

Outcomes of Rural-Centric Residency Training to Prepare Family Medicine Physicians for Rural Practice

KEY FINDINGS

- Family medicine physicians who graduated from rural-centric residency programs—those that actively recruit medical students with an interest in rural practice and require at least eight weeks of rural training—practiced in rural areas during the first five years after graduation at much higher rates than the entire population of family physicians.
- No single program characteristic or model offered sustained advantages over any other type in producing high yields to rural practice.
- Graduates of rural-centric family medicine residencies also chose to practice in Primary Care Health Professional Shortage Areas (both rural and urban) at high rates, up to 54% three years post-graduation, declining by five years post-graduation to 42%.
- The combination of a program mission to produce rural physicians with required rural training experiences may help to account for similar outcomes among a diverse group of residency programs that produce family physicians who choose rural practice.
- More research is needed to determine whether rural practice choices are sustained beyond five years post-graduation, the time period of this study.

BACKGROUND

Family medicine physicians provide the majority of physician care in rural areas,¹ but there were fewer family medicine residency trainees in 2013-14² than in the late-1990s.³ Shortages of primary care providers, including family physicians, are persistent and widespread in rural areas.⁴ Physicians that receive greater exposure to rural clinical experiences are more likely to choose rural practice.⁵⁻⁷ Yet the amount of time family medicine residents spent in rural areas was steadily declining at least until 2007, the most recent year of available data, when rural training amounted to just 7.3% of residents' training time.^{1,5,8,9}

Family medicine residency programs based in rural areas can provide full immersion in rural medicine by virtue of their location, while urban programs that seek to produce rural physicians may offer rural block rotations (e.g., one or more months of immersion in rural practice), longitudinal continuity clinic sessions (e.g., one or two continuity clinic sessions per week over a year or more) in a rural area, or both during part or all of the three years of residency training. A challenge in determining how many family

medicine training programs are “rural” or urban with some type of “rural training track” (RTT), or how much rural training programs provide, is that these terms lack standard definitions, and different sources offer different estimates.^{1,9-10}

Some have called urban programs with RTTs a promising source of rural physicians,⁸ but the outcomes of rural- versus urban-based programs with rural training have not been compared. Studies of one model, the “1-2” RTT, where residents may spend up to a year in an urban setting and two years in a rural site, have shown that from 45% to 76% of graduates ended up in rural practice,^{7,8} compared with 22% of family medicine physicians as a whole.⁷ High proportions of these graduates (42% to 61%) also practiced in Primary Care Health Professional Shortage Areas (HPSAs), located in both rural and urban areas.⁶⁻⁸

Even 1-2 RTTs, all of which are either singly accredited allopathic or dually accredited (allopathic and osteopathic) programs, vary in the amount of time spent in rural training. The rural output of singly accredited osteopathic residencies has not been examined despite rapid expansion of osteopathic medical schools and a higher propensity of osteopathic physicians to choose family medicine and rural practice.⁹ This study of rural-centric U.S. family medicine residency programs examined the proportions of graduates choosing practice in rural areas and Primary Care HPSAs. We compared programs in four ways: (1) rural- versus urban-based programs; (2) 1-2 RTTs versus all other rural-centric programs; (3) programs requiring more versus less rurally located training; and (4) singly accredited allopathic, singly accredited osteopathic, and dually accredited programs.

METHODS

DATA SOURCES

This study used multiple sources of data to identify family medicine residencies providing rural training and the practice locations of their graduates. The University of Washington Human Subjects Division determined that this study was not human subjects research.

Survey of family medicine residencies

Out of all 583 family medicine residencies (singly accredited allopathic, singly accredited osteopathic, and dually accredited allopathic and osteopathic) in summer 2013, we used several sources of information to identify programs that either were rurally located or had a “rural track”: the FREIDA Online® database¹¹ (containing singly accredited allopathic and dually accredited programs); two osteopathic program databases, the American Osteopathic Association (AOA) Opportunities database and the American College of Osteopathic Family Physicians (ACOFP) Residency Finder database (containing singly accredited osteopathic and dually accredited programs); as well as screening phone calls. Survey inclusion criteria included the following:

- The program had a rural ZIP code according Rural-Urban Commuting Area Codes (RUCAs; 2006 version 2.0 ZIP approximation) or was in a nonmetropolitan county according to Urban Influence Codes.¹²
- The program reported that it was in a “rural setting” in the ACOFP database.
- The program reported having a “rural track” in FREIDA Online®.
- The program reported in a screening phone call that it had a “rural track” (singly accredited osteopathic programs only, since this information was not available in the AOA Opportunities or ACOFP databases).

In late 2013 we conducted a Web and postal mail survey of the program coordinators or directors of all 171 programs (29.3% of all family medicine residencies) that met at least one of these criteria in order to include as many programs as possible that could have a mission to produce rural physicians. We attempted to contact programs up to ten times, including up to five follow up calls to non-responders. Of the 171 programs surveyed, 131 (76.6%) responded.

Programs that reported actively recruiting medical students with an interest in rural practice and that required at least 8 weeks of rural training were asked to provide basic descriptive information; ZIP codes of required rural training sites for block rotations, clinic sessions, and full time rural training; and information on program graduates (described below). We chose a minimum threshold of 8 weeks of required rural training because of past research finding that fewer than 2 required rural months of training yielded 36.5% or fewer family medicine residency graduates choosing rural practice.⁵ Furthermore, our 8-week threshold represents just 5% of the 3 years of family medicine residency training, and we reasoned that less rural training might not offer enough exposure to make a significant difference in later practice choice. Of the 131 responding programs, 58 (44.3%) both actively recruited medical students with an interest in rural practice and required at least 8 weeks of rural training. The graduates of these “rural-centric” programs are the subject of this study.

To determine which programs provided more versus less rural training, we classified the locations that each program reported to be “required rural training” sites as rural or urban using RUCA codes as above. Because each program was allowed to designate the sites it considered rural, it was possible for programs to list training locations that were not rural according to RUCA classifications. Though most programs (67%) reported locations were entirely rural according to RUCA codes, we found that 25% of programs listed entirely urban locations. We compared the graduate outcomes of programs reporting “required rural training” locations that were entirely rural versus programs reporting locations that were entirely urban.

Graduate practice data

Of the 58 rural-centric family medicine residency programs, 13 (22.4%) programs were too new to have residency graduates because the first residents had started training after 2010. Of the remaining 45 programs, 26 (60.0%) provided identifiers (name, graduation month and year) for physicians who had participated in at least 8 weeks of required rural training and completed residency from July 2007 through June 2013. We also had graduate identifiers for 3 of the non-responding programs collected as part of a prior study, bringing the total number of programs included in the analysis to 29. Graduation cohorts were assigned based on calendar years (e.g., the 2010 cohort completed residency January through December 2010); because of small numbers, the 2007 graduates were grouped with 2008 graduates.

Graduates were matched to the National Plan and Provider Enumeration System (NPPES) databases¹³ based on last name or initial, first name or initial, ACGME number and graduation year, yielding practice addresses for 440 program graduates for the years 2008 through 2013. Practice addresses were geocoded using NAVTEQ and ArcGIS software, and classified as urban or rural using RUCAs and in a Primary Care HPSA or not, whether urban or rural.

ANALYSIS

Statistical analyses describe graduate outcomes at graduation and up to five years post-graduation (depending on the cohort) comparing programs on the four dimensions noted above: (1) program location (rural- versus urban-based); (2) 1-2 RTT status; (3) programs requiring more versus less rural training; and (4) type of accreditation. We performed chi-square analyses as appropriate using SAS Version 9.4; significant findings are reported at $p < 0.05$.

RESULTS

Table 1 shows key residency program characteristics and the number of program graduates in each analysis of rural-centric programs. About half, 15, of the 29 programs were rurally located according to the main address of the program, and 16 programs were 1-2 RTTs. Sixteen programs reported locations of “required rural training” that were entirely in RUCA-defined rural ZIP codes, while 6 programs reported ZIP codes of “required rural training” that were entirely in urban locations. Most programs were singly-accredited allopathic (17) or singly-accredited osteopathic (7).

Table 1. Numbers of graduates from responding rural-centric family medicine residency programs by program characteristics

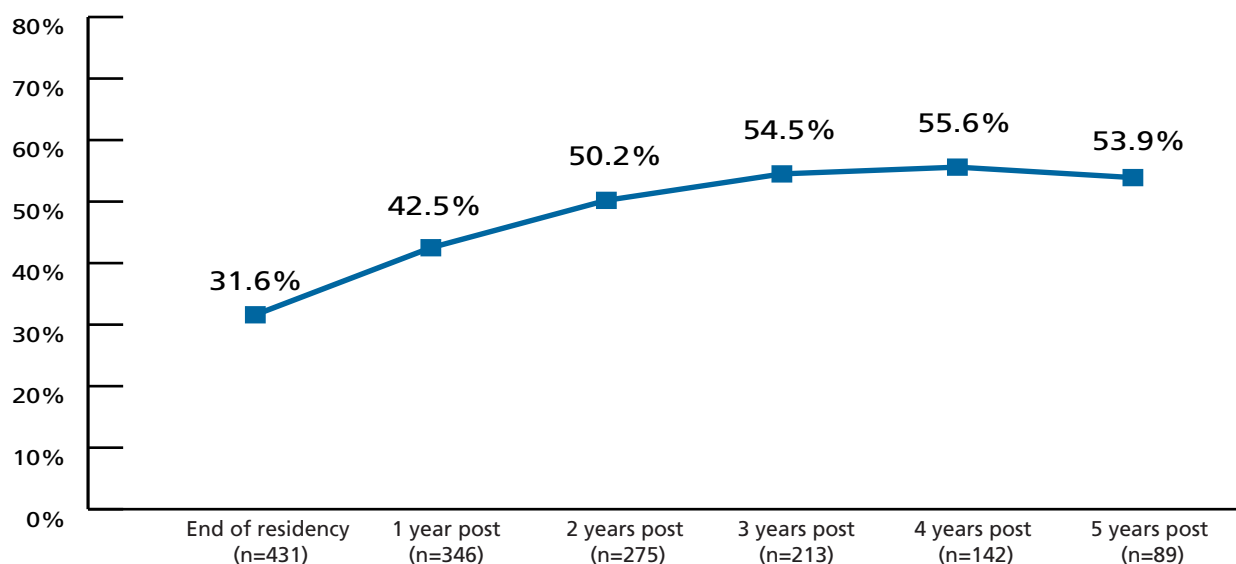
Program characteristics		Total graduates n (%)
All programs (29)		440 (100.0%)
Program location	Rurally located (15)	202 (45.9%)
	Urban with a rural track (14)	238 (54.1%)
1-2 RTT status	1-2 RTT (16)	187 (42.5%)
	Not a 1-2 RTT (13)	253 (57.5%)
Program reporting more vs. less rural training*	Programs reporting "required rural training" that was located entirely in rural ZIP codes (16)	230 (65.9%)
	Programs reporting "required rural training" that was located in both rural and urban ZIP codes (2)	24 (6.9%)
	Programs reporting "required rural training" that was located entirely in urban ZIP codes (6)	95 (27.2%)
Type of accreditation	Singly-accredited allopathic (17)	286 (65.0%)
	Singly-accredited osteopathic (7)	51 (11.6%)
	Dually-accredited (5)	103 (23.4%)

*Reported locations of "required rural training" were coded as rural or urban according to the RUCA ZIP-code approximation. This information could not be determined for 5 programs and 91 graduates.

RURAL PRACTICE

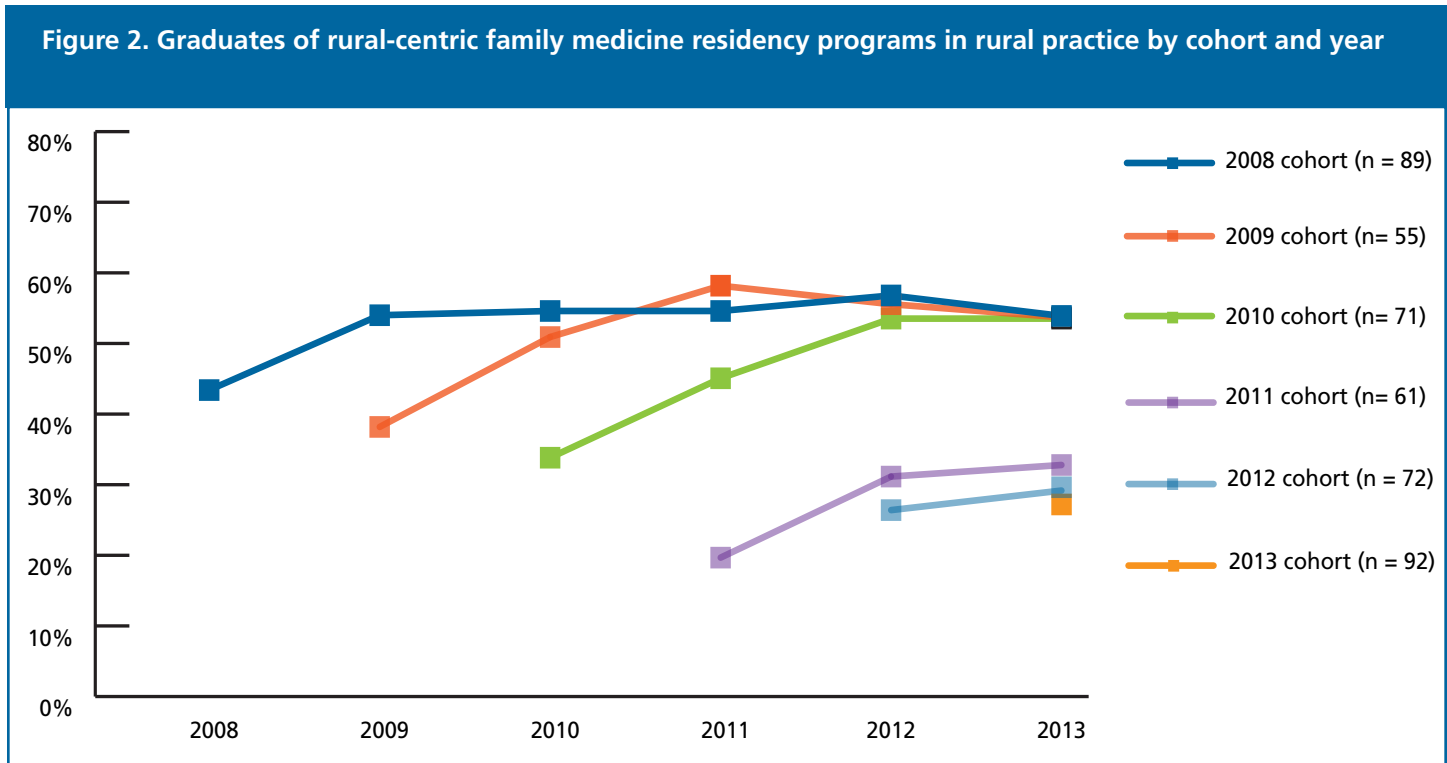
The proportion of residency graduates in rural practice (whether in the community they trained or another rural community) was 31.6% at the end of residency, increasing in the next two years and stabilizing just above 50% during the period from two to five years post-residency (Figure 1).

Figure 1. Graduates of rural-centric family medicine residency programs in rural practice from end of residency to 5 years post



Note: Practice locations were missing for 9 graduates.

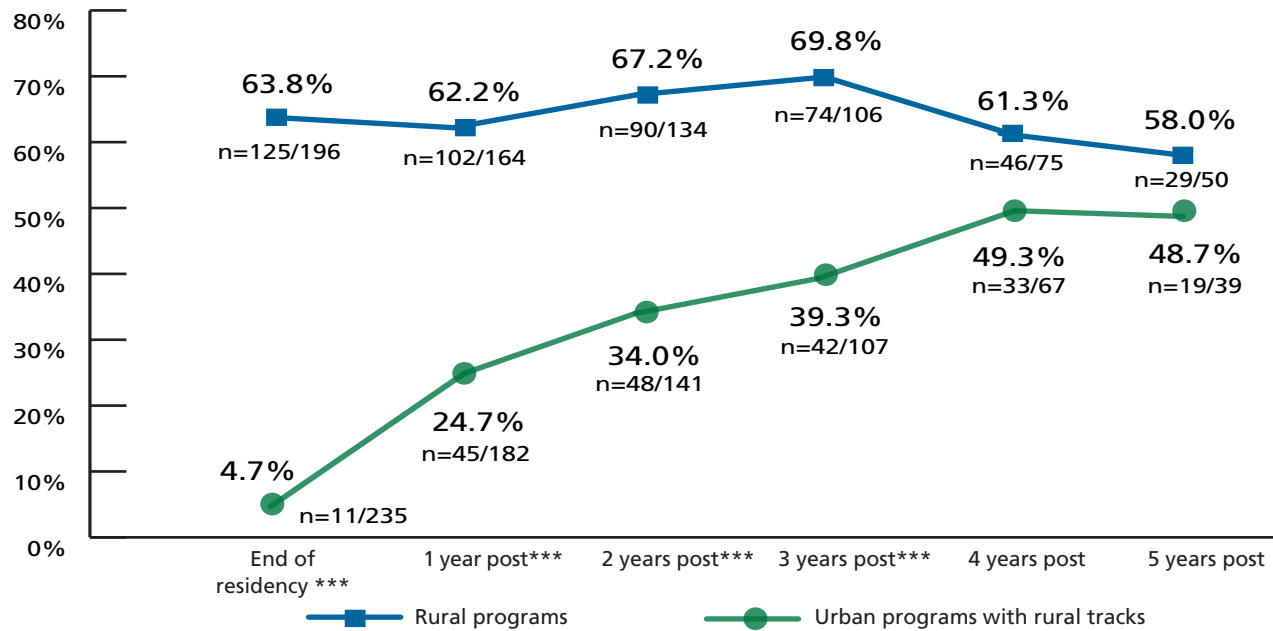
Figure 2 shows proportions of graduates in rural practice by year and cohort of graduation. Consistent with the pattern in Figure 1, the proportion practicing in rural areas increased in the first year or two after graduation for every cohort with available trend data. However, the proportions of graduates practicing in rural areas upon completion of residency training (the first data point in the trend line for each cohort) declined steadily from 2008 through 2011, with a slight uptick in 2012.



Rural Practice: Rurally-located Programs vs. Urban Programs with Rural Tracks

More than 60% of graduates from rurally-located programs practiced in rural areas from the end of residency through four years post-graduation, with a high of 69.8% at three years post-graduation. This percentage declined to 58.0% by five years post-graduation (Figure 3). By comparison, only 4.7% of graduates of urban programs with rural tracks were practicing in rural areas at the end of residency. However, this proportion increased steadily and rapidly until almost half were in rural practice four years post-graduation, substantially closing the gap with rural program yields. The 9% to 12% differences in rural practice between graduates from rural programs versus urban programs with a rural track were no longer statistically significant in years four and five post-residency (most likely due to small sample sizes).

Figure 3. Graduates of rural-centric family medicine residency programs in rural practice from end of residency to 5 years post: rural programs versus urban programs with rural tracks



Note: Practice locations were missing for 9 graduates.
 ***Differences by program type were statistically significant at $p < 0.001$.

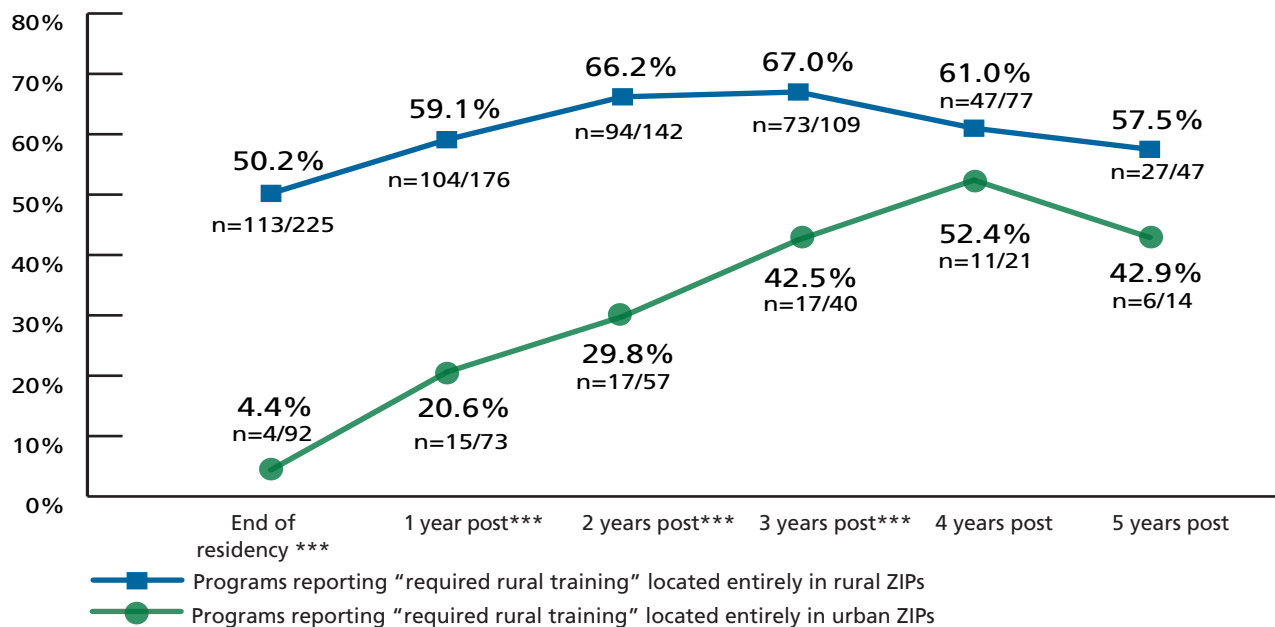
Rural Practice: 1-2 RTT Programs vs. Other Programs

Fewer 1-2 RTT graduates were in rural practice at the end of residency compared with graduates of other programs (25.7% of 1-2 RTT graduates vs. 35.9% of others; $p < .05$), but the proportions of graduates from these two groups in rural practice were nearly identical in every year post-residency (not shown).

Rural Practice: Comparing Programs by Locations of “Required Rural Training”

Programs were asked to report ZIP codes of locations where “required rural training” occurred. We used RUCA categories to classify these ZIP codes as urban or rural. This analysis compared the outcomes of programs that reported this training in locations that were entirely rural with programs where this training was entirely urban (Figure 4). The trends were similar to those comparing graduates from rural and urban-based programs. Programs whose training was rural according to RUCA codes produced much higher proportions of graduates choosing rural practice in the early years. The differences between the two groups declined in years four and five and were not statistically significant, likely due in part to the smaller sample sizes in later years.

Figure 4. Graduates of rural-centric family medicine residency programs in rural practice from end of residency to 5 years post: Programs reporting “required rural training” located entirely in rural or entirely urban ZIP codes



Note: Programs reported ZIP codes of “required rural training” (continuity clinics, block rotations, full time rural training) locations. This analysis compared only the 225 graduates of programs whose “required rural training” was entirely in rural ZIPs (5 were missing practice location) with 92 graduates of programs whose “required rural training” was entirely in urban ZIPs (3 were missing practice location), according to RUCA codes. 24 graduates whose “required rural training” locations were mixed urban and rural were excluded, and this information could not be determined for 91 graduates.

***Differences by program type were statistically significant at $p < 0.01$.

***Differences by program type were statistically significant at $p < 0.001$.

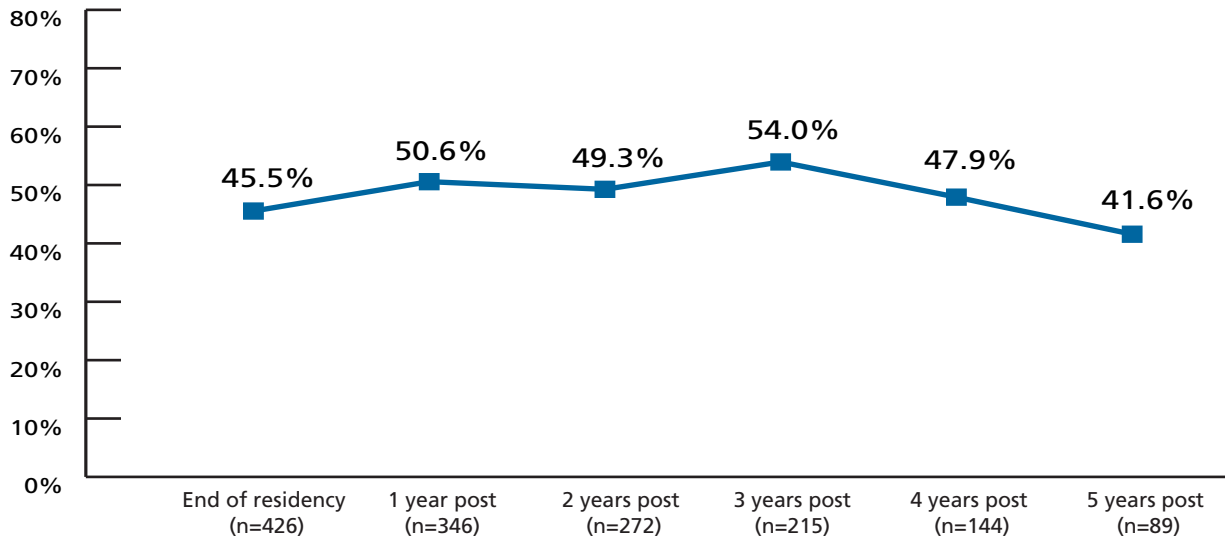
Rural Practice by Type of Program Accreditation

More graduates from singly-accredited osteopathic programs (49.0%) were in rural practice at the end of residency compared with graduates of programs with other types of accreditation (40.6% of graduates from dually-accredited programs and 25.3% of singly-accredited allopathic programs were in rural practice; $p < .001$), but the proportions of graduates from these three groups in rural practice were much more similar and not statistically different in any year post-residency (not shown).

Practice in Primary Care HPSAs

From 41.6% to 54.0% of all rural-centric program graduates practiced in Primary Care HPSAs (located in both rural and urban areas) from the end of residency through five years post-residency (Figure 5).

Figure 5. Graduates of rural-centric family medicine residency programs in Primary Care HPSAs from end of residency to 5 years post

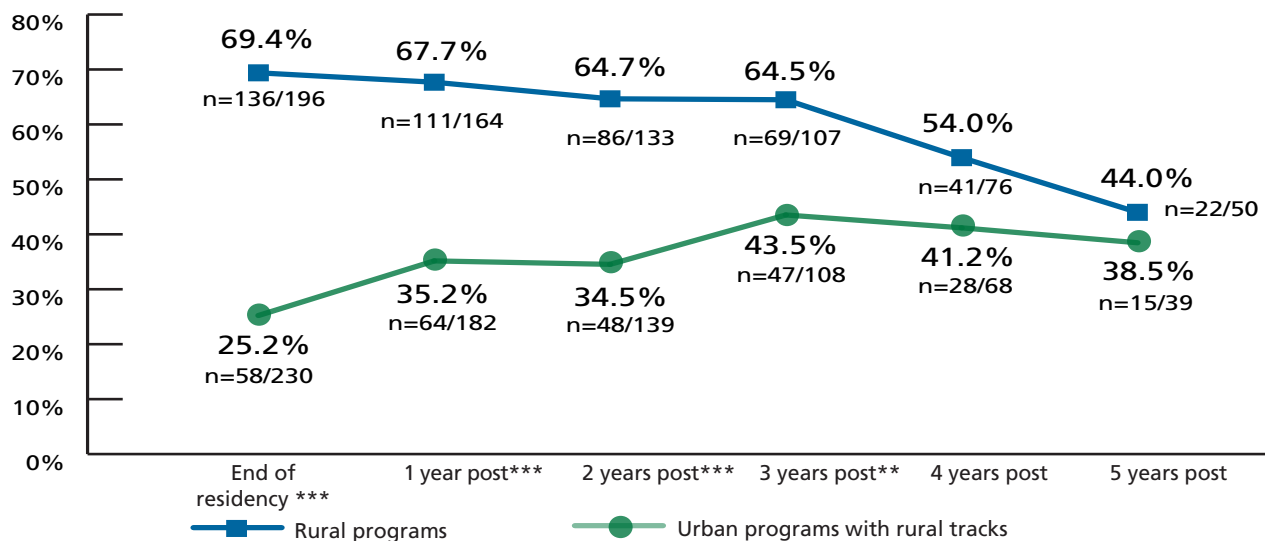


Note: Practice locations were missing for 14 graduates.

Practice in Primary Care HPSAs: Rurally-located Programs vs. Urban Programs with Rural Tracks

Graduates from rural programs were more likely than those from urban programs with rural tracks to practice in Primary Care HPSAs from the end of residency through three years post-graduation, but the proportion dropped from 69.4% to 44.0% over the entire study period, and the differences between groups were not statistically significant in years four and five post-residency (Figure 6).

Figure 6. Graduates of rural-centric family medicine residency programs in Primary Care HPSAs from end of residency to 5 years post: rural programs versus urban programs with rural tracks



Note: Practice locations were missing for 14 graduates.

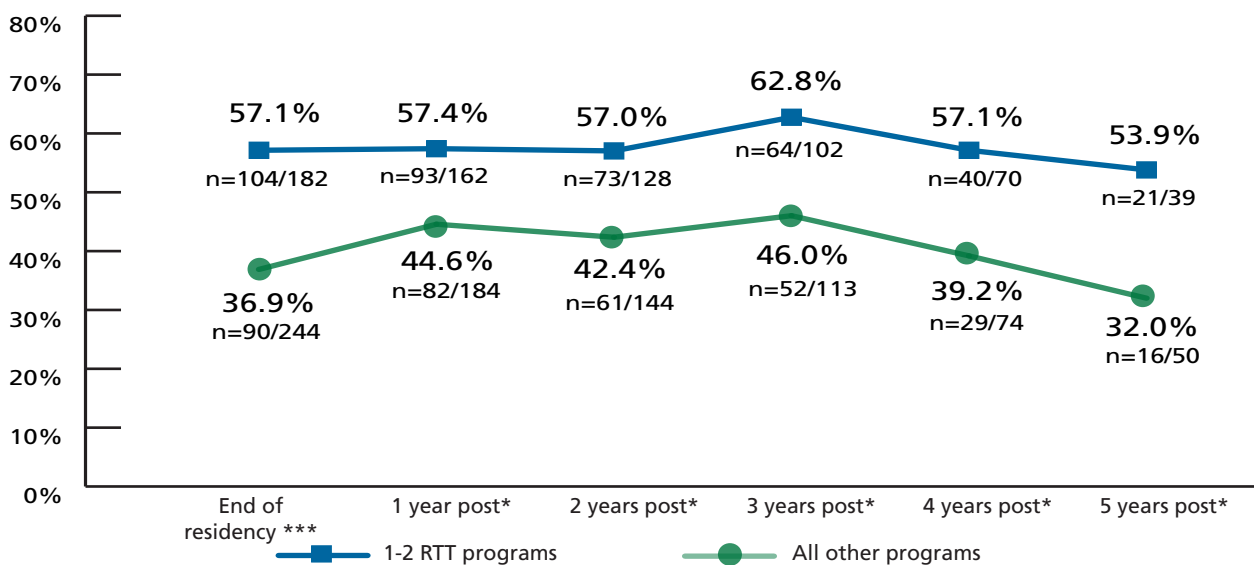
**Differences by program type were statistically significant at $p < 0.01$.

***Differences by program type were statistically significant at $p < 0.001$

Practice in Primary Care HPSAs: 1-2 RTT Programs vs. Other Programs

More than half of graduates from 1-2 RTT programs practiced in Primary Care HPSAs, and 13% to 22% more graduates from 1-2 RTTs practiced in Primary Care HPSAs than graduates of other programs throughout the study period (Figure 7). These differences were statistically significant in every year.

Figure 7. Graduates of rural-centric family medicine residency programs in Primary Care HPSAs from end of residency to 5 years post: 1-2 RTT programs versus all other programs



Note: Practice locations were missing for 14 graduates.

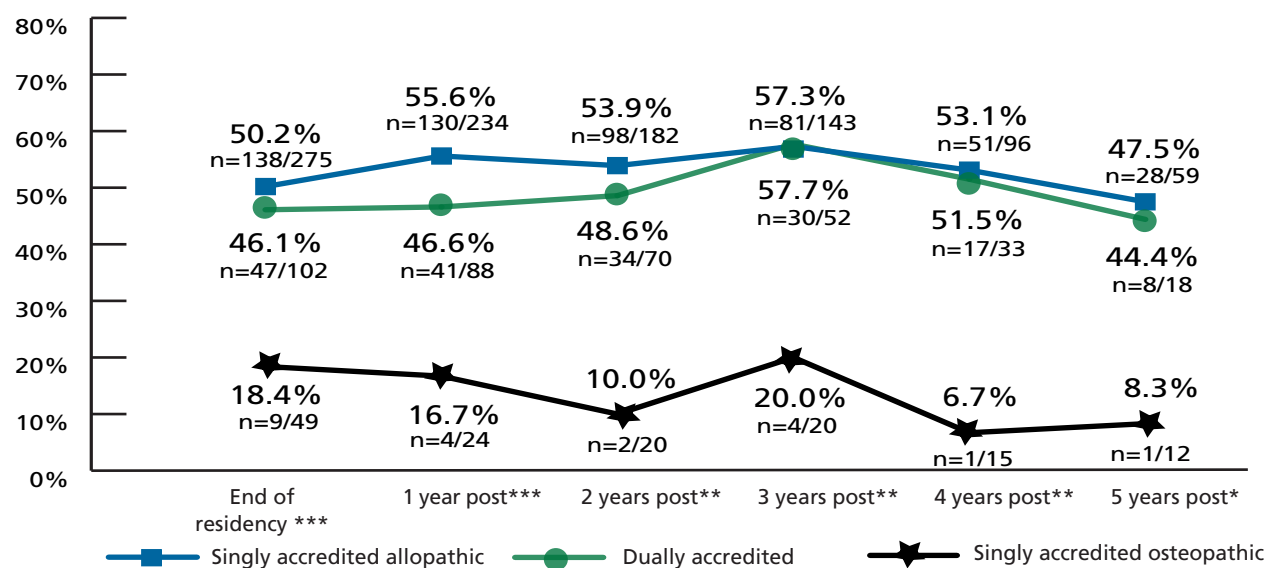
*Differences by program type were statistically significant at $p < 0.05$.

***Differences by program type were statistically significant at $p < 0.001$.

Practice in Primary Care HPSAs by Type of Program Accreditation

Singly-accredited osteopathic programs were distinct from the other two groups of programs: their graduates were much less likely to practice in Primary Care HPSAs (Figure 8). By five years post residency, only 8.3% of graduates from singly-accredited osteopathic programs were in Primary Care HPSAs, compared with more than 40% of graduates from singly-accredited allopathic and dually-accredited residencies.

Figure 8. Graduates of rural-centric family medicine residency programs in Primary Care HPSAs from end of residency to 5 years post



Note: Practice locations were missing for 14 graduates.
 *Differences by program type were statistically significant at $p < 0.05$.
 **Differences by program type were statistically significant at $p < 0.01$.
 ***Differences by program type were statistically significant at $p < 0.001$.

LIMITATIONS

This study has several limitations. Though the overall survey response rate was high, a smaller proportion of programs identified their graduates who had participated in required rural training, and this may have introduced bias in the graduate sample. All of the 1-2 RTTs that participated in this study would generally have been expected to be “urban programs with rural tracks,” but some misclassification is likely. 1-2 RTT configurations vary significantly and deviations from the original prototype of “one year in the city and two years in the country” may have led to misidentification of some 1-2 RTT program locations because of inconsistent self- and ACGME-reporting of program addresses. Practice locations may be misidentified due to time lags in updating the NPES database, and these lags may be more pronounced for early-career physicians who are transitioning from residency into practice. If a practice street address could not be precisely matched during geocoding, the centroid of the ZIP code was used, which could have incorrectly located the practice either inside or outside of a Primary Care HPSA. The sample size may have limited our ability to detect statistically significant differences between graduates from different types of residency programs. We were not able to control for the effects of self-selection of more rurally-oriented physicians into rural-centric residencies. We also do not know the extent to which early career practices choices are maintained, so we cannot draw any conclusions about long-term retention.

CONCLUSIONS AND POLICY IMPLICATIONS

Our definition of “rural-centric” training was based on programs’ active recruitment of medical students with an interest in rural practice and requiring eight weeks of rural training during three years of family medicine residency, a minimum threshold of only 5% of total training time. This training could be longitudinal (continuity clinics) or concentrated in discrete blocks. Even using this low benchmark, we found that graduates from rural-centric family medicine residencies were much more likely than family

physicians overall to be in rural practice. For example, just 17.5% of members of the American Academy of Family Physicians are in nonmetropolitan areas, compared with over 50% of the early-career physicians in this study in the first two to five years after residency.¹⁴

This study found differences in yields to rural practice for different types of programs, but these differences largely disappeared after the first few years of practice. Differences in outcomes between rurally located programs and urban programs with rural tracks diminished over time, as did the differences between programs with more and less rural training, with the rural yields of the urban-based programs approaching those of rural programs during the five years post-graduation. In addition, neither 1-2 RTTs nor other program models were more successful at producing rural physicians, nor were there substantial differences by type of program accreditation.

High proportions of rural-centric family medicine residency graduates also chose to practice in Primary Care HPSAs. Yields from 1-2 RTT programs and allopathic and dually-accredited programs were consistently higher than for other types of programs, and these differences were sustained for up to five years, the outer limit of available data. It is not known the extent to which these high rates of practice in shortage areas are the result of incentive programs, such as the National Health Service Corps,¹⁵ or Conrad 30 Waiver Program,¹⁶ or other factors. If incentives are driving this trend, we do not know whether these physicians will remain in shortage areas once incentive obligations are fulfilled, since incentive programs typically involve two to six years of service in underserved locations. Tracking both short- and long-term retention is thus important for understanding the total return on investment in rural training and incentives for practice in underserved locations.

This study of program characteristics did not collect data on individual physician motivations or their experiences in residency training. Further study could elucidate the relative importance of and interaction between individual characteristics and residency program experiences, such as the amount of time spent in rural communities, that determine physicians' practice choices. More research is also needed to understand if and how initial practice choices are sustained, for which physicians, and the likely transition points at which physicians move into or out of rural and underserved practice over the course of their careers. The time period of this study included economic recession and recovery during which initial yields to rural practice declined and began to recover, suggesting that either differences between cohorts of graduates or the effects of this unique historical period or both may have also played a role in graduate practice choices.

Study findings suggest that residency programs with a mission to recruit students interested in rural practice and that also require rural training, even using a self-defined notion of "rural" that does not conform to a formal definition such as that used in this study (RUCA codes), can produce relatively high yields of family medicine physicians that choose rural practice. The pattern of results in this study suggests that many different kinds of rural-centric residency programs—rural or urban; allopathic, osteopathic, or dually-accredited; and with varying amounts of rural training—can provide rurally focused training opportunities and the support that residents with an interest in rural practice need to pursue this goal. Rural mission combined with required training focused on rural practice may help to account for similar outcomes among a diverse group of residency programs.

Rural training opportunities are unevenly distributed relative to rural population, with the West and South regions of the country at a disadvantage compared with the Northeast and Midwest.⁹ The West and South may thus offer great potential for expansion of rural-centric residency training. Rural place-based health professions education is also consistent with an increasing emphasis on GME models such as the Teaching Health Center, which bases clinical training in community settings such as Federally Qualified Health Centers.¹⁷ Shortages of providers are widespread,⁴ and opportunities abound to support rural-centric training throughout the U.S. to increase rural populations' access to primary health care.

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