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The Affordable Care Act Medicaid Expansion, Social Disadvantage, and the Practice Location Choices of New General Internists

José J. Escarce, MD, PhD,† Gregory D. Wozniak, PhD,‡ Stavros Tsipas, MA,‡ Joseph D. Pane, MSP,§ Yanlei Ma, PhD,‖ Sarah E. Brotherton, PhD,‡ and Hao Yu, PhD‖*

Background: A recent study found that states that expanded Medicaid under the Affordable Care Act (ACA) gained new general internists who were establishing their first practices, whereas nonexpansion states lost them.

Objective: The objective of this study was to examine the level of social disadvantage of the areas of expansion states that gained new physicians and the areas of nonexpansion states that lost them.

Research Design: We used American Community Survey data to classify commuting zones as high, medium, or low social disadvantage. Using 2009–2019 data from the AMA Physician Masterfile and information on states' Medicaid expansion status, we estimated conditional logit models to compare where new physicians located during the 6 years following the expansion to where they located during the 5 years preceding the expansion.

Subjects: A total of 32,102 new general internists.

Results: Compared with preexpansion patterns, new general internists were more likely to locate in expansion states after the expansion, a finding that held for high, medium, and low disadvantage areas. We estimated that, between 2014 and 2019, nonexpansion states lost 371 new general internists (95% confidence interval, 203–540) to expansion states. However, 62.5% of the physicians lost by nonexpansion states were lost from high disadvantage areas even though these areas only accounted for 17.9% of the population of nonexpansion states.

Conclusions: States that opted not to expand Medicaid lost new general internists to expansion states. A highly disproportionate share of the physicians lost by nonexpansion states were lost from high disadvantage areas, potentially compromising access for all residents irrespective of insurance coverage.

Key Words: Affordable Care Act, Medicaid expansion, health care workforce, physician geographical distribution, underserved areas

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The Affordable Care Act (ACA) has increased health insurance coverage for working-age adults through the health insurance marketplaces, where individuals can purchase subsidized private insurance, and the expansion of Medicaid coverage to adults with incomes <138% of the federal poverty level. As of early 2020, about 11.4 and 15.6 million Americans obtained coverage through the marketplaces and Medicaid expansion, respectively.[1,2]

Initially intended to be mandatory for states, the Medicaid expansion was rendered optional by a Supreme Court decision in 2012.[3] Twenty-four states and the District of Columbia expanded Medicaid when the ACA was fully implemented in January 2014, and several others expanded subsequently, resulting in gains in insurance coverage, access to care, and health status among low-income, working-age residents.[4–7]

A recent study in *Medical Care*[8] assessed whether the fact that some states expanded Medicaid while other did not influenced the choice of states where new physicians, defined as those just completing graduate medical education (GME), in 8 specialty groups established their first practices. The study found that higher numbers of new general internists established their first practices in expansion states than would have if every state had expanded, meaning that expansion states gained new general internists, while nonexpansion states lost them. This study builds on that research by examining the level of social disadvantage of the areas in expansion states that gained new general internists and the areas

From the *Division of General Internal Medicine and Health Services Research, Department of Medicine, David Geffen School of Medicine at UCLA; †Department of Health Policy and Management, Fielding School of Public Health, Los Angeles, CA; ‡American Medical Association, Chicago, IL; §RAND Corporation, Pittsburgh, PA; and ‖Department of Population Medicine, Harvard Medical School and Harvard Pilgrim Health Care Institute, Boston, MA.

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Correspondence to: José J. Escarce, MD, PhD, 1100 Glendon Avenue, Suite 900, Los Angeles, CA 90024. E-mail: jescarce@mednet.ucla.edu.

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in nonexpansion states that lost them. General internists are important in the US health care system because they comprise 44% of primary care physicians for adults,[9] and their training and scope of practice include both primary care and medical subspecialties.

CONCEPTUAL FRAMEWORK

Demand for care is the most important determinant of physicians' practice location choices.[10] Although both the insurance marketplaces and the Medicaid expansion increased demand, the former is unlikely to have affected physicians' geographical distribution since all states participated. By contrast, the Medicaid expansion represented a "demand shock" that boosted demand in expansion states relative to nonexpansion states. A recent qualitative study documented how health care organizations in 5 Medicaid expansion states responded to the increased demand for care by attempting to recruit additional primary care physicians and medical subspecialists.[11] Within expansion states, moreover, the Medicaid expansion is likely to have boosted demand to a greater degree in socially disadvantaged areas, whether urban or rural, than in less disadvantaged areas, since disadvantaged areas had lower insurance coverage rates before ACA implementation.[12–14] If health care organizations responded by recruiting for new positions in these areas, physicians may have been disproportionately drawn to them. Within nonexpansion states, the areas least attractive to physicians may have disproportionately lost them as alternative opportunities opened in expansion states.

MATERIALS AND METHODS

Study Population

We identified new general internal medicine physicians who established their first practices in the 50 states or the District of Columbia between 2009 and 2019 using the American Medical Association (AMA) Physician Masterfile. We used the year-end data for those years to select general internists whose main professional activity was direct patient care and who had completed their residency 2.5 years earlier. The 2.5-year interval allowed time for more complete updating of practice addresses (see below) and served to exclude physicians who either practiced briefly after residency but subsequently entered fellowships or took temporary positions while searching for stable practice opportunities.[15] The Masterfile also includes each physician's birthplace, medical school, and GME program. We excluded general internists who reported practicing hospital medicine.

We identified the state and county of each physician's first practice using the most recently updated practice address in the Masterfile or the National Plan and Provider Enumeration System, provided the update had occurred at most 3 years before the year of practice. If neither practice address was updated in this interval, we used the mailing address in the Masterfile. Of the assigned practice addresses, 34.4%, 61.5%, and 86.6% were updated within the prior year, 2, and 3 years, respectively. The remaining 13.4% were mailing addresses. The 0.4% of physicians with missing addresses were excluded.

Medicaid Expansion Status

We obtained states' Medicaid expansion dates from the Kaiser Family Foundation[16] and defined expansion states as those that expanded Medicaid at any point between 2014 and 2019. Twenty-five states and the District of Columbia expanded in 2014 (all but 1 on January 1), 3 in 2015, 2 in 2016, 1 in 2017, and 2 in 2019 (Online Appendix A, Supplemental Digital Content 1, http://links.lww.com/MLR/C414). About 64.9% of the US population of 314.1 million in 2014 lived in expansion states. Of the population in expansion states, 82.1% lived in states that expanded in 2014 and 10.1% in states that expanded in 2015.

Commuting Zones and Commuting Zone–States

We used commuting zones (CZs) to define the set of geographic areas where new general internists could establish their first practices. CZs consist of groups of adjacent counties and were developed to reflect the local economy where people live and work.[17] Urban CZs typically encompass one or more tightly linked metropolitan areas, but the advantage of CZs is that they cover small towns and rural areas as well. CZs were most recently updated using 2010 census data, yielding 625 CZs.[18] Of these, 497 are contained within a single state, 117 overlap 2 states, and 11 overlap 3 states.

Since decisions on expanding Medicaid occur at the state level, different portions of the CZs that overlap >1 state could lie in states with different Medicaid expansion status. Therefore, we split these CZs into 2 or 3 parts corresponding to the portions of the CZs that overlapped different states and refer to these parts as CZ-States. This resulted in 764 CZs and CZ-States (497 CZs contained within a single state and 267 CZ-States) in which new physicians could locate. For brevity, we refer to these as "choice areas." We obtained the population of each choice area using the 5-year American Community Survey (ACS) county-level estimates.[19]

Commuting Zone–level Variables

We used a variety of data sources to construct variables describing CZs in each year. We used the 5-year ACS county-level estimates[19] to obtain sociodemographic characteristics including the percentage of the population female; percentage below 5, 5–17, and above 64 years old; percentage Hispanic, non-Hispanic Black, and non-Hispanic other minority; percentage with less than a high school diploma and with a bachelor's degree or more; percentage foreign-born; percentage with health insurance coverage from a source other than Medicaid; percentage poor; and per capita income (inflation-adjusted). We also obtained the percentage of the population with a disability and the percentages of adults 18 years or older with a disability and with different types of physical difficulties.

A key variable in our analyses was the level of social disadvantage of each CZ. We developed a social disadvantage index using 4 ACS sociodemographic variables: percentage of the population with less than a high school diploma, percentage with a bachelor's degree or more, percentage poor, and per capita income. We first standardized each variable, using the mean and SD across CZs to calculate a *Z*-score for each CZ, and then added the *Z*-scores for the

4 variables.[20–23] Cronbach α, a measure of the internal consistency of the index, was 0.88–0.89, and index values were consistent over time, with correlations exceeding 0.96 for every pairwise comparison of years (Online Appendix C, Supplemental Digital Content 1, http://links.lww.com/MLR/C414). For analysis, we grouped CZs into terciles based on their social disadvantage index values and labeled the terciles high disadvantage, medium disadvantage, and low disadvantage. We chose terciles after considering hexiles as a more granular approach and determining that pairs of adjacent hexiles could be combined (Online Appendix F, Supplemental Digital Content 1, http://links.lww.com/MLR/C414).

We collapsed the county-level, 9-category Rural-Urban Continuum Codes (RUCCs)[24] and used them to assign each CZ to one of 4 urban-rural categories—large metro areas (> 1 million population), medium metro areas (250,000–1 million), small metro areas (< 250,000), and nonmetro towns and rural areas—based on the RUCC categories of the counties in which the majority of the CZ's population resided.

We used lists of allopathic and osteopathic medical schools to construct indicator variables for whether each CZ had each of these types of schools in each year.[25]

Finally, to capture physicians' practice costs, we used county-level data on the Medicare Geographic Practice Cost Indices (GPCI) for 2012[26] to construct CZ-level values as population-weighted averages of the county-level values.

Because we wanted to treat CZs contained within a single state and CZ-States symmetrically, we constructed the above variables at the level of CZs and assigned the same CZ-level values to the 2 or 3 CZ-States that belonged to the same CZ.

Other State Policies

We obtained information on states' decisions to continue the "bump" in Medicaid primary care fees after the national bump expired in 2015,[27] state malpractice reforms (caps on punitive and noneconomic damages),[28] and nurse practitioner scope of practice laws from other sources.[29] Because these are state-level policies, like the Medicaid expansion, they could differ across the CZ-States belonging to the same CZ.

Conditional Logit Models

Our goal was to assess whether the probability that new general internists practiced in each choice area changed after implementation of the Medicaid expansion in 2014 and how the change in probability differed according to the disadvantage level of the CZ, while accounting for other CZ characteristics. We used the conditional logit regression model, which was developed to analyze situations in which subjects make a single choice (eg, a choice area) from a set of alternatives and the probability of each choice depends on the characteristics of all the alternatives.[30] The estimated coefficients from the model can be used to predict the probability that each new physician locates in each choice area.

We estimated models with individual physicians as the unit of analysis and physicians' selected choice area as the dependent variable. The independent variables included state fixed effects (ie, an indicator variable for each state), to capture measurable and unmeasurable state characteristics that are constant over time; indicators for whether the physician was born, attended medical school and completed GME in the state; an indicator for whether the physician completed GME in the CZ; the population of the choice area; the CZ-level sociodemographic variables listed earlier; indicators for the social disadvantage levels; indicators for the urban-rural categories; indicators for whether the CZ had an allopathic medical school and an osteopathic medical school; the GPCI; and an indicator for whether the state continued the Medicaid primary care fee bump.

To assess the effects of the Medicaid expansion across disadvantage levels, we included as independent variables 5 vectors of interaction terms constructed by interacting indicator variables for calendar years 2009–2019 with indicators for 5 categories of choice areas: (1) high disadvantage choice areas in expansion states; (2) medium disadvantage choice areas in expansion states; (3) low disadvantage choice areas in expansion states; (4) high disadvantage choice areas in nonexpansion states; and (5) medium disadvantage choice areas in nonexpansion states. The sixth category, low disadvantage choice areas in nonexpansion states, was the "reference category," meaning that the interaction terms were always zero for these choice areas. To enable estimation, we constrained the average of the coefficients of the first 5 interaction terms—that is, those corresponding to the preexpansion period (2009–2013)—in each of the 5 vectors to equal zero. Thus, we implicitly treated all states that ever expanded as if they had expanded in 2014 (Online Appendix B has details on the model, Supplemental Digital Content 1, http://links.lww.com/MLR/C414).

This specification provided full flexibility in the modeling and statistical testing. Further, the antilogarithm of the difference of the estimated coefficients for 2 different categories of choice areas in the same year is approximately equal to the ratio of the probabilities that, other things equal, a physician located in those 2 categories in the particular year relative to the ratio of the same probabilities averaged over the 5-year preexpansion period. We refer to this quantity as the relative rate ratio (RRR). As an example, consider the antilogarithm of the difference in the coefficients for high disadvantage choice areas in expansion states and nonexpansion states in 2014. An RRR = 1.0 (> 1.0) would mean that in 2014 physicians were equally likely (more likely) to locate in high disadvantage choice areas in expansion states relative to high disadvantage choice areas in nonexpansion states than they were, on average, during the preexpansion period. Of note, an RRR > 1.0 could result from more physicians locating in expansion states, fewer physicians locating in nonexpansion states or both. In general, interpretation of the estimated coefficients in complex conditional logit models is difficult and can be misleading, so we used simulations (described below) to obtain more interpretable results.

We conducted several sensitivity analyses: (1) using data for 2007–2019 to extend the preexpansion period by 2 years; (2) adding indicators for caps on punitive and noneconomic damages and for full nurse practitioner scope of practice to the models; (3) using the disadvantage levels in

TABLE 1. Characteristics of Choice Areas in 2014

	All Choice Areas		Expansion States		Nonexpansion States	
Variables	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Total population (log)	11.58	1.67	11.66	1.70	11.48	1.63
Female (%)	50.1	1.6	50.0	1.8	50.2	1.4
<5 y old (%)	6.2	1.1	6.0	1.1	6.5	1.1
5–17 y old (%)	16.9	2.1	16.5	2.0	17.3	2.1
65+ y old (%)	16.0	3.8	16.2	3.8	15.8	3.8
Hispanic (%)	9.5	13.1	8.3	11.6	11.0	14.5
Non-Hispanic Black (%)	8.2	12.0	6.1	9.2	10.7	14.2
Non-Hispanic other minority (%)	6.6	10.8	7.6	12.8	5.3	7.5
Less than high school (%)	14.1	5.5	13.3	5.0	15.0	5.9
Bachelor's degree or more (%)	22.0	7.1	22.5	7.6	21.4	6.4
Foreign born (%)	5.4	5.6	5.4	6.0	5.4	5.2
Insurance other than Medicaid (%)	67.6	8.8	67.9	9.4	67.1	8.1
Poor (%)	17.0	5.2	16.4	4.9	17.8	5.4
Per capita income ($)	26,373	4975	27,292	5428	25,257	4101
Social disadvantage level*						
High disadvantage	0.317	NA	0.255	NA	0.391	NA
Medium disadvantage	0.344	NA	0.363	NA	0.322	NA
Low disadvantage	0.339	NA	0.382	NA	0.287	NA
Urban-rural category*						
Large metro areas	0.157	NA	0.174	NA	0.136	NA
Medium metro areas	0.157	NA	0.148	NA	0.168	NA
Small metro areas	0.183	NA	0.196	NA	0.168	NA
Small towns and rural areas	0.503	NA	0.482	NA	0.528	NA
Has allopathic medical school*	0.169	NA	0.200	NA	0.130	NA
Has osteopathic medical school*	0.064	NA	0.072	NA	0.055	NA

*Binary indicator variables.
NA indicates not applicable.

2014 for all years rather than allowing the disadvantage level to vary across years; (4) adding the percentage of adults with any disability to the models; (5) using CZ fixed effects in place of CZ-level independent variables; (6) removing the CZ-level independent variables; and (7) limiting the analyses to states that expanded in 2014 or never expanded during the study period. To facilitate comparisons with the main analysis, we estimated models in which we used a single indicator variable for the 6 years following implementation of the Medicaid expansion (2014–2019), rather than a separate indicator for each year. The antilogarithm of the difference of the estimated coefficients of this indicator for 2 different categories of choice areas can be interpreted as the ratio of the average probabilities that a physician located in those 2 categories relative to the ratio of the same probabilities averaged over the preexpansion period. We refer to this RRR as the average 6-year postexpansion RRR.

We estimated all models using maximum likelihood and used robust SEs.

Simulations

We used the estimated conditional logit regression coefficients to predict the number of new physicians who would establish their first practice in each choice area under 2 scenarios: (1) the observed patterns of Medicaid expansion across the states; and (2) a hypothetical alternative in which all states expanded Medicaid. We aggregated the predicted numbers across choice areas with different levels of disadvantage in expansion and nonexpansion states to determine how many physicians were gained or lost (Online Appendix H, Supplemental Digital Content 1, http://links.lww.com/MLR/C414). We obtained SEs for the predictions using the delta method.[31]

RESULTS

Descriptive Data

The study included 32,102 new general internists over the study period. Annual samples initially declined, from 2820 in 2009 to 2668 in 2014, before rebounding to 3477 in 2019 (Online Appendix D, Supplemental Digital Content 1, http://links.lww.com/MLR/C414). Physicians' mean age was 35.1 (SD, 4.6), 49.2% were women, and 52.6% were international medical graduates.

Table 1 presents descriptive data for 2014 for the 764 choice areas combined and separately for the 419 choice areas in Medicaid expansion states and the 345 in nonexpansion states. Compared with their counterparts in nonexpansion states, choice areas in expansion states, on average, were more populous; had higher percentages of seniors and college graduates; had lower percentages of children, African Americans and Hispanics, and adults without a high school diploma; had lower poverty rates and higher per capita incomes; were much less likely to be classified as a high disadvantage and much more likely to be classified as a low disadvantage; and were more likely to be metropolitan and to have an allopathic medical school. Notably, 68.1% and 72.9% of the high disadvantage areas in expansion and nonexpansion states, respectively, were small towns and rural areas, highlighting the correlation between social disadvantage and urban-rural status.

As expected, the percentage of the population with income below 138% of the federal poverty level, and hence

TABLE 2. Percentage of the Population With Income <138% of the Federal Poverty Level and Percentages With Various Disabilities in 2014, by Disadvantage Level of Choice Area

Category of choice area	% of Population With Income <138% Federal Poverty Level	% of Population With a Disability	% of Adults With a Disability	% of Adults With a Hearing Difficulty	% of Adults With a Vision Difficulty	% of Adults With a Cognitive Difficulty	% of Adults With an Ambulatory Difficulty	% of Adults With a Self-care Difficulty	% of Adults With an Independent Living Difficulty
High disadvantage	32.9	16.6	15.3	4.6	3.2	5.4	9.2	3.2	5.8
Medium disadvantage	25.5	12.7	11.7	3.5	2.2	4.1	6.7	2.4	4.5
Low disadvantage	20.0	11.2	10.3	3.0	1.8	3.6	5.7	2.1	4.0

Note: Adults are 18 years old or older.

potentially newly eligible for coverage under the Medicaid expansion, was highest in high disadvantage choice areas and lowest in low disadvantage areas (Table 2). Moreover, the prevalence of disability and various types of physical difficulties was highest in high disadvantage areas and lowest in low disadvantage areas (Table 2), indicating that high disadvantage areas are disadvantaged not just socioeconomically but also with respect to health status.

Figure 1 illustrates the number of new general internists per 100,000 population who established their practices in expansion and nonexpansion states each year, for all choice areas combined (left panel) and by disadvantage level. In every case, the trends in expansion and nonexpansion states were roughly parallel in the preexpansion period (2009–2013), even if at different levels. In the postexpansion period (2014–2019), however, the number of new general internists per 100,000 population uniformly grew more quickly in expansion than in nonexpansion states.

Table 3 sheds additional light on the findings in Figure 1. In the preexpansion period, 72.0% of new general internists located in expansion states, where 65.2% of the population resided. The ratio of 1.10 (=72.0/65.2) indicates that new physicians were "overrepresented" relative to the population in expansion states. Conversely, 28.0% of new general internists located in nonexpansion states, where 34.8% of the population lived. The ratio of 0.81 means that new physicians were "underrepresented" relative to the population in nonexpansion states. Table 3 also shows that in the preexpansion period, new physicians were underrepresented in all categories of choice areas except low disadvantage choice areas in expansion states, and they were particularly underrepresented in high disadvantage choice areas.

The ratio of the percentage of new physicians to population in the postexpansion period reveals the same general patterns, but the data additionally show that new physicians were more overrepresented in expansion states and more underrepresented in nonexpansion states than in the preexpansion period. This trend holds for choice areas categorized by disadvantage level, although the sizable increase in the underrepresentation of new physicians in high disadvantage choice areas of nonexpansion states stands out.

Regression Results

There were no trends in the preexpansion years (2009–2013) toward either rising or declining probabilities that new general internists located in any of the 6 categories of choice areas (Online Appendix E, Supplemental Digital Content 1, http://links.lww.com/MLR/C414), corroborating the impression of parallel preexpansion trends gleaned from Figure 1. Following the Medicaid expansion, however, new general internists were increasingly more likely to locate in high, medium, and low disadvantage areas of expansion states than in the corresponding areas of nonexpansion states, and most of the changes in location choice occurred in the last 3 years of the postexpansion period (2014–2019). Online Appendix E (Supplemental Digital Content 1, http://links.lww.com/MLR/C414) presents full regression results and further explains them. The findings of the sensitivity analyses

FIGURE 1. New general internists per 100,000 population who established their practices in Medicaid expansion and nonexpansion states each year, all choice areas combined (left panel) and by disadvantage level (right 3 panels).

were similar to those of the main analysis (Online Appendix G, Supplemental Digital Content 1, http://links.lww.com/MLR/C414).

Simulations

Our simulations found that, between 2014 and 2019, 371 general internists (95% confidence interval, 203–540) who would have established practices in nonexpansion states if every state had expanded Medicaid opted instead to locate in expansion states (Fig. 2A). This number represents 2.0% (95% confidence interval, 1.1%–2.9%) of all new general internists between 2014 and 2019. Three fourth of the 371 physicians gained by expansion states were gained by low disadvantage choice areas and an additional one fifth by medium disadvantage choice areas. On the flip side, fewer than two fifth of the 371 physicians lost by nonexpansion states were lost from low disadvantage choice areas, whereas 62.5% were lost from high disadvantage choice areas.

Figure 2B presents the same findings normalized for population. On a per resident basis, high disadvantage choice

TABLE 3. Percentage of the Population and of New General Internists in Medicaid Expansion and Nonexpansion States in the Preexpansion (2009–2013) and Postexpansion (2014–2019) Periods, by Category of Choice Area

Category of Choice Area	% of Population, 2009–2013 (1)	% of Physicians, 2009–2013 (2)	Ratio of Column (2) to Column (1)	% of Population, 2014–2019 (3)	% of Physicians, 2014–2019 (4)	Ratio of Column (4) to Column (3)
Expansion states						
High disadvantage	4.3	2.7	0.63	4.3	2.8	0.65
Medium disadvantage	15.7	11.5	0.73	17.5	14.6	0.84
Low disadvantage	45.2	57.8	1.28	42.7	55.7	1.31
Total	65.2	72.0	1.10	64.6	73.2	1.13
Nonexpansion states						
High disadvantage	6.7	3.9	0.58	6.3	2.8	0.45
Medium disadvantage	10.9	9.1	0.83	12.2	10.0	0.82
Low disadvantage	17.2	15.1	0.88	16.9	14.0	0.83
Total	34.8	28.0	0.81	35.4	26.8	0.76

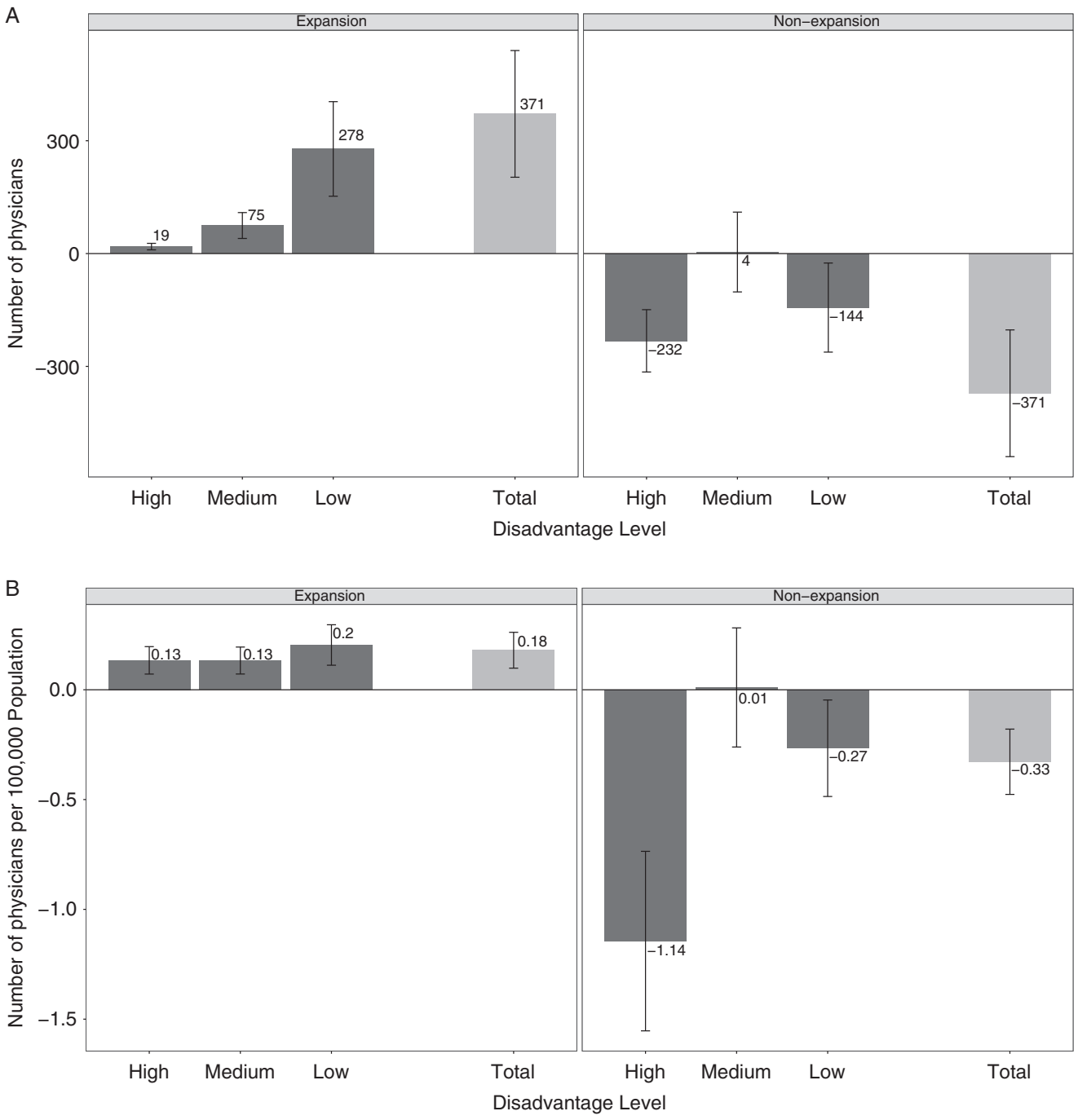

FIGURE 2. A, Simulated total number of new general internists gained and lost by choice areas in Medicaid expansion and nonexpansion states, by disadvantage level, 2014–2019. B, Same results normalized for population. The graph shows point estimates and 95% confidence intervals for the simulated numbers of physicians.

areas in expansion states gained as many physicians as medium disadvantage areas, although both types of areas gained slightly fewer physicians than low disadvantage areas. In striking contrast, on a per resident basis, the loss of new general internists suffered by high disadvantage areas in nonexpansion states was >4 times the loss experienced by low disadvantage areas in those states.

DISCUSSION

This study examined the level of social disadvantage of the choice areas in Medicaid expansion states that gained new general internists and the areas in nonexpansion states that lost them. We found that high, medium, and low disadvantage choice areas in expansion states all gained

physicians, although on a per resident basis high and medium disadvantage areas gained slightly fewer physicians than low disadvantage areas. One possibility is that, following the expansion, health care organizations in expansion states recruited new physicians where they had always done so, but in higher numbers. Another possibility is that irrespective of where health care organizations created new positions, physicians accepted them approximately in line with established patterns. Given the desire of health care organizations in expansion states to provide care to new Medicaid recipients,[11] it seems likely that many of the new positions created even in medium and low disadvantage areas were located where the physicians could treat the underserved populations who lived there.

By contrast, an outsized percentage of the new general internists lost by nonexpansion states were lost from high disadvantage choice areas. A feature of high disadvantage choice areas in both expansion and nonexpansion states is that they were disproportionately small towns and rural areas. Rural communities have historically struggled with recruiting and retaining health care providers,[32] and observers have argued that certain aspects of rural practice are inherently unappealing.[33,34] At the same time, studies have found that some physicians express a long-standing interest in practicing in an underserved area and that this interest predicts a higher likelihood of doing so.[35]

Thus, a possible explanation for our finding is that many of the new general internists who located in high disadvantage small towns and rural areas of nonexpansion states before the Medicaid expansion were physicians with a strong interest in practicing in an underserved area and chose their first practice location in accordance with an established but fragile status quo regarding the geographical distribution of available positions. However, after the Medicaid expansion resulted in the creation of new positions in expansion states, a disproportionate number of new general internists who previously would have chosen high disadvantage small towns and rural areas in nonexpansion states might have opted to take newly created positions in expansion states that enabled them to treat underserved populations under more favorable circumstances. We cannot test this hypothesis with our data, but qualitative studies could be useful in understanding our finding.

Three limitations of our study deserve mention. First, interpreting our estimates as causal effects of the Medicaid expansion on the location of new general internists requires assuming that differential trends in the share of new physicians electing to practice in expansion and nonexpansion states after 2014 were due exclusively to the expansion and not to unrelated, unmeasured time-varying factors. Our finding of parallel preexpansion trends lends support to this assumption, but we cannot rule out the possibility that unmeasured time-varying factors differed between expansion and nonexpansion states after 2014.

Second, most residents begin their job search before completing training,[36] indicating that the optimal time interval for ascertaining the first practice location is likely to be shorter than 2.5 years. However, one third of address updates in the Masterfile occurred between 1.5 and 2.5 years after GME completion. In the trade-off between a shorter time interval and more accurate addresses, using more accurate addresses almost certainly results in less bias.

Third, we could only analyze allopathic physicians because the Masterfile collected limited data on osteopathic physicians during the study period. This is noteworthy because osteopathic physicians are more likely than allopathic physicians to practice in small towns and rural areas.[32] We have no way of knowing whether our findings are generalizable to osteopathic physicians.

We found that Medicaid nonexpansion states lost new general internists compared with the number of new general internists who would have located there if the states had expanded, and that a highly disproportionate fraction of these physicians were lost from high disadvantage choice areas. The decision not to expand Medicaid may have compromised access to care for residents of the most disadvantaged areas in nonexpansion states—and especially of small towns and rural areas—irrespective of insurance coverage.

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