

Healthcare License Turf Wars

The Effects of Expanded Nurse Practitioner and
Physician Assistant Scope of Practice on
Medicaid Patient Access

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Abstract

The provision of health care to low-income Americans remains an ongoing policy challenge. In this paper, I examine how important changes to occupational licensing laws for nurse practitioners and physician assistants have affected cost and access to health care for Medicaid patients. The results suggest that allowing physician assistants to prescribe drugs is associated with a substantial (more than 11 percent) reduction in the dollar amount of outpatient claims per Medicaid recipient. I find little evidence that expanded scope of practice has affected proxies for access to care such as total claims and total care days. Relaxing occupational licensing requirements by broadening the scope of practice for healthcare providers may represent a low-cost alternative to providing quality care to America's poor.

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Edward J. Timmons

Providing health care to low-income Americans remains an ongoing policy challenge.

Occupational licensing laws typically dictate the tasks that healthcare professionals are allowed by law to complete. Occupational licensing laws have begun to come under increased scrutiny as a result of a recent White House report documenting the costs and benefits of the laws.¹ The American Medical Association has historically exerted great influence over the licensing of physicians and other healthcare professionals and was described by Milton Friedman as the “strongest trade union in the United States.”²

Two types of healthcare professionals that are becoming a more important part of healthcare delivery in the United States are nurse practitioners (NPs) and physician assistants (PAs). Each state has different rules for the scope of practice of NPs and PAs. In some states, PAs are allowed to prescribe drugs with physician supervision; in others, they are not. The same is true for NPs. However, some states grant NPs the authority to prescribe drugs *without* physician supervision—effectively allowing them to practice autonomously.

Matching data from 1999 to 2012 from the Centers for Medicare and Medicaid Services Medicaid Statistical Information System (CMS-MSIS) with regulatory data from *The Nurse Practitioner* and the American Academy of Physician Assistants, I estimate the effect of

¹ Department of the Treasury Office of Economic Policy, the Council of Economic Advisers, and the Department of Labor, “Occupational Licensing: A Framework for Policymakers,” White House, Washington, DC, July 2015, https://www.whitehouse.gov/sites/default/files/docs/licensing_report_final_nonembargo.pdf.

² Milton Friedman, *Capitalism and Freedom* (Chicago: University of Chicago, 1962),150.

expanded scope of practice of NPs and PAs on access to health care for Medicaid patients.³

The 1990s and the years since 2000 were a period of substantial change in the scope of practice for PAs and NPs. This study exploits those changes to use a difference-in-differences framework.

After providing some background and summarizing the existing research specifically on the economic effects of scope of practice, this paper provides some graphs of the data and then shares the empirical results of the analysis.

The Evolving Role of NPs and PAs in the Market for Health Care

The emergence of the NP and PA professions coincided with the introduction of Medicare and Medicaid in 1965.⁴ Both occupations have experienced tremendous growth; for example, the number of practicing PAs per 100,000 residents in the United States more than tripled from 1980 to 2000.⁵ A similar trend occurred for NPs from the 1980s to the 1990s, but NP growth slowed in the 1990s.⁶ The role of NPs and PAs in the market for health care has changed as consumer preferences respond to a lack of access to services. Although half of Americans would prefer to have a physician as a primary care provider, most would opt for seeing an NP or a PA over waiting for an available physician.⁷ The role of NPs and PAs also has historically varied with

³ Public access to the CMS-MSIS was revoked indefinitely in April 2015 until an update to the database is complete.

⁴ Agency for Healthcare Research and Quality, “The Number of Nurse Practitioners and Physician Assistants Practicing Primary Care in the United States,” Rockville, MD, October 2014, <http://www.ahrq.gov/research/findings/factsheets/primary/pcwork2/>.

⁵ Eric H. Larson and Lawrence G. Hart, “Growth and Change in the Physician Assistant Workforce in the United States, 1967–2000,” *Journal of Allied Health* 36, no. 3 (2007): 121–30.

⁶ Roderick S. Hooker and Linda E. Berlin, “Trends in the Supply of Physician Assistants and Nurse Practitioners in the United States,” *Health Affairs* 21, no. 5 (2002): 174–81.

⁷ Michael J. Dill, Stacie Pankow, Clese Erikson, and Scott Shipman, “Survey Shows Consumers Open to a Greater Role for Physician Assistants and Nurse Practitioners,” *Health Affairs* 32, no. 6 (2013): 1135–42.

geography and consumer income. NPs and PAs often serve as primary care providers in low-income, rural areas in the United States.⁸

Training programs for NPs and PAs vary in length, and restrictions on entry have tightened over time.⁹ Today, NPs are required to obtain master's degrees to be eligible for licensure. The American Association of Colleges of Nursing made clear as early as 2004 that the members wanted to see entry requirements raised to a doctorate degree by 2015.¹⁰ This upward shift in education requirements is consistent with efforts by nurse professional associations to raise education requirements for nurses more broadly.¹¹ Like NPs, PAs are required to complete a master's degree program to practice and are likely to face similar pressures to expand requirements to a doctoral degree as new doctoral programs in physician assistant sciences emerge.¹² Although the intention of increasing education requirements may be to increase the quality of care, economic theory suggests that erecting new barriers to entering these two professions would result in less access to care and higher earnings for each professional.¹³

At the same time, lobbying efforts of NP and PA professional associations have led to an expanded scope of practice that may increase access to care.¹⁴ In the 1990s and the decade after 2000, several states either began to permit NPs and PAs to prescribe prescription drugs or started

⁸ Christine M. Everett, Jessica R. Schumacher, Alexandra Wright, and Maureen A. Smith, "Physician Assistants and Nurse Practitioners as a Usual Source of Care," *Journal of Rural Health* 25, no. 4 (2009): 407–14.

⁹ Regulations are set at the state level, but particularly in health fields such as these, there are attempts at the federal level by professional associations to uniformly make changes to licensing statutes. Unlike in other licensed professions—for instance, barbers—licensing exams for NPs and PAs are administered by a national body.

¹⁰ American Association of Colleges of Nursing, "DNP Fact Sheet," Washington, DC, June 2015, <http://www.aacn.nche.edu/media-relations/fact-sheets/dnp>.

¹¹ Richard Pérez-Peña, "More Stringent Requirements Send Nurses Back to School," *New York Times*, June 24, 2012.

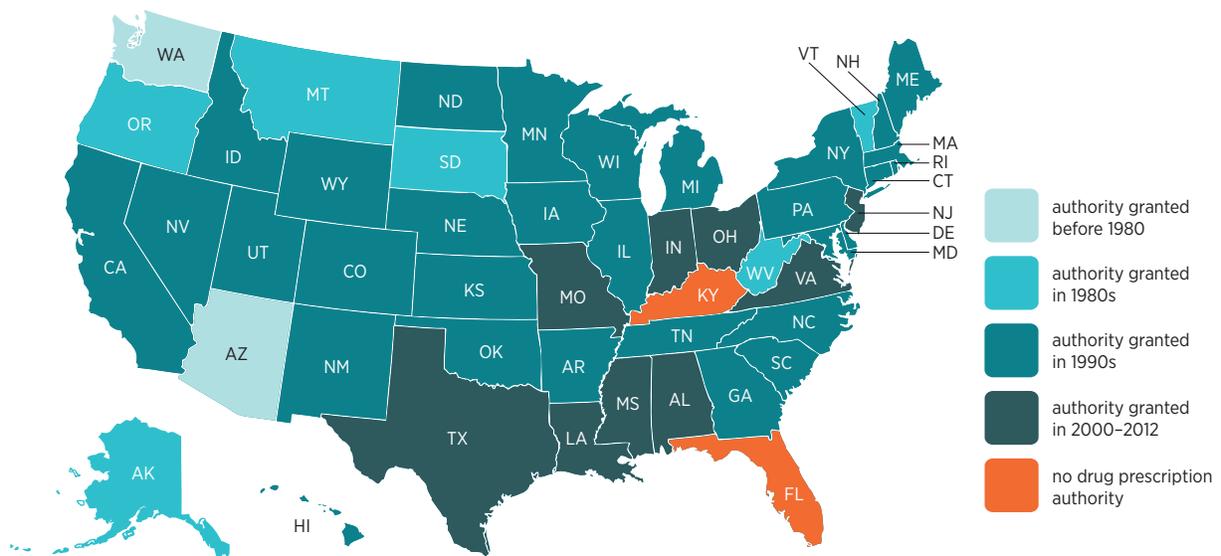
¹² Stephen Cornell, "U.S. Army Pleased with PA Doctorate Programs," Advance Healthcare Network, King of Prussia, PA, April 9, 2009, <http://nurse-practitioners-and-physician-assistants.advanceweb.com/Article/US-Army-Pleased-With-PA-Doctorate-Programs.aspx>.

¹³ Morris Kleiner, *Licensing Occupations: Ensuring Quality or Restricting Competition* (Kalamazoo, MI: W.E. Upjohn Institute, 2006).

¹⁴ John Fauber and Kristina Fiore, "Millions of Painkiller Prescriptions Written by Non-doctors," *Milwaukee-Wisconsin Journal Sentinel*, February 27, 2014.

to grant NPs more autonomy—authorizing them to prescribe without physician supervision. Figure 1 depicts how these changes have evolved over time for PAs throughout the United States. Before 1980, only two states (Washington and Arizona) permitted PAs to prescribe drugs. Six additional states (Alaska, Montana, Oregon, South Dakota, Vermont, and West Virginia) granted authority in the 1980s, and 31 others followed in the 1990s. In the decade after 2000, nine more states (and the District of Columbia) granted authority; today, only two states (Florida and Kentucky) do not permit PAs to prescribe drugs.

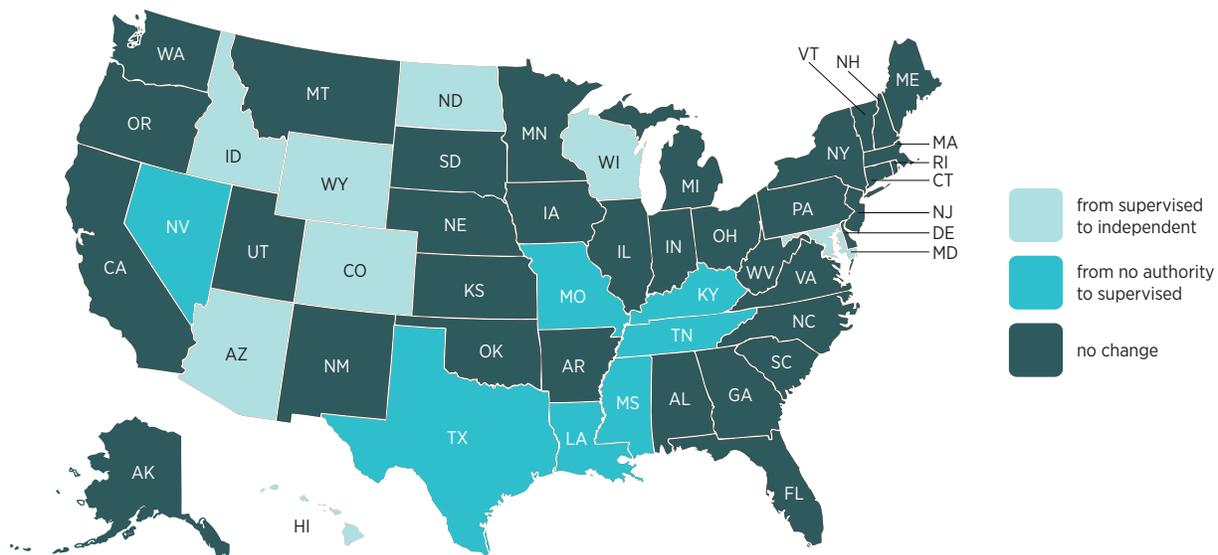
Figure 1. Where Physician Assistants Have Authority to Prescribe Drugs



Source: Based on data from the American Academy of Physician Assistants.

Like PAs, NPs were not permitted to prescribe drugs in only two states (Alabama and Florida) at the end of 2012. A new law passed in 2013 in Alabama now allows NPs to prescribe drugs with physician supervision. Several states, however, grant NPs much more autonomy than PAs—allowing NPs to prescribe drugs without physician supervision. Figure 2 depicts the current breakdown of NP autonomy. A number of states granted NPs more

Figure 3. Changes in Nurse Practitioner Autonomy, 1999–2012



Source: Based on data from Morris Kleiner et al., “Relaxing Occupational Licensing Requirements: Analyzing Wages and Prices for a Medical Service” (NBER Working Paper No. 19906, National Bureau of Economic Research, Cambridge, MA, February 2014).

Literature Review

A small but growing economics literature has emerged estimating the effects of occupational licensing.¹⁵ A number of papers estimate the effects of occupational licensing of healthcare professions ranging from dentists to radiologic technologists.¹⁶ Researchers generally find evidence that more restrictive entry requirements for healthcare professionals have resulted in higher professional salaries and higher prices for consumers, but researchers have been unable to find definitive evidence of improvements in the quality of care delivered to consumers.¹⁷ A

¹⁵ Kleiner, *Licensing Occupations*, and Morris Kleiner, *Stages of Occupational Regulation: Analysis of Case Studies* (Kalamazoo, MI: W.E. Upjohn Institute, 2013).

¹⁶ Morris Kleiner and Robert Kudrle, “Does Regulation Affect Economic Outcomes? The Case of Dentistry,” *Journal of Law and Economics* 43, no. 2 (2000): 547–82, and Edward Timmons and Robert Thornton, “The Effects of Licensing on the Wages of Radiologic Technologists,” *Journal of Labor Research* 29, no. 4 (2008): 333–46.

¹⁷ Edward Timmons and Anna Mills, “Bringing the Effects of Occupational Licensing into Focus: Optician Licensing in the United States,” Working Paper, Mercatus Center at George Mason University, Arlington, VA, February 17, 2015, <http://mercatus.org/publication/bringing-effects-occupational-licensing-focus-optician-licensing-united-states>.

subset of the occupational licensing literature has focused specifically on the issue of scope of practice. The existing literature documents “battles” between dentists and dental hygienists and among chiropractors, physical therapists, and physicians.¹⁸ A few papers have specifically focused on competition among NPs, PAs, and physicians. John Perry examined the effects of liberalizing the scope of practice for NPs and PAs on the earnings of each kind of practitioner as well as on the earnings of physicians.¹⁹ His findings suggest that more liberal scope of practice for NPs increases NP earnings and decreases physician earnings. Another paper, by Morris Kleiner and colleagues, focuses on liberalizing the scope of practice of NPs but examines a broader set of outcomes (earnings, hours worked, and quality of service).²⁰ The authors find evidence that more restrictive scope of practice increases physician earnings and reduces the number of hours that NPs work but has no noticeable effect on the quality of service (as measured by infant mortality and malpractice insurance premiums). The most closely related report is a recent paper by Kevin Stange that estimated how more liberal scope of practice for and increases in the number of NPs and PAs have affected healthcare access, utilization, and cost.²¹ He finds little evidence that increases simply in the number of PAs and NPs have improved healthcare access. However, when also accounting for expanded scope of practice, he does find some evidence that access has improved.

¹⁸ Morris Kleiner and Kyoung Won Park, “Battles among Licensed Occupations: Analyzing Government Regulations on Labor Market Outcomes for Dentists and Hygienists” (NBER Working Paper No. 16560, National Bureau of Economic Research, Cambridge, MA, November 2010), and Edward Timmons, Jason Hockenberry, and Christine Piette Durrance, “More Battles among Licensed Occupations: Estimating the Effects of Scope of Practice and Direct Access on the Chiropractic, Physical Therapist, and Physician Labor Market” (working paper, Collegio Carlo Alberto, Moncalieri, Italy, May 2014), <http://www.carloalberto.org/assets/events/timmons-26may2014.pdf>.

¹⁹ John Perry, “The Rise and Impact of Nurse Practitioners and Physician Assistants on Their Own and Cross-Occupation Incomes,” *Contemporary Economic Policy* 27, no. 4 (2009): 491–511.

²⁰ Morris Kleiner, et al., “Relaxing Occupational Licensing Requirements: Analyzing Wages and Prices for a Medical Service” (NBER Working Paper No. 19906, National Bureau of Economic Research, Cambridge, MA, February 2014).

²¹ Kevin Stange, “How Does Provider Supply and Regulation Influence Health Care Markets? Evidence from Nurse Practitioners and Physician Assistants,” *Journal of Health Economics* 33, no. 1 (2014): 1–27.

The contribution of this study will be to focus on Medicaid patients—a group that stands to gain the most from expanded scope of practice for NPs and PAs. I rely on data obtained from the CMS-MSIS. This study also examines a slightly different time period (1999–2012) than those used by Kevin Stange (1990–2008 from the Medical Expenditure Panel Survey) and by Morris Kleiner and colleagues (2002–2009 from the American Community Survey). Another important difference is that the CMS-MSIS specifically tracks spending on prescription drugs and outpatient claims, thus allowing the opportunity to explore the effects on Medicaid claims in more detail.

Data and Preliminary Analysis

The CMS-MSIS compiles data on the number of Medicaid beneficiaries in each state as well as on the dollar value of claims on a variety of healthcare services, including outpatient clinics and prescription drugs. I converted data from 1999 to 2012 into 2012 dollars using the consumer price index; dollar amounts were computed for each of the services per Medicaid beneficiary (those who filed claims in each category) in each state. These data were then merged with data counting the number of employed PAs and NPs in each state from the American Community Survey and the annual legislative update from the *Nurse Practitioner* magazine, respectively.²² The data were then merged with information on the prescription authority and autonomy of PAs and NPs. Data on real personal income per capita (in 2012 dollars) and state unemployment rates also were included.

Table 1 presents summary statistics. Fifteen states and the District of Columbia allowed PAs to prescribe drugs with physician supervision beginning between 1999 and 2012. In

²² See the website of the *Nurse Practitioner*, <http://journals.lww.com/tnpj/pages/default.aspx>.

addition, six states began to allow NPs to prescribe drugs with physician supervision and eight states began to allow NPs to prescribe drugs without physician supervision. Several states reimburse healthcare services provided by PAs at substantially lower rates than those provided by physicians (as low as 65 percent of the physician rate in some cases in Minnesota). Currently, 23 states reimburse PA services at a discount relative to physician rates.²³ Like PA Medicaid reimbursement rates, NP Medicaid reimbursement rates are lower than physician rates in many states. Rates are set as low as 75 percent of physician rates in Indiana, Kansas, Kentucky, and North Dakota. In addition, 24 states reimburse NP services provided to Medicaid patients at a lower rate than services provided by physicians.²⁴ To take a preliminary look at the effect of these changes in legislation, figure 4 plots the mean level of three types of Medicaid spending per beneficiary. Each type of claim is expressed in per-beneficiary terms to make the claims comparable because each category has a different denominator. Total claims per beneficiary are lower than some of the prescription claims because the number of Medicaid beneficiaries filing claims (of all types) significantly exceeds the number of Medicaid beneficiaries filing prescription drug claims. Total claims per Medicaid beneficiary are flat, and outpatient claims rise slightly for all states from 1999 to 2012. Prescription claims per beneficiary, however, sharply rise and then begin to fall in 2005. How much of this decline can be attributed to expanding the scope of practice for NPs and PAs cannot be surmised from this type of analysis. In the section that follows, regression analysis is used to estimate the contribution of more liberal scope of practice on Medicaid claims.

²³ Data retrieved by the author from the American Academy of Physician Assistants, 2015.

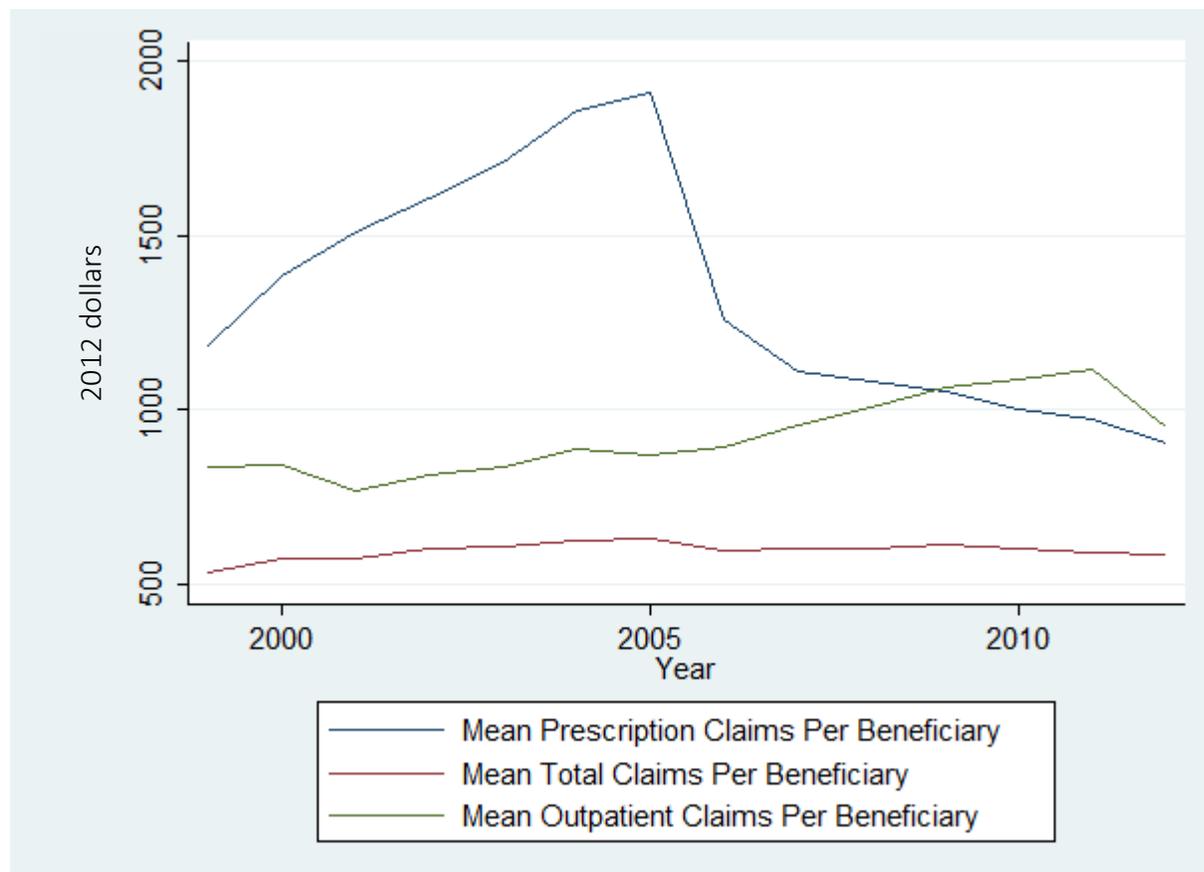
²⁴ “Medicaid Benefits: Nurse Practitioner Services,” State Health Facts, Henry J. Kaiser Family Foundation, <http://kff.org/medicaid/state-indicator/nurse-practitioner-services/>.

Table 1. Summary Statistics

	<i>n</i>	Mean	Standard deviation	Median
Prescription claims per Medicaid beneficiary (2012 \$)	689	1,330.93	603.93	1,187.75
All medical claims per Medicaid beneficiary (2012 \$)	701	597.34	160.07	569.29
Outpatient medical claims per Medicaid beneficiary (2012 \$)	701	923.50	964.71	783.69
Physician assistants (per thousand state residents)	701	0.019	0.020	0.010
Nurse practitioners (per thousand state residents)	701	0.48	0.42	0.42
Real state personal income per capita (2012 \$)	701	41,100.32	71,33.34	39,495.55
State unemployment rate (%)	701	5.8	2.1	5.3

Sources: Data on Medicaid claims come from the Centers for Medicare and Medicaid Services Medicaid Statistical Information System. Data on physician assistant density and population are compiled from the American Community Survey. Data on nurse practitioner density were obtained from *The Nurse Practitioner*.

Figure 4. Trends in Medicaid Claims per Beneficiary, 1999–2012



Sources: Data on Medicaid claims come from the Centers for Medicare and Medicaid Services Medicaid Statistical Information System. Data on physician assistant density and population are compiled from the American Community Survey.

Regression Results

The preceding section illustrates how health care delivered to Medicaid patients changed after the scope of practice for NPs and PAs was expanded. In this section, the more analytically rigorous methodology of difference-in-differences estimation will be used to estimate how these changes have affected Medicaid patients in each state. The methodology will rely on those states that changed status (either from not allowing PAs or NPs to prescribe drugs to allowing them to prescribe drugs or from allowing NPs to prescribe with supervision to no longer requiring supervision) and controls for state- and time-specific factors that may have influenced access to care. Equations estimated will take the following form:

$$\text{Medicaid outcome}_{s,t} = \alpha + \beta_{s,t}(\text{scope of practice}) + \mu_{s,t}(\text{professional density}) + \gamma_{s,t}(\text{state controls}) + \forall_{s,t}(\text{state and year fixed effects}) + \varepsilon_{s,t}$$

where the *Medicaid outcomes* are the same variables measured in figure 4 (total Medicaid claims per beneficiary in 2012 dollars, total outpatient Medicaid claims per beneficiary in 2012 dollars, and total prescription drug Medicaid claims per beneficiary in 2012 dollars), as well as the total Medicaid claims (in 2012 dollars) and total care days (in thousands of days). The claim values per beneficiary are meant to capture the cost of providing care, whereas the total Medicaid claims and total care days are meant to proxy for access to care. Presumably, higher total claim amounts and care days would support greater access to care—given that NP and PA services are often reimbursed at lower rates.

Professional density is measured by taking the number of each employed professional (NP or PA) in state s at time t and dividing by the state's population at time t in thousands of persons to construct measures of NP density and PA density. *State controls* are meant to capture differences in Medicaid enrollment across states that may vary over time. I use real state personal

income per capita (in 2012 dollars) and the state unemployment rate to control for these changes. The *state and year fixed effects* variables refer to binary indicator variables (coded as either 0 or 1) for each year and each state in the sample. These variables allow me to control for any state- or time-specific differences in Medicaid outcomes. As an additional control, I include both linear and quadratic state-specific trends in the regressions.

The main variable of interest in the analysis, *scope of practice*, is measured differently given the nature of the regulatory differences for each profession. According to data obtained from the American Academy of Physician Assistants, states fall into one of two categories: either allowing PAs to prescribe drugs with physician supervision or not allowing PAs to prescribe drugs. To measure the effect of allowing PAs to prescribe drugs, I count the number of years that have elapsed since the law took effect. I then separate states into groups and construct dummy variables using the number of years that PAs have had the authority to prescribe drugs with physician supervision: PAs not allowed to prescribe drugs, PAs allowed to prescribe drugs for 1 to 5 years, PAs allowed to prescribe drugs for 6 to 10 years, and PAs allowed to prescribe drugs for 11 years or more. I also measure the ability of PAs to prescribe drugs using a simple indicator variable equal to 1 if PAs are permitted to prescribe drugs with physician supervision in state s in year t and zero otherwise. For NPs, states fall into one of three categories: states that allow NPs to prescribe drugs without physician supervision, states that allow NPs to prescribe with physician supervision, or states that do not allow NPs to prescribe drugs at all. In this case, to properly separate cases, I use simple indicator variables: an indicator for if NPs are able to prescribe drugs without physician supervision in state s and year t and a different indicator if NPs are able to prescribe drugs only with physician supervision in state s and year t . For example, Tennessee first allowed NPs to prescribe drugs in 2000. Tennessee observations from 1999 and

2000 are coded as 0 and then 1 thereafter for the *NP Prescriptions with Supervision* indicator variable. All Tennessee observations are coded as 0 for the *NPs Prescribe without Supervision* indicator variable.

Tables 2 and 3 present the results of the regression estimations. In table 2, I measure PA scope of practice by grouping states by the number of years that PAs have been permitted to write prescriptions with physician supervision. In table 3, I measure the presence of a statute (not taking into account the number of years the statute has been in effect). As noted previously, each regression includes time and state fixed effects, a linear state-specific trend, and a quadratic state-specific trend. In most regressions, the density of NPs and PAs appears to have little effect on Medicaid patients. The lone exception is on prescription claims per Medicaid beneficiary. This result is particularly notable because opposition to expanded NP and PA scope of practice has often centered on concerns that NPs and PAs overprescribe drugs.²⁵ Higher NP and PA density appears to have little effect on Medicaid claims. I now turn attention to the effects of expanded scope of practice. In columns 1 and 2 of tables 2 and 3, I use the total amount of Medicaid claims (in 2012 dollars) and the total care days received by Medicaid patients as a proxy for access to care. I find little evidence that expanded scope of practice has increased access to care much. Admittedly, these proxies are rough and ideally would have included patient outcomes (e.g., life expectancy). Such measures were not available for Medicaid patients, however. At worst, it would appear that broader NP and PA scope of practice has not affected access to care.

²⁵ Fauber and Fiore, “Millions of Painkiller Prescriptions Written by Non-doctors.”

Table 2. Difference-in-Differences Estimates of the Effects of Physician Assistant (PA) and Nurse Practitioner (NP) Scope of Practice on Medicaid Patients, 1999–2012

	Total Medicaid claims (2012 \$)	Total care days	Prescription claims per beneficiary (2012 \$)	Total claims per beneficiary (2012 \$)	Outpatient claims per beneficiary (2012 \$)
PAs per thousand residents	4,815.81 (4,010.27)	130,456.00 (180,795.90)	-30,780.71 (22,552.43)	3,695.44 (5,841.82)	-14,955.68 (19,930.64)
NPs per thousand residents	2.24 (1.82)	-24.04 (180.14)	-7.42* (4.42)	0.68 (1.68)	1.06 (7.41)
PAs allowed to prescribe 1–5 years	-19.50 (20.39)	215.41 (762.74)	-61.61 (93.22)	10.83 (18.51)	-108.76* (63.34)
PAs allowed to prescribe 6–10 years	-30.40 (32.10)	-1,939.01 (2,242.06)	-120.01 (117.94)	12.43 (27.16)	-65.19 (91.78)
PAs allowed to prescribe more than 11 years	-43.22 (31.64)	-3,452.53 (3,813.69)	-55.60 (132.41)	-1.31 (32.49)	-159.04 (100.67)
NPs allowed to prescribe without supervision	-1.03 (29.95)	1,024.37 (1,276.40)	-80.00 (134.05)	20.85 (17.36)	-436.15 (499.15)
NPs allowed to prescribe with supervision	12.64 (23.09)	1,224.62 (1,105.05)	-98.57 (98.02)	6.61 (10.52)	12.90 (51.83)
Real state personal income per capita (2012 \$)	0.000082 (0.0034)	-0.042 (0.14)	-0.0086 (0.0080)	0.0015* (0.00082)	0.0053 (0.0032)
State unemployment rate (%)	-0.22 (1.03)	-55.18 (65.17)	-3.32 (2.23)	0.0085 (0.89)	7.39* (4.32)
<i>n</i>	701	701	689	701	701
<i>R</i> ²	0.91	0.54	0.87	0.72	0.86

* = significant at the 10% level.

Note: Standard errors clustered by state in parentheses. All regressions include state and year fixed effects, a linear state-specific trend, and a quadratic state-specific trend.

Sources: Data on Medicaid claims come from the Centers for Medicare and Medicaid Services Medicaid Statistical Information System. Data on PA employment and population are from the American Community Survey. Data on NP employment are from *The Nurse Practitioner*. Data on PA scope of practice are from the American Academy of Physician Assistants. Data on NP scope of practice are compiled from Kevin Stange, “How Does Provider Supply and Regulation Influence Health Care Markets? Evidence from Nurse Practitioners and Physician Assistants,” *Journal of Health Economics* 33, no. 1 (2014): 1–27; and Morris Kleiner et al., “Relaxing Occupational Licensing Requirements: Analyzing Wages and Prices for a Medical Service” (NBER Working Paper No. 19906, National Bureau of Economic Research, Cambridge, MA, February 2014). Data on personal income are from the Bureau of Economic Analysis. Data on the Consumer Price Index and unemployment are from the Bureau of Labor Statistics.

Table 3. Difference-in-Differences Estimates of the Effects of Physician Assistant (PA) and Nurse Practitioner (NP) Scope of Practice on Medicaid Patients, 1999–2012

	Total Medicaid claims (2012 \$)	Total care days	Prescription claims per beneficiary (2012 \$)	Total claims per beneficiary (2012 \$)	Outpatient claims per beneficiary (2012 \$)
PA per thousand residents	5,106.10 (3,916.69)	171,746.80 (184,154.40)	-31,694.65 (22,144.27)	3,899.00 (5,755.23)	-13,829.73 (20,792.28)
NPs per thousand residents	2.47 (1.88)	3.15 (174.10)	-8.76* (4.59)	0.92 (1.67)	2.66 (7.59)
PA allowed to prescribe	-17.55 (20.23)	714.20 (686.12)	-38.88 (90.56)	8.81 (17.15)	-132.72** (58.07)
NPs allowed to prescribe without supervision	-1.73 (30.59)	768.05 (1,281.96)	-105.38 (135.58)	22.76 (19.18)	-416.50 (495.05)
NPs allowed to prescribe with supervision	11.82 (22.98)	1,025.36 (1,115.18)	-114.10 (94.81)	7.29 (10.00)	21.45 (50.68)
Real state personal income per capita (2012 \$)	0.00017 (0.0033)	-0.03 (0.13)	-0.0090 (0.0081)	0.0016* (0.00082)	0.0057 (0.0032)
State unemployment rate (%)	-0.20 (1.03)	-53.06 (63.46)	-3.42 (2.18)	0.027 (0.91)	7.51* (4.46)
<i>n</i>	701	701	689	701	701
<i>R</i> ²	0.91	0.54	0.87	0.72	0.86

* = significant at the 10% level, ** = significant at the 5% level.

Note: Standard errors clustered by state in parentheses. All regressions include state and year fixed effects, a linear state-specific trend, and a quadratic state-specific trend.

Sources: Data on Medicaid claims come from the Centers for Medicare and Medicaid Services Medicaid Statistical Information System. Data on PA employment and population are from the American Community Survey. Data on NP employment are from *The Nurse Practitioner*. Data on PA scope of practice are from American Academy of Physician Assistants. Data on NP scope of practice are compiled from Kevin Stange, “How Does Provider Supply and Regulation Influence Health Care Markets? Evidence from Nurse Practitioners and Physician Assistants,” *Journal of Health Economics* 33, no. 1 (2014): 1–27; and Morris Kleiner et al., “Relaxing Occupational Licensing Requirements: Analyzing Wages and Prices for a Medical Service” (NBER Working Paper No. 19906, National Bureau of Economic Research, Cambridge, MA, February 2014). Data on personal income are from the Bureau of Economic Analysis. Data on the Consumer Price Index and unemployment are from the Bureau of Labor Statistics.

In the last three columns in tables 2 and 3, the claims per beneficiary variables are meant to measure the cost of medical care delivered to Medicaid patients. I find little evidence that expanded scope of practice (effectively relaxing occupational licensing laws) has affected the dollar amount of prescription claims per beneficiary or the dollar amount of all medical claims per beneficiary. The total claims category perhaps is too broad a measure (including unrelated expenses such as dentistry). The cost of the same prescription drug also will not vary with the

medical practitioner who is writing the prescription—unlike the medical services whose price is influenced by set Medicaid reimbursement rates in each state. The final column of both tables, however, shows consistent evidence that expanded scope of practice for PAs is associated with lower outpatient claims per Medicaid beneficiary. The reduction in cost is quite large (\$109–\$133, depending on specification, or about 11.8 to 14.4 percent evaluated at the mean level of outpatient claims per beneficiary) and appears to take effect in the first few years after PAs are allowed to prescribe drugs with physician supervision. I find less convincing evidence that allowing NPs to prescribe drugs has had a similar effect, although it should be noted that the coefficient on the dummy variable indicating that NPs can prescribe drugs without physician supervision is large and negative in both specifications but is not statistically significant. Taken together, these results are fairly consistent with the findings in the literature that looks at the effects of broadening NP and PA scope of practice on access to and quality of care for all patients. As noted in the preceding section, the existing literature finds evidence that broadened scope of practice has increased access to care without infringing on the quality of service delivered to patients. Results from tables 2 and 3 suggest that broader PA scope of practice may have reduced the cost of outpatient services delivered to Medicaid patients. Taxpayers more broadly may also stand to benefit by if the costs of services delivered to low-income Americans are reduced.

Conclusion

In this paper, I have estimated the effects that modifications to existing occupational licensing laws allowing NPs and PAs to prescribe drugs have had on the cost of and access to health care for Medicaid patients. The results suggest that broader scope of practice for PAs is correlated

with cheaper outpatient care (an 11.8 to 14.4 percent reduction, depending on specification) without negatively affecting access to health care. There are at least two important policy takeaways from these results. First, policymakers in Florida and Kentucky, the two states that prohibit NPs, PAs, or both from prescribing drugs, should consider broadening the scope of practice of NPs and PAs to allow them to prescribe drugs with physician supervision. Second, states that do not currently allow both NPs and PAs to prescribe drugs without physician supervision should consider changing their laws to allow them to do so. The results of this paper, combined with findings of other researchers, suggest that broader scope of practice for NPs and PAs has little effect on the quality of care delivered, increases access to health care, and also potentially reduces the cost of providing health care to patients. More generally, broadening the scope of practice of nonphysician healthcare providers and reducing the monopoly power of physicians in the healthcare market is very likely to improve consumer welfare.