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**The Production of
Rural Female
Generalists by
U.S. Medical Schools**

by

Kathleen E. Ellsbury, M.D., M.S.P.H.

Mark P. Doescher, M.D., M.S.P.H.

L. Gary Hart, Ph.D.

WVAMI **RURAL HEALTH**
RESEARCH CENTER

UW University of Washington



School of Medicine

Department of Family Medicine

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L. Gary Hart, PhD, Principal Investigator and Director
Roger A. Rosenblatt, MD, MPH, Co-Principal Investigator
Denise Lishner, MSW, Associate Director/Editor
WWAMI Rural Health Research Center
Department of Family Medicine
School of Medicine
University of Washington
Box 354696
Seattle, WA 98195-4696
E-mail: wamirhrc@fammed.washington.edu
WWW: <http://www.fammed.washington.edu/wamirhrc/>

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ABOUT THE AUTHORS

Kathleen E. Ellsbury, MD, MSPH, is an Associate Professor in the Department of Family Medicine, University of Washington School of Medicine.

Mark P. Doescher, MD, MSPH, is an Assistant Professor in the Department of Family Medicine, University of Washington School of Medicine.

L. Gary Hart, PhD, is Director of the WWAMI Rural Health Research Center and Professor in the Department of Family Medicine, University of Washington School of Medicine.

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ABSTRACT

Purpose: As women comprise increasing proportions of medical school classes but tend to practice in urban locations, concerns have been raised about shortages of physicians in rural areas and the degree to which medical schools address these shortages. This study compares the production of rural female generalists among medical schools.

Method: Data from the 1996 AMA Physician Masterfile for the 1988-96 graduate cohort were analyzed to compare the production of rural female generalists by medical school. Outcome measures included total number and percentage of rural female generalist graduates of each school.

Results: The number of listed rural female generalist graduates among schools ranged from 0 to 37 (0 to 7.8% of each school's 1988-96 graduates). There were approximately twice as many male as female rural generalists. A lower percentage of the female generalist graduates (5.1%) than of the male graduates (5.8%) were practicing in rural areas (i.e., 14% fewer). Publicly-funded schools produced the most rural female generalists. Some 50 medical schools produced five or fewer female generalists from the graduating classes studied.

Conclusions: A few schools contribute most of the rural female generalists. These schools' admissions policies, curricula, extracurricular programs, and career advising efforts may serve as models for schools whose priority is to encourage more of their female graduates to enter rural practice. Federal and state policy makers should use fiscal incentives to support the production of female rural generalists.

The shortage of rural physicians continues to be one of the most challenging problems confronting health policy makers in the United States. The steady increase in the proportion of graduating physicians who are female seems likely to aggravate this shortage. The proportion of U.S. medical students who were female in 1997-98 was 42.5 percent, compared to 5.7 percent in 1959-60 (Bickel et al., 1997). It is projected that 30 percent of U.S. physicians will be female in 2010 (Kletke et al., 1990). Recent American Medical Association (AMA) data (Doescher et al., 1998) show that clinically active female physicians comprised only 13 percent of all rural physicians, whereas they comprised 19 percent of urban physicians. Women are relatively more likely than men, regardless of specialty, to practice in metropolitan areas. As the proportion of female physicians in the U.S. continues to increase, the disproportionately lower number of females who practice in rural areas, even among the most recent graduates, may further exacerbate the shortage of rural physicians (COGME, 1998). These observed gender imbalances by location argue for further investigation of gender and its correlation to patterns of recruitment and retention of physicians in rural areas.

For several reasons, it is important to examine how well individual medical schools perform in producing physicians for rural areas, with specific examination of rural physician production by gender. Past studies have reported a positive correlation between female physicians and quality of health maintenance services among female patients (Bertakis et al., 1995; Lurie et al., 1993) and between female providers and female patients' satisfaction with health care services and the choices afforded by the availability of female providers (Delgado et al., 1993). In addition, portions of both federal and state funds are intended to increase the production of generalist physicians for areas of need, such as rural areas of the U.S. It is important, therefore, to examine how well medical schools do at producing physicians of both genders who practice in rural areas.

Many have called for reform in medical education as a means of addressing the shortage of physicians in rural areas. To improve access to and delivery of primary care in rural areas and support training of rural physicians, many have proposed changes in medical school admissions, curriculum, and training location (American College of Physicians, 1995; Kassebaum et al., 1993; Saver et al., 1998; Vanselow, 1990) and reduction in the number of barriers to rural residency training tracks (Saver et al., 1998). A few studies have demonstrated the effectiveness of rural-oriented training programs (Geyman et al., 1999). Students in regional programs that utilize rural settings for training are more likely to enter rural practice than students from the same region not enrolled in such programs (Brazeau et al., 1990; Schwarz, 1974; Verby et al., 1991). However, little research has been reported on women's relatively smaller representation in rural areas. A first step in understanding the relationship between gender and workforce maldistribution is to

identify medical schools with relatively greater success in producing rural female generalists.

We hypothesized that, while publicly funded medical schools in rural states produce the largest total numbers and proportions of rural generalists, there would be great variation even among those schools in the total numbers of rural female generalists produced. We also hypothesized that a few medical schools would contribute much of the nation's stock of rural female generalists.

METHODS

Data from the October, 1996 AMA Masterfile (AMA, 1996) were analyzed. Given the large number of physicians in this database, we considered it the best available representation of physician distribution patterns in the U.S. Results were utilized to describe the geographic location and gender distribution of all clinically active, allopathic physicians who graduated from U.S. medical schools in the years 1988 through 1996 and were practicing in the U.S. We chose this cohort as representative of the most recent medical school graduate practice patterns and demographics. This group would be more likely than an older cohort to allow projections of future physician distribution. We excluded osteopaths, as well as physicians who were retired, in residency training, or located outside of the 50 states or the District of Columbia. We defined clinically active physicians as those in office- or hospital-based practice. We excluded physicians engaged primarily in research, teaching, or administration. The study population included 53,960 physicians, among them 19,085 women, 20,881 generalists, and 5,817 rural practitioners.

The AMA database contains several physician variables examined in this study, including gender, location (professional or home address, including county and state), self-reported specialty, practice type, year of graduation from medical school, and medical school location (U.S. medical school name). Every physician's practice location was classified as either rural or urban, based on county of self-reported address. Rural or urban county designation was based on the U.S. Office of Management and Budget's Metropolitan Statistical Area classification as enumerated by the 1997 version of the U.S. Department of Agriculture's Urban Influence Codes (Ghelfi & Parker, 1997). Physician specialty was self-designated according to a protocol designed by the AMA (Roback et al., 1990). A physician's primary specialty was that area of medicine in which he or she spent the plurality of work hours during a typical week. For several of the analyses, we defined generalists as physicians in the primary care specialties of family or general practice, general internal medicine and general pediatrics.

The AMA Masterfile includes 126 U.S. medical schools. We included 122 of these schools, excluding the three medical schools in Puerto Rico. The Association of American Medical Colleges (AAMC) categorizes the Duluth campus of the University of Minnesota as a separate medical school. However, because the AMA Masterfile does not separately code the Duluth graduates, they were included with the University of Minnesota (Minneapolis) main campus graduates. Two schools listed as state-funded (Temple and University of Pittsburgh) in AAMC data were considered to be publicly-funded institutions.

RESULTS

Among listed medical school graduates in 1988-96, 978 of 19,085 (5.1%) female graduates were rural female generalists. Of these, 293 were rural female family/general practitioners (of whom 82 practiced in remote areas). This compares with 2,072 of 34,875 (5.8%) male graduates who were rural male generalists (14% higher for males than females). Of these, 588 were rural family/general practitioners (of whom 207 practiced in remote areas). Expressed another way, women comprised 35.4 percent of listed graduates, 32.1 percent of rural practitioners, 33.3 percent of rural family/general practitioners, and 28.4 percent of rural family/general practitioners in remote areas (isolated counties with no town of 10,000 or more). Even among this most recent cohort of graduates, rural male generalists outnumbered their female counterparts by more than two to one.

The total number of listed rural female generalists who graduated in 1988-1996 varied substantially by U.S. medical school (Table 1). Overall, the numbers and proportions of these schools' recent graduates who were rural female generalists was strikingly low. Among individual medical schools, the total numbers of listed rural female generalists ranged from 0 to 37 (mean 8.0 for all schools, 10.1 for public, and 4.8 for private schools), while the percentage of each school's graduates who were rural female generalists ranged from 0 at UC Irvine to 7.8 percent at Mercer (mean 2.0% for all schools, 2.3% for public, and 1.4% for private schools). Publicly-funded medical schools produced 64 percent (34,659) of all graduates but 77 percent (755) of the 978 listed rural female generalists (Figure 1). The 31 schools in the top quartile for numbers of rural female generalists (shown in bold on Table 1) produced 31 percent (16,879) of all graduates but 52 percent (506) of the rural female generalists. The schools in the top quartile for numbers of graduates who were rural female generalists (shown in bold on Table 1) were all publicly funded, with the exception of one school (Jefferson). The schools in the top quartile for percentage of graduates who were rural female generalists (shown in bold on Table 1) were also all publicly funded except for Mercer, Dartmouth, Mayo, and Eastern Virginia.

There was great variation in the overall production of rural graduates (both genders, all specialties) among medical schools in 1988-96 (not shown). The number of rural graduates ranged from 7 each at New York University and Morehouse to 176 at the University of Minnesota (mean 48). Among schools, the percentage of 1988-96 graduates practicing in rural areas in 1996 ranged from 1.6 percent at New York University to 36.5 percent at Mercer, with a mean among schools of 11.3 percent. The 31 medical schools in the top quartile for numbers of rural physicians produced 50 percent (2,905) of the 5,817 listed rural physician graduates. Most (27 of 31) of the top quartile schools with the highest numbers of rural graduates were publicly funded, and among the bottom quartile of schools, few (7 of 27) were publicly funded. The 27 schools of the bottom quartile produced 17 percent of all study graduates but only 7 percent of those located in rural areas.

DISCUSSION

The large variation in medical schools' production of generalists has been described in the past (Rosenblatt et al., 1992). In that study, 12 schools produced over one-quarter of rural generalists. Similarly, we found that 17 schools produced over 25 percent of the 5,814 rural generalists. We also found that of 978 rural female generalists, over 25 percent graduated from the top 16 schools, and of 2,072 rural male generalists, over 25 percent graduated from the top 14 schools within each respective category. The few high producers of rural generalists were almost all publicly funded. A few privately-funded schools, especially those in relatively rural states, appear to recruit and/or persuade many female students who later enter rural practice. Urban medical schools, private medical schools, and many publicly-funded schools produced few rural female generalists. The largest producers of rural generalists tended to be schools in the midsection of the U.S. Schools in the most southern and some mid-western states produced rural generalist graduation populations that were predominately male, while schools on the coastal regions tended to produce more gender-balanced groups of rural generalist graduates.

There are several limitations in this study. First, this study, although based on a large number of physicians, does not include data on allopathic physicians not listed in the AMA Masterfile. Thus, the data are not complete. However, the database contains the vast majority of allopathic physicians and the distribution of physicians within this database likely provides a representative reflection of the U.S. geographic distribution of generalist physicians by gender and medical school. Second, graduates who were practicing in the District of Columbia (DC) and those who were residents in October of 1996 were excluded from the analyses. Those practicing in DC are all urban, so the bias is to show the medical schools as slightly more rural than they would be if DC were included. Third, because the most recent

cohort of graduates was analyzed to make the study relevant to the most recent changes in medical school production, many of the study period graduates were still in their residency training in 1996. Of course, this is less true for those graduates who graduated at the beginning of the study period. It seems that the net influence of this on the study results is to bias the findings towards showing that the medical schools are producing higher percentages of generalists than will be true at a later point in time. This is because medical school graduates who specialize spend more time in residencies and therefore are more likely not to be included in this study's analyses. The resident exclusion probably has little influence on the relative generalist female and male results. Fourth, this paper does not address retention or migration of physicians (few studies have; see West et al. [1996] for an example). Fifth, we did not explore the entire spectrum of rural female generalists because we excluded osteopath physicians, physician assistants, and nurse practitioners, majorities of whom are generalists. In addition, the database does not include information about whether physicians work full time or part time. Because female physicians are relatively more likely than their male counterparts to work part time, the statistics in this study may overestimate the availability of female physicians in rural areas.

The issues of correlation of gender and geography in career pathways should not be overlooked. As the percentage of women in medical training increases, the relative underrepresentation of women practicing in rural areas may exacerbate physician shortages, especially in remote rural areas. In addition, local shortages of female physicians in rural areas may compromise some female patients' willingness to seek medical care, especially for such services as prevention (Bertakis et al., 1995; Delgado et al., 1993; Lurie et al., 1993), and will, at the very least, limit the choices available to both male and female rural patients.

Most of the schools producing high numbers and percentages of rural physicians are publicly funded, yet some private schools produced significant numbers of rural female generalist physicians. One explanation may be that such schools attract women whose career inclinations differ somewhat from those of men, or who follow different career pathways than typical of most women in medicine. A few private medical schools are located in relatively rural states like New Hampshire and Minnesota. Such schools, despite having nonpublic funding, may offer female students more exposure to attractive models of rural practice, thereby influencing career choices. However, if the desired public policy outcome is the production of more practicing rural female generalists, then indiscriminately earmarking funds for private medical schools, which are substantially more expensive, is not likely to prove cost-effective.

What can medical schools do to produce more generalists, both male and female, for rural areas? If calibrated carefully, revised admissions policies may increase the probability of admitting female applicants who will ultimately practice

in rural regions. To re-balance the relatively low proportions of female generalists in rural areas, pro-active medical school admission policies should be linked to rural-oriented curricular, extracurricular, and career advising efforts, especially on a longitudinal basis. Another strategy might be to admit and support rural-oriented female students in medical schools in states with relatively low proportions of female generalists in rural areas, by admitting and encouraging women with rural backgrounds and/or rural career intentions. However, there is little objective evidence that such an approach will be effective. Another approach likely to yield more rural female generalists is preferential funding of schools and specialties producing the highest numbers or proportions of rural female generalists.

Funding priorities should be contingent on meeting goals, based on accountability of recipients. Institutions succeeding in producing more generalists and better gender balance should be funded preferentially. We need to carefully evaluate existing programs and better understand the program components that are most effective. Funding priorities ought to result in the movement of federal and state resources 1) to institutions that produce more generalists and that place relatively more female graduates in rural areas, so that these institutions can continue to do so, and 2) to institutions with clear strategies to do better.

The next steps in understanding the physician gender imbalance in rural areas should probe the reasons for this imbalance and identify specific methods by which medical schools and residency training programs can help correct this problem. For example, additional research should examine the reasons and timing by which men and women choose or reject rural medical practice. We need to better understand the correlation among gender, admissions policies, curricular programs, rural practice experience, retention programs, and ultimate practice location. One aspect of career decision-making that has received little attention is that of the partner's role in specialty and practice site selection. Efforts to increase the diffusion of generalists into rural areas should take physician partners into account, especially related to remote rural areas. Future studies should examine "best practices" compared to others, to gain a better understanding of practices that recruit, retain, and thrive in rural areas, with gender-balanced provider profiles. Programs successful at encouraging both men and women to choose practices in remote locations deserve special funding priority.

It is especially important that the specialties producing the largest numbers of rural generalists consider the needs and motivations of both men and women in training and practice. Educational programs sensitive to the motivations influencing women's career choices are likely to have greater success in producing female physicians for rural areas.

Since family and general practitioners have the greatest tendency to practice in rural locations, and are much more likely than other physicians to practice in

isolated rural regions (Rosenblatt et al., 1992), federal and state policy makers should look to family medicine departments as important sources of female generalists. While it is often politically expedient to be egalitarian in dispersal of federal funds to medical schools, policies should be carefully devised to target funds to support those schools that meet federal and state public policy goals with regard to production of female and male rural generalists, especially family physicians. Developmental funds should also be made available to medical schools with a poor track record to aid them in their attempts at increasing their production of female rural generalists. However, continuation of funding should be contingent on meaningful improvement.

Recruiting and retaining adequate numbers of physicians for rural areas is likely to remain difficult. The maldistribution cannot be corrected in a few years. But, taking observed patterns and career influence factors into account, medical schools can do more to adapt their programs and to produce female physicians who choose to practice in rural areas. Policies are needed to effectively remedy the shortage of rural physicians overall, and rural female generalists in particular.

REFERENCES

- American College of Physicians (1995). Rural primary care. *Annals of Internal Medicine*, 122(5), 380-390.
- American Medical Association (AMA) (1996). *American Medical Association Masterfile, 1996 Update*. Chicago: AMA.
- Bertakis, K. D., Helms, L. J., Callahan, E. J., Azari, R., Robbins, J. A. (1995). The influence of gender on physician practice style. *Medical Care*, 33(4), 407-416.
- Bickel, J., Croft, K., Johnson, D., Marshall, R. (1997). *Women in U.S. Academic Medicine Statistics*. Washington, DC: AAMC.
- Brazeau, N. K., Potts, M. J., Hickner, J. M. (1990). The Upper Peninsula Program: a successful model for increasing primary care physicians in rural areas. *Family Medicine*, 22(5), 350-355.
- Council on Graduate Medical Education (COGME) (1998). *Tenth Report: Physician Distribution and Health Care Challenges in Rural and Inner-City Areas*. Washington, DC: Government Printing Office.
- Delgado, A., Lopez-Fernandez, L. A., Luna, J. D. (1993). Influence of the doctor's gender in the satisfaction of the user. *Medical Care*, 9, 795-800.
- Doescher, M., Ellsbury, K. E., Hart, L. G. (1998). *The Distribution of Rural Female Generalist Physicians in the United States*. Rural Health Working Paper #44. Seattle, WA: WWAMI Rural Health Research Center, University of Washington.
- Geyman, J. P., Hart, L. G., Norris, T. E., Coombs, J. B., Lishner, D. M. (1999). *Physician Education and Rural Location: A Critical Review*. Rural Health Working Paper #49. Seattle, WA: WWAMI Rural Health Research Center, University of Washington.
- Ghelfi, L. M., Parker, T. S. (1997). *A County-Level Measure of Urban Influences*. Staff Paper No. 9702. Rural Economy Division, Economic Research Service, U.S. Department of Agriculture.
- Kassebaum, D. G., Szenas, P. L., Ruffin, A. L. (1993). The declining interest of medical school graduates in generalist specialties: students' abandonment of earlier inclinations. *Academic Medicine*, 68(4), 278-280.

- Kletke, P. R., Marder, W. D., Silberger, A. B. (1990). The growing proportion of female physicians: implications for U.S. physician supply. *American Journal of Public Health*, 80, 300-304.
- Lurie, N., Slater, J., McGovern, P., Ekstrum, J., Quam, L., Margolis, K. (1993). Preventive care for women: does the sex of the physician matter? *New England Journal of Medicine*, 329, 478-482.
- Roback, G., Randolph, M., Seidman, B. (1990). *Physician Characteristics and Distribution in the U.S.* Chicago, IL: Division of Survey and Data Resources, American Medical Association.
- Rosenblatt, R. A., Whitcomb, M. E., Cullen, T. J., Lishner, D. M., Hart, L. G. (1992). Which medical schools produce rural physicians? *JAMA*, 268, 1559-1565.
- Saver, B. G., Bowman, R., Crittenden, R. A., Maudlin, R. K., Hart, L. G. (1998). *Barriers to Residency Training of Physicians in Rural Areas*. Rural Health Working Paper #46. Seattle, WA: WWAMI Rural Health Research Center, University of Washington.
- Schwarz, M. R. (1974). WAMI—an experiment in regional education. *Western Journal of Medicine*, 121, 233-234.
- Vanselow, N. A. (1990). Medical education and the rural health crisis: a personal perspective from experiences in five states. *Academic Medicine*, 65(12 Suppl), S27-S31.
- Verby, J. E., Newell, J. P., Andresen, S. A., Swentko, W. M. (1991). Changing the medical school curriculum to improve patient access to primary care. *JAMA*, 266(1), 110-113.
- West, P. A., Norris, T. E., Gore, J., Baldwin, L.-M., Hart, L. G. (1996). The geographic and temporal patterns of residency trained family physicians: University of Washington Family Practice Residency Network. *Journal of the American Board of Family Practice*, 9(2), 100-108.

Table 1: 1988-96 U.S. Allopathic Medical School Rural Generalist Graduates by Gender, as Listed in 1996 AMA Masterfile*

State	Medical School	Owner-ship	Total Number of Listed Graduates	Male Rural Generalists		Female Rural Generalists		
				Number Graduates	% of Graduates	Number Graduates	% of Graduates	
Alabama	U Alabama	Public	573	30	5.2	9	1.6	
	U South Alabama	Public	233	17	7.3	2	1.0	
Arizona	U Arizona	Public	330	10	3.0	12	3.6	
Arkansas	U Arkansas	Public	469	65	13.9	7	1.5	
California	Loma Linda U	Private	505	32	6.3	10	2.0	
	Stanford U	Private	219	5	2.3	4	1.8	
	U California, Davis	Public	337	8	2.4	6	1.8	
	U California, Irvine	Public	347	6	1.7	0	0.0	
	U California, Los Angeles	Public	650	2	0.3	5	0.8	
	U California, San Diego	Public	410	10	2.4	3	0.7	
	U California, San Francisco	Public	477	5	1.0	5	1.0	
	U Southern California	Private	568	7	1.2	2	0.4	
	Colorado	U Colorado	Public	475	17	3.6	20	4.2
	Connecticut	U Connecticut	Public	280	6	2.1	2	0.7
Yale U		Private	278	3	1.1	4	1.4	
DC	George Washington U	Private	482	8	1.7	7	1.5	
	Georgetown U	Private	625	11	1.7	8	1.3	
	Howard U	Private	279	8	2.5	2	0.7	
Florida	U Florida	Public	413	4	1.0	6	1.5	
	U Miami	Private	566	5	0.9	6	1.1	
	U South Florida	Public	342	6	1.8	5	1.5	
Georgia	Emory U	Private	372	7	1.9	2	0.5	
	Medical College of Georgia	Public	664	54	8.1	17	2.6	
	Mercer U	Private	115	22	19.1	9	7.8	
	Morehouse U	Private	90	3	3.3	2	2.2	
Hawaii	U Hawaii John A Burns	Public	205	2	1.0	4	2.0	
Illinois	Chicago Medical School/ Finch	Private	532	8	1.5	5	0.9	
	Loyola U	Private	424	7	1.7	7	1.7	
	Northwestern U	Private	490	4	0.8	3	0.6	
	Rush Medical College	Private	393	11	2.8	3	0.8	
	Southern Illinois U	Public	259	31	12.0	8	3.1	
	U Chicago Pritzker	Private	309	2	0.6	1	0.3	
	U Illinois	Public	1040	38	3.7	17	1.6	
Indiana	Indiana U	Public	970	44	4.5	12	1.2	
Iowa	U Iowa	Public	621	60	9.7	30	4.8	
Kansas	U Kansas	Public	669	56	8.4	22	3.3	

State	Medical School	Owner-ship	Total Number of Listed Graduates	Male Rural Generalists		Female Rural Generalists	
				Number Graduates	% of Graduates	Number Graduates	% of Graduates
Kentucky	U Kentucky	Public	343	33	9.6	15	4.4
	U Louisville	Public	473	31	6.6	14	3.0
Louisiana	Louisiana State U, New Orleans	Public	625	15	2.4	10	1.6
	Louisiana State U, Shreveport	Public	345	14	4.1	5	1.4
Maryland	Tulane U	Private	482	4	0.8	5	1.0
	Johns Hopkins U	Private	316	3	0.9	6	1.9
	U Maryland	Public	494	10	2.0	7	1.4
Massachusetts	Uniform. Services U	Public	458	24	5.2	5	1.1
	Boston U	Private	437	8	1.8	3	0.7
	Harvard Medical School	Private	409	2	0.5	6	1.5
Michigan	Tufts U	Private	439	9	2.1	3	0.7
	U Massachusetts	Public	351	5	1.4	4	1.1
	Michigan State U	Public	387	20	5.2	9	2.3
Minnesota	U Michigan	Public	601	7	1.2	8	1.3
	Wayne State U	Public	949	23	2.4	8	0.8
	Mayo Medical School	Private	103	10	9.7	4	3.9
Mississippi	U Minnesota	Public	911	78	8.6	37	4.1
	U Mississippi	Public	423	54	12.8	20	4.7
Missouri	St. Louis U	Private	511	21	4.1	5	1.0
	U Missouri Columbia	Public	396	23	5.8	15	3.8
	U Missouri Kansas City	Public	290	14	4.8	8	2.8
Nebraska	Washington U	Private	352	7	2.0	6	1.7
	Creighton U	Private	379	24	6.3	7	1.8
	U Nebraska	Public	466	56	12.0	22	4.7
Nevada	U Nevada	Public	172	12	7.0	7	4.1
New Hampshire	Dartmouth Medical School	Private	191	3	1.6	12	6.3
New Jersey	UMDNJ Medical School-Newark	Public	536	9	1.7	2	0.4
	UMDNJ-Robert Wood Johnson	Public	472	5	1.0	3	0.6
New Mexico	U New Mexico	Public	242	16	6.6	9	3.7
New York	Albany Medical College	Private	404	6	1.5	4	1.0
	Albert Einstein	Private	534	1	0.2	2	0.4
	Columbia U	Private	391	3	0.8	1	0.3
	Cornell U	Private	287	2	0.7	1	0.3
	Mount Sinai	Private	406	2	0.5	3	0.7
	New York Medical College	Private	639	11	1.7	4	0.6
	New York U	Private	434	1	0.2	2	0.5
	SUNY at Brooklyn	Public	677	8	1.2	4	0.6
	SUNY at Buffalo	Public	476	7	1.5	3	0.6
	SUNY at Stonybrook	Public	354	5	1.4	3	0.8
New York	SUNY at Syracuse	Public	534	10	1.9	5	0.9
	U Rochester	Private	332	2	0.6	2	0.6

State	Medical School	Owner-ship	Total Number of Listed Graduates	Male Rural Generalists		Female Rural Generalists	
				Number Graduates	% of Graduates	Number Graduates	% of Graduates
North Carolina	Bowman Gray of Wake Forest U	Private	373	11	2.9	5	1.3
	Duke U	Private	373	7	2.3	2	0.7
	East Carolina U	Public	267	18	6.7	12	4.5
	U North Carolina at Chapel Hill	Public	517	26	5.0	15	2.9
North Dakota	U North Dakota	Public	193	25	13.0	10	5.2
Ohio	Case Western Reserve U	Private	486	4	0.8	7	1.4
	Medical College Ohio at Toledo	Public	521	22	4.2	12	2.3
	Northeastern Ohio U	Public	325	7	2.2	5	1.5
	Ohio State U	Public	808	26	3.2	13	1.6
Oklahoma	U Cincinnati	Public	650	22	3.4	16	2.5
	Wright State U	Public	376	22	5.9	8	2.1
	U Oklahoma	Public	552	35	6.3	8	1.4
	Oregon Health Sciences U	Public	334	24	7.2	14	4.2
Pennsylvania	Hahnemann U**	Private	559	8	1.4	6	1.1
	Jefferson	Private	770	29	3.8	11	1.4
	Medical College of Pennsylvania**	Public	382	3	0.8	8	2.1
	Pennsylvania State U Temple U***	Private State	301 577	10 18	3.3 3.1	6 10	2.0 1.7
Rhode Island	U Pennsylvania	Private	468	8	1.7	6	1.3
	U Pittsburgh***	State	419	8	1.9	3	0.7
	Brown U	Private	248	3	1.2	2	0.8
South Carolina	MUSC, Charleston	Public	516	20	3.9	13	2.5
	U South Carolina, Columbia	Public	223	13	5.8	4	1.8
South Dakota	U South Dakota	Public	206	36	17.5	11	5.3
Tennessee	East Tennessee State U	Public	210	16	7.6	5	2.4
	Meharry Medical College	Private	196	5	2.6	2	1.6
	U Tennessee	Public	575	37	6.4	14	2.4
	Vanderbilt U	Private	310	7	2.3	2	0.6
Texas	Baylor	Private	555	13	2.3	7	1.3
	Texas A&M, College Station	Public	167	8	4.8	6	3.6
	Texas Tech, Lubbock	Public	381	22	5.8	9	2.4
	U Texas, Galveston	Public	674	20	3.0	9	1.3
	U Texas, Houston	Public	685	18	2.6	11	1.6
	U Texas, San Antonio	Public	720	27	3.8	17	2.4
	U Texas Southwestern, Dallas	Public	691	21	3.0	6	0.9
	U Utah	Public	367	32	8.7	7	1.9
Utah	U Vermont	Public	309	14	4.5	15	4.9
Virginia	Eastern Virginia Medical School	Private	319	9	2.8	10	3.1
	U Virginia	Public	455	22	4.8	9	2.0
	Virginia Commonwealth U	Public	615	23	3.7	16	2.6

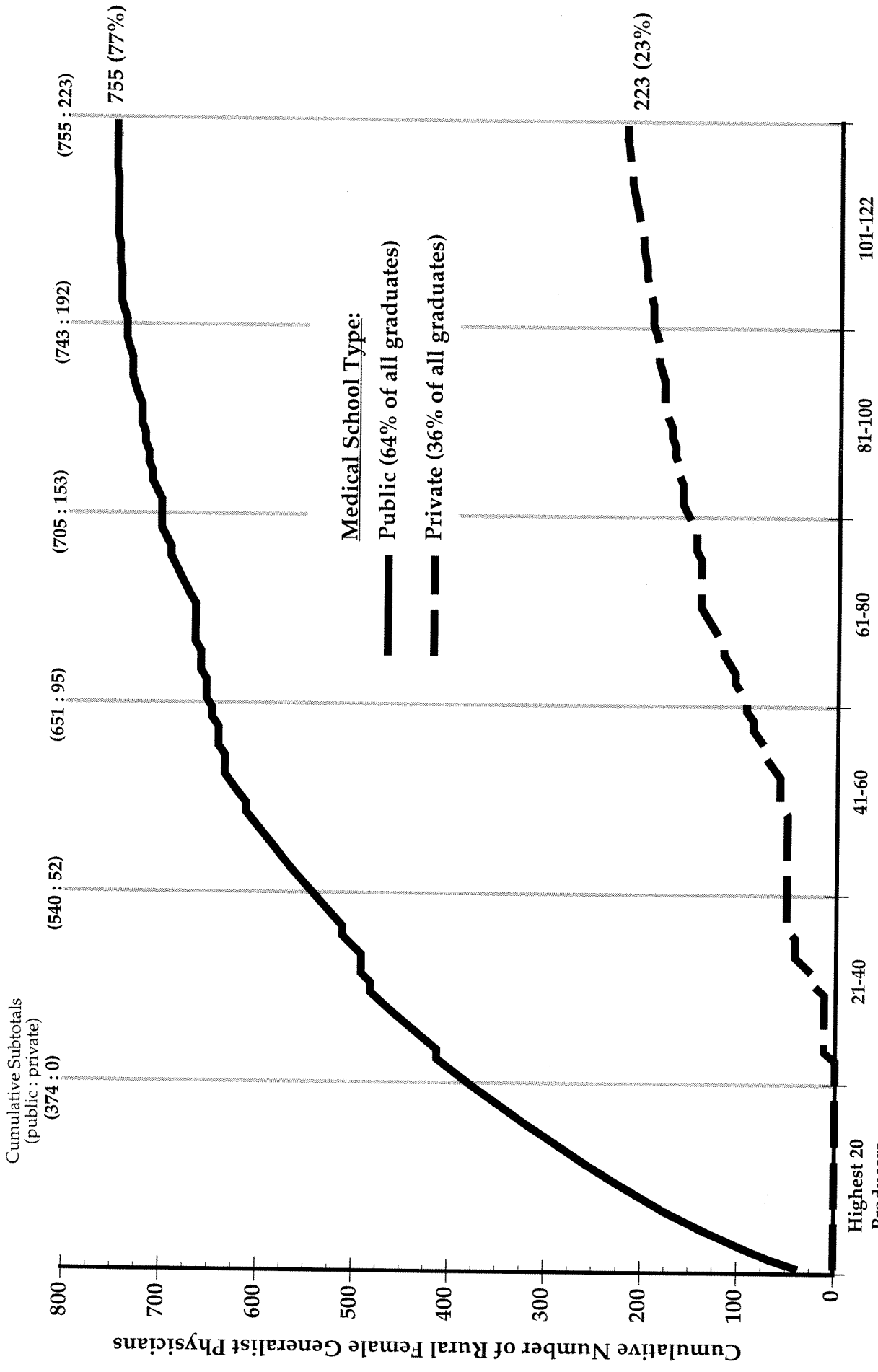
State	Medical School	Owner-ship	Total Number of Listed Graduates	Male Rural Generalists		Female Rural Generalists	
				Number Graduates	% of Graduates	Number Graduates	% of Graduates
Washington	U Washington	Public	603	41	6.8	24	4.0
West Virginia	Marshall U	Public	173	10	5.8	3	1.7
	West Virginia	Public	294	24	8.2	13	4.4
Wisconsin	Medical College of Wisconsin	Private	668	13	1.9	6	0.9
	U Wisconsin	Public	517	26	5.0	14	2.7
Mean			442	16.6	4.0	8.0	2.0
Minimum			90	1	0.2	0	0.0
Median			421	11	2.8	6	1.5
75 th percentile			548	10.8	5.8	5.8	2.5
Maximum			1,040	78	19.1	37	7.8
Totals			53,960	2,072		978	

* Numbers in top quartile for production of female generalist columns are shown in bold.

** Medical College of Pennsylvania and Hahnemann schools of Medicine have since merged to form Allegheny University Health Sciences Center

*** For analysis purposes these schools were considered publicly funded, as they receive state funds.

Figure 1
Production of Rural Female Generalist Physicians By Public and Private Medical Schools



Medical Schools Listed in Order of Rural Female Generalist Production
(122 schools, 1988-1996 medical school graduates)

Previous WWAMI Rural Health Research Center Working Papers

1. Hart, L. Gary; Rosenblatt, Roger A.; and Amundson, Bruce A. Is There a Role for the Small Rural Hospital? January 1989.
2. Hart, L. Gary; Rosenblatt, Roger A.; and Amundson, Bruce A. Rural Hospital Utilization: Who Stays and Who Goes? March 1989.
3. Amundson, Bruce A. and Hughes, Robert D. Are Dollars Really the Issue for the Survival of Rural Health Services? June 1989.
4. Nesbitt, Thomas S.; Rosenblatt, Roger A.; Connell, Frederick A.; and Hart, L. Gary. Access to Obstetrical Care in Rural Areas: Effect on Birth Outcomes. July 1989.
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7. Rosenblatt, Roger A.; Weitkamp, Gretchen; Lloyd, Michael; Schafer, Bruce; Winterscheid, Loren C.; Vaughn, J. Daniel; and Hart, L. Gary. Are Rural Family Physicians Less Likely to Stop Practicing Obstetrics Than Their Urban Counterparts: The Impact of Malpractice Claims. April 1990.
8. Rosenblatt, Roger A.; Whelan, Amanda; Hart, L. Gary, Long, Constance; Baldwin, Laura-Mae; and Bovbjerg, Randall R. Tort Reform and the Obstetric Access Crisis: The Case of the WAMI States. June 1990.
9. Hart, L. Gary; Pirani, Michael; and Rosenblatt, Roger A. Causes and Consequences of Rural Small Hospital Closures from the Perspectives of Mayors. September 1990.
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19. Williamson, Harold; Hart, L. Gary; Pirani, Michael J.; Rosenblatt, Roger A. Rural Hospital Surgical Volume: Cutting Edge Service or Operating on the Margin? January 1993.
20. Rosenblatt, Roger A.; Saunders, Greg; Tressler, Carolyn; Larson, Eric H.; Nesbitt, Thomas S.; Hart, L. Gary. Do Rural Hospitals Have Less Obstetric Technology than their Urban Counterparts? A Statewide Study. March 1993.
21. Williamson, Harold A.; Hart, L. Gary; Pirani, Michael J.; Rosenblatt, Roger A. Market Shares for Rural Inpatient Surgical Services: Where Does the Buck Stop? April 1993.
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26. Statewide Office of Rural Health and Washington Rural Health Association. Implementing Health Care Reform: Setting a Course for Rural Washington. Summary of a Workshop, November 9-10, 1993, Seattle, Washington. January 1994.
27. Williamson, Harold A.; West, Peter A.; Hagopian, Amy. Scope of Rural Medical Services: A Workbook for Hospital Trustees. March 1994.
28. Cullen, Thomas J.; Hart, L. Gary; Whitcomb, Michael E.; Lishner, Denise M.; Rosenblatt, Roger A. The National Health Service Corps: Rural Physician Service and Retention. September 1994.
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33. Rosenblatt, Roger A.; Saunders, Greg; Shreffler, Jean; Pirani, Michael J.; Larson, Eric H.; Hart, L. Gary. Beyond Retention: National Health Service Corps Participation and Subsequent Practice Locations of a Cohort of Rural Family Physicians. April 1995.
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51. Hart, L. Gary; Rosenblatt, Roger A.; Lishner, Denise M.; Friedman, Harvey; Baldwin, Laura-Mae. Where Do Elderly Rural Residents Obtain their Physician Care? A Study of Medicare Patients in Washington State. (forthcoming)
52. Ellsbury, Kathleen E.; Doescher, Mark P.; Hart, L. Gary. The Production of Rural Female Generalists by U.S. Medical Schools. January 1999.
53. Lishner, Denise M.; Rosenblatt, Roger A.; Baldwin, Laura-Mae; Hart, L. Gary. Emergency Department Use by the Rural Elderly. November 1998.