date that rules are promulgated. Other differences involve assumptions about the types or schedules of drugs allowed and consideration of requirements for transition to practice.

Recommendations for Researchers

As researchers continue to investigate the role of SOP laws in the provision of healthcare and the labor markets for healthcare providers, several recommendations may facilitate the generation of accurate empirical results that are both policy-relevant and comparable across studies. Our first major recommendation for researchers focused on NPs is to consider using the legal classification scheme outlined above and shown in Table 1. Using the practice authority and prescriptive authority classifications jointly, researchers will be able to examine the primary policy lever that is currently under discussion.

Our second major recommendation concerns how the classification scheme described above is deployed. For most outcomes, researchers will likely want to consider a variable that

identifies states with FPA (a state grants NPs independence and full prescriptive authority). For example, when focusing on labor market outcomes, a joint variable for full practice authority is likely to be most appropriate since labor market decisions are often based on all characteristics of the job, rather than one aspect such as prescription authority (see Markowitz and Adams 2022). When focused on medical care and health outcomes, the choice of examining the joint variable or the separate variables will depend on the outcome under consideration. The one caveat here is that some states have changed practice and prescription authorities simultaneously so including these as separate variables in linear regression models could result in a multicollinearity problem. Researchers should carefully consider which mechanisms of effect they are attempting to isolate and consider which coding scheme is most appropriate for their study setting.

Third, and relatedly, as researchers develop their projects, they should determine whether additional legal information is required. For some outcomes, other laws may interact with SOP laws in important ways. Identifying these other laws and how they may or may not modulate the effect of NP SOP laws is an important preliminary step in all studies. In many cases, no other relevant laws will exist. But in some cases—often those of most interest to researchers—other legal regimes may be relevant. Examples include medical liability laws, laws pertaining to reimbursement, and SOP laws for other practitioners. Understanding these other regimes is important both for designing a study correctly (e.g., controlling for other relevant factors) and for interpreting the results of the study.

Fourth, we recommend that researchers adopt a more consistent terminology. For various reasons, different ways to describe essentially the same law have emerged, and there are often good editorial reasons to do so. We hope to encourage the development of consistency so that studies can more easily be compared to one another. We recommend the term “full practice

authority” be used to describe SOP that does not legally mandate any form of supervision by or collaboration with physicians as a condition of NP practice, including prescription authority. We also recommend that researchers be clear when describing independence in one aspect of practice or prescription but not both.

Our final recommendation concerns SOP requirements that are not based in law. An emerging trend in the SOP literature is to examine the effects of hospital- or clinic-imposed requirements on NPs (Pittman et al. 2020). These institutions often have authority to restrict the practices of NPs to a greater extent than state law does. These restrictions are necessarily based on the contracts that exist between NPs and these institutions and should not be treated as interchangeable with statutes and regulations. One important reason for this is that the restrictions will only apply at the relevant institution and would not affect the NPs at other places of practice. Another important reason concerns the interpretation of these restrictions, which will necessarily occur under contract law. Courts may use similar legal tools when interpreting contracts, statutes, and regulations, but contract interpretation is nonetheless different than statutory or regulatory interpretation. Thus, a requirement imposed by statute may have a different impact than the same requirement imposed by a healthcare institution via contract. We do not mean to suggest that institution-specific SOP requirements are unimportant; we only mean to caution against treating these requirements the same as SOP laws.

Conclusion

While the coding of legal variables may not attract as much attention among economists and health policy researchers as identification strategies and other econometric questions, ensuring these variables correctly code the laws of interest is key to correctly estimating the effects of those laws. In this paper, we offer a new, consistent coding scheme for NP SOP laws based on statutory

and regulatory research. These scheme offers substantive advantages over existing approaches. Each coded variable includes a legal citation that is verifiable to other researchers, policymakers, and attorneys. And the variables are coded at the month level, which may be important for certain health outcomes of interest to researchers. Our coding scheme does, however, have some important limitations. It does not, for example, include an exhaustive list of all SOP laws that may be of interest to researchers. And it should not be used for professionals other than NPs. With respect to NPs, however, we hope our new scheme will simplify the legal research necessary to engage in SOP research and facilitate consistent and accurate research in this important area of health policy.

References

- Adams, E. K., & Markowitz, S. (2018). Improving efficiency in the health-care system: Removing anticompetitive barriers for advanced practice registered nurses and physician assistants. *Policy Proposal*, 8: 9-13.
- Alexander, D., & Schnell, M. (2019). Just what the nurse practitioner ordered: Independent prescriptive authority and population mental health. *Journal of Health Economics*, 66: 145-162.
- Bureau of Labor Statistics (BLS) (2019). May 2019 National Occupational Employment and Wage Estimates United States. Bureau of Labor Statistics, U.S. Department of Labor, Washington DC. https://www.bls.gov/oes/current/oes_nat.htm#29-0000
- DePriest, K., D'Aoust, R., Samuel, L., Commodore-Mensah, Y., Hanson, G., & Slade, E. P. (2020). Nurse practitioners' workforce outcomes under implementation of full practice authority. *Nursing outlook*, 68(4), 459-467.
- Frakes, M.A., & Evans, T. (2006) An Overview of Medicare Reimbursement Regulations For Advanced Practice Nurses. *Nursing Economics*, 24: 59–65.
- Greco, A. M., & Spector, L. C. (2019). Nurse practitioner's independent prescriptive authority and opioids abuse. *Health Economics*, 28(10): 1220–1225.
- Institute of Medicine, Committee on Monitoring Access to Personal Health Care Services. (1993). Access to health care in America. Washington, DC: National Academy Press; <https://www.ncbi.nlm.nih.gov/books/NBK235882/>
- Kandrack, R., Barnes, H., & Martsof, G. R. (2021). Nurse practitioner scope of practice regulations and nurse practitioner supply. *Medical Care Research and Review*, 78(3), 208-217.
- Kleiner, M. M., Marier, A., Park, K. W., & Wing, C. (2016). Relaxing occupational licensing requirements: Analyzing wages and prices for a medical service. *The Journal of Law and Economics*, 59(2): 261-291.
- Kurtzman, E. T., Barnow, B. S., Johnson, J. E., Simmens, S. J., Infeld, D. L., & Mullan, F. (2017). Does the regulatory environment affect nurse practitioners' patterns of practice or quality of care in health centers?. *Health services research*, 52: 437-458.
- Luo, T., Escalante, C. L., & Taylor, C. E. (2021). Labor market outcomes of granting full professional independence to nurse practitioners. *Journal of Regulatory Economics*, 1-33.

- Markowitz, S., & Adams, E. K. (2022). The effects of state scope of practice laws on the labor supply of advanced practice registered nurses. *American Journal of Health Economics*, 8(1): 65-98.
- Markowitz, S., Adams, E. K., Lewitt, M. J., & Dunlop, A. L. (2017). Competitive effects of scope of practice restrictions: Public health or public harm?. *Journal of Health Economics*, 55: 201-218.
- McMichael, B. J. (2018). Beyond Physicians: The effect of licensing and liability laws on the supply of nurse practitioners and physician assistants. *Journal of Empirical Legal Studies*, 15(4): 732-771.
- McMichael, B. J., Safriet, B. J., & Buerhaus, P. I. (2018). The extraregulatory effect of nurse practitioner scope-of-practice laws on physician malpractice rates. *Medical Care Research and Review*, 75(3): 312-326.
- McMichael, B. J., Spetz, J., & Buerhaus, P. I. (2019). The Association of Nurse Practitioner Scope-of-Practice Laws With Emergency Department Use. *Medical care*, 57(5): 362-368.
- McMichael, B.J. (2020a). Healthcare Licensing and Liability. *Indiana Law Journal*, 95(3): 821—881.
- McMichael, B. J. (2020b). Occupational licensing and the opioid crisis. *UC Davis L. Rev.*, 54, 887.
- Muench, U., Whaley, C., Coffman, J., & Spetz, J. (2021). Scope-of-practice for nurse practitioners and adherence to medications for chronic illness in primary care. *Journal of general internal medicine*, 36(2), 478-486.
- Park, J., Han, X., & Pittman, P. (2020). Does expanded state scope of practice for nurse practitioners and physician assistants increase primary care utilization in community health centers?. *Journal of the American Association of Nurse Practitioners*, 32(6), 447-458.
- Perry, J. J. (2012). State-granted practice authority: Do nurse practitioners vote with their feet?. *Nursing research and practice*, 2012.
- Pittman, P., Leach, B., Everett, C. Han, X., & McElroy, D. (2020). NP and PA Privileging in Acute Care Settings: Do Scope of Practice Laws Matter?. *Medical Care Research and Review*, 77(2) 112–120.
- Poghosyan, L., Ghaffari, A., Liu, J., Jin, H., & Martsolf, G. (2021). State policy change and organizational response: Expansion of nurse practitioner scope of practice regulations in New York State. *Nursing Outlook*, 69(1), 74-83.
- Traczynski, J., & Udalova, V. (2018). Nurse practitioner independence, health care utilization, and health outcomes. *Journal of Health Economics*, 58: 90-109.
- Shakya, S., & Plemmons, A. (2020). Does Scope of Practice Affect Mobility of Nurse Practitioners Serving Medicare Beneficiaries?. *Journal of Labor Research*, 1-14.
- Spetz, J., Parente, S.T., Town, R.J., & Bazarko, D. 2013. “Scope-of-Practice Laws for Nurse Practitioners Limit Cost Savings That Can Be Achieved in Retail Clinics.” *Health Affairs*, 32(11): 1977–84.
- Stange, K.. 2014. “How Does Provider Supply and Regulation Influence Health Care Markets? Evidence from Nurse Practitioners and Physician Assistants.” *Journal of Health Economics*, 33: 1–27.
- Timmons, E.J. 2017. “The Effects of Expanded Nurse Practitioner and Physician Assistant Scope of Practice on the Cost of Medicaid Patient Care.” *Health Policy*, 121 (2): 189–96.

Table 1: Nurse Practitioner Scope of Practice Laws, 1998–2022^a

State	FPA Status 1998-2020 ^b	Independence in Practice if no RX	Controlled Substance Authority ^d	Practice Citation	Prescription Citation	Notes
Alabama	Never		Aug. 2013-present: allowed with oversight	Code of Ala. § 34-21-85. <i>Id.</i> § 34-21-86.	Code of Ala. § 34-21-86.	
Alaska	Always ^c		Always allowed	Alaska Admin. Code tit. 12, § 44.430. <i>Id.</i> § 44.445.	Alaska Admin. Code tit. 12, § 44.440.	
Arizona	December 1999	Allowed prior to Dec. 1999.	1998-Dec 1999: allowed with oversight; Dec 1999-present: allowed	Ariz. Rev. Stat. § 32-1601(22). <i>Id.</i> § 32-1651.	Ariz. Rev. Stat. § 32-1651.	Arizona includes some restrictions on opioid prescribing. Independence in practice without prescribing was allowed prior to 1999 but still required the establishment of a relationship with a physician for consultation or referral.
Arkansas	July 2021		1998-2021: Allowed with oversight	Ark. Code Ann. § 17-87-314	Ark. Code Ann. § 17-87-310	
California	Never–See Note		Allowed with oversight until Jan 2023	Cal. Bus & Prof Code § 2835.103-04	Cal. Bus & Prof Code § 2836.1.	California passed a bill in 2020 to grant NPs FPA, but the law does not become effective until 2023
Colorado	July 2010		1998-July 2010: allowed with oversight July 2010-present: allowed	Colo. Rev. Stat. § 12-38-111.5. <i>Id.</i> § 12-255-112.	Colo. Rev. Stat. § 12-255-112.	
Connecticut	July 2014		1998-July 2014: allowed with oversight July 2014-present: allowed	Conn. Gen. Stat. § 20-87a.	Conn. Gen. Stat. § 20-87a.	
Delaware	September 2015		1998-Sept. 2015: allowed with oversight Sept. 2015-present: allowed	Del. Code Ann. tit. 24, § 193.	Del. Code Ann. tit. 24, § 1935.	

District of Columbia	Always ^c		Always allowed	D.C. Code § 3-1206.01.	D.C. Code § 3-1206.01.	
Florida	July 2020		Jan. 2017-July 2020: allowed with oversight July 2020-present: allowed	Fla. Stat. Ann. § 464.0123.	Fla. Stat. Ann. § 464.012.	Only NPs engaged in “primary care practice, including family medicine, general pediatrics, and general internal medicine” may practice independently of physicians.
Georgia	Never		July 2006-present: allowed with oversight	Ga. Code Ann. § 43-34-25.	Ga. Code Ann. § 43-34-25.	
Hawaii	July 2009	Prior to July 2009, independent in practice if no RX and document a collegial working relationship with MD.	April 2005-July 2009: allowed with oversight July 2009-present: allowed	Haw. Rev. Stat. Ann. § 457-2.7. <i>Id.</i> § 457-8.6.	Haw. Rev. Stat. Ann. § 457-8.6.	
Idaho	July 2004		July 1998-July 2004: allowed with oversight July 2004-present: allowed	Idaho Code § 54-1402(1).	Idaho Code § 54-1402(1).	
Illinois	June 2019		August 1998-2018: allowed with oversight 2019-present allowed	225 Ill. Comp. Stat. Ann. 65/65-43.	225 Ill. Comp. Stat. Ann. 65/65-40.	NPs can only prescribe benzodiazepines and Schedule II narcotics in “consultation” with a physician.
Indiana	Never–See Note		Allowed with oversight	Ind. Code Ann. § 25-23-1-19.4.	Ind. Code Ann. § 25-23-1-19.5.	Indiana allows NPs to practice with “all of the supervisory rights and responsibilities, including prior authorization, that are available to a licensed physician or a health service provider in psychology (HSPP) operating in a community mental health center” when providing care to Medicaid patients.
Iowa	Always ^c		Always allowed	Iowa Code § 152E.3.	Iowa Code § 147.107.	
Kansas	Never–See Note		April 2000-present: Allowed with oversight	Kan. Stat. Ann. § 65-1130.	Kan. Stat. Ann. § 65-1130(d).	Kansas passed a statute in 2022 granting full practice authority, but it is not yet effective.
Kentucky	Never	Effective July 15, 2014, can prescribe non-controlled drugs	August 2006-present: Allowed with oversight	Ky. Rev. Stat. Ann. § 314.042.	Ky. Rev. Stat. Ann. § 314.042(10).	

		independently after 4 years of collaboration with a physician.				
Louisiana	Never		Feb 1998-present: Allowed with oversight.	La. Stat. Ann. § 37:913.	La. Stat. Ann. § 37:913(8).	
Maine	Always ^c		Always allowed	Me. Rev. Stat. Ann. tit. 32, § 2102. <i>Id.</i> § 221; Me. Code of Regs. §02.380.008;	Me. Rev. Stat. Ann. tit. 32, § 2210.	
Maryland	October 2010–See Note		1998-Oct 2010, allowed with oversight; Oct 2010-present: allowed	Md. Code Ann., Health Occupations § 8-302.	Md. Code Ann., Health Occupations § 8-512(a)(2).	Prior to Oct 1 2010, NPs had collaborative agreements. As of Oct 1 2010, NPs must file an attestation form with the state that declares the NP will collaborate with a named physician and will adhere the rules governing the scope of practice for their certification, but the attestation does not require the physician collaborator’s signature and, once filed, NPs may practice independently. The requirement for attestation was eliminated Oct 1 2015.
Massachusetts	January 2021		1998-2020: Allowed with oversight; Jan 2021-present Allowed	Mass. Ann. Laws ch. 112, § 80E. 244 Mass. Code Regs. 4.02.	1397 Mass. Code Regs. 57(2.10).	
Michigan	Never	Physician delegation not required for non-controlled drugs as of April 2017	April 2017-present: allowed with oversight	Mich. Comp. Laws Serv. § 333.17211a.	Mich. Comp. Laws Serv. § 333.17211a.	Prescribing controlled substances is a delegated act of a physician
Minnesota	January 2015		1998-2014: allowed with oversight; 2015-present: allowed	Minn. Stat. § 148.235.	Minn. Stat. § 148.235.	
Mississippi	Never		July 2002: allowed with oversight	Miss. Code Ann. § 73-15-20.	Miss. Code Ann. § 73-15-20.	
Missouri	Never		Allowed with oversight	Mo. Rev. Stat. § 334.104.	Mo. Ann. Stat. § 334.104.	

Montana	Always ^c		Allowed	Mont. Code Ann. § 37-8-409.	Mont. Admin. R. 24.159.1461.	
Nebraska	March 2015		1998-March 2015, allowed with oversight; March 2015-present: allowed	Neb. Rev. Stat. Ann. § 38-2315.	Neb. Rev. Stat. Ann. § 38-2315.	
Nevada	July 2013		May 2001-July 2013: Allowed with oversight. July 2013-present: allowed	Nev. Rev. Stat. Ann. § 632.237. <i>Id.</i> § 639.1375. <i>Id.</i> § 639.2351.	Nev. Rev. Stat. Ann. § 639.1375.	Cannot prescribe Schedule II drugs unless 2 years/2000 hours clinical experience or unless controlled substance is prescribed pursuant to a protocol approved by a collaborating physician.
New Hampshire	Always ^c		Allowed	N.H. Rev. Stat. Ann. § 326-B:11.	N.H. Rev. Stat. Ann. § 326-B:11.	
New Jersey	Never		August 2004-present: allowed with oversight	N.J. Stat. Ann. § 45:11-49.	N.J. Stat. Ann. § 45:11-49.	
New Mexico	Always ^c		Allowed	N.M. Stat. Ann. § 61-3-23.2.	N.M. Stat. Ann. § 61-3-23.2.	
New York	January 2015– See Note		1998-2014: allowed with oversight 2015-present: allowed	N.Y. Educ. Law § 6902.	2020 N.Y. CLS Educ Consol. Laws Adv. Legis. Serv. § 6902(3).	As of Jan. 2015, NPs need to attest to a collaborative relationship with a physician, but are otherwise independent. Local NPs interpret the 2015 change in the law as allowing full practice authority (Poghosyan et al. 2020). New York passed a statute granting full practice authority in 2022.
North Carolina	Never		Allowed with oversight	N.C. Gen. Stat. § 90-18.2.	N.C. Gen. Stat. § 90-18.2.	
North Dakota	October 2011		1998-Oct 2011: allowed with oversight Oct 2011-present: allowed	N.D. Cent. Code § 43-12.5-01.	N.D. Admin. Code 54-05-03.1-03.	
Ohio	Never		Feb. 2002-present: allowed with oversight	Ohio Rev. Code Ann. § 4723.43.	Ohio Rev. Code Ann. § 4723.50.	
Oklahoma	Never		Allowed with oversight	Okla. Stat. tit. 59, § 567.3a(6).	Okla. Stat. tit. 59, § 567.4a.	
Oregon	Always ^c		Allowed	Or. Rev. Stat. § 678.375(4).	Or. Rev. Stat. § 678.390.	
Pennsylvania	Never		Nov 2000-present allowed with oversight	63 Pa. Cons. Stat. § 218.2. <i>Id.</i> § 218.3.	63 Pa. Cons. Stat. § 218.3.	

Rhode Island	June 2013		1998-Jun 2013: allowed with oversight Jun 2013-present: allowed	216-RICR-40-05-3	R.I. Gen. Laws § 5-34-49.	Regulations arguably granting full practice authority were promulgated in January/February 2012. Rhode Island changed its statute to allow full practice authority in June 2013. 5 R.I. Gen. Laws § 5-34-44.
South Carolina	Never		May 2004-present allowed with oversight	S.C. Code Ann. § 40-33-34.	S.C. Code Ann. § 40-33-34.	
South Dakota	July 2017		1998-July 2017: allowed with oversight July 2017-present: allowed	S.D. Codified Laws § 36-9A-12.	S.D. Codified Laws § 36-9A-12.	
Tennessee	Never		Allowed with oversight	Tenn. Code Ann. § 63-7-123.	Tenn. Code Ann. § 63-7-123.	
Texas	Never		Allowed as of May 2003	Tex. Occ. Code Ann. § 157.0512.	Tex. Occ. Code Ann. § 157.0512.	
Utah	May 2016	Yes-See note	1998-May 2016: allowed with oversight May 2016-present: allowed	Utah Code Ann. § 58-31d-102.	Utah Code Ann. § 58-17d-102(23); Utah Code Ann. § 58-31b-803.	Prior to May 2016, independent in practice and prescription only for Schedules IV and V. Schedules II and III required a consultation and referral (C&R) plan with a consulting physician. After May 2016, Schedule II requires a C&R plan for inexperienced APRNs.
Vermont	June 2011		1998-June 2011: allowed with oversight June 2011-present: allowed	Vt. Stat. Ann. tit. 26, §§ 1611, 1613.	04-030-170 Vt. Code R. § 8.5.	
Virginia	April 2018		Allowed Schedules II through VI on and after July 1, 2006 with oversight. April 2018-present: allowed	Va. Code Ann. § 54.1-2957. <i>Id.</i> § 54.1-2957.01.	Va. Code Ann. § 54.1-2957.01.	
Washington	Jan 21 2006 -See notes	See notes	See note: Prior to August 19, 2001, Schedule V and non-controlled drugs only. Effective August 19, 2001, Schedules II-IV allowed.	Wash. Rev. Code Ann. § 18.79.050.	Wash. Rev. Code Ann. § 18.79.050.	Prior to 8/19/01, APRNs had independent PA and RX, but RX was limited to Schedule V and non-controlled drugs. From 8/19/01 to 1/21/06 a joint practice agreement was required for controlled substance prescriptions. The JPA is a written agreement that describes how collaboration will occur between the physician and the ARNP (i.e. when and how the ARNP will consult regarding the Rx of controlled

						substances). The JPA was eliminated when FPA became effective 1/21/2006.
West Virginia	June 2016		1998-June 2016, allowed with oversight June 2016-present: allowed	W. Va. Code Ann. § 9-4B-1. <i>Id.</i> § 30-7-15b.	W. Va. Code Ann. § 30-7-15b.	
Wisconsin	Never		Allowed with oversight	Wis. Stat. § 961.395. <i>Id.</i> § 441.16.	Wis. Stat. § 961.395 (2020); Wis. Stat. § 441.16.	
Wyoming	Always ^c		Always allowed	Wyo. Stat. Ann. § 33-21-302.	Wyo. Stat. Ann. § 33-21-120(a)(i)(A).	

^aThis table excludes laws and executive orders that were enacted as part of the Covid-19 public health emergency.

^b Some states require a transition to practice period that requires an NP to be supervised for some amount of time before being granted full practice authority.

^c State has always allowed full practice authority since at least 1998.

^d State allows prescription of controlled substances on Schedules V through III or II. The start date of 1998 in this column indicates the law extended at least as far back as 1998. The initial effective date of these laws is not reported.

Table A1: Literature

Study	SOP Law Separate— Practice Authority (PA)	SOP Law Separate— Prescription Authority (RX)	SOP Law PA and RX both included	SOP Data Source and Years Included	Main findings
Alexander and Schnell (2019)		Independent		NPALU, state nursing boards, state statutes 1990-2014	No effect on suicides. Independent RX associated with fewer mental health related deaths, fewer days in poor mental health. Mixed results for prescription rates.
DePriest et al. (2020)			FPA	NPALU based on AANP classification, 2010-2018	FPA positively associated with: NP self-employment; residing in health professional shortage area. FPA not associated with NP earnings
Greco and Spector (2019)		Independent for Schedule II CS		State statutes, 2003-2015	No effect on opioid treatment admissions nor mortality unless combined with a prescription drug monitoring program.
Kandrack et al. (2019)			FPA	NPALU, 2010-2017	No effect on nurse supply
Kleiner et al. (2016)		Mutually exclusive categories: • Independent	Independent in PA Independent in RX	NPALU, 1999-2010	Independent PA: increased NP earnings, no effects on hours

		<ul style="list-style-type: none"> • Supervised/delegated (CS only under supervision) • Limited (no CS, legend under supervision) 			Independent RX: no effect on NP earnings, increased hours, lower price for well-child visits, no effect on infant mortality; no effect on physician malpractice insurance
Kurtzman et al. (2017)	Independent (no restrictions + sole authority by BON)	Independent		NPALU, 2006-2011	No differences in quality of care associated with either independence in PA or independence in RX
Luo et al. (2021)			FPA	NPALU, 1980-2008	FPA associated with more work hours and higher probability of working in an ambulatory care setting. No effect on wages.
Markowitz et al. (2017)			Mutually exclusive categories for CNMs: <ul style="list-style-type: none"> • FPA • CPA • CPA with protocols • Supervisory, no RX. 	NPALU, state statues	No difference in maternal health behaviors; FPA associated with small increases in infant health outcomes and fewer labor inductions and C-sections; no effects on labor supply of CNMs

Markowitz and Adams (2022)			<p>Mutually exclusive categories:</p> <ul style="list-style-type: none"> • FPA • CPA • CPA with protocols • CPA with protocols, limited RX • Supervisory, no RX. 	State statutes and regulations, NPALU, 1992-2008	FPA associated with higher likelihood of self-employment and more hours worked. No effect of laws on probability of nursing employment, part-time work, working multiple jobs, and moving to a different state for work.
McMichael, Safriet, and Buerhaus (2018)			<p>Mutually exclusive categories:</p> <ul style="list-style-type: none"> • FPA • Physician supervision required only for RX • Complete supervision 	State statutes, regulations, and court cases, 1999-2012	Independent in PA and RX associated with reduced physician malpractice liability
McMichael (2018)	Independent	<ul style="list-style-type: none"> • CS allowed • 	<p>Mutually exclusive categories:</p> <ul style="list-style-type: none"> • FPA • Physician supervision required only for RX • Complete supervision 	State statutes, regulations, and court cases, 2001-2003; 2010-2015	Independent in PA and RX associated with increased supply of NPs
McMichael, Spetz, and Buerhaus (2019)			FPA	State statutes, regulations, and court cases, 2006-2015	Independent in PA associated with smaller increase in emergency department

					use following Medicaid expansion
McMichael (2020a)			FPA	State statutes, regulations, and court cases, 1998-2015	FPA and malpractice liability interact to affect C-sections and inductions
McMichael (2020b)			FPA	State statutes, regulations, and court cases, 2011-2018	FPA associated with decrease in opioid prescriptions
Muench et al. (2020)			FPA	NPALU, state nursing boards, state statutes 2008-2012	FPA associated with a small increase in medication adherence.
Park et al. (2020)			Mutually exclusive categories: <ul style="list-style-type: none"> • Full practice and prescription • Full practice only • Restricted practice and prescription 	State statutes and regulations, 2009-2015	Effects on visits to community health centers vary based on type of staff visit and levels of support staff.
Perry (2012)		CS allowed (Y/N), regardless of oversight requirements		NPALU, 1991-2003	NPs less likely to move from a state with CS authority
Shishir and Plemmons (2020)			Mutually exclusive categories: <ul style="list-style-type: none"> • Full Practice • Reduced Practice • Restricted Practice 	American Association of Nurse Practitioners, 2014-2017	NPs less likely to move from a state with FPA
Smith (2022)			FPA	NPALU, state nursing boards, state statutes, 2011-2017	FPA associated with increase in independently billed NP provided visits.

					FPA not associated with: NP visits with no physician on-site; NP prescription of schedule II drugs; work relative value units provided by NPs; number of chronic conditions among NP's patients; inappropriate prescribed antibiotics; unnecessary imaging ordered.
Spetz et al. (2013)			Independent in PA Independent in RX and PA	NPALU, 2004-2007	Independent in PA only associated with fewer RX payments and RX filled in retail clinics. Independent in PA and RX associated with higher RX payments and more RX filled in retail clinics.
Stange (2014)		CS allowed (Y/N), regardless of oversight requirements		NPALU, 1996-2008	CS RX allowed is associated with more office visits. No effects on usual source of care and amount paid.
Timmons (2017)		Mutually exclusive categories:		NPALU, 1999-2012	No effects on claims, care days, RX claims

		<ul style="list-style-type: none"> • CS without supervision • CS with supervision • No CS 			
Traczynski and Udalova (2018)			FPA	NPALU, state statues, BON rules and regulations, 1995-2012	FPA associated with: decreased emergency room visit; increased appointment availability; increases in quality of care metrics