

Will Rural Family Medicine Residency Training Survive?

Roger A. Rosenblatt, MD, MPH; Amy Hagopian, MHA, PhD;
C. Holly A. Andrilla, MS; L. Gary Hart, PhD

Background and Objectives: Rural family medicine residencies may be more threatened by declining interest in family medicine than their urban counterparts. This study examines the recent performance of rural residencies in the National Resident Matching Program as an indicator of their viability. **Methods:** We surveyed all 30 family medicine residencies located in rural areas during the summer of 2004 and a geographically matched sample of 31 urban residencies. We gathered information about the matching process for 2002, 2003, and 2004. The response rate was 70.5%. **Results:** Rural programs offer about one third fewer first-year (postgraduate year 1 [PGY-1]) positions than their urban counterparts. Rural programs had lower Match rates (60.1%) than urban programs (72.5%) in 2004 but no meaningful differences in the proportion of international medical graduates (IMGs) or osteopathic physicians (DOs) who ultimately accepted positions. The 44.2% of residencies that predicted they would be thriving 2 years in the future filled an average of 81.3% of their slots on Match Day; there were no rural/urban differences. Programs with less-optimistic appraisals of their future had much lower Match rates. Two factors were associated with lower Match rates when other variables were taken into account: the proportion of IMGs in the 2 previous entering years and a stated rural mission. **Conclusions:** Rural programs appear to be slightly less stable than their urban counterparts, but the differences are minor. The viability of rural family medicine residency programs is probably affected more by the overall attractiveness of family medicine as a discipline rather than the rural or urban location of the residency.

(Fam Med 2006;38(10):705-11.)

The vitality of rural health care delivery systems depends to a large extent on the supply of well-trained family physicians. Family physicians represent 42% of all physicians in active practice in towns of 10,000 people or less;¹ in 2004, 20,900 family physicians were practicing in nonmetropolitan counties, by far the largest single rural physician discipline.² With their broad spectrum of clinical practice, family physicians serve as the foundation of the medical care system in most small towns.³ Medical specialists and nonphysician health care providers expand and complement the family physician practice core, but without the generalist base, many rural health care systems cannot provide a stable and appropriate scope of clinical services.

An important source of rural family physicians is rural family medicine residencies. Physicians tend to locate and practice near where they trained, and residents who train in rural locations are more likely to settle in rural areas than their urban counterparts.^{4,5} Only 7.5% of family medicine training in the United States actually takes place in rural areas, and most of that is provided by the relatively few residency programs that are actually located in rural towns.⁶ Therefore, the viability of these residencies is important to the training of future rural generalists.

In 2000, we surveyed all 453 civilian allopathic family medicine residency programs in the United States. Of the 435 programs that responded, 33 were in rural areas, and virtually all of their training occurred in rural settings.^{6,7} Since that 2000 survey, medical student interest in family medicine training has declined, continuing a trend that began in 1998.^{8,9} As student interest has declined, fewer US graduates have matched

From the Washington, Wyoming, Alaska, Montana, Idaho (WWAMI) Rural Health Research Center, University of Washington.

with family medicine programs, and 36 programs have closed between 2000 and 2004.¹⁰

Given that rural residency programs are smaller and more remote than urban programs, rural programs may be having more problems remaining viable than their urban counterparts. Because of the importance of rural training to the future supply of rural US physicians, we designed a study to examine the current health of these programs. We hypothesized that rural programs would be at a higher risk of closure than their urban counterparts. We also postulated that it would be possible to identify specific risk factors for operational distress, including such markers as declining rates of applicants, declining numbers of students interviewing, and increasing numbers of international medical graduates (IMGs).

Methods

Study Sample

The 435 programs that responded to our 2000 survey comprised our sample. We defined rural using Version 1.11 of the Rural-Urban Commuting Area (RUCA) classification system.^{11,12} Twenty-eight of the programs were in large rural towns (RUCAs 4.0, 5.0, and 6.0), and five were in small rural communities (RUCAs 7.0–10.5, except 7.1, 8.1, and 10.1). These 33 programs constituted the rural program arm of this study. We excluded rural training tracks from this survey because the host programs are entirely in urban areas, and it was impossible to separate out the rural and urban components of the programs for the purpose of analysis.

RUCAs were used in this study to match the rural-urban classification method used in the previous survey.⁶ While the Centers for Medicare and Medicaid Services (CMS) classify areas as rural or urban for the purpose of reimbursement using a different methodology, the differences in classification are minor: two of the programs classified as rural in our study would be considered as urban by CMS. RUCAs have the advantage of being more sensitive to the nuances of rural-urban differences.

We selected a stratified random sample of urban-based programs as a comparison group. For each of the 33 rural residency programs, we randomly selected one urban program from the same state to partially control for regional variation and state-specific idiosyncrasies. We excluded rural training tracks because they represent an urban-rural hybrid. In the two states in which no urban programs existed, we randomly selected an urban program from the smallest geographically contiguous state. In total, 66 programs were selected for the study, 33 rural and 33 urban. Of the 66 programs in our sample, three of the rural programs (9.1%) and two of the urban programs (6.1%) closed between 2000 and 2004, leaving a denominator of 61 programs.

Instrument and Survey Methods

We designed and pretested a four-page questionnaire. The instrument was pretested in several residency programs not included in the study sample. The modified instrument was mailed to the program director at each of the selected programs. The questionnaires contained closed-ended questions requesting an update on the status of the program and information on the residency recruitment and matching process for residency classes starting in 2002, 2003, and 2004. Directors were also asked to rate the quality of applicants in each year and specify how they handled vacancies that occurred. In addition, open-ended questions asked respondents to indicate how they thought their program would fare in the next 2 years, the major problems facing their residency, and the steps they had to taken to enlarge and strengthen their applicant pool.

Nonresponding programs received two additional mailed surveys and a phone call request to complete the questionnaire; 37 programs (60.7% of the sample) returned a completed questionnaire. We then created a shortened version of the questionnaire that requested complete information only for the current (2004) year and abbreviated information about the 2 prior years. This short form was administered by phone, and six more programs responded (for an overall response rate of 70.5%). We linked the 2004 responses to our 2000 survey.

Our questionnaire asked respondents to indicate the number of PGY-1 approved positions filled on Match Day in 2002, 2003, and 2004, and the fill rate was calculated by dividing this number by the number of approved slots obtained from the directories. The number of first-year slots (PGY-1) offered by each program in 2002, 2003, and 2004 was extracted from the list of "Accredited Programs in Family Practice," part of the *Graduate Medical Education Directory* published each year by the American Medical Association.¹³⁻¹⁵

The questionnaire also asked respondents to specify the number of slots that were eventually filled by IMGs and doctors of osteopathy (DOs). The study and research protocol was approved by the Institutional Review Board of the University of Washington.

Data Analysis

We used chi-square, *t* test, one-way analysis of variance, and multiple regression statistics in our statistical analysis of the data. Because of the small number of paired rural and urban respondents, we analyzed the data as though the programs were drawn from a simple random sample. This approach decreases the variance in the study sample, and small differences that attain statistical significance should be interpreted with caution. We further explored the relative contribution of program characteristics on the proportion of slots that were filled on Match Day using a linear multiple regression.

Results

Of the 61 programs open in the summer of 2004, 43 provided usable responses, for a true response rate of 70.5%; the response rate was virtually identical for rural and urban programs. The rural programs were about one third smaller than the urban programs, as measured by the number of first-year residency slots (PGY-1) offered. It is interesting to note that the programs' stated missions—as recorded in our 2000 survey of family medicine programs—did not necessarily correspond with their geographic location. Eighty-one percent of the programs located in rural areas stated that training rural physicians was a very important part of their mission. By contrast, half of the urban programs subscribed to the same goal, a difference that was not statistically different from the rural programs ($P=.07$).

The rural and urban programs that responded to our survey did not differ significantly in the number of applicants per available slot invited to interview with their programs. Although there was a slight decline over the 3-year period covered by the survey, a mean of between 5.7 and 7.1 applicants per slot were invited during each of the survey years (Figure 1).

Number of Applicants and Match Rates

Rural and urban programs did diverge slightly in the number of applicants per slot who interviewed with the program prior to the Match. During the period from 2002–2004, urban programs interviewed roughly five

applicants for each available slot, with no change over time. Rural programs interviewed 4.8 applicants per slot in 2002, and the number had fallen to 4.3 by 2004, although this difference was not statistically significant. The number of applicants ranked by the urban and rural programs was quite similar, at about four applicants ranked per slot, although again rural programs ranked fewer applicants per slot (not significant [NS]). Both groups interviewed about 70% of the applicants whom they had invited to interview and ranked about 80% of all of those applicants they interviewed.

As seen in Table 1, rural programs had lower Match rates than their urban counterparts in each year of the study. Urban programs had higher Match rates (an average of 72.5%) for all 3 study years as compared to rural programs (60.1%), although the differences were not statistically significant.

IMGs

The proportion of IMGs matching to family medicine programs increased significantly during the three time periods of the study, rising from 28.9% in 2002 to 35.4% in 2004. The proportion of IMGs matching was virtually identical for rural and urban programs. The percentage of DOs matching remained stable at just under 20%, and again the rural-urban difference was negligible.

Figure 1

Number of Applicants Invited for Interview, Interviewed, and Ranked for Each Available PGY-1 Slot, by Rural-Urban Location, 2002–2004

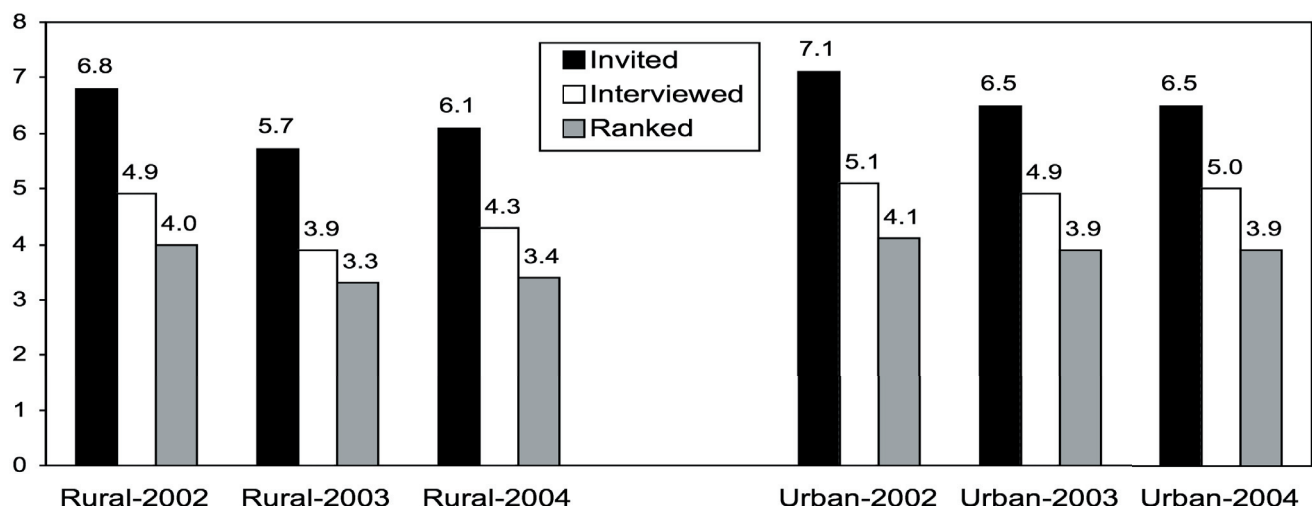


Table 1

Fill Rates and Proportion of IMGs and DOs, by Rural-Urban Location of Residencies

	Rural 02 (n=21)	Rural 03 (n=21)	Rural 04 (n=21)	Urban 02 (n=22)	Urban 03 (n=22)	Urban 04 (n=22)	Total 02	Total 03	Total 04	Total Rural 2002–2004	Total Urban 2002–2004	Total
Total slots offered	122	125	122	185	187	185	307	312	307	369	557	926
Total slots filled on Match Day	72	80	72	126	139	140	198	219	212	224	405	629
Mean % of slots filled on Match Day	62.2	63.9	60.1	75.5	74.2	74.5	68.8	69.3	67.5	60.1*	72.5*	NS
Total # of IMGs matching to program in July	32	33	42	38	53	52	70	86	94	107	143	250
Mean % of slots filled by IMGs	31.5	27.2	35.6	26.3	32.6	35.3	28.9	30.0	35.4	30.6**	29.9**	NS
Total # of DOs matching to program in July	17	26	20	27	25	37	44	51	57	63	89	152
Mean % of DOs	16.4	21.9	16.0	16.8	16.1	18.5	16.6	18.9	17.3	16.4***	16.4***	NS

* Only programs with all 3 years of data are included in estimates; * includes 18 rural and 19 urban programs

** Includes 18 rural and 18 urban programs

*** Includes 17 rural and 19 urban programs

IMG—international medical graduate

DO—doctor of osteopathy

NS—not significant.

Program Directors' Comments

Residency directors' responses to an open-ended question about what they have done to enlarge and/or strengthen the pool of applicants to their programs fell into six discrete categories. The most common response was directed at improving marketing and publicity about the program, including visiting more medical schools and participating in more residency fairs and regional recruitment programs. A second response was to increase the number of clinical rotations and opportunities for medical students at the recruiting residency. The third major group of responses was to improve the quality of the program and thus its reputation. Additional tactics included increasing the recruitment of IMGs, scheduling more applicant interviews, and seeking osteopathic accreditation.

The directors described a wide range of challenges to their future viability. Those most commonly cited were declining interest in family medicine, program-specific funding issues, malpractice coverage problems, declining morale, and the challenge of responding to increasing numbers of IMGs. The directors were most concerned with the decrease in the number of medical school applicants applying to their residencies and the perceived decline in the quality of the applicant pool.

When the directors predicted the status of their residency program in the 2 years following the survey, only two of the rural programs and one of the urban programs predicted that they were at risk for closure. Half of the programs felt they would be maintaining their current status, and more than 40% felt that they would be thriving. There were no significant rural/urban differences.

When we compared the characteristics of the programs that felt that they would be thriving with those that thought they would be maintaining or at risk of closure it became clear that residency matching success was associated with the assessment of future status (Table 2). Programs that predicted that they would be thriving filled 81.3% of their slots on Match Day. By contrast, the 7.0% of programs that perceived a risk for closure filled only 46.3% of their slots. Of the 19 programs that predicted they would thrive, 16 filled more than two thirds of their slots on Match Day, and more than half had no vacancies at all. The programs that felt they were at risk of closure had higher proportions of both IMGs and DOs, and in the aggregate only 15.7% of the residents who entered these programs in 2004 were graduates of US allopathic medical schools. Rural-urban differences were insignificant.

Table 2

Fill Rates of Residency Programs With Differing Predictions
of Their Future Status, by Rural-Urban Status, 2004

	<i>Will Thrive in Future</i>			<i>Will Maintain in Future</i>			<i>May Close in Future</i>			<i>One-Way ANOVA</i>
	<i>Rural</i>	<i>Urban</i>	<i>Total</i>	<i>Rural</i>	<i>Urban</i>	<i>Total</i>	<i>Rural</i>	<i>Urban</i>	<i>Total</i>	
Number (percentage)	9 (42.9)	10 (45.5)	19 (44.2)	10 (47.6)	11 (50.0)	21 (48.8)	2 (9.5)	1 (4.5)	3 (7.0)	
Percentage of slots filled on Match Day 2004	80.4	82.1	81.3	42.3	72.4	58.1	58.3	22.2	46.3	0.028
Percentage of slots filled by IMGs, July 2004	28.3	22.4	25.2	44.3	41.7	43.0	25.0	100.0	50.0	NS
Percentage of slots filled by DOs, July 2004	19.0	23.5	21.4	10.6	11.5	11.1	29.2	44.4	34.3	0.06

IMG—international medical graduate
NS—not significant.

Two program characteristics explained a statistically significant proportion of the observed variance in the residency fill rates when entered into a regression analysis: whether or not the program had a stated rural mission and the percentage of IMGs matched to the program in the preceding 2 years. Programs with a greater proportion of IMGs in the preceding 2 years had significantly lower Match rates when other factors were taken into account. Programs who responded to our 2000 survey by stating that a rural mission was “very important” also had lower Match rates when other

factors were held constant. As can be seen in Table 3, the rural or urban location of the program does not explain a significant amount of variance when other factors are taken into account. Program size also lacked independent explanatory power.

Discussion

People living in rural America need physicians, and the largest and most important source of those physicians is family medicine residencies.⁵ A major impetus for the development of family medicine as a medical specialty was the chronic shortage of rural physicians and the perception that family medicine training—particularly training in rural areas and with a rural emphasis—could counter the prevailing tendency of physicians to practice in urban areas.¹⁶ This strategy was quite successful for a period of time,¹⁷ but the future supply of rural physicians is threatened by dramatic declines in the number and proportion of medical student graduates entering family medicine residencies.³

This study explores specifically the experience of the 33 US residency programs that were located in rural communities in 2000. Although rural programs

Table 3

Regression Results: Factors Correlated With the Percentage
of Available PGY-1 Slots Filled on Match Day, 2004

<i>Independent Variable</i>	<i>Standardized Regression Coefficient (Beta)</i>	<i>Significance</i>
Location (rural versus urban)	0.10	0.61
Program size (PGY-1 slots in 2002 and 2003)	0.16	0.37
Stated rural mission (rural mission “very important”)	-0.48	0.01
Percentage of IMGs in 2002 and 2003	-0.35	0.04

PGY-1—postgraduate year 1
IMG—international medical graduate

Adjusted R²=0.22.
Overall F=3.32 (P=.023).

have slightly fewer applicants and lower Match rates than urban programs, the similarities are more striking than the differences. Both rural and urban programs have been buffeted by the declining interest in family medicine among medical school graduates: 7.6% of the programs in our experimental and comparison group closed between 2000 and 2004, and the proportion of US allopathic graduates entering the remaining residencies declined significantly. An additional 7.0% of the 43 programs that responded to our 2004 survey felt that they were at risk for closure, suggesting that the future supply of family physicians will continue to contract unless something rekindles the interest of medical students in generalist careers.¹⁸

The qualitative responses to this survey gave a graphic picture of the challenges that family medicine residencies confront and the steps they have taken to adapt to changes in medical student interest. The majority of residency directors report that declining student interest is the major challenge to their continued success and viability, a problem they are addressing by investing more time and energy in reaching out to potential future applicants in many ways. Certainly, many programs have also sought out both osteopathic graduates and IMGs, and this is reflected in the growing proportion of residency slots filled from these two groups. Despite the risks that IMG-dependent programs will be less attractive to US graduates, this approach has allowed programs to fill positions and keep their doors open.

The strategy of using IMGs to fill residency slots that are unfilled during the Match is controversial.¹⁹⁻²³ The proportion of IMGs in family medicine residencies in the United States has increased rapidly, and the national figures are higher than those captured in this small survey; in July of 2005, 39.6% of first-year family medicine residents were IMGs.²⁴ Our study suggests that the proportion of IMGs matching in prior years may tend to reduce the proportion of US graduates who will subsequently match to the program (as reflected in the Match rate on Match Day), regardless of its rural or urban location.

The finding that having a rural mission is correlated with lower Match rates, when controlling for other factors, is perplexing. It may be that applicants are looking for residencies that train them for a broad spectrum of future practice settings. It also may be that interest in practicing in rural settings is declining among applicants to family medicine residencies.²⁵⁻²⁷

Limitations

This study is limited by the study design and the response rates. The rural cohort was selected in 2000 as a result of a national study with very high response rates; the urban comparison group was randomly selected from the universe of urban sites, and matching

by state was used to try to mitigate regional differences. Response rates were substantially lower in our 2004 study. It is possible that those programs that did not respond were those with lower Match rates, a possibility that we could not evaluate since Match rates on Match Day and the proportion of slots filled by IMGs is not available for individual programs. Despite this, the lack of meaningful rural-urban differences suggests the future of rural family medicine training programs is tied more to the health of the discipline in general than to specific rural issues.

The study is also limited by the unavailability of other data that might explain the attractiveness of programs or their future status. The economic vitality of the sponsoring hospitals, their receptivity to the family medicine model of care, and the amenities and desirability of the communities themselves may well have played a role. It should also be noted that the relatively small number of rural communities that support family medicine residencies have a greater spectrum of medical resources than the portions of rural America with serious health workforce shortages.

Acknowledgments: We would like to acknowledge the assistance of Ronald Schneeweiss, MB, ChB, and Robert Maudlin, MD.

This study was funded by the Federal Office of Rural Health Policy.

Corresponding Author: Address correspondence to Dr Rosenblatt, University of Washington, Department of Family Medicine, Box 354696, Seattle, WA 98195-4696. 206-685-1361. Fax: 206-685-0610. rosenbl@u.washington.edu.

References

1. Rosenblatt RA. A view from the periphery—health care in rural America. *N Engl J Med* 2004;351(11):1049-51.
2. Robert Graham Center. The family physician workforce: the special case of rural populations. One-pager number 31. Leawood, Kan: American Academy of Family Physicians, 2005.
3. Colwill JM, Cultice JM. The future supply of family physicians: implications for rural America. *Health Aff (Millwood)* 2003;22(1):190-8.
4. Rosenthal TC. Outcomes of rural training tracks: a review. *J Rural Health* 2000;16(3):213-6.
5. Geyman JP, Hart LG, Norris TE, Coombs JB, Lishner DM. Educating generalist physicians for rural practice: how are we doing? *J Rural Health* 2000;16(1):56-80.
6. Rosenblatt RA, Schneeweiss R, Hart LG, Casey S, Andrilla CH, Chen FM. Family medicine training in rural areas. *JAMA* 2002;288(9):1063-4.
7. Hart LG, Lishner DM, Larson EH, et al. Pathways to rural practice: a chartbook of family medicine residency training locations and characteristics. Seattle: WWAMI Rural Health Research Center, University of Washington, 2005.
8. Pugno PA, Schmittling GT, Kahn NB Jr. Entry of US medical school graduates into family medicine residencies: 2004–2005 and 3-year summary. *Fam Med* 2005;37(8):546-54.
9. Newton DA, Grayson MS. Trends in career choice by US medical school graduates. *JAMA* 2003;290(9):1179-82.
10. Gonzalez EH, Phillips RL Jr, Pugno PA. A study of closure of family practice residency programs. *Fam Med* 2003;35(10):706-10.
11. Morrill R, Cromartie J, Hart LG. Metropolitan, urban, and rural commuting areas: toward a better depiction of the US settlement system. *Urban Geography* 1999;20(8):727-48.
12. Hart LG, Larson EH, Lishner DM. Rural definitions for health policy and research. *Am J Public Health* 2005;95(7):1149-55.
13. American Medical Association (AMA). Graduate medical education directory, 2004–2005. Chicago: AMA, 2004.

14. American Medical Association (AMA). Graduate medical education directory, 2002–2003. Chicago: AMA, 2002.
15. American Medical Association (AMA). Graduate medical education directory, 2003–2004. Chicago: AMA, 2003.
16. Whitcomb ME. Who's going to take care of the folks? *Acad Med* 2005;80(9):789-90.
17. Fryer GE, Dovey SM, Green LA. The United States relies on family physicians, unlike any other specialty. One-pager number 5. Leawood, Kan: American Academy of Family Physicians, 2000.
18. Schwartz MD, Basco WT Jr, Grey MR, Elmore JG, Rubenstein A. Rekindling student interest in generalist careers. *Ann Intern Med* 2005;142(8):715-24.
19. Pugno PA, McPherson DS. The role of international medical graduates in family practice residencies. *Fam Med* 2002;34(6):468-9.
20. Brotherton SE, Rockey PH, Etzel SI. US graduate medical education, 2002–2003. *JAMA* 2003;290(9):1197-202.
21. Koehn NN, Fryer GE Jr, Phillips RL, Miller JB, Green LA. The increase in international medical graduates in family practice residency programs. *Fam Med* 2002;34(6):429-35.
22. Blonski J, Rahm S. The relationship of residency performance to Match status and US versus international graduate status. *Fam Med* 2003;35(2):100-4.
23. McMahon GT. Coming to America—international medical graduates in the United States. *N Engl J Med* 2004;350(24):2435-7.
24. Pugno PA, Schmittling GT, Fetter GT Jr, Kahn NB Jr. Results of the 2005 National Resident Matching Program: family medicine. *Fam Med* 2005;37(8):555-64.
25. Skinner BD, Newton WP. A long-term perspective on family practice residency Match success: 1984–1998. *Fam Med* 1999;31(8):559-65.
26. Kutob RM, Senf JH, Campos-Outcalt D. Declining interest in family medicine: perspectives of department heads and faculty. *Fam Med* 2003;35(7):504-9.
27. Hueston WJ, Bradford WD, Shepard TM. Family medicine and hospital specialty Match rates: does the economy have anything to do with it? *Fam Med* 2004;36(4):265-9.