

ORIGINAL ARTICLE

Trends in Rural and Urban Family Physician Teaching of Health Professions Students and Residents

C. Holly A. Andrilla, MS^a; Lars E. Peterson, MD, PhD^b; Davis G. Patterson, PhD^a; David V. Evans, MD^a; Janessa M. Graves, PhD^a

AUTHOR AFFILIATIONS:

^aDepartment of Family Medicine,
University of Washington School of
Medicine, Seattle, WA^bAmerican Board of Family Medicine,
Lexington, KY

CORRESPONDING AUTHOR:

C. Holly A. Andrilla, Department of
Family Medicine, University of
Washington School of Medicine,
Seattle, WA,
hollya@uw.edu**HOW TO CITE:** Andrilla CHA,
Peterson LE, Patterson DG, et al.
Trends in Rural and Urban Family
Physician Teaching of Health
Professions Students and Residents.
Fam Med. 2026;58(8):555–563.
doi: [10.22454/FamMed.2026.266557](https://doi.org/10.22454/FamMed.2026.266557)**FIRST PUBLISHED:** September 4,
2026**KEYWORDS:** clinical education, rural© Society of Teachers of Family
Medicine

ABSTRACT

Background and Objectives: Place-based clinical education is vital for promoting the growth of the rural clinician workforce; where learners receive their education strongly influences where they practice. Yet students may struggle to find rural placements. In this study, we sought to understand trends in teaching by family physicians for varied health professions and the associated physician, practice, and community factors.**Methods:** We analyzed data from 14,789 early career family physicians surveyed from 2016 to 2023. We compared the teaching status of rural and urban physicians overall and by year. We conducted trend analyses and multivariate regression to investigate the relationship between physician and practice characteristics, practice activities, community characteristics, and teaching status.**Results:** More rural than urban physicians taught premedical students (30.8% vs 18.7%), medical students (62.2% vs 54.4%), and advanced practice professional students (51.2% vs 33.7%), while more urban than rural physicians taught residents (41.9% vs 37.8%) and fellows (8.7% vs 2.3%). Trend analyses showed an 8.4% increase in rural physicians teaching residents from 2016 to 2023,, and a decline in teaching advanced practice professional students over the same time period. In adjusted analyses, family physicians who were younger, male, and White non-Hispanic were more likely to teach, as were osteopathic physicians, those with a broad scope of practice, and those who provided obstetric services.**Conclusions:** A larger share of rural than urban early career family physicians teach health professions students, but the rate who are teaching advanced practice professional students has declined significantly. Understanding and arresting the decline will be essential to addressing rural workforce capacity.

INTRODUCTION

Place-based clinical education is essential to promoting the growth of the rural clinician workforce; where learners receive their education strongly influences where they practice.^{1,2} Yet students may struggle to find rural placements.² Studies have identified competition for scarce rural clinical sites as the top barrier preventing nurse practitioner (NP) and physician assistant (PA) education programs from providing rural clinical education for their students.^{3,4} Medical schools and residencies also struggle to find and develop preceptors and

teaching sites. Meanwhile, the demand for rural clinical sites is increasing as the numbers of health professions schools and students expand, including those with a rural orientation.² The gravity of the preceptor shortage prompted the National Rural Health Association to urge the US Senate Health, Education, Labor, and Pensions Committee to explore new strategies to increase the availability of rural preceptors and to support existing programs by the US Health Resources and Services Administration for nurse faculty, with a priority given to rural preceptor development.⁵

Other barriers to rural clinical education include travel and living expenses, lack of student housing, lack of funding, limited broadband Internet access, inadequate patient volumes and demographic characteristics to support learning about a variety of patients and conditions, and lack of preceptors.^{2–6} Preceptors may experience costs in terms of productivity and clinic performance, often with minimal remuneration.^{2,7} As rural facilities merge into larger health systems, educators also anecdotally report that health system consolidation increasingly shifts decisions about precepting to distant corporate sites.

If time spent precepting detracts from revenue, new owners may not be supportive of clinicians wishing to participate in teaching. Community clinical sites hold potential, but smaller and more rural sites may lack the resources and capacity to accept students and provide effective clinical education.²

This combination of challenges for successful rural clinical education may require new models to reduce competition and encourage collaboration between and across disciplines, particularly models that support interprofessional education.² In this study, we sought to understand trends in teaching by family physicians for varied health professions by answering these questions:

- Do rural and urban early career family physicians differ in their teaching of health professions students?
- How has this participation in teaching changed over time?
- What early career family physician background, practice, and community factors are associated with teaching?

Study findings can help involved parties expand rural clinical education opportunities.

METHODS

Data Sources

We used deidentified data from the 2016 to 2023 American Board of Family Medicine (ABFM) National Graduate Survey (NGS). The NGS is administered to ABFM-certified family physicians 3 years after graduation from residency; the response rate has been 40%–70% among respondents representative of their cohort.⁸ The NGS queried physicians about personal and practice characteristics and whether they taught premedical students, medical students, resident physicians, and those completing a postresidency fellowship. Respondents also were asked about whether they taught NP and PA students. Details on the specific nature and quantity of teaching were not queried. We analyzed binary outcomes (self-reported teacher or not) for each of these types of learners. In addition, we created a teaching variable for medical learners, coded as Yes if the physician indicated that they taught *any* of the following: premedical students, medical students, residents, or fellows. We used physician

practice address to link to the Area Health Resources File for county-level persistent poverty status. Using the Rural–Urban Commuting Area (RUCA) code corresponding to practice zip code, we classified physicians as urban (RUCA codes 1.0, 1.1, 2.0, 2.1, 3.0, 4.1, 5.1, 7.1, 8.1, 10.1) or rural (RUCA codes 4.0, 5.0, 6.0, 7.0, 7.2, 8.0, 8.2, 9.0, 10.0, 10.2).⁹

The NGS asked respondents to indicate (yes/no) whether they were currently providing care for each of 30 subject areas and procedures. A complete list of the clinical activities and procedures has been published elsewhere.¹⁰ We used a validated measure to calculate each respondent's scaled score indicating their scope of practice ranging from 0 to 30; higher scores denoted broader scope.¹¹ We defined a binary scope of practice variable classifying 17 or greater as a broad scope; scores below 17 were not broad scope. Because the age distribution of respondents was concentrated, we created a binary age variable. We classified physicians in the oldest quartile (37 years or older) as Older; and those in the lower quartiles as not. We combined the following practice site responses with the Otherpractice site category: rural health clinics, federal clinics, Indian Health Service or tribal health clinics, work site clinics, and nonfederal government clinics. Physicians were asked to report on their overall satisfaction with their principal practice (Very Satisfied to Very Dissatisfied with a Not Applicable option for those who were self-employed). We combined the options into Somewhat or Very Satisfied, Neutral, Somewhat or Very Dissatisfied, and Not Applicable. Throughout this manuscript, the term *family physicians* refers to early career family physicians.

Analysis

We calculated descriptive statistics and used χ^2 and t tests to investigate the association of physician characteristics with practice location (urban, rural) and teaching status. We used the Cochran–Armitage trend test to investigate changes in the proportion of family physicians teaching various types of learners in rural and urban locations from 2016 to 2023.

We used hierarchical logistic regression to understand the relationship between rurality, physician demographics, practice characteristics, practice activities, community characteristics, and teaching status. Our primary regression analysis was limited to those in continuity care settings, excluding hospitalists and emergency medicine physicians because they lacked practice site data (type or size). We conducted sensitivity analyses, including noncontinuity physicians, using dummy variables for missing practice type and size. Because the prevalence of medical teaching, the outcome variable of our regression analysis, was greater than 10%, we converted the odds ratios to adjusted risk ratios (aRR) using the method described by Zhang.¹² We conducted all analyses using SAS statistical software version 9.4 (SAS Institute). The University of Washington Human Subjects Division determined that this study was exempt from formal review.

RESULTS

We excluded 153 physicians whose zip code did not match a RUCA category, leaving a sample of 14,789. [Table 1](#) summarizes physician demographics, practice characteristics, practice activities, and satisfaction by practice location. Overall, 83.4% of respondents practiced in urban areas and 16.6% in rural areas. Rural physicians were more likely than urban physicians to be male (49.8% vs 42.7%) and White non-Hispanic (81.8% vs 63.7%), whereas urban physicians were more likely to be Black (7.7% vs 4.9%), Asian (23.3% vs. 9.6%), or Hispanic (9.6% vs 4.8%). Slightly more urban than rural physicians held MD degrees (80.4% vs 78.2%) and were international medical graduates (32.2% vs 24.1%).

Hospital or health system–owned practices were the most common practice site for urban (32.6%) and rural (36.3%) physicians. Among urban physicians, similar shares worked in academic health centers (11.8%), Federally Qualified Health Centers (FQHCs) (11.0%), and independent practices (11.6%). Among rural physicians, 2.6% reported working in academic health centers, 7.9% in FQHCs, and 10.1% in independent practices. One-tenth (10.2%) of urban compared to one-fourth of rural (27.7%) physicians worked in other practice settings. Other practice settings included (not shown in table), for urban and rural physicians, respectively, rural health clinics (1.3%, 21.5%), federal clinics (4.8%, 4.4%), Indian Health Service or tribal health clinics (0.4%, 3.6%), work site clinics (1.6%, 0.7%), and nonfederal government clinics (1.6%, 0.7%). Practice site data were missing for 15.8% due to survey skip logic.

Rural physicians were more likely to work in small practices (1–5 clinicians: 40.2% vs 29.7%), while urban physicians were three times more likely to work in large practices (more than 20 clinicians: 23.1% vs 7.5%). Both groups had similar participation in midsized practices (6–20 clinicians). Half of rural physicians practiced in a clinic with exclusively family physicians (50.1%) compared to 40.8% of their urban counterparts. Urban physicians more frequently worked in multispecialty practices (25.1%) or practices with a mix of primary care specialties (34.1%) compared to rural physicians (19.3% and 30.6%, respectively).

More rural than urban physicians reported having a broad scope of practice (67.1% vs 40.0%) and providing obstetrical services (26.8% vs 10.3%). Rural physicians spent an average of 3.5 hours more on direct patient care and 0.5 more hours on administrative work than urban physicians. Urban physicians reported spending, on average, 1 more hour per week teaching than rural physicians (3.9 vs 2.9, respectively). Rural and urban physicians reported similar levels of overall job satisfaction, with 81.7% and 82.6%, respectively, indicating they were Somewhat or Very Satisfied.

Two-thirds (66.0%) of physicians reported teaching medical learners (premedical and medical students, residents, and fellows) while just over one-third (36.6%) reported teaching NP or PA students ([Table 2](#)). Rural physicians had

higher rates of teaching in both categories. Specifically, rural physicians more often taught premedical (30.8%) and medical students (62.2%) than urban physicians (18.7% and 54.5%, respectively). However, urban physicians more often taught residents (urban: 41.9%; rural: 37.8%) and fellows (urban: 8.7%; rural: 2.3%) than rural physicians.

The proportions of physicians teaching some learners have changed over time ([Table 3](#)). From 2016 through 2023, the proportion of physicians teaching residents and fellows increased overall, primarily due to a rise in the percentage of rural physicians teaching residents (from 33.9%–42.3%). The percentage of rural physicians teaching fellows remained unchanged, while urban physicians saw a 2.5% increase. In contrast, teaching of NP and PA students overall by family physicians declined by 8.0% and 3.1%, respectively, with rural physicians showing a greater drop than their urban counterparts. However, a larger proportion of rural than urban family physicians reported teaching NPs and PAs across the study period. We found no significant trend in the proportion of rural or urban physicians who reported teaching premedical or medical students.

In multivariate hierarchical logistic regression ([Table 4](#)), physician characteristics were strong predictors of medical teaching status (teaching any or all of the following: premedical students, medical students, residents, and fellows). Female and older physicians were less likely to report teaching (aRR 0.90 and 0.96, respectively). Compared to White non-Hispanic physicians, all other racial groups were significantly less likely to participate in medical teaching. In contrast, physicians with a broad scope of practice (aRR 1.36) and those who provided obstetrical services (aRR 1.33) were more likely to teach than their counterparts with a narrower scope of practice and those who did not deliver babies. Relative to physicians whose main practice site was a hospital or health system–owned medical practice, physicians working in an academic health center, an FQHC, or a look-alike were more likely to teach, while those working in a managed care/HMO practice were less likely (0.89). Physicians working in small practices (0–5 clinicians) were less likely to teach than those working in practices with more than 20 clinicians. Finally, physicians who reported being neutral or dissatisfied when queried about their overall job satisfaction were less likely to teach than those who said they were satisfied. Rural practice location was not predictive of teaching. The associations were relatively the same in the sensitivity analysis.

DISCUSSION

In this national study of early career family physicians, we found that two-thirds are participating in teaching health professional learners with significant variation by learner type. With exposure to rural settings during training being a strong predictor of rural practice, this finding bodes well for increasing the rural health care workforce. This study provides new insight into who is teaching, what types of learners

TABLE 1. Physician and Practice Characteristics by Rural Urban Practice Location

	Overall	Urban ^a	Rural ^b	P value ^c
	14,789 (100.0)	12,331 (83.4)	2,458 (16.6)	
Age, mean (SD)	14,789, 35.3 (4.3)	35.3 (4.3)	35.2 (4.5)	0.6161
Older age quartile^d, n (%)	3,775 (25.5)	3,151 (25.6)	624 (25.4)	0.8623
Sex^e, n (%)				
Male	6,499 (43.9)	5,274 (42.8)	1,225 (49.8)	<0.0001
Female	8,220 (55.6)	6,998 (56.8)	1,222 (49.7)	
Race^e, n (%)				<0.0001
American indian/Alaska Native	113 (0.9)	88 (0.8)	25 (1.2)	
Asian	2,659 (21.0)	2,458 (23.3)	201 (9.6)	
Black	914 (7.2)	811 (7.7)	103 (4.9)	
Native Hawaiian/Pacific Islander	59 (0.5)	52 (0.5)	7 (0.3)	
White	8,430 (66.7)	6,708 (63.7)	1,722 (81.8)	
Other	463 (3.7)	416 (4.0)	47 (2.2)	
Ethnicity^e, n (%)				<0.0001
Hispanic	1,109 (8.8)	1,008 (9.6)	101 (4.8)	
Degree type, n (%)				0.0147
MD	11,830 (80.0)	9,908 (80.4)	1,922 (78.2)	
DO	2,959 (20.0)	2,423 (19.7)	536 (21.8)	
International medical graduate status, n (%)				<0.0001
Yes	4,568 (30.9)	3,975 (32.2)	593 (24.1)	
Main practice site^e, n (%)				<0.0001
Academic health center/faculty practice	1,517 (10.3)	1,454 (11.8)	63 (2.6)	
Hospital/health system– owned medical practice	4,912 (33.2)	4,021 (32.6)	891 (36.3)	
Managed care/HMO practice	854 (5.8)	833 (6.8)	21 (0.9)	
FQHC or look-alike	1,548 (10.5)	1,354 (11.0)	194 (7.9)	
Independently owned medical practice	1,675 (11.3)	1,428 (11.6)	247 (10.1)	
Other ^f	1,941 (13.1)	1,260 (10.2)	681 (27.7)	
Practice site size^e, n (%)				<0.0001
1–5 clinicians	4,632 (31.3)	3,645 (29.6)	987 (40.2)	
6–20 clinicians	4,785 (32.4)	3,859 (31.3)	926 (32.3)	
>20 clinicians	3,030 (20.5)	2,846 (23.1)	184 (7.5)	
Practice specialty mix^e, n (%)				<0.0001
Family medicine only	5,275 (42.4)	4,224 (40.8)	1,051 (50.1)	
Multiple specialties (not only primary care)	3,007 (24.2)	2,602 (25.1)	405 (19.3)	
Primary care specialty mix	4,165 (33.5)	3,524 (34.1)	641 (30.6)	
Broad scope of practice^e, n (%)				<0.0001
Yes	5,656 (44.5)	4,229 (40.0)	1,427 (67.1)	
No	7,041 (55.5)	6,341 (60.0)	700 (32.9)	
Provide obstetrics care, n (%)				<0.0001
Yes	1,931 (13.1)	1,272 (10.3)	659 (26.8)	
No	12,858 (86.9)	11,059 (89.7)	1,799 (73.2)	
Weekly hours, mean (SD)				
Providing direct patient care	14,789, 35.4 (15.5)	34.8 (15.8)	38.3 (13.7)	<0.0001
Teaching	14,789, 3.7 (7.0)	3.9 (7.2)	2.9 (5.7)	<0.0001
Video care	4,724, 2.4 (4.4)	2.6 (4.6)	1.4 (3.2)	<0.0001
Telephone care	14,789, 2.2 (3.9)	2.3 (3.9)	2.0 (3.3)	0.0018
E-visits	10,065, 0.8 (3.1)	0.9 (3.3)	0.5 (1.8)	<0.0001
Portal	4,724, 3.8 (6.2)	3.9 (6.3)	3.4 (5.5)	0.0340
Administration	14,789, 9.0 (8.7)	8.9 (8.7)	9.4 (8.9)	0.0132
Other	14,789, 0.9 (3.4)	0.9 (3.5)	0.9 (3.2)	0.9894

(Continued)

TABLE 1. Physician and Practice Characteristics by Rural Urban Practice Location (Continued)

	Overall	Urban ^a	Rural ^b	P value ^c
Overall job satisfaction, n (%)				0.0985
Somewhat or very dissatisfied	989 (6.7)	801 (6.5)	188 (7.7)	
Neither satisfied nor dissatisfied	1,398 (9.5)	1,162 (9.4)	236 (9.6)	
Somewhat or very satisfied	12,195 (82.5)	10,188 (82.6)	2,007 (81.7)	
N/A (self-employed)	207 (1.4)	180 (1.5)	27 (1.1)	
Census division, n (%)				<0.0001
New England	586 (4.0)	481 (3.9)	105 (4.3)	
Middle Atlantic	1,400 (9.5)	1,292 (10.5)	108 (4.4)	
East North Central	2,110 (14.3)	1,757 (14.2)	353 (14.4)	
West North Central	1,398 (9.5)	836 (6.8)	562 (22.9)	
South Atlantic	2,595 (17.5)	2,346 (19.0)	249 (10.1)	
East South Central	700 (4.7)	508 (4.1)	192 (7.8)	
West South Central	1,701 (11.5)	1,444 (11.7)	257 (10.5)	
Mountain	1,317 (8.9)	1,006 (8.1)	311 (12.7)	
Pacific	2,982 (20.2)	2,661 (21.5)	321 (13.1)	

^aUrban practice location zip code classified with Rural–Urban Commuting Area (RUCA) codes 1.0, 1.1, 2.0, 2.1, 3.0, 4.1, 5.1, 7.1, 8.1, and 10.1.

^bRural practice location zip code classified with RUCA codes 4.0, 5.0, 6.0, 7.0, 7.2, 8.2, 9.0, 10.0, 10.2, and 10.3.

^c χ^2 (categorical data) or *t* tests (continuous data) comparing rural and urban responses.

^dOlder age quartile includes physicians age 37 years or older.

^eMissing responses (due to survey skip logic): 70 for sex, 2,309 for race and ethnicity, 2,209 for scope of practice data, and 2,342 for practice site, size and specialty information.

^fOther includes rural health clinics, federal clinics, Indian Health Service or tribal health clinics, work site clinics, and non-federal government clinics.

Also included are 1,981 urban and 361 rural missing responses.

Abbreviations: DO, doctor of osteopathy; FQHC, Federally Qualified Health Center; HMO, Health Maintenance Organization; MD, doctor of medicine; N/A, not applicable; SD, standard deviation

TABLE 2. Percentage of Family Physicians Teaching Various Types of Medical Learners From 2016 to 2023 by Urban–Rural Location

	Overall N = 14,789 n (%)	Urban ^a N = 12,331 n (%)	Rural ^b N = 2,458 n (%)	P value ^c
Premedical students	3,065 (20.7)	2,307 (18.7)	758 (30.8)	<0.0001
Medical students	8,247 (55.8)	6,718 (54.5)	1,529 (62.2)	<0.0001
Residents	6,101 (41.3)	5,171 (41.9)	930 (37.8)	0.0002
Fellows	1,128 (7.6)	1,071 (8.7)	57 (2.3)	<0.0001
Any medical path teaching ^d	9,760 (66.0)	7,976 (64.7)	1,784 (72.6)	<0.0001
Nurse practitioner students	4,234 (28.6)	3,199 (25.9)	1,035 (42.1)	<0.0001
Physician assistant students	3,081 (20.8)	2,326 (18.9)	755 (30.7)	<0.0001
Any advanced practice professional student teaching ^e	5,418 (36.6)	4,160 (33.7)	1,258 (51.2)	<0.0001

^aUrban practice location zip code classified with Rural–Urban Commuting Area (RUCA) codes 1.0, 1.1, 2.0, 2.1, 3.0, 4.1, 5.1, 7.1, 8.1, and 10.1.

^bRural practice location zip code classified with RUCA codes 4.0, 5.0, 6.0, 7.0, 7.2, 8.2, 9.0, 10.0, 10.2, and 10.3.

^c χ^2 test comparing rural and urban responses.

^dMedical path teaching includes premedical students, medical students, and residents and fellows teaching, and excludes teaching nurse practitioner and physician assistant students.

^eAdvance practice professional student teaching includes teaching nurse practitioner and physician assistant students.

they teach, and how rural and urban teaching patterns have changed over time.

Who Is Teaching

Family physicians who were younger, male, and White non-Hispanic were more likely to teach, while women and older physicians were less likely. Notably, all racial and ethnic minority groups were significantly less likely to engage in medical teaching than White physicians. Non-White and female physicians may experience limited access to mentors or institutional networks that facilitate entry into formal

precepting roles as well as other barriers, including reduced institutional support and increased responsibilities in their personal life such as childcare and home care.^{13–18} Evidence has shown that women spend more time in the electronic medical record.¹⁹ In addition, female physicians care for a larger share of patients who require more time on average.¹⁹ This increased workload, coupled with other time demands, may limit their ability, desire, or both to take on uncompensated or time-intensive educational activities. Together, these factors may contribute to the observed differences in teaching,

TABLE 3. Percentage of Family Physician Teaching Participation of Various Types of Learners by Year From 2016 to 2023 by Physician Location

	2016	2017	2018	2019	2020	2021	2022	2023	P value ^c
N	1,945	2,021	2,124	2,378	1,597	1,492	1,598	1,634	
Premedical students, %									
Urban ^a	20.1	18.6	18.5	20.2	18.3	15.5	16.9	20.7	0.2636
Rural ^b	28.3	32.2	34.4	34.3	31.6	25.3	30.7	25.9	0.1689
Medical students, %									
Urban ^a	52.4	55.4	54.6	54.0	53.7	56.7	53.2	56.4	0.1649
Rural ^b	59.1	61.9	62.2	63.1	61.8	59.8	63.4	67.0	0.1618
Residents, %									
Urban ^a	39.1	40.8	44.8	41.3	41.9	42.9	41.5	43.6	0.0718
Rural ^b	33.9	35.3	40.6	36.1	36.8	37.3	42.8	42.3	0.0212
Fellows, %									
Urban ^a	8.3	7.8	8.0	8.5	9.0	8.4	9.3	10.8	0.0052
Rural ^b	2.2	2.0	1.7	1.3	3.5	5.4	1.6	2.1	0.3192
Nurse practitioners, %									
Urban ^a	30.1	30.7	25.4	26.4	23.1	24.5	22.5	22.7	<0.0001
Rural ^b	42.2	43.4	46.3	47.4	41.0	44.8	33.9	32.6	0.0018
Physician assistants, %									
Urban ^a	20.1	19.7	18.9	19.6	18.3	17.8	18.3	17.6	0.0309
Rural ^b	31.1	33.1	30.1	36.3	27.4	32.0	25.7	26.4	0.0435

^aUrban practice location zip code classified with Rural–Urban Commuting Area (RUCA) codes 1.0, 1.1, 2.0, 2.1, 3.0, 4.1, 5.1, 7.1, 8.1, and 10.1.

^bRural practice location zip code classified with RUCA codes 4.0, 5.0, 6.0, 7.0, 7.2, 8.2, 9.0, 10.0, 10.2, and 10.3.

^cCochran–Armitage trend test for urban and rural teaching trends.

underscoring the need for more intentional institutional support for diverse faculty and community preceptors. These findings highlight a need to address barriers to precepting among heterogeneous physicians, thereby expanding the pool of preceptors, particularly in rural communities with varied populations where diversity among clinicians is already limited.²⁰

Physicians with a broad scope of practice were significantly more likely to teach, as were those who provided obstetric services. Long-standing literature has described rural family physicians as broad generalists,^{10,21,22} providing more reason to expand rural family medicine teaching. Physicians working in academic health centers and FQHCs were more likely to teach than others, consistent with their missions,²³ while those in smaller practices were less likely to teach than those working in larger practices. These practice-size differences may reflect the administrative, financial, and workflow resources required to support teaching.²⁴

Doctors of osteopathy (DOs) also were more likely to participate in teaching. The rapid expansion of osteopathic medical schools during the study period, many with rural or community-focused missions, has increased demand for community preceptors.^{25,26} DO physicians may therefore be receiving more requests to host learners. Additionally, DOs are disproportionately represented in rural family medicine compared to doctors of medicine (MDs), a context in which teaching often remains a valued professional and community service. Together, these factors may help explain why

DO physicians contribute disproportionately to the teaching workforce.

After accounting for physician and practice characteristics, rurality was not an independent predictor of medical teaching, suggesting that differences between rural and urban physicians stem from demographic, practice, and scope factors rather than geography alone.

Trends in Medical Teaching Over Time

Participation in teaching medical learners (excluding NP and PA students) remained largely stable from 2016 through 2023. The most notable temporal change was the increase in rural physicians teaching residents. This pattern aligns with the expansion of rural residencies nationally, including new rural training programs, which may have created more structured opportunities for rural physicians to engage in teaching.²⁷ The proportion of rural physicians teaching fellows did not change, consistent with the highly specialized nature of fellowship training and the concentration of fellowship programs in urban areas.

Declines in Teaching NP and PA Learners

The proportion of family physicians teaching NP or PA students declined in both urban and rural areas from 2016 to 2023. This decline occurred despite rapid growth in the NP and PA workforces and rising demand for rural placements.^{28–30} Despite this decline, about 10% more rural than urban family physicians taught advanced practice NP or PA students throughout the study period. Rural physicians'

TABLE 4. Adjusted Risk Ratios Between Medical Teaching* and Rural–Urban Practice Location, Physician Demographics, and Practice Characteristics

	aRR	95% CI
Geography		
Urban ^a	REF	
Rural ^b	1.02	0.97–1.07
Older age^c		
Older age	0.96	0.93–1.00
Not older	REF	
Sex		
Male	REF	
Female	0.91	0.87–0.94
Medical degree		
MD	REF	
DO	1.05	1.02–1.09
Race/ethnicity		
White	REF	
Asian	0.92	0.88–0.95
Black	0.84	0.77–0.90
Hispanic	0.93	0.88–0.98
Other ^d	0.83	0.75–0.91
Missing ^e	0.92	0.88–0.96
Practice site		
Academic health center/faculty practice	1.59	1.58–1.61
Hospital/health system–owned medical practice	REF	
Managed care/HMO practice	0.89	0.82–0.96
FQHC or look-alike	1.16	1.10–1.20
Independently owned medical practice	1.02	0.97–1.06
Other ^f	1.01	0.96–1.05
Practice size		
Small 0–5 clinicians	0.94	0.91–0.98
Medium 6–20 clinicians	0.99	0.96–1.02
>20 clinicians	REF	
Practice specialty mix		
Family medicine only	REF	
Multiple specialties (not only primary care)	1.04	1.00–1.07
Primary care specialty mix	0.96	0.93–1.00
Broad scope of practice		
Yes	1.36	1.32–1.39
No	REF	
Provides obstetric care		
Yes	1.33	1.28–1.37
No	REF	
Overall satisfaction		
Somewhat or very dissatisfied	0.84	0.78–0.90
Neither satisfied nor dissatisfied	0.93	0.88–0.98
Somewhat or very satisfied	REF	
N/A (self-employed)	1.01	0.88–1.13

(Continued)

TABLE 4. Adjusted Risk Ratios Between Medical Teaching* and Rural–Urban Practice Location, Physician Demographics, and Practice Characteristics (Continued)

	aRR	95% CI
Persistent poverty county		
Yes	0.910	0.81–1.00
No	REF	

*Medical teaching includes teaching any type of medical learner (premedical students, medical students, residents, or fellows).

^aUrban practice location zip code classified with Rural–Urban Commuting Area (RUCA) codes 1.0, 1.1, 2.0, 2.1, 3.0, 4.1, 5.1, 7.1, 8.1, and 10.1.

^bRural practice location zip code classified with RUCA codes 4.0, 5.0, 6.0, 7.0, 7.2, 8.2, 9.0, 10.0, 10.2, and 10.3.

^cOlder age quartile includes physicians age 37 years or older.

^dOther race includes respondents who selected American Indian/Alaska Native, Native Hawaiian/Pacific Islander, or Other.

^eThis category includes the 2,309 respondents missing race data.

^fOther practice site includes rural health clinics, federal clinics, Indian Health Service or tribal health clinics, work site clinics, and nonfederal government clinics

Abbreviations: CI, confidence interval; DO, doctor of osteopathy;

FQHC, Federally Qualified Health Center; HMO, Health Maintenance

Organization; MD, doctor of medicine; N/A, not applicable; REF, reference;

aRR, adjusted risk ratios

increased teaching of residents might have reduced their capacity to teach NP and PA students. Finally, as the NP and PA workforce grows, more clinical training opportunities may be shifting toward NP or PA clinicians themselves, reducing the use of physician preceptors.

Implications for Rural Health Workforce Development

These results have direct implications for federal and state strategies to strengthen rural clinical training capacity. Support for rural residency development, interprofessional training models, and preceptor incentives may help sustain or increase rural physician teaching. Because rural training strongly predicts rural practice, expanding such training is essential.¹ Given the association between broad scope and teaching, policies that safeguard rural physicians' procedural and obstetrical scope can indirectly strengthen rural training capacity, further supporting the pathway to rural practice. Emerging federal programs focused on rural health transformation also could be leveraged to support the infrastructure, housing, and administrative resources necessary to host learners in small and remote communities.³¹

Limitations

Study limitations included potential biases associated with self-reported survey data. Also, cross-sectional data do not allow us to determine causality between participating in teaching and the factors we examined. Although the NGS data are largely nationally representative of early career ABFM-certified family physicians, due to survey skip logic, our regression analysis did not include physicians who did not provide continuity care, such as, but not limited to, hospitalists and emergency medicine physicians. We conducted a sensitivity analysis eliminating practice type and

size sequentially from the regression to allow the inclusion of these excluded physicians ($n = 2,343$), and our findings did not change meaningfully. Further, the NGS does not allow physicians to describe the nature of their teaching, which may be variable in the number hours spent, the longevity of the teaching, and the number of students taught.

These findings are not generalizable to nonboard-certified family physicians or those who are certified by a different board. Finally, the NGS survey includes only early career physicians, and results may not generalize to all family physicians.

Future Directions

Future research should examine why physicians—especially women, small-practice clinicians, and physicians from groups that have historically been underrepresented in medicine—opt not to teach, and what factors influence these decisions. Qualitative studies are needed to capture the perspectives of rural clinicians navigating workforce shortages, administrative burden, and shifting professional dynamics. Additionally, studies should investigate the implications of declining NP and PA student teaching for rural primary care training capacity and interprofessional collaboration.

CONCLUSIONS

This study highlights trends in the rural and urban early career clinical teaching workforce. While rural family physicians continue to provide substantial teaching for medical learners, particularly residents, important disparities remain in who teaches and which professions receive training. Declines in NP and PA student teaching, disparities affecting female and non-White physicians, and barriers in small and resource-limited practices all point to a need for targeted policy and institutional solutions. Sustaining a strong rural clinical teaching workforce will require improved training infrastructure, preceptor development, and fewer participation barriers.

AUTHOR CONTRIBUTIONS

Coauthor Davis G. Patterson, PhD died June 17, 2026.

REFERENCES

1. Patterson DG, Shipman SA, Pollack SW, et al. Growing a rural family physician workforce: the contributions of rural background and rural place of residency training. *Health Serv Res.* 2024;59(1):e14168. doi:10.1111/1475-6773.14168
2. Advisory Committee on Interdisciplinary Community-Based Linkages. Enhancing Community-Based Clinical Training Sites: Challenges and Opportunities. Sixteenth Annual Report to the Secretary of Health and Human Services and the U.S. Congress. Accessed July 2, 2026. <https://www.hrsa.gov/sites/default/files/hrsa/advisory-committees/community-based-linkages/reports/sixteenth-2018.pdf>
3. Kaplan L, Pollack SW, Skillman SM, Patterson DG. NP program efforts promoting transition to rural practice. *Nurse Pract.* 2020;45(10):48–55. doi:10.1097/01.NPR.0000696920.66207.65
4. Larson EH, Oster NV, Jopson AD, Andrilla CHA, Pollack SW, Patterson DG. Routes to rural readiness: enhancing clinical training experiences for physician assistants. *J Physician Assist Educ.* 2023;34(3):178–187. doi:10.1097/JPA.0000000000000514
5. Letter from Alan Morgan, Chief Executive Officer, National Rural Health Association, to the Honorable Bernard Sanders, Chair, and Bill Cassidy, MD, Ranking Member, U.S. Senate Health, Education, Labor, and Pensions Committee. March 20, 2023. Accessed December 2025. https://www.ruralhealth.us/getmedia/04e4623a-1b3f-4a51-9a93-6a6e8eb85f5d/3-19-2023-Senate-HELP-Workforce-RFI.pdf?utm_source=chatgpt.com
6. Domino ME, Lin C-CC, Morrissey JP, et al. Training psychologists for rural practice: exploring opportunities and constraints. *J Rural Health.* 2019;35(1):35–41. doi:10.1111/jrh.12299
7. Evans TC, Wick KH, Andrilla CHA, Skaggs SA, Burgin T. A method to study the effect of a physician assistant student on preceptor productivity. *J Physician Assist Educ.* 2018;29(4):205–210. doi:10.1097/JPA.0000000000000220
8. Peterson LE. Using the family medicine national graduate survey to improve residency education by monitoring training outcomes. *Fam Med.* 2021;53(7):622–625. doi:10.22454/FamMed.2021.719992
9. U.S. Department of Agriculture Economic Research Service. Rural-Urban Commuting Area Codes 2010. Accessed December 2025. <https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes>
10. Pollack SW, Andrilla CHA, Peterson L, et al. Rural versus urban family medicine residency scope of training and practice. *Fam Med.* 2023;55(3):162–170. doi:10.22454/FamMed.2023.807915
11. O'Neill T, Peabody MR, Blackburn BE, Peterson LE. Creating the Individual Scope of Practice (I-SOP) scale. *J Appl Meas.* 2014;15(3):227–239.
12. Zhang J, Yu KF. What's the relative risk? a method of correcting the odds ratio in cohort studies of common outcomes. *JAMA.* 1998;280(19):1690–1691. doi:10.1001/jama.280.19.1690
13. Rodriguez JE, Campbell KM, Fogarty JP, Williams RL. Underrepresented minority faculty in academic medicine: a systematic review of URM faculty development. *Fam Med.* 2014;46(2):100–104. doi:https://www.stfm.org/familymedicine/vol46issue2/Rodriguez100
14. Chesak SS, Salinas M, Abraham H, et al. Experiences of gender inequity among women physicians across career stages: findings from participant focus groups. *Womens Health Rep (New Rochelle).* 2022;3(1):359–368. doi:10.1089/whr.2021.0051
15. Anderson LN, Anaya YB, Gilchrist V. Supporting our women colleagues. *Fam Med.* 2024;56(4):219–221. doi:10.22454/FamMed.2024.754708
16. Murphy M, Record H, Callander JK, Dohan D, Grandis JR. Mentoring relationships and gender inequities in academic medicine: findings from a multi-institutional qualitative study. *Acad Med.* 2022;97(1):136–142. doi:10.1097/ACM.0000000000004388

17. Mangurian C, Linos E, Sarkar U, Rodriguez C, Jagsi R. What's holding women in medicine back from leadership. *Harv Bus Rev*. November 7, 2018. Accessed December 2025. <https://hbr.org/2018/06/whats-holding-women-in-medicine-back-from-leadership>
18. Keller T, Wilson M, Chung K, Andrilla CHA, Evans DV, Cawse-Lucas J. Gender differences in authorship of family medicine publications, 2002–2017. *Fam Med*. 2021;53(6):416–422. doi:10.22454/FamMed.2021.866524
19. Rittenberg E, Liebman JB, Rexrode KM. Primary care physician gender and electronic health record workload. *J Gen Intern Med*. 2022;37(13):3295–3301. doi:10.1007/s11606-021-07298-z
20. Peterson LE, Morgan ZJ. The racial and ethnic diversity of the family physician workforce in non-metropolitan and metropolitan counties. *Rural & Underserved Health Research Center Publications*. June 2022;21. Accessed December 2025. https://uknowledge.uky.edu/ruhrc_reports/21
21. Nasim U, Morgan ZJ, Peterson LE. The declining scope of practice of family physicians is limited to urban areas. *J Rural Health*. 2021;37(4):734–744. doi:10.1111/jrh.12540
22. Skariah JM, Rasmussen C, Hollander-Rodriguez J, et al. Rural curricular guidelines based on practice scope of recent residency graduates practicing in small communities. *Fam Med*. 2017;49(8):594–599. doi:<https://www.stfm.org/familymedicine/vol49issue8/Skariah594>
23. Health Resources and Services Administration. Teaching Health Center Graduate Medical Education (THCGME): expanding the primary care workforce. Accessed December 2025. <https://bhwh.hrsa.gov/funding/apply-grant/teaching-health-center-graduate-medical-education>
24. Finnell K, Ortiz K, Gowin M, et al. The premier medical education model: improving preceptor recruitment in underserved areas. *Fam Med*. 2024;56(8):485–491. doi:10.22454/FamMed.2024.513346
25. Theobald M, Ruttter A, Steiner B, Morley CP. Preceptor expansion initiative takes multitactic approach to addressing shortage of clinical training sites. *Fam Med*. 2019;51(2):159–165. doi:10.22454/FamMed.2019.379892
26. American Association of Colleges of Osteopathic Medicine. Expanding clinical education opportunities: a strategic approach for health workforce goals and physician recruitment and retention. 2024. Accessed December 2025. https://www.aacom.org/docs/default-source/residency-gme/expanding-clinical-education-opptys_050424.pdf?sfvrsn=48aa26a0_1
27. Health Resources and Services Administration. Rural Residency Planning and Development (RRPD) program. Accessed December 2025. https://www.hrsa.gov/rural-health/grants/rural-health-research-policy/rrpd?utm_source=chatgpt.com
28. National Commission on Certification of Physician Assistants. PA workforce growing, but diversity lags. Accessed December 2025. https://www.nccpa.net/news/pa-workforce-growing-but-diversity-lags/?utm_source=chatgpt.com
29. Ainslie M, Bahalkeh E, Bigley MB. Nurse practitioner program enrollment trends and predictions. *J Prof Nurs*. 2024;55:97–104. doi:10.1016/j.profnurs.2024.09.007
30. Andrilla CHA, Woolcock SC, Garberson LA, Patterson DG. Changes in the supply and rural-urban distribution of nurse practitioners in the U.S., 2001–2020. Data brief. WWAMI Rural Health Research Center, University of Washington; 2024. Accessed December 2025. https://familymedicine.uw.edu/rhrc/wp-content/uploads/sites/4/2024/10/RHRC_DBOCT2024_NP_Andrilla.pdf
31. Centers for Medicare and Medicaid Services. CMS announces \$50 billion in awards to strengthen rural health in all 50 states. December 29, 2025. Accessed December 2025. <https://www.cms.gov/newsroom/press-releases/cms-announces-50-billion-awards-strengthen-rural-health-all-50-states>