# The Role of the Medical School in Rural Graduate Medical Education: Pipeline or Control Valve?

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ABSTRACT: Although rural-based graduate medical education is critically important in the training of competent rural family physicians, the number of physicians selecting these programs is highly dependent on what happens earlier in the pipeline, i.e., during medical school. Using the experience and outcomes research from Jefferson Medical College's Physician Shortage Area Program, as well as from published literature describing six other medical school programs with similar goals, this paper addresses the important role of these programs in substantially increasing the number of physicians interested in rural family practice. Although each of these programs differs in its structure, all contain three core features: a strong institutional mission; the targeted selection of students likely to practice in rural areas, predominantly those with rural backgrounds; and a focus on primary care, especially family practice. Outcomes show that all seven programs have been highly successful. Medical schools, therefore, can have a major impact on the number of rural physicians they produce by acting not only as a pipeline or conduit to residency programs, but also as a control value, beginning as early as the admissions process. In order to maximize their impact on the supply and training of rural family physicians, rural residency programs should understand, support, collaborate with and help develop medical school programs whose mission is to provide rural physicians.

he shortage of family physicians in rural areas continues to be a major health care problem in the United States (Council on Graduate Medical Education, 1998). At the graduate medical education (GME) level, rural-based programs have become an increasingly important component, both in providing appropriate training for rural family practice, as well as in supporting the career goals of their trainees. Nevertheless, one major difficulty facing rural family practice residency programs is the limited number of applicants and matriculants to their programs (Rosenthal, et al., 1998). Because medical schools represent the prior stage of the physician work force 'pipeline,' understanding their role in selecting, supporting, educating and producing physicians for rural family practice is critically important.

This paper briefly describes the experiences and

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outcomes of the 25-year-old Physician Shortage Area Program (PSAP) of Jefferson Medical College (JMC) of Thomas Jefferson University (Rabinowitz, 1988, 1993; Rabinowitz, et al., 1999). It also reviews published outcomes from other medical school programs with a similar goal to increase the rural physician work force, and it discusses what has been learned from these programs regarding the role of the medical school in rural GME.

## Background and Methods

The PSAP. The PSAP was initiated in 1974, responding to the shortage of physicians in rural Pennsylvania. Although primarily known for its major urban centers of Philadelphia and Pittsburgh, Pennsylvania actually contains the largest rural population of any state in the country, according to the U.S. Census Bureau (defined as a nonurbanized area with fewer than 2,500 people). According to this definition, there are more rural people in Pennsylvania than in the 11 states of North Dakota, South Dakota, Montana, Wyoming, Idaho, Nevada, Colorado, Utah, New Mexico, Arizona and Alaska combined. In addition, Pennsylvania has a severe geographic maldistribution of physicians, with more than half of the doctors in the state practicing in only three counties (Philadelphia, its adjacent Montgomery, and Pittsburgh's Allegheny counties), although the remaining 64 counties have almost three-quarters of the state's population.

The PSAP recruits and selectively admits students who have grown up in a rural area or small town and who have a firm commitment to returning to a similar area to practice the specialty of family medicine. All applicants to JMC receive a written description of the PSAP and are invited to complete the secondary PSAP application, which includes a statement of their future career goals and requires three additional letters of recommendation from individuals in their hometown. Applicants who meet Jefferson's academic standards as well as the PSAP requirements are interviewed by either the director or associate director of the program, both of whom are members of the school's Committee on Admissions. As part of the PSAP Cooperative Program, the health career advisors at six Pennsylvania undergraduate institutions (Allegheny College, Indiana University of Pennsylvania, Bucknell University, the Pennsylvania State University, the University of Scranton, and Franklin and Marshall University) help recruit applicants for the PSAP and

serve on the PSAP Subcommittee of the Committee on Admissions, which recommends PSAP candidates for acceptance. Final decisions for admission are then made by the entire Admissions Committee, although Subcommittee recommendations have almost always been accepted.

Upon matriculation, PSAP students are provided with advisors in the Department of Family Medicine (DFM) for their four years of medical school, as well as a small amount of additional financial aid (almost entirely in the form of loans, averaging approximately \$3,000 per year). PSAP students meet two to three times each year with DFM faculty to provide support and discuss issues related to rural family practice. They are also given priority to participate in summer research assistantships in family medicine between their first and second years of medical school. During their third year, PSAP students are required to take their family medicine clerkship at one of Jefferson's rural or small town family practice centers (Geisenger Medical Center or Latrobe Area Hospital). Senior PSAP students are required to take their primary care outpatient subinternship in family medicine and are given priority for a rural private office preceptorship. Upon graduation, they are expected to complete a family medicine residency and practice rural family medicine, although no formal mechanism exists to ensure compliance.

**Programs at Other Medical Schools.** A MEDLINE search was performed to identify published articles regarding other comprehensive medical school programs with a mission to increase the number of rural physicians, in which outcomes were reported for family practice or primary care (family practice, general internal medicine and general pediatrics) specialty choice, or rural practice at the state or national level. Six other programs were identified that met these criteria. They are as follows:

- WWAMI program (Washington, Wyoming, Alaska, Montana and Idaho) at the University of Washington, started in 1971, which selects applicants from those five states and provides community-based four-year educational experiences (Adkins, et al., 1987);
- University of Minnesota-Duluth, a two-year medical school started in 1972 that includes a special rural background and family practice admissions component, with students completing the final two years of a four-year curriculum at the Minneapolis campus of the University of Minnesota (Boulger, 1991);
- University of Minnesota's Rural Physicians Associate

Program (RPAP), started in 1971, which focuses on an intense nine-month rural curriculum during the third year of medical school (Verby, et al., 1991), in which some of the Duluth students also participate;

- Upper Peninsula Program (UPP) at Michigan State University, started in 1974, which includes a selective rural and family practice admissions program, with all clerkships taking place in rural communities at the Upper Peninsula Campus during the third and fourth year of medical school (Brazeau, et al., 1990);
- Rural Medical Education Program (RMED) at the University of Illinois-Rockford, started in 1993, which includes a targeted rural admissions program and a four-year comprehensive curriculum in rural medicine (Stearns, et al., 2000);
- Mercer University, a medical school opened in 1982 with a specific mission to increase the number of physicians in Georgia's rural and underserved communities, which has a special admissions policy for applicants from underserved communities and has developed a four-year curriculum to increase the number of physicians selecting rural practice (Ackermann and Comeau, 1996).

### Results

Outcomes from these seven programs show that they have all been highly successful in increasing the number of family and primary care physicians, and the number of physicians practicing in rural areas. At Jefferson, PSAP graduates were three times as likely as were their peers (34 vs. 11 percent) to practice in a rural (i.e., non-Standard Metropolitan Statistical Area) part of the United States, four times as likely (52 vs. 13 percent) to practice family medicine, and 8.5 times as likely (21 vs. 2 percent) to have combined a career in family medicine with practice in a rural area (Rabinowitz, et al., 1999). The vast majority of PSAP graduates (84 percent) were practicing in either a rural or small metropolitan area or one of the primary care specialties. Additionally, 76 percent of PSAP graduates practice in areas with a population of less than 50,000, and 68 percent practice in areas with a population of less than 25,000 (unpublished data). PSAP program retention (87 percent practicing rural family medicine five to 10 years after first located in practice) is among the highest reported. Despite the relatively small size of the program (averaging 15 students per year), the PSAP has had a major impact on the rural physician

work force—accounting for 21 percent of the rural family physicians practicing in Pennsylvania who graduated from one of the seven allopathic medical schools in the state, even though PSAP students represent only 1 percent of all graduates from those schools (Rabinowitz, et al., 1999).

Ongoing analysis of the PSAP is currently providing quantitative data to determine why the program has been successful. Preliminary results (unpublished data) indicate that six factors are independently related to JMC graduates practicing rural primary care: rural background, freshman plans for family medicine, participation in the PSAP, participation in a senior rural preceptorship, participation in the National Health Service Corps scholarship program, and gender. However, freshman interest in general internal medicine or general pediatrics, academic performance, and debt did not appear to be independently related to rural primary care. Of importance, non-PSAP graduates who grew up in a rural area and entered medical school with plans for family medicine were almost as likely to practice rural primary care as PSAP graduates, suggesting that the admissions component of the PSAP is by far the most important reason for its success. One significant limitation of this data, however, is that they only consider those components that are part of Jefferson's PSAP, and they do not address the importance of other potential elements.

Comparing these outcomes of the PSAP with those of the other six medical school programs with similar missions to produce rural primary care physicians provides a context for these results and makes this data more generalizable (Table 1) (Ackermann & Comeau, 1996; Adkins, et al., 1987; Boulger, 1991; Brazeau, et al., 1990; Rabinowitz, et al., 1999; Stearns, et al., 2000; Verby, et al., 1991). Graduates from all seven programs were highly likely to practice in rural areas, irrespective of whether this was measured as a non-SMSA county (range, 23 to 59 percent), communities with fewer than 50,000 people (range, 50 to 79 percent) or those with fewer than 20,000 to 25,000 people (range, 41 to 68 percent). Physicians who graduated from these programs were also practicing family medicine at a very high rate (range, 36 to 64 percent for those in practice), with a similarly high rate for those practicing one of the primary care specialties (range, 61 to 74 percent).

There are a number of difficulties in making rigorous comparisons among these program outcomes. Each was measured during a different time period, and many used different outcome variables. Although most programs measured actual practice specialty, a few used

## Table 1. Specialty and Rural Practice Outcomes of Medical School Programs With a Mission to Increase Rural Physicians.

Program	Percentage of Graduates in Rural Practice			Percentage of Graduates in Family Medicine	Percentage of Graduates in Primary Care
	Non-SMSA <sup>1</sup> County	Community of <50,000	Community of <25,000		
Physician Shortage Area Program (PSAP)	34%	76%	68%	52%	63%
WWAMI <sup>2</sup> Program	23%				61%
Rural Physicians Associate Program (RPAP)	59%³	79%³	68%³	64%	74%
University of Minnesota, Duluth		54%	41%*	52% <sup>5</sup>	
Upper Peninsula Program (UPP)		50%		35% <sup>s</sup>	
Mercer University				36%	64%
Rural Medical Education Program (RMED)				<b>69%</b> ⁵	

1. County which is not a Standard Metropolitan Statistical Area.

2. Washington, Wyoming, Alaska, Montana and Idaho.

3. Of graduates practicing in Minnesota only.

4. Community of <20,000.

5. Specialty choice of residency program.

only the specialty choice for residency programs. Although most measured their rural outcomes for the entire country, other results relate only to a specific state. In addition, the structure of many of these programs has evolved and changed over time. Nevertheless, despite these differences, the reported outcomes from all of these programs are relatively similar.

### Discussion

Despite the common belief that medical schools have little role in the production of physicians who practice in rural areas (Cohen, 1999), all seven of these programs that were developed to increase the number of rural primary care physicians have been highly successful in their outcomes. Although these programs differ widely in their curricular, financial aid and other components, they all contain three core features: a strong institutional mission; the targeted selection of students highly likely to practice in rural areas, predominantly those with rural backgrounds; and a focus on primary care, especially family practice. For the PSAP, it appears that the preferential selection of medical students who grew up in rural areas and planned to become family physicians is by far the most important factor in the successful outcomes for the program. Curricular and other components are also likely to contribute to the success of these programs; however, most have not analyzed the independent effects of these various elements, nor controlled for important variables, such as rural background. Although evaluation of these initiatives is both difficult and requires a long time frame and a major commitment by the programs and their institutions, additional information is critically needed regarding the relative and incremental importance of these various factors in producing rural family physicians.

The outcome studies that have been undertaken so far show the major impact of these medical school programs, and their success is crucial to the overall goal of increasing the supply of rural primary care physicians. Although each of these programs is relatively small, their combined output of physicians who are likely to practice rural primary care (more than 100 yearly) represents an enormous resource to rural GME programs, because these are graduates who are most likely to enter rural residency programs. In this way, undergraduate medical education acts not only as a pipeline or conduit to residency programs, but also serves as a control valve, which is active as early on as the admissions process. That valve needs to be open to students from rural backgrounds with an interest in family practice from the onset, and a channel needs to be provided for those students, supporting and directing them toward rural residencies at the other end.

Rural GME also has an important role regarding these special medical school programs. Rural residencies need to support those programs that already exist, working collaboratively with medical schools to help with the admissions process (e.g., identifying potential applicants, serving as interviewers and members on the Admissions Committee), the curriculum (e.g., serving as preceptors) and serving as a faculty resource (e.g., advising students in person and through the Internet, identifying appropriate rural resources, providing information regarding programs with opportunities for rural training). Rural residency programs should also encourage and work with other medical schools to develop additional special programs to increase the production of rural physicians.

#### Conclusions

In summary, medical schools play a critically important role in providing a potential pool of physicians for rural GME programs. Outcomes data clearly show that those schools with special programs to increase the rural physician work force have been highly successful in achieving their goals. Medical schools should therefore be viewed by rural GME programs not merely as a pipeline, but also as a control valve. In order to maximize their resources and achieve the greatest success, rural residency programs should understand, collaborate with and encourage medical school programs whose mission is to produce rural physicians.

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