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EVIDENCE FROM THE CONRAD 30 WAIVER PROGRAM

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Migration Policy and the Supply of Foreign Physicians: Evidence from the Conrad 30 Waiver Program

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ABSTRACT

In the United States, rural and low-income communities have difficulty attracting and retaining physicians, potentially adversely impacting health outcomes. With a limited supply of physicians completing medical school at US universities, foreign-born and educated physicians provide a potential source of supply in underserved areas. For international medical school graduates (IMGs) the terms of the commonly used J-1 visa require a return to the home country for two years following employment in medical residency. Our analysis examines the extent to which the Conrad 30 Visa Waiver impacts the supply of physicians at state and local levels, particularly in areas designated as medically underserved. Changes in the federal limit on the number of waivers per state, combined with variation in the state-level restrictions on eligible specialties, and geographies in which physicians can work, provide evidence on the role of visa restrictions in limiting the supply of doctors. Expansion of the cap on visa waivers increased the supply of IMGs, particularly in states that did not limit waiver recipients to primary care physicians or particular places of employment. There is little evidence of reductions in US-trained doctors in states where IMG increases were the largest, suggesting little evidence for crowding out.

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1. Introduction

Rural and poor areas have difficulty attracting and retaining primary care physicians. Although about 20 percent of the United States population lives in rural areas, only 11 percent of physicians practice in these locations (Burrows et al. 2012). The geographic disparity in the access to physician services contributes to important disparities in population health, as research suggests positive associations between physician supply (particularly primary care doctors) and health outcomes in the US (Starfield et al. 2005; Basu et al 2019) and other countries (Lee et al. 2010; Sundmacher and Busse 2011; Or, Wang and Jamison 2005).

In the United States, the flow of foreign-born and educated physicians to serve as medical residents in US hospitals expands the potential pool of physicians to the US market well beyond the number of graduates from US medical schools. The US is expected to have a shortfall of about 124,000 physicians by 2034 (AAMC, 2021). As such, foreign-born physicians have the potential to expand access to high-quality healthcare for substantial parts of the country that are under-served by the constrained supply of US-born doctors. Yet, for the many international medical graduates (IMGs) who enter the US on J-1 visas, the two-year home residency requirement limits the capacity of these physicians to work in the US after completion of postgraduate medical residencies. In this study, we assess how policies relaxing visa requirements for foreign physicians impact the allocation of doctors to underserved areas in the US.

Our interest is in estimating the impact of changes in immigration policy impacting opportunities for foreign medical residents to extend their employment in the United States on the long-term stock of immigrant physicians and the corresponding effects on US-born doctors. The Conrad 30 Waiver Program grants a waiver of the two-year home residency requirement tied to the J-1 visa for medical residents and provides a pathway to immigrant visas, such as the H-1B, after employment for three years in a high-need area. First introduced in 1994, the Conrad 30 Visa Waiver program includes a federal cap on the number of waivers that can be sponsored, with states setting additional limitations on participation, such as restricting the number of waivers granted to physicians to practice nonprimary care. Since 2001, more than 18,000 foreign physicians have participated in the program (3RNTE 2021). Conservative estimates suggest that at least 44 million patients were treated by a Conrad 30 doctor since the program began (La Corte and Guerra, 2023).

The increase in the yearly federal cap of J-1 visa waivers per state from 20 to 30 in 2002 provided the opportunity for each state to add 100 new IMGs to their stock of doctors over the next decade, equivalent to more than 5 thousand additional doctors across the country during the time period, concentrated in rural and under-served areas. Combined with state-level restrictions on the program, the increase in the cap generated significant variation in the flow of IMGs to states. We find that states constrained by the cap in 2001 (those already at the limit of 20) experienced a 9 percent increase in the stock of IMGs in 2012 compared with unconstrained states. Significantly, these relative increases were not accompanied by a substantive decline in the number of US-trained doctors. We interpret this result as evidence that physicians participating in the Conrad 30 Waiver program do not crowd-out US-trained doctors, which is consistent with the fact that states are constrained by a low number of physicians.

Next, we compare the gap in the supply of IMGs and US graduate doctors between medically underserved and better serviced areas across states with more and fewer restrictions tied to participation in the Conrad 30 program. We find that the gap in the supply of IMGs between better-served and underserved counties decreases by about 41 percent in states that allow nonprimary care physicians to participate in the program without any restrictions.

Importantly, we do not find evidence that this policy restriction affects the distribution of US graduates within a state. There is no evidence that doctors whose J-1 visa requirements were waived are crowding out doctors who are US citizens in underserved areas, which again, is consistent with the observation that underserved areas face physician shortages that are potentially alleviated by foreign-born physicians. These results, taken together, suggest that, given the supply-constraints on US physicians, more accommodating visa policies may improve healthcare access for US residents, without adversely affecting the market for US-born doctors.

Our paper advances different strands of the research literature. First, it contributes to the literature on the effect of migration policies on high-skilled immigration. While papers have investigated the effects of visa restrictions on the allocation computer scientists (Bound et al. 2015), STEM workers (Amuedo-Dorantes, Furtado, and Xu 2019), and nurses (Abarcar and Theoharides 2020), we investigate the effects of visa restrictions on the allocation of physicians across different regions of the country. Second, we engage with the prior research on the determinants of physician supply in the US. While past work has investigated the role of physician organizations (Nicholson and Propper 2011), payment schemes (Hennig-Schmidt, Selten, and Wiesen 2011), and noncompete agreements (Lavetti, Simon and White 2020) on the supply of doctors, we investigate the effect of visa restrictions on the supply of physicians in the US. Our paper also advances Sasso's work (2021), which shows how the increased scrutiny on the H-1B program in 2009 prompted hospitals to hire fewer foreign-born residents. Overall, understanding the impact of the Conrad 30 Visa waiver on the persistence of foreign-born physicians in the US informs the question of whether immigration policy may be an effective tool in efforts to increase access to medical care in localities that lack access to physicians.

Finally, we contribute to the body of research on whether high-skilled immigrants crowd-out US-born workers. On the one hand, an increasing supply of migrant workers might impose costs on American workers who are close substitutes (Borjas 1999), such as computer scientist (Bound et al. 2015) and mathematicians in the 1990s (Borjas and Doran 2012). On the other hand, the magnitude of these costs may be substantially mitigated if the supply of US high-skilled workers is constrained (Peri 2016). Evidence shows that the increase in the supply of high-skilled immigrants due to changes in the H1-B visa led to limited effects on native science and engineering employment (Kerr and Lincoln 2010) and positive effects on wages of native college-educated workers in metropolitan areas from 1990 to 2010 (Peri, Shih, and Sparber 2015). That an increase in the supply of foreign physicians derived from a more flexible migration policy had no detectable effect on the employment of US-trained doctors is consistent with a supply-constraints in the US market for physicians.

The economics of utilizing the Conrad 30 Waiver program also relate to questions around labor supply and demand. For IMGs on J-1 visas with medical residencies in the US, the attractiveness of the Conrad 30 Waiver program depends on preferences for US residency and expected wages in the

home country. Because salaries for physicians are much lower in many countries than in the US, even salaries that are relatively modest by US standards in rural or underserved areas may seem attractive to IMGs. For example, an entry-level physician in Pakistan would be expected to earn about \$16,645 US dollars per year (Salary Expert 2021). Thus, we would expect IMGs from relatively poor countries to be most likely to participate in the Conrad program. For states and communities, the benefits of incurring the bureaucratic costs to attract IMGs depend on the likelihood that IMGs will persist in medically underserved communities beyond the three-year term when they are eligible for H-1B visas, along with their impact on the quantity and quality of health care provision in local communities.

Our analysis of how international medical graduates affect the supply and geographic distribution of physicians in the US begins with an overview of the educational and licensure pathway for foreign-trained physicians to practice in the US. We then outline immigration and visa policies, primarily the connection between the educational exchange (J-1) and work visas (H-1B) afforded by the Conrad 30 Visa program, and consider how policy constraints potentially impact the flow of physicians. The third section outlines the available data. The fourth section presents our main results, studying how changes in state-level restrictions combined with changes to the federal cap affect the supply of physicians. The fifth section examines how county-designation of shortage areas affects the spatial distribution of physicians within states, and the final section discusses implications for policy and future research.

2. International Medical Graduates and the Conrad Visa Waiver Program

An international medical graduate (IMG) is a physician who received a basic medical degree from a medical school located outside the United States and Canada that is not accredited by a US accrediting body. IMGs have been an important source of physicians for developed countries, constituting about 24.7 percent of all active doctors in the US in 2019 (AAMC 2019). In certain specialties, IMGs constitute an even greater share, embodying 41.2% of critical care medicine, and more than half of all physicians in nephrology or geriatric care. Indeed, as the US population ages, IMGs are seen as a critical source of physician supply (de Pena and Leonard, 2023).

In 2010, about 24 percent of all IMGs were American citizens who obtained their medical degree from an institution abroad, and 76 percent of IMGs were non-US citizens (ECFMG 2021). The top source countries for non-US citizen IMGs are India, Canada, Pakistan, and Nigeria (Ranasinghe 2015). The number of IMGs in the country has steadily increased over the past decades, with 40 thousand more IMGs practicing patient care in the US in 2013 compared with 2003, which represents about 34 percent of the increase in all patient care doctors in the country during the same period (AMA Masterfile Table 2015).

The main pathway for IMGs to be licensed as physicians in the United States is to complete a US medical residency program. Participation in a medical residency is a form of postgraduate training under the supervision of senior medical clinicians, which is generally required to obtain an unrestricted license to practice medicine. Medical residency appointments are generally three years, with longer terms in specialty fields. Although they are paid appointments, compensation is generally much less than that received by independently practicing physicians. The general method to apply

for residency programs is through the National Resident Matching Program (NRMP). To participate in the NRMP, an IMG is required to be certified by the Educational Commission for Foreign Medical Graduates (ECFMG), which assesses the readiness of international medical graduates to enter residency programs in the US. Nearly 30,000 IMG residents are currently in training, representing almost one-quarter of all trainees in the US (Pinsky 2017).

Although several visa types are available to foreign IMGs (such as the H-1B visa for specialty occupations), most foreign IMGs entered the US on J-1 visas during their residency program (Brotherton and Etze 2019). The J-1 visa is a temporary visa that authorizes an IMG to obtain a graduate medical education (GME) credential in the US. More than 12 thousand physicians were approved for J-1 visa sponsorship in 2020 (ECFMG 2021). Once they have completed their GME on a J-1 visa, physicians are required to return to their home country or country of residence for at least two years before they may apply for a temporary work visa or for permanent residence in the US. In other words, unless the two-year home residence obligation is waived, a J-1 physician is ineligible for an H-1B visa and/or permanent residence after their graduate studies (GAO 2006).

The Conrad 30 Visa Program waives the two-year home residency requirement for J-1 visa holders and allows a foreign physician to stay in the US to practice in an underserved area. The program was introduced as part of the Immigration and Nationality Act § 214(l) reauthorization in 1994 by Senator Kent Conrad of North Dakota, who designed the initiative to address the significant physician shortages identified in rural areas. In its initial form, each state could sponsor up to 20 IMGs per year holding J-1 visas to bypass the two-year foreign residency requirements in exchange for serving in a rural or underserved population in the state for at least three years. The program was reauthorized and expanded in 2002, increasing the number of state sponsored waivers to 30 per year. If states had taken full advantage of the expansion of the cap, there could be more than 10 thousand new doctors added to the stock of physicians in the US by 2022, concentrated in rural and underserved areas.

To receive a J-1 visa waiver, a foreign physician must be recommended by an interested federal or state government agency through the Conrad 30 Waiver program. Once the physician is granted the waiver, the physician must work at the facility specified in the waiver application for a minimum of three years, unless the physician obtains approval from the United States Citizenship and Immigration Services (USCIS) to transfer to another facility. Since 2001, more than 18,000 foreign physicians have participated in the program (3RNTE 2021). Evidence from Wisconsin shows that most participants are from less developed countries, such as the Philippines, India, and Pakistan (Crouse and Munson 2006).

State and federal agencies can request waivers for physicians to work in a variety of practice specialties, settings, and locations. They have significant discretion in shaping their J-1 visa waiver programs to address particular needs or priorities. For example, state and federal agencies may choose to limit their waiver requests for physicians to practice nonprimary care or require that waiver physicians work in certain practice settings. State agencies may also choose to restrict waiver physicians to work in facilities required to accept some patients who are uninsured or covered by Medicaid. Finally, while some states' requests for primary and nonprimary care physicians are limited to Health Professional Shortage Areas (HPSAs), other states have the flexibility to request a few doctors in other areas (GAO 2006).

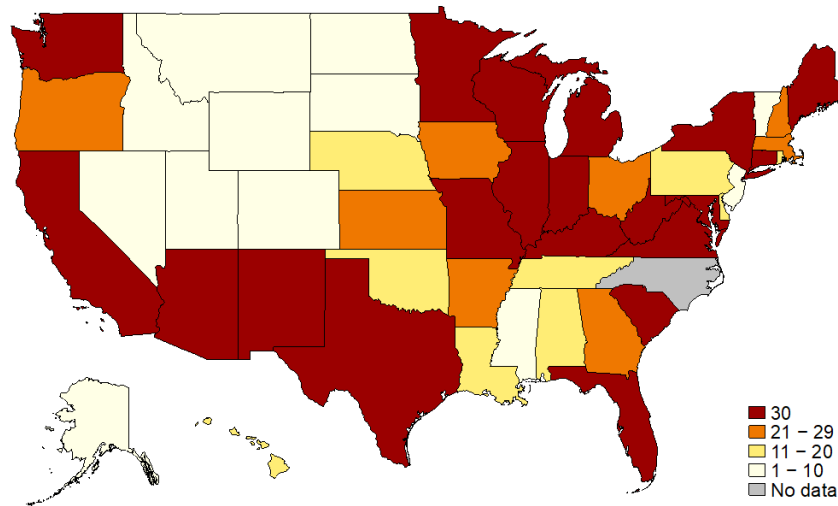
3. Data and Descriptive Findings

Data on Conrad 30 Waiver utilization, state-specific policies, and the representation of IMGs by geography require assembly from multiple administrative data sources, often only available in printed volumes (summarized in Table A1). Information on the number of J-1 visa waivers under the Conrad 30 program are collected by each State Primary Care Office and compiled by the 3RNET website (3RNET 2023). These data cover all states from 2001 to 2020.

Substantial variation exists in the take-up rate of the Conrad 30 Visa Waiver program across states (Figure 1). Twenty states requested the maximum number of visa waivers available under the current cap (30 waivers) in the fiscal year 2015. The mix of states at the cap includes substantial variation in state income and geography with Connecticut and West Virginia at the cap, even as Wyoming and New Jersey requested fewer than 10 waivers.

To better understand the importance of the increase in the federal cap in 2002, we calculate the number of J1 visa waivers requested for each state above the 20 limit over the next 18 years. The increase in the cap allowed the influx of more than 4 thousand new IMGs to the US between 2002 and 2020. For reference, Hawaii, the 43rd states with most medical doctors in the country, has about 3,700 active physicians in 2022 (Kaiser Family Foundation, 2022). The 4 thousand new doctors represented 15% of the growth in IMGs over the two decades.

Figure 1 – Number of J-1 Visa Waivers Requested in FY 2015



Note: Data sourced from State Primary Care Offices/3RNET. Map plots the number of J-1 waivers granted in the 2015 fiscal year.

The distinction between J-1 visa waivers requested in a year and IMGs reported in a geographic area at a point of time is important to recognize. The former is the potential “flow” of new IMGs under the Conrad Waiver program while the latter is a stock measure, representing the net inflow (and outflow) of IMGs to an area.

For information on IMGs and US-trained doctors by state, we digitize annual reports from the American Medical Association’s physician characteristics and distribution in the United States between 1997 and 2012 (AMA Masterfile Tables 1997 to 2012). These data include information on

both federal physicians (employed by the US federal government) and nonfederal physicians (e.g., employed in the private sector). We use state population data from the Census to calculate the number of IMG and US-trained doctors per capita by state.

We use the Area Health Resources (AHR) dataset to obtain information on the number of active nonfederal IMG and US-trained doctors and by county from 2010 to 2020.¹ The data also include indicators for whether the county is partially or completely a Health Professional Shortage Area (HPSA) in the years of 2010 and 2015–2020. A county receives a HPSA status if there is a shortage of primary care physicians, dentists, or mental health providers. We present the geographic distribution of IMG and US-trained doctors per capita for the years 2010 and 2015 in Figure A1 and the distribution of HPSA in 2015 in Figure A2.

Finally, we gather data on policy restrictions of the J-1 visa waiver program for each state. We use the framework behind the 2006 GAO report that highlights five important state policy restrictions in the 2005 fiscal year associated with the request for J-1 visa waivers by the states: whether (a) facilities that hire J-1 waiver doctors are required to accept some patients who are either uninsured or covered by Medicaid, (b) nonprimary care physicians are ineligible to participate in the program (c) nonprimary care physicians are eligible with limitations; (d) primary care physicians are limited to work in HPSAs, and (e) nonprimary care physicians are limited to HPSAs. We update these laws by directly contacting each state’s Primary Care Office in August 2017. Our final set of policy variables are presented in Appendix Table A2. These represent snapshots of restrictions in 2005 and 2017.

4. The Impact of Changes in Eligibility Criteria and Federal Caps on Physician Supply

We explore how the increase in the federal cap on number of waivers and differences across states in work restrictions for Conrad Waiver program participants affect both program participation and overall physician supply. We begin by describing the dynamics surrounding the changes in eligibility criteria and how they interact with the federal caps, before formally testing how cap changes affect the supply of both IMG and non-IMG physicians.

4a. How changes in state restrictions affect the number of J-1 waivers

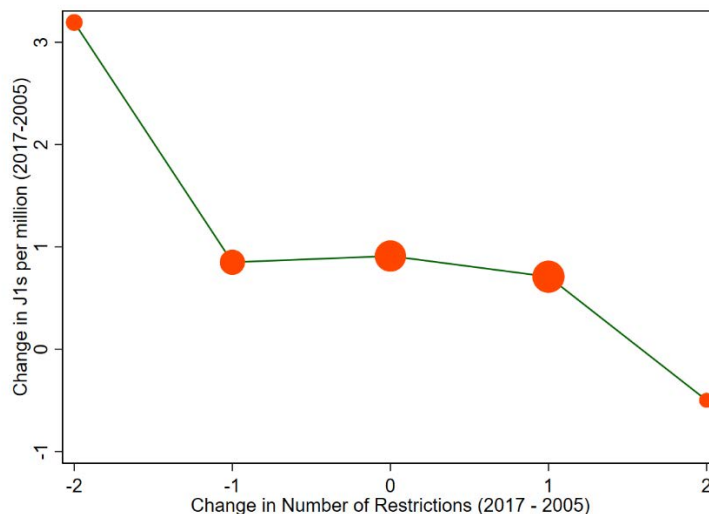
Substantial variation exists across states in the work restrictions for program participants (Appendix Table A2). In 2017, 10 states allowed nonprimary care physicians to participate in the program without any restrictions, 37 states imposed some limitation on the number of no-primary care physicians, and in Missouri nonprimary care physicians were ineligible to participate in the program. Eight states also restricted nonprimary care physicians to work on HPSA only. Finally, only 3 states did not request that J-1 visa waiver doctors must work in facilities accepting uninsured or Medicaid patients.

Between 2005 and 2017, some states changed the restrictions applied to Conrad 30 Visa Waiver recipients. While more states relaxed restrictions than added new restrictions, both directions of change are evident in the data. We compare changes in the number of restrictions over this interval to changes in the number of J-1 visa waivers requested per capita during the same period in Figure 2. The figure shows that the states that decreased the number of restrictions to the program

¹ The data are restricted to non-federal patient care physicians.

experienced the highest increase in the number of visa waivers requested, and vice versa. We interpret this finding as evidence that state restrictions may be an important determinant of participation in the Conrad 30 Waiver program.

Figure 2 – Change in J-1 Visa Waiver Requests by Changes the Number of Restrictions



Source: State Primary Care Offices/3RNET and GAO reports. Bubble sizes weighted by number of states.
 Notes: State level changes in the number of J-1 visa waivers granted between 2005 and 2017 vs. the change in the number of state-level restrictions on the visa waiver program over the same period. Bubble sizes weighted by number of states.

4b. How changes in the Federal cap affect physician supply by state restrictions

From its inception in 1994 until 2001, states were allowed to request a maximum of 20 new J-1 visa waivers per year. In November 2002, the number of waivers available to states was increased to 30. This led to a discrete increase in J-1 physician waivers from 550 (in 2001) to 842 (in 2002) and 982 (in 2003) at the national level. The increase in the cap allowed the influx of more than 4 thousand new IMGs to the country between 2002 and 2020, more than the total number of active physicians in Hawaii in 2022 (Kaiser Family Foundation 2022), and representing 15% of the growth in all foreign physicians over the two decades.

This exogenous increase in the supply of J-1 waivers affected states differently based on their prior program utilization and the level of restrictions tied to the program. Institutions in states with fewer restrictions may be better positioned to leverage the increase in the cap and expand IMG hiring. In 2001, the first year for which data are available, 18 states had requested 19 or 20 visa waivers in 2001, which we define as states “constrained by the 2001 cap.” The 18 states constrained by the 2001 cap had a greater number of IMGs and lower number of US graduate doctors per capita than the unconstrained state in 2001—our baseline year (Table 1). The states constrained by the cap were also more populous and less likely to have a Democratic governor. Not surprisingly, constrained states had more flexible restrictions toward the Rural J-1 visa program (measured in 2005), with half of the constrained states allowing nonprimary care physicians to participate in the program—compared with 39 percent in the comparison group of states. Finally, states that were constrained by

the cap in 2001 systematically requested more than 20 visa waivers in the next 10 years (270 compared with 149 in the unconstrained states). While raising the state-level cap generally produced across-the-board increases in utilization, those states at the original cap of 20 were most likely to reach the cap of 30 after the policy change (50.5% of capped states versus 12.4% of other states), suggesting persistent excess demand for J-1 waivers.

Finally, both constrained and unconstrained states experienced a substantial increase in the number of IMGs per capita between 2001 and 2012—and increase of 0.19 and 0.14 IMG per thousand residents, respectively (Table 1). Based on simple calculations, we estimate that the influx of J-1 visa waivers during the period accounts for about 25 percent of the increase of IMGs working on patient care in the US between 2003 and 2013 (3RNET 2021 and AMA Masterfile Table 2013).

Table 1 – Characteristics of States Constrained by the Cap in 2001

	Constrained by the cap in 2001	
	No	Yes
<i>State characteristics in 2001</i>		
J1 Visa waiver requested	6.0	19.8
IMGs per thousand	0.49	0.65
US grads per thousand	2.34	2.22
State population	5,142,464	6,403,757
Democratic governor	42.4%	33.3%
State poverty rate	11.5	11.1
<i>Program restrictions in 2005</i>		
No facility restrictions	84.9%	83.3%
Non-PC eligible without restrictions	39.4%	50.0%
Restrictions to work on HPSA	27.3%	27.8%
<i>Average between 2002 and 2012</i>		
Cumulative J-1 visa waiver requested during the period	149.2	270.4
At the 30 cap	12.4%	50.5%
<i>State characteristics in 2012</i>		
IMGs per thousand	0.63	0.84
US grads per thousand	2.56	2.45
# of states	33	18

Sources: Data from the AMA Masterfile Tables (1997 to 2012), State Primary Care Offices/3RNET, University Kentucky Welfare Database, and the GAO 2006 report on laws.

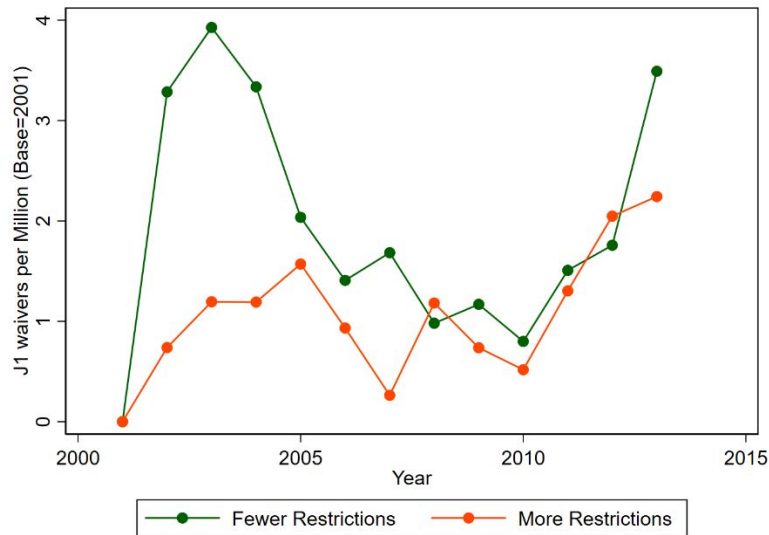
Notes: States constrained by the cap in 2001 were states that requested 19 or 20 J-1 visa waivers in FY 2001. Non-PC eligible indicates whether nonprimary care physicians can participate in the J-1 visa waiver program without limitation.

States constrained by the cap also tend to have fewer restrictions on whether waiver recipients needed to be primary care physicians or restrictions on the potential workplaces of employment (Table 1). These restrictions may inhibit medical facilities in the state from hiring physicians when the cap is raised. Using state policy restrictions from the 2006 GAO report, which approximate the policies in place in 2002, we find that states with three or more restrictions on the Conrad program

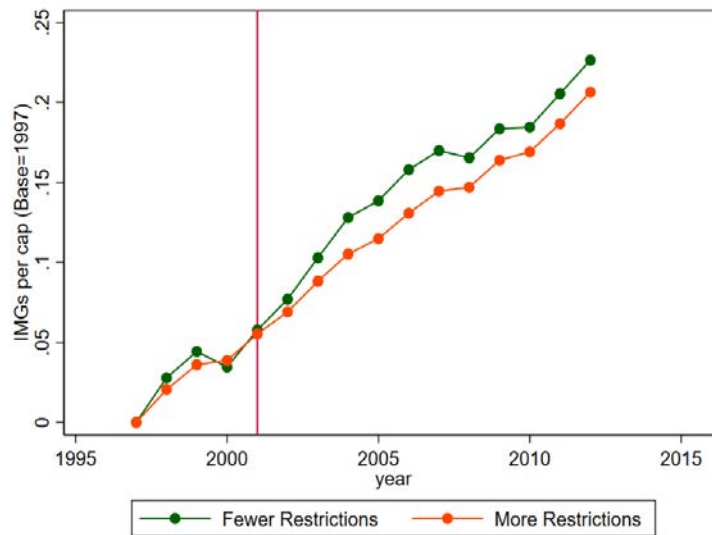
experienced a smaller initial increase in the number of J-1 visas requested in the years following the increase in the federal cap, compared with states with two or fewer restrictions (Figure 3, Panel A). That is, states with fewer restrictions were better able to leverage the change in the cap and enroll more participants in the program when the federal cap was raised.

Figure 3 – International Physicians by Restrictions in 2006 State Policies

Panel A – Change in the number of J-1 visa waivers per million since 2001



Panel B – Number of international medical graduates per capita



Sources: Data from the AMA Masterfile Tables (1997 to 2012) and the GAO 2006 report on laws.

Notes: The graphs show the growth in J-1 visa requests and IMGs per capita normalized to the baseline year (2001 level for J-1 visa requests and 1997 level for IMGs). The vertical line in 2001 indicates the last year before there was an increase in the J-1-waiver cap. Less restrictive states impose 1 or 2 restrictions on doctors who can participate in the J-1 visa waiver program. More restrictive states impose 3, 4, or 5 restrictions.

A key question concerns the impact of increased J-1 waivers on the stock of physicians in a state, both IMGs and domestically trained. In addition, we also find that states with fewer restrictions experienced a higher increase in the number of IMGs after 2001 compared with states with more restrictions—although the rapid growth of IMGs is notable for the two groups of states (Figure 3, Panel B). While in the pre-2001 period, both sets of states exhibited similar trends, there is a stark divergence after the cap was raised in 2001. As such, the trends in flows (from Figure 3, Panel A) by restrictiveness of state policy reflect the overall change in the stocks (Panel B) of IMGs per capita.

4c. The effects of cap changes by whether states were constrained by the cap

Next, we formally test for the effect of changes in the cap by whether states were bound by the cap, using an event study design. We compare the number of IMG and US-trained doctors across states constrained (or not) by the 2001 cap overtime:

$$Doctors\ per\ cap_{st} = \sum_{\tau=1997}^{2000} \theta_{\tau} D_s 1\{t = \tau\} + \sum_{\tau=2002}^{2012} \pi_{\tau} D_s 1\{t = \tau\} + \gamma_s + \mu_t + \varepsilon_{cst},$$

where $Doctors\ per\ cap_{st}$ is the number of physicians (by location of medical degree) in state s in year t . D_s indicates whether the state was constrained by the cap in 2001, $1\{t = \tau\}$ is an indicator that identifies a year relative to 2001 (baseline year), γ_s are state fixed effects, and μ_t are year fixed effects. Estimates of θ_{τ} describe the differential evolution of the outcome between constrained and unconstrained states *before* the cap expansion (relative to 2001) and serve as a test for parallel trends in the pre-period. Estimates of π_{τ} describe the differential evolution of the outcome between constrained and unconstrained states after the cap expansion (relative to 2001). We report both 90% and 95% confidence intervals of our estimates.

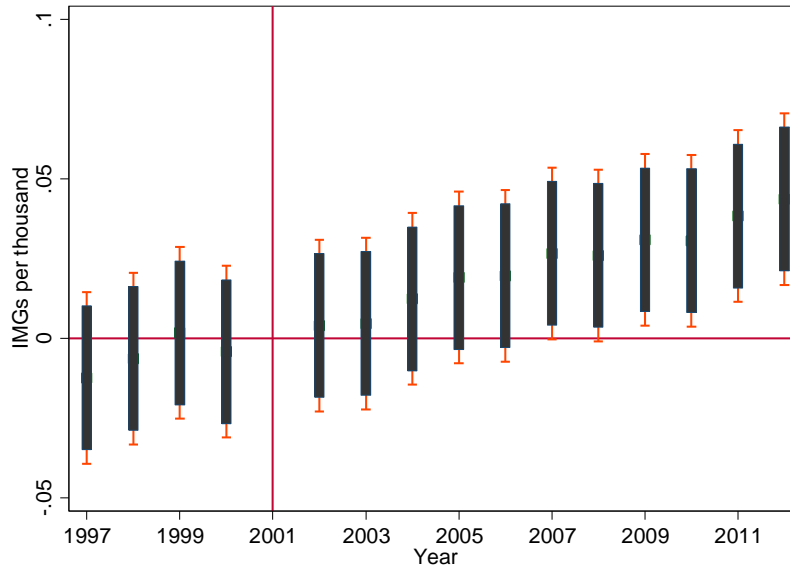
While the gap in the stock of IMG per capita between constrained and unconstrained states was relatively stable before 2001, we observe a steady increase in the number of IMGs per capita in the constrained states after the federal expansion of the cap in 2001 (Figure 4, Panel A).² We find that states that took advantage of the cap expansion of the program have 0.04 more IMGs per thousand residents than states that did not take advantage of the cap expansion in 2001. This effect corresponds to about a 9 percent increase in the number of IMG doctors per capita compared with the baseline number in 2001 for the unconstrained states. In other words, even with the program restriction that IMGs have to stay attached to an underserved community for only three years, the increase in the cap had persistent effects on the stock of IMGs for states that took advantage of the program. Using simple calculations based on the findings from Basu et al. (2019), we estimate that 0.04 more IMGs per thousand residents were associated with a 20.6-day increase in life expectancy in restricted states relative to unrestricted states.³

² The stability in the difference in IMGs per capita between bounded and unbounded states between 1997 and 2001 suggests that it is unlikely the trends between the states would have diverged for unrelated reasons. This parallel trends assumption is intrinsic to the event-study framework.

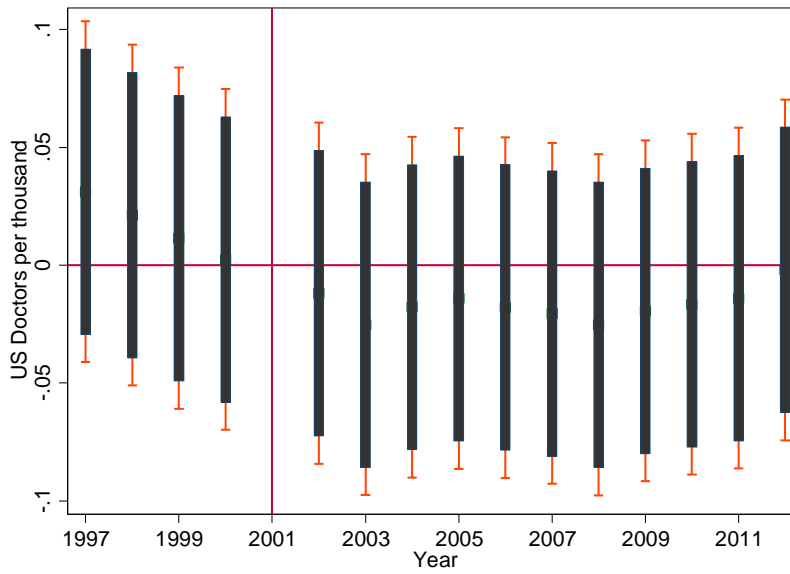
³ Basu et al. (2019) estimates that 10 additional primary care physicians per 100, 000 population in a county is associated with a 51.5-day increase in life expectancy.

Figure 4 – Effect of the 2001 Cap Expansion

Panel A – On IMGs per capita



Panel B – On US-trained doctors per capita



Sources: Data from the AMA Masterfile Tables (1997 to 2012) and State Primary Care Offices/3RNET .

Notes: The graphs report both 90% and 95% confidence intervals. States constrained by the cap in 2001 were states that requested 19 or 20 J-1 visa waivers in FY 2001.

We also investigate whether the increase in the cap had different impacts on the stock of US-trained doctors between the constrained and unconstrained states (Figure 4, Panel B). We find that constrained states were experiencing a small decline in the stock of US-trained doctors per capita relative to the unconstrained states in the years leading up to the cap’s expansion. Yet, after the 2001 expansion, the gap in the stock of US-trained doctors between constrained and unconstrained states stabilized. We interpret this as evidence that constrained states did not experience a relative decline in number of US doctors as a result of the cap expansion. In other words, the influx of IMGs did not crowd out the employment of US-graduate doctors in the constrained states. This suggests that states that were constrained by the cap were likely to have a shortage of physicians that was perhaps alleviated by the raised cap. This result is consistent with evidence that an increasing supply of high-skilled immigrants might have null to positive effects on labor market outcomes of natives when their labor supply is constrained (Kerr and Lincoln 2010 and Peri, Shih, and Sparber 2015).

5. The Conrad Waiver Program and the Disparities of Physicians within a State

To determine whether lower state-specific restrictions to the program lead to lower disparities of the distribution of doctors within a state, we utilize the Area Health Resources dataset. We compare the gap in the supply of IMGs and US graduate doctors between underserved and better serviced areas across states with more and fewer restrictions to the program.

In this paper, underserved areas are defined as counties fully classified as a Health Professional Shortage Area (HPSA).⁴ A county receives a HPSA status if there is a shortage of primary care physicians, dentists, or mental health providers. The majority of J-1s must be hired in such areas.⁵ There are 1,343 counties in the US classified as HPSAs, which are more likely to be rural, have a greater share of the population US-born, and a smaller share Hispanic (Table 2).

Table 2 – Characteristics of Counties by Their HPSA Status

<i>County characteristics in 2010</i>	HPSA county	
	No	Yes
IMGs per thousand	0.29	0.19
US grads per thousand	1.15	0.78
% Hispanic	11.0%	9.9%
% Black	7.8%	9.7%
% Native American	1.1%	2.8%
% Asian	1.2%	1.0%
% Foreign Born	4.6%	4.5%
% Rural	50.8%	66.7%
% Population on Medicaid	21.0%	22.8%
# of Counties	1,880	1,343

Source: Area Health Resources (AHR) Dataset (2010).

Notes: HPSA counties are counties where the entire county is designated as a Health Professional Shortage Area.

⁴ See Appendix Figure 2 for the geographic distribution of HPSA in 2015.

⁵ Since 2006, states are allowed up to 10 J-1s to be hired in non-HPSA areas, but many state agencies impose restrictions on which J-1 doctors can be hired (Appendix Table A1).

Our empirical strategy consists of comparing the number of IMG and US-trained doctors per 1,000 in HPSA counties across states with more and less restrictive J-1 visa waiver policies:

$$Doctors\ per\ cap_{cst} = \beta_1 HPSA_{cst} + \beta_2 (HPSA_{cst} \times Restrict_s) + \gamma_{st} + \varepsilon_{cst},$$

where *Doctors per cap*_{cst} is the number of physicians (IMGs or US-trained doctors) per 1,000 inhabitants in county *c* in state *s* in year *t*. *HPSA*_{cst} indicates whether the whole county is defined as an HPSA in year *t*. As we only have information on HPSA status for the years 2010 and 2015–18 in the AHR data, we restrict this analysis to these five years. *Restrict*_s indicates whether state *s* has more restrictive J-1 visa waiver policies. For this specification, we restrict the analysis to whether nonprimary care physicians can participate in the J-1 visa waiver program without limitation in state *s*, using the information we collected from Primary Care Offices in each state in 2017. For this analysis, we use the state policy restrictions from 2017, which would likely better approximate the policies in place in 2010 and 2020. γ_{st} are state-by-year fixed effects, which allow for differences between states on the overall supply of doctors to change overtime. The advantage of this specification is that we compare HPSA and non-HPSA counties *within* a state. We cluster the standard errors at the state level.

Table 3 – Physician Supply by State Policy Restrictions and HPSA Status

Panel A – International medical graduates

Dependent variable	IMGs per 1,000 habitants		
HPSA county	-0.166 (0.016)***	-0.179 (0.017)***	-0.183 (0.018)***
Non-PC eligible * HPSA county		0.079 (0.022)***	0.081 (0.025)***
Observations	21,562	21,562	21,562
Mean outcome		0.235	
Year fixed effects	Yes	Yes	-
State fixed effects	Yes	Yes	-
State-year fixed effects	No	No	Yes

Panel B – US-trained doctors

Dependent variable	US grads per 1,000 habitants		
HPSA county	-0.766 (0.044)***	-0.770 (0.049)***	-0.791 (0.050)***
Non-PC eligible * HPSA county		0.025 (0.098)	0.020 (0.103)
Observations	21,562	21,562	21,562
Mean outcome		1.024	
Year fixed effects	Yes	Yes	-
State fixed effects	Yes	Yes	-
State-year fixed effects	No	No	Yes

Sources: 2010, 2010–20 Area Health Resources data and the J-1 visas from each state’s Primary Care Office in 2017.

Notes: Robust standard errors in parentheses clustered at the state level. HPSA county indicates the entire county is a Health Professional Shortage Area. Non-PC eligible indicates whether nonprimary care physicians can participate in the J-1 visa waiver program without limitation. *** $p < 0.01$

HPSA counties have significantly fewer IMGs per capita than non-HPSA counties (Table 3, Panel A). Nonetheless, the gap declines from 18 international doctors per 100,000 habitants to 10 doctors in states with that allow non–primary care physicians to participate in the Rural J-1 visa waiver program without any restrictions. In other words, we find that the gap in the supply of IMGs between better-served and underserved counties decreases by about 41 percent with fewer restrictions to the program.

US-trained doctors are also less likely to work in HPSAs (Table 3, Panel B). We estimate that HPSA counties have on average 77 fewer US doctors per 100,000 habitants than non-HPSA counties. However, we do not find evidence that this gap is not higher in states that allow nonprimary care physicians to participate in the Rural J-1 visa waiver program without any restrictions. This suggests J-1 visa waiver doctors are not replacing US-trained doctors in those underserved areas.

6. Discussion

About one in four active doctors in the US were international medical graduates in 2019 (AAMC 2019), and foreign-born physicians potentially play an important role in providing health care to underserved areas. Even before the current pandemic, one out of every four people living in rural areas said they couldn't get the health care they needed (RWJF, 2019). At the same time, only 1% of doctors in their last year of medical school said they wanted to live in communities under 10,000, and 2% want to live in towns of 25,000 or fewer (AMN, 2019). The Conrad 30 program may be an effective tool in bridging the shortfall in rural areas, with aging populations. Foreign IMGs may be particularly crucial at times of health care crises and pandemics when hospitals may be short on staff.

Policies at both the national and state levels, however, may restrict the flow of foreign-born physicians to the United States. Understanding whether programs like the Conrad 30 Visa Waiver meaningfully impact the supply of health care providers in medically underserved areas is important in the future design of visa policy at the federal level, while also informing state-level policies that impact health care staffing. While many dimensions of immigration policy are highly contentious in the political process, proposals to expand the Conrad 30 program appear to enjoy notable bipartisan support. Going back to 2019, a group of senators introduced bipartisan legislation that would have increased the number of waivers that a state could obtain each fiscal year from 30 to 35 and providing further adjustments depending on demand (Conrad State 30 and Physician Access Reauthorization Act 2019). More recently, in March of 2023, Senator Amy Klobuchar introduced S.665 - Conrad State 30 and Physician Access Reauthorization Act, with 22 co-sponsors; an identical bill was introduced in the House of Representative as HR 4942 with 78 cosponsors in the same legislative session. As with proposals in prior years, the bills were referred to committee (the Judiciary Committee), but subsequently expired.

Our analysis uses available data on physicians, utilization of J-1 visa waivers, and associated state policies to assess the impact of the Conrad 30 program on the supply of physicians. We find that relaxing the baseline cap on J-1 visa waivers generated a sustained increase in IMG physicians, without reducing the supply of US-trained physicians, with these effects particularly large in states with the fewest restrictions on the nature of employment for waiver recipients. In precise terms, we find that states that took advantage of the cap expansion of the program have 0.04 more IMGs per

thousand habitants than states that did not take advantage of the cap expansion in 2001. Using simple calculations based on Basu et al. (2019), we estimate that this increase in supply of doctors was associated with a 20.6-day increase in life expectancy in states taking advantage of the cap increase in 2001. Our results are also consistent with evidence that an increasing supply of high-skilled immigrants might have null to positive effects on labor market outcomes of natives when their labor supply is constrained (Kerr and Lincoln 2010 and Peri, Shih, and Sparber 2015).

Our findings also offer evidence on the impact of the Conrad Waiver program on the supply of physicians in those areas identified as Health Professional Shortage Areas (HPSAs) or Medically Underserved Areas (MUAs). Within states, those that do not limit Conrad waiver recipients to primary care physicians also demonstrate a greater supply of IMGs, with little evidence that the supply of US-trained doctors is affected. Together, these results suggest that the Conrad 30 visa program may increase the supply of doctors to shortage areas. These results provide suggestive evidence that less restrictive visa policy may be an efficient way to deal with shortages of high-skilled professionals in fields like medicine where the training lag is long and there are substantial fixed costs to increasing supply through growth of medical schools.

This paper also offers insights on untapped sources of physician supply. While 12,506 physicians were approved for J-1 visa sponsorship in the US in 2020 (ECFMG 2021), only 1,162 J-1 visa waivers were granted by the Conrad 30 program in the same year (3RNET 2021). Despite the importance of the program highlighted in this study, the majority J-1 medical residents in the US still must return home for two years before they can apply for a temporary visa, which potentially creates significant disruption of the flow of physicians to the country. At the same time, the US faces a potential physician shortage of 37,800 to 124,000 doctors by 2034 (AAMC 2021), with rural and low-income communities facing the greatest challenges in attracting and retaining doctors.

With 22 states “at the cap” of 30 (and another 9 states at 25 or more) visas granted under the Conrad program in the fall of 2022 (3RNET 2023), health policy organizations and legislators have introduced legislation proposing to raise the cap to an annual level of 35 (La Corte and Guerra, 2023).

While this analysis suggests that the Conrad 30 program can produce a sustained increase in physicians at the state-level and in underserved communities, additional research efforts should attempt to identify direct evidence on a link between health outcomes and the Conrad 30 program. More generally, expansion in access to data resources, particularly information on visa transitions, would be particularly informative in understanding how Conrad 30 participants impact the stock of physicians in the United States, particularly those choosing to practice in underserved areas. Moreover, details of the Conrad visa program surely matter in policy impacts: questions for future research should consider how the terms of the Conrad visa program, including the number of waivers available and the restrictions imposed by states, impact health outcomes and health care costs.

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Appendix

Table A1 – Data Sources

Variable	Geographical level	Time frame	Source
J-1 visa waivers requested	State	FY 2001–20	State Primary Care Offices/3RNET
J-1 policy restrictions	State and federal	2006 and 2017	GAO reports and State Primary Care Offices
Active IMGs and US-trained doctors	State	1997–2012	(AMA) Physician Masterfile Tables
Active nonfederal IMGs and US-trained doctors	County	2010–18	Area Health Resources
HPSA indicator	County	2010 and 2015–18	Area Health Resources
Population	State and county	1997–2019	Census
Governor is Democratic, share of population on Medicaid, etc.	State	1997–2019	University of Kentucky Welfare Database

Note: The table describes our various data sources, by the smallest identifiable geographic level in the data, the time period the data covers, and our primary variable of interest.

Table A2 – J-1 Visa Waiver Restrictions by State

State	2006			2017		
	Must Accept uninsured or Medicaid patients	Non–primary care physicians eligible**	Work restricted to HPSA	Must accept uninsured or Medicaid patients	Non–primary care physicians eligible**	Work restricted to HPSA
Alabama	Yes	With limitations	Primary	Yes	With limitations	Primary and nonprimary
Alaska	No	Without limitation	No	Yes	Without limitation	No
Arizona	Yes	With limitations	No	Yes	With limitations	Primary and nonprimary
Arkansas	Yes	Without limitation	No	Yes	Without limitation	Nonprimary
California	No	Not eligible	No*	Yes	With limitations	No
Colorado	Yes	Without limitation	No	Yes	Without limitation	Primary
Connecticut	No	Without limitation	No	No	Without limitation	Primary and nonprimary
Delaware	Yes	Without limitation	No	Yes	With limitations	No
Florida	No	With limitations	No	Yes	With limitations	No
Georgia	Yes	With limitations	No	Yes	With limitations	Primary and Nonprimary
Hawaii	Yes	With limitations	No	.	.	.
Idaho	Yes	Not eligible	No*	Yes	With limitations	No
Illinois	No	With limitations	Primary	Yes	With limitations	Nonprimary
Indiana	Yes	Without limitation	No	Yes	With limitations	No
Iowa	Yes	Without limitation	No	Yes	Without limitation	No
Kansas	Yes	With limitations	No	Yes	With limitations	No
Kentucky	Yes	Without limitation	No	Yes	With limitations	No
Louisiana	Yes	With limitations	No	Yes	With limitations	No
Maine	Yes	Without limitation	No	Yes	With limitations	No
Maryland	Yes	With limitations	No	.	With limitations	No
Massachusetts	Yes	With limitations	No	Yes	With limitations	No
Michigan	Yes	With limitations	Primary	Yes	With limitations	No
Minnesota	Yes	Without limitation	No	Yes	With limitations	No
Mississippi	Yes	With limitations	Primary	.	With limitations	Primary and nonprimary
Missouri	Yes	Without limitation	Primary and nonprimary	Yes	Not eligible	Primary*

Montana	Yes	With limitations	No	Yes	With limitations	No
Nebraska	Yes	With limitations	No	Yes	With limitations	No
Nevada	Yes	With limitations	No	Yes	Without limitation	No
New Hampshire	Yes	With limitations	No	Yes	With limitations	No
New Jersey	Yes	With limitations	Primary and nonprimary	Yes	With limitations	No
New Mexico	Yes	With limitations	Primary	Yes	With limitations	No
New York	Yes	Without limitation	No	Yes	Without limitation	No
North Carolina	Yes	With limitations	Primary and nonprimary	Yes	With limitations	Primary
North Dakota	No	Without limitation	No	.	With limitations	No
Ohio	Yes	Without limitation	Primary and nonprimary	Yes	With limitations	.
Oklahoma	Yes	With limitations	No	No	With limitations	No
Oregon	Yes	Without limitation	No	Yes	With limitations	No
Pennsylvania	Yes	Without limitation	No	Yes	With limitations	No
Rhode Island	Yes	Without limitation	No	Yes	With limitations	No
South Carolina	Yes	Without limitation	No	Yes	Without limitation	.
South Dakota	Yes	Without limitation	No	Yes	Without limitation	No
Tennessee	No	With limitations	No	Yes	With limitations	No
Texas	No	With limitations	Primary	Yes	With limitations	No
Utah	Yes	Without limitation	Primary and nonprimary	Yes	Without limitation	No
Vermont	Yes	With limitations	No	No	With limitations	No
Virginia	Yes	With limitations	No	Yes	With limitations	No
Washington	Yes	With limitations	No	Yes	With limitations	No
West Virginia	Yes	With limitations	No	.	.	Nonprimary
Wisconsin	Yes	Without limitation	No	Yes	With limitations	No
Wyoming	Yes	With limitations	Primary and nonprimary	Yes	With limitations	No

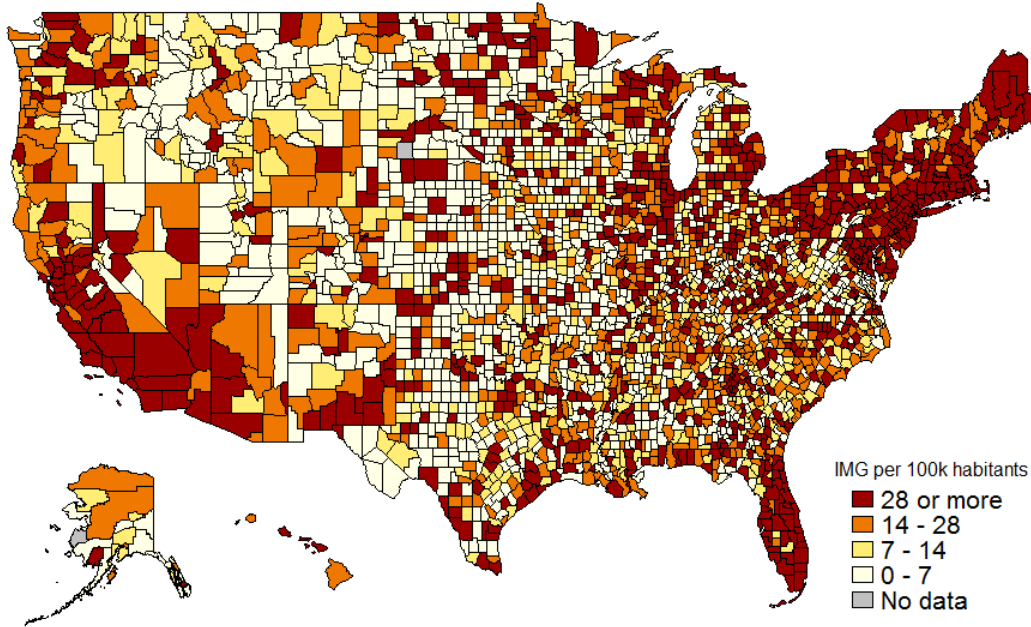
* Nonprimary doctors not eligible to work in the state

** Examples of limitations provided in the survey question included policies limiting the number of nonprimary care physicians allowed and the number of practice hours allowed in a specialty outside primary care.

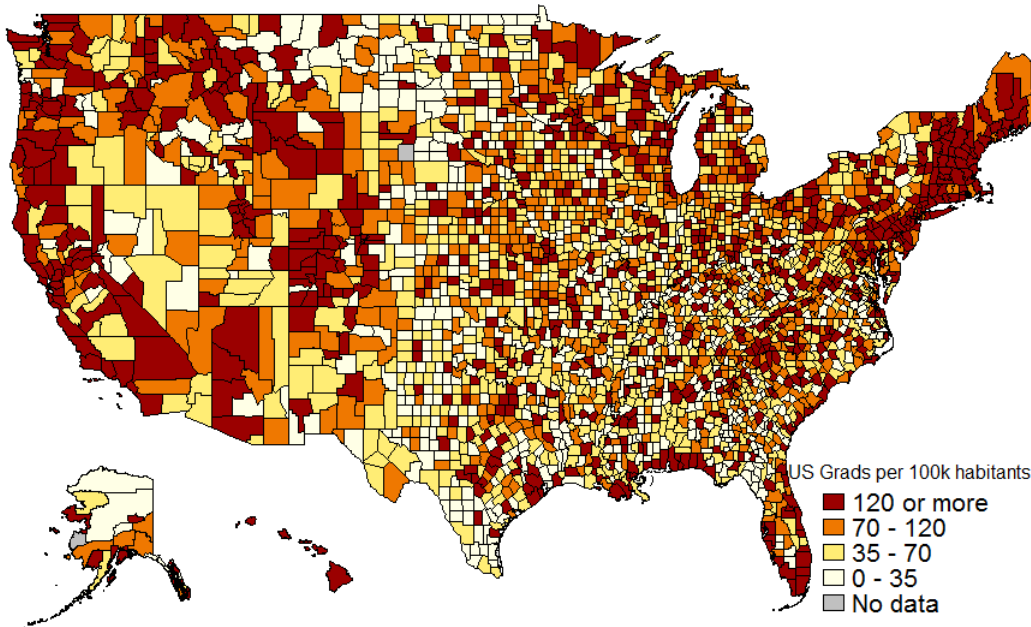
Sources: GAO 2006 report on laws and Primary Care Offices in each state in August 2017.

Figure A1 – Distribution of Non-Federal Patient Care Physicians

Distribution of IMG - 2015



Distribution of US Trained Doctors - 2015

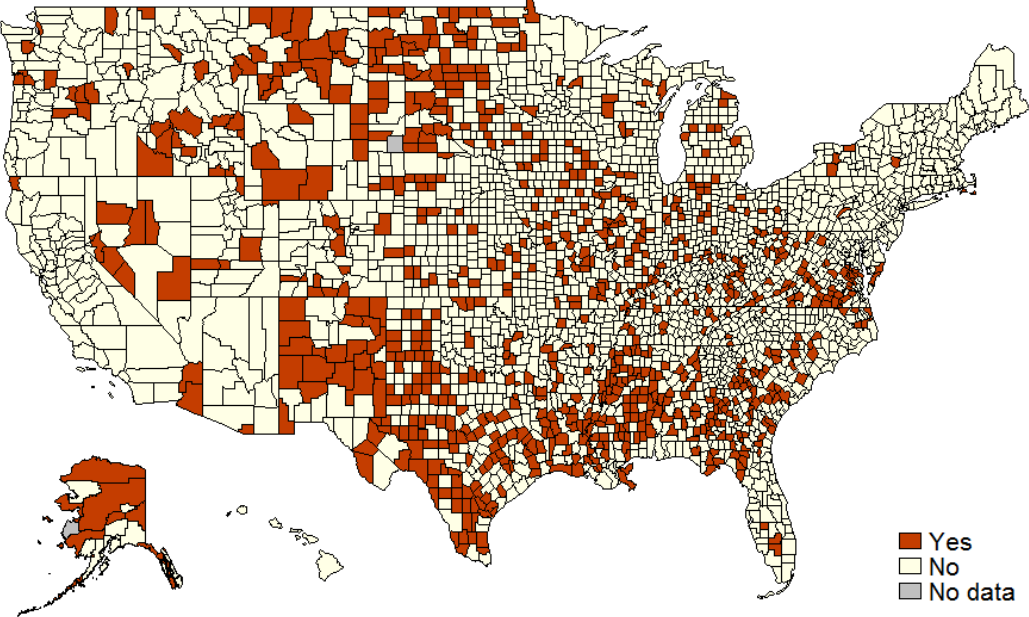


Source: Area Health Resources 2015.

Notes: The top panel shows the number of International Medical Graduates (IMGs) per 100,000 inhabitants by US county. The bottom panel shows the number US graduate physicians per 100,000 inhabitants across US counties.

Figure A2 – Distribution of Health Professional Shortage Areas (HPSAs)

HPSA County in 2015



Source: Area Health Resources 2015.

Note: HPSA indicates whether the whole county is defined as a Health Professional Shortage Area in 2015.