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2005 Physician Supply and Distribution in Rural Areas of the United States

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by

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The WWAMI Rural Health Research Center is based in the Department of Family Medicine at the University of Washington School of Medicine, and has close working relationships with the WWAMI Center for Health Workforce Studies, state offices of rural health, and the other health science schools at the University, as well as with other major universities in the five WWAMI states: Washington, Wyoming, Alaska, Montana, and Idaho. The University of Washington has over 30 years of experience as part of a decentralized educational research and service consortium involving the WWAMI states, and the activities of the Rural Health Research Center are particularly focused on the needs and challenges in these states. The WWAMI RHRC also works closely with the associated Area Health Education Centers.

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ABSTRACT

PURPOSE

Maldistribution of physicians is a longstanding problem in the United States. Addressing this problem requires up-to-date information. This study describes the 2005 supply and distribution of physicians with particular emphasis on generalists in rural areas, where the role of osteopaths (DOs) and international medical graduates (IMGs) was also considered.

METHODS

AMA and AOA 2005 Masterfiles were combined to identify clinically active, nonresident, nonfederally employed physicians aged 70 or younger. Rural-Urban Commuting Area (RUCA) codes were used to categorize practice locations as urban, large rural, small rural, or isolated small rural. Analyses were performed at the national, Census Division, and state levels.

RESULTS

We found uneven rural-urban distribution of physicians and wide variation among rural locations. Conditions nationally were not necessarily representative of those at Census Division or state level. Generalists were the mainstay of physician care in rural areas, becoming more prominent as degree of rurality increased, while the specialist/population ratio generally decreased as rural locations become smaller and more isolated. DOs and IMGs made substantial contributions to health care in rural areas, although their relative representation varied geographically.

CONCLUSIONS

With the falling number of USMGs filling family medicine residency slots, the post-9/11 problems of IMGs entering the country, and the reductions in Title VII funding, among other issues, the future of health care in rural areas is a concern. Decreasing supply of rural generalists can hinder access to services and impact staffing of critical access hospitals (CAHs). To effectively address health care needs in rural locations, it is vital that policymakers be aware of the great variability that exists in rural areas and craft policy that is responsive to local conditions.

INTRODUCTION

The longstanding disparity between rural and urban physician supply extends to variations among different types of rural areas overall and among states and regions (Kindig & Movassaghi, 1989). However, these disparities also fluctuate over time (Frenzen, 1991; GAO, 2003; Kindig & Movassaghi, 1989). Influences during the past 15 years include the rise and fall of primary care, increases in malpractice insurance premiums, and the changing demographics of the physician population. Furthermore, primary care physicians earn less than other specialists, a factor that affects medical students' choice of career path (Bodenheimer et al., 2007). This milieu of diverse influences affects both distribution and supply.

The purpose of this study is to describe supply and distribution of clinically active physicians in the United States in 2005 with emphasis on rural areas. Access to health care depends on many factors but the most basic of these is the presence of providers. Urban areas have their own unique problems in this regard, but in rural areas the problem is compounded by physician maldistribution among rural locations. Understanding current physician distribution and supply is a crucial step in addressing uneven access.

Because rural residents routinely rely on generalist physicians for their medical care and because changes in supply can affect access for rural populations, these physicians were examined separately. Also, because female physicians and international medical graduates (IMGS) have become a large component of the rural physician workforce, the distribution of female physicians and IMGs in rural areas were examined. To address physician distribution in rural locations analyses were conducted at several geographic levels including: national overall; urban versus rural; and large, small and isolated small rural places.

METHODOLOGY

Physicians in this study were limited to nonfederal, clinically active allopathic (MD) and osteopathic (DO) physicians who were less than 70 years old in 2005. Data came from the 2005 American Medical Association (AMA) and the American Osteopathic Association (AOA) Masterfiles. Inactive physicians and those whose primary professional activity included research, teaching and administration were excluded. Resident physicians were excluded, as they are supervised by attending physicians and perform most of their duties within a hospital setting. Federally employed MDs and DOs were excluded because access to them is often limited to special populations. Furthermore, their ability to choose their practice location is also limited. IMGs who met study criteria were included. Physicians not educated in the United States, Puerto Rico or Canada were considered to be IMGs. IMGs include both foreign nationals and U.S. citizens who received their medical education outside the United States or Canada.

Physicians were categorized according to their self-designated primary specialty. Generalists were the principal focus of this study and included family medicine (family physicians and general practitioners), general internal medicine and general pediatrics. Nongeneralist physicians were categorized as medical, surgical, pediatric and other. Within these categories, some specific specialty types were broken out, for instance, cardiology, general surgery and emergency medicine. In creating specialty types, similar specialties were grouped together. Cardiologists, for example, include specialists in cardiovascular disease, interventional cardiology, cardiac electrophysiology and nuclear cardiology. Physicians other than generalists were included in national analyses but not in analyses of smaller geographic units.

Physician practice location was determined by ZIP code and reflected, as closely as possible, the physician's primary practice location. While previous studies of rural-urban variability in physician supply have typically analyzed data at the county level, this study used the ZIP code approximation of the Rural-Urban Commuting Area (RUCA) taxonomy, version 2.0, linked by ZIP code to physician practice location. The RUCA codes offer a much more flexible way of differentiating between, and among, rural and urban areas and, being based on smaller geographical units, can define locations with much more precision than county-level taxonomies. RUCAs are especially useful in differentiating between rural and remote areas. The RUCA codes classify ZIP code areas into 33 categories according to core population and work commuter flow patterns (WWAMI RHRC, 2005). In this study, RUCAs were used to differentiate between urban, large rural, small rural and isolated small rural areas (Figure 1).

Figure 1: RUCA Version 2.0 Categorization

Rural/Urban Category	RUCA Version 2.0 Code
Urban	1.0, 1.1, 2.0, 2.1, 3.0, 4.1, 5.1, 7.1, 8.1, 10.1
Large Rural	4.0, 4.2, 5.0, 5.2, 6.0, 6.1
Small Rural	7.0, 7.2, 7.3, 7.4, 8.0, 8.2, 8.3, 8.4, 9.0, 9.1, 9.2
Isolated Small Rural	10.0, 10.2, 10.3, 10.4, 10.5, 10.6

Rural-urban data that has been aggregated at the national level should not be construed to represent conditions in smaller subunits of the country. Therefore, geographic levels of analyses included state and Census Bureau Divisions. Within each geographic level, analytic results are presented by RUCA category and by an overall rural category.

In the past, very remote, sparsely populated rural areas, known as 'Frontier' areas, were defined as counties having a population density of 6 people or less per square mile. The concept of 'Frontier' was refined in this study by supplementing ZIP-level RUCA codes with travel time information allowing truly remote areas to be targeted effectively.

These analyses compared physician/population ratios for remote versus nonremote areas within RUCA category by travel time. Travel time was categorized as taking either less than or at least 60 minutes to travel to the closest edge of an urbanized area (Census Bureau-defined population of 50,000 or more). Travel time was calculated to the nearest relevant place from population centroid to population centroid along the fastest paved road route (WWAMI RHRC, 2006). A travel time of at least 60 minutes identified ZIP code area populations that were truly remote. Travel time was calculated by the Center for Evaluative Clinical Sciences at Dartmouth College, Hanover, New Hampshire.

Similarly, ZIP-level RUCA codes were used to classify persistent poverty areas according to their degree of rurality. Persistent poverty counties were identified using 2004 Economic Research Service (ERS) policy type county typology codes. The ERS defines a persistent poverty county as any county in which 20% or more of the residents were classified as poor in each of the previous 4 censuses, 1970 through 2000. The 2004 version, unlike earlier ones, includes metropolitan counties in assessment of persistent poverty status (USDA ERS, 2004).

Analytic emphasis was on rural generalists, though national analyses included all clinically active physicians in both urban and rural settings. Estimated 2004 population data were obtained from the 2004 Claritas ZIP-level demographic database and served as

the denominator for calculating physician per 100,000 population ratios (Claritas, 2004). The numerator consisted of allopaths and osteopaths combined. For some analyses the percent of osteopaths represented within a physician population ratio is given, as is that of IMGs.

Tests of statistical significance were not applied because the study included the population of virtually all clinically active physicians and associated residential populations. In addition, because of the large numbers of physicians, tests of significance under these conditions would yield significant results even for very small differences, so, any meaningful differences would return significant results upon testing.

RESULTS

The combined 2005 AMA and AOA database contained 782,225 physicians, of whom 752,858 were active MDs and 29,367 were direct patient care, nonresident DOs whose professional employment status was known. Approximately 25% (about 10,000) of clinically active DOs whose professional employment status was unknown were not included in our data. Any MD classified as locum tenens, office based or hospital staff or DO classified as direct patient care was considered clinically active. After eliminating all MD residents (105,370 or 14.0% of all active MDs) and all physicians who were not clinically active (84,031), a total of 592,824 physicians remained. Of the remaining physicians, those who were federal, over the age of 70 or who were missing specialty or RUCA information were eliminated. Among the MDs, 158,559 (28.1%) were not classified as to federal status, were assumed to be employed in nonfederal positions and remained in the study. This study is based on the remaining 559,709 clinically active, nonfederal, nonresident physicians who were 70 or younger in 2005. Of these, 532,479 (95.1%) were MDs and 27,230 (4.9%) were DOs.

NATIONAL-LEVEL PHYSICIAN DISTRIBUTION

Physicians Overall: The proportion of U.S. physicians practicing in urban areas was 88.6% compared to the 80.8% of the 2004 U.S. population residing there. In contrast, rural areas contained 19.2% of the population but only 11.4% of physicians (Table 1). This disproportionate representation is reflected in physician/population ratios where, nationally, the ratio of clinically active, nonfederal, nonresident physicians to 100,000 population was 191.1 but varied from 209.6 in urban locations to 52.3 in the most isolated rural locations.

Generalist Physicians: Generalist physicians had the highest physician/population ratios of all specialty groups but family medicine ratios underscored the importance of these specific physicians to rural areas (Table 1). In each of the three rural geographic categories, family medicine had by far the highest ratios of any specialty. It was also the only specialty with a physician/population ratio higher in all three rural types and rural areas overall than in urban places.

Generalist physicians made up the largest segment of the specialty groups within each of the RUCA categories and, overall, represented of 35.9% of all physicians (Table 2). However, as places became smaller and more isolated, the proportion of physicians represented by generalists within each increased, reaching 68.1% in isolated small rural areas. Of the three generalist specialties, family medicine was most important in rural areas, representing 50.8% of all physicians in isolated, small rural areas. In urban areas, general internists were slightly more predominant.

Specialist Physicians: Except for family medicine and general surgery, there was a consistent decline in specialist/population ratios across the RUCA categories as the geographic units became smaller and more isolated, with specialists being in lowest supply in isolated, small rural locations (Table 1). Physician/population ratios in large rural areas generally resembled urban ratios more closely than those in smaller rural locations. However, among the three types of rural areas physician/population ratios varied greatly in comparison to each other and to rural overall.

Nationally, specialists represented 64.1% of the physician workforce (Table 2). However, from a high of 65.7% of the urban physician workforce, specialist representation dropped steadily as rurality increased. This disproportionate representation was not uniform for rural areas overall or across rural categories when individual specialties were considered.

Within all three rural types, general surgeons and emergency medicine specialists made up a larger percentage of the physician workforce than in urban areas (Table 2). Also of note is that obstetrician-gynecologists constituted a higher percentage of the large rural physician workforce than they did in urban areas.

DIVISION-LEVEL, RURAL, GENERALIST DISTRIBUTION

Analyses of Census Bureau Divisions (Figure 2) were based on rural generalists only and revealed much variation both among and within divisions. For rural generalists, New England was notable for its extremes (Table 3). It had the highest generalist/population ratio for rural areas overall (85.9/100,000) and for each of the three rural types. Overall, its generalist/population ratio was almost twice as high as the division with the lowest, West South Central, and close to 1.5 times higher than the division with the second highest overall

Table 1: Patient Care Physician/Population Ratios by Specialty and Rural-Urban Status

	Physician/Population Per 100,000					
	U	Rural Total	LR	SR	ISR	Grand Total
Generalists	**71.8**	**54.9**	**61.1**	**58.5**	**35.7**	**68.6**
Family medicine	26.4	33.3	32.4	40.1	26.6	27.7
General internal medicine	29.2	15.0	19.3	13.4	7.0	26.5
General pediatrics	16.2	6.6	9.4	5.0	2.0	14.4
Medical specialists	**29.9**	**9.6**	**14.9**	**5.3**	**2.5**	**26.0**
Cardiology	7.3	2.3	3.7	1.2	*0.5*	6.4
Surgical specialists	**46.3**	**25.1**	**36.5**	**18.8**	**6.3**	**42.2**
General surgery	6.9	6.6	8.1	6.9	2.5	6.8
Obstetrics-gynecology	12.8	6.4	9.4	4.8	1.5	11.5
Ophthalmology	5.9	2.7	4.4	1.5	*0.4*	5.3
Orthopedics	6.8	4.4	6.6	3.2	0.9	6.3
Pediatric specialists	**3.5**	**0.4**	**0.5**	***0.3***	***0.2***	**2.9**
Other specialists	**58.2**	**23.3**	**33.9**	**16.3**	**7.7**	**51.5**
Anesthesiology	12.6	4.1	6.3	2.4	1.0	10.9
Emergency medicine	8.8	5.2	6.9	4.3	2.3	8.1
Pathology	4.4	1.8	2.8	1.1	*0.5*	3.9
Psychiatry	12.5	4.3	6.1	3.2	1.5	10.9
Radiology	9.3	4.4	6.5	3.0	1.1	8.3
Total	**209.6**	**113.2**	**146.9**	**99.2**	**52.3**	**191.1**

	Number of Physicians					
	U	Rural Total	LR	SR	ISR	Grand Total
Generalists	**169,966**	**30,847**	**17,358**	**9,153**	**4,336**	**200,813**
Family medicine	62,515	18,729	9,213	6,283	3,233	81,244
General internal medicine	69,048	8,424	5,478	2,091	855	77,472
General pediatrics	38,403	3,694	2,667	799	248	42,097
Medical specialists	**70,684**	**5,368**	**4,230**	**829**	**309**	**76,052**
Cardiology	17,293	1,300	1,052	189	59	18,593
Surgical specialists	**109,598**	**14,094**	**10,381**	**2,947**	**766**	**123,692**
General surgery	16,322	3,682	2,297	1,083	302	20,004
Obstetrics-gynecology	30,201	3,607	2,684	746	177	33,808
Ophthalmology	14,027	1,520	1,237	229	54	15,547
Orthopedics	16,025	2,495	1,885	503	107	18,520
Pediatric specialists	**8,178**	**221**	**153**	**46**	**22**	**8,399**
Other specialists	**137,645**	**13,108**	**9,621**	**2,555**	**932**	**150,753**
Anesthesiology	29,724	2,286	1,795	368	123	32,010
Emergency medicine	20,832	2,910	1,950	678	282	23,742
Pathology	10,442	1,018	789	173	56	11,460
Psychiatry	29,509	2,431	1,742	504	185	31,940
Radiology	21,930	2,451	1,843	470	138	24,381
Total	**496,071**	**63,638**	**41,743**	**15,530**	**6,365**	**559,709**
% of total physicians	88.6	11.4	7.5	2.8	1.1	100.0
Total population	236,698,880	56,237,806	28,418,747	15,655,002	12,164,057	292,936,686
% of total population	80.8	19.2	9.7	5.3	4.2	100.0

Italics indicates a numerator of less than 100.
U = Urban, LR = Large Rural, SR = Small Rural, ISR = Isolated Small Rural.

rural ratio, Pacific. However, New England also had the lowest percentage of IMGs (8.7%) and the second lowest of DOs (7.0%) comprising the rural generalist workforce.

The lowest ratios were generally concentrated in the South, particularly the West South Central Division. The mix of ratios in the West North Central Division was complex and contained some of the highest and lowest. In the Middle Atlantic Division, the overall ratios for all generalists combined and for general internists and pediatrics were strong while family medicine tied with the East South Central Division for having the lowest (27.0/100,000).

State-level analyses of rural generalists also revealed much variation. Results for state-level analyses can be found in Appendix A. Note that none of the analyses in this study account for the changes in physician supply and distribution that occurred along the Gulf Coast and especially in New Orleans, Louisiana after Hurricane Katrina. The six states with the highest rural ratios (from highest to lowest) were: New Hampshire, Maine, Vermont, Hawaii, Massachusetts and Alaska. The six states with the lowest ratios (from lowest to highest) were: Louisiana, Mississippi, Alabama, Texas, Arizona and Florida.

Table 2: Percent Patient Care Physicians by Specialty Within Rural-Urban Status Categories

	% of Physicians Within Geographic Category					
	U	Rural Total	LR	SR	ISR	Grand Total
Generalists	**34.3**	**48.5**	**41.6**	**58.9**	**68.1**	**35.9**
Family medicine	12.6	29.4	22.1	40.5	50.8	14.5
General internal medicine	13.9	13.2	13.1	13.5	13.4	13.8
General pediatrics	7.7	5.8	6.4	5.0	3.9	7.5
Medical specialists	**14.2**	**8.4**	**10.1**	**5.3**	**4.9**	**13.6**
Cardiology	3.5	2.0	2.5	1.2	0.9	3.3
Surgical specialists	**22.1**	**22.1**	**24.9**	**19.0**	**12.0**	**22.1**
General surgery	3.3	5.8	5.5	7.0	4.7	3.6
Obstetrics-gynecology	6.1	5.7	6.4	4.8	2.8	6.0
Ophthalmology	2.8	2.4	3.0	1.5	0.8	2.8
Orthopedics	3.2	3.9	4.5	3.2	1.7	3.3
Pediatric specialists	**1.6**	**0.3**	**0.4**	**0.3**	**0.3**	**1.5**
Other specialists	**27.7**	**20.6**	**23.0**	**16.5**	**14.6**	**26.9**
Anesthesiology	6.0	3.6	4.3	2.4	1.9	5.7
Emergency medicine	4.2	4.6	4.7	4.4	4.4	4.2
Pathology	2.1	1.6	1.9	1.1	0.9	2.0
Psychiatry	5.9	3.8	4.2	3.2	2.9	5.7
Radiology	4.4	3.9	4.4	3.0	2.2	4.4
Total % nongeneralist specialties	**65.6**	**51.4**	**58.4**	**41.1**	**31.8**	**64.1**
Grand total	**99.9***	**99.9***	**100.0**	**100.0**	**99.9***	**100.0**

* Rounding error.
U = Urban, LR = Large Rural, SR = Small Rural, ISR = Isolated Small Rural.

RURAL, GENERALIST OSTEOPATHIC PHYSICIANS

DOs comprised 4.9% of all physicians who met study criteria and 7.8% of all generalists. As a whole, they were more likely than MDs to be generalists (57.5 versus 34.8%) and to practice in rural areas (18.5 versus 11.0%). Of all generalists, DOs were more likely to practice in rural areas than MDs (20.5 versus 14.9%) and within rural areas, generalist DOs were more likely to practice in small and isolated small rural areas than were MDs but less likely to practice in persistent poverty areas (results not tabled).

The importance of osteopaths in providing rural primary care varied across the country. DOs contributed 10.4% to the rural generalist workforce (Table 3) but their proportional representation in each of the generalist specialties in rural areas was uneven. They were strongly represented in family medicine, making up 14.7% of all rural family practitioners, but only 4.2% of rural general internists and 2.6% of rural general pediatricians. Their contribution to the rural physician workforce at the census division level and within states was also variable, supplying a disproportionately high percentage in some places and a low percentage in others.

At the census division level, DOs comprised over 12% of the rural, generalist workforce in

Figure 2: U.S. Census Divisions

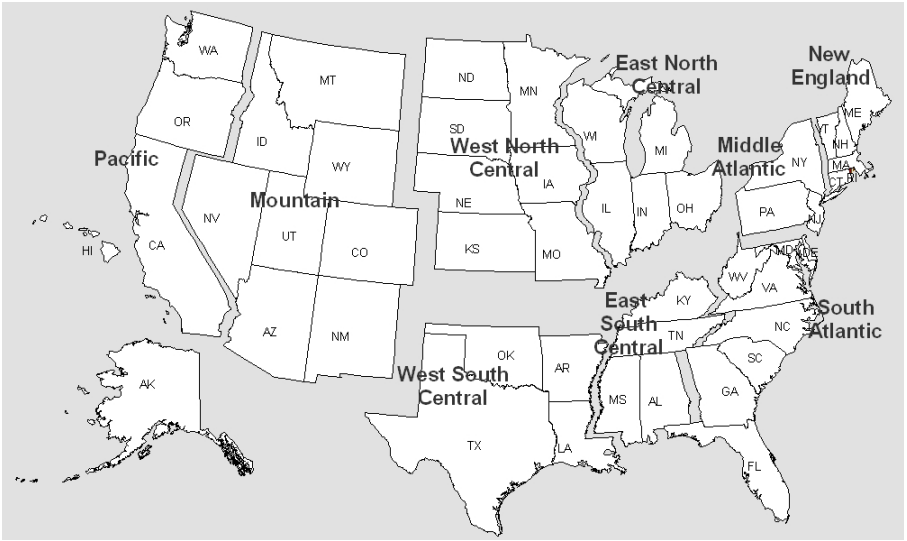


Table 3: Generalist Patient Care Physician/Population Ratios by Rural Status within Census Bureau Divisions

Division	Physician/Population Ratio Per 100,000				% DO	% IMG
	LR	SR	ISR	Total		
1. New England						
All generalists	**90.2**	**102.1**	**69.3**	**85.9**	**7.0**	**8.7**
Family medicine	41.7	47.9	41.5	43.0	10.2	4.7
General internal medicine	33.4	34.6	19.7	29.2	3.8	15.4
General pediatrics	15.1	*19.6*	*8.1*	13.8	3.8	6.8
2. Middle Atlantic						
All generalists	**59.9**	**63.4**	**33.2**	**55.0**	**13.3**	**30.6**
Family medicine	27.2	33.8	20.2	27.0	21.7	15.4
General internal medicine	23.0	22.3	9.6	20.1	5.0	47.0
General pediatrics	9.7	*7.4*	*3.4*	7.9	5.6	40.5
3. East North Central						
All generalists	**61.4**	**60.0**	**32.7**	**56.0**	**13.4**	**22.9**
Family medicine	34.5	43.3	26.0	35.7	18.1	12.0
General internal medicine	18.6	12.6	5.5	14.5	5.6	44.0
General pediatrics	8.3	4.2	*1.2*	5.8	3.8	37.2
4. West North Central						
All generalists	**73.0**	**67.8**	**35.6**	**59.5**	**14.8**	**13.0**
Family medicine	45.3	57.8	30.6	43.8	17.3	6.8
General internal medicine	18.7	8.2	4.5	11.4	9.5	31.9
General pediatrics	9.0	*1.8*	*0.5*	4.4	3.4	25.6
5. South Atlantic						
All generalists	**57.8**	**55.3**	**37.1**	**52.9**	**7.3**	**24.3**
Family medicine	27.3	32.9	24.4	28.2	11.6	13.7
General internal medicine	19.9	15.7	9.7	16.7	2.8	39.4
General pediatrics	10.7	6.7	*3.0*	8.0	1.3	30.2
6. East South Central						
All generalists	**55.0**	**47.7**	**33.8**	**48.0**	**6.6**	**20.7**
Family medicine	27.0	30.1	22.5	27.0	10.4	9.2
General internal medicine	18.8	12.7	8.9	14.6	1.5	36.9
General pediatrics	9.2	4.9	*2.4*	6.3	1.8	32.7
7. West South Central						
All generalists	**52.2**	**48.9**	**24.8**	**46.0**	**12.6**	**18.3**
Family medicine	29.6	37.4	20.0	30.1	17.4	9.4
General internal medicine	14.7	8.7	*3.5*	10.8	4.4	36.6
General pediatrics	7.9	*2.8*	*1.3*	5.2	1.6	31.9
8. Mountain						
All generalists	**60.6**	**64.3**	**35.1**	**56.2**	**8.3**	**13.3**
Family medicine	34.0	44.8	30.1	36.7	11.4	7.8
General internal medicine	18.0	14.2	*4.1*	13.7	2.7	23.8
General pediatrics	8.6	*5.3*	*1.0*	5.9	2.4	22.8
9. Pacific						
All generalists	**64.5**	**60.1**	**38.5**	**59.6**	**7.1**	**14.9**
Family medicine	34.5	40.9	32.4	35.6	10.1	9.4
General internal medicine	20.0	14.0	*4.4*	16.3	3.1	25.0
General pediatrics	10.0	*5.2*	*1.7*	7.7	1.6	19.4
Total						
All generalists	**61.1**	**58.5**	**35.7**	**54.9**	**10.4**	**19.3**
Family medicine	32.4	40.1	26.6	33.3	14.7	10.1
General internal medicine	19.3	13.4	7.0	15.0	4.2	35.6
General pediatrics	9.4	5.0	2.0	6.6	2.6	29.0

Italics indicates a rate with a numerator of less than 100.
U = Urban, LR = Large Rural, SR = Small Rural, ISR = Isolated Small Rural.

the Middle Atlantic, East North Central, West North Central and West South Central Divisions (Table 3). In all other divisions they represented less than 8.4% of rural generalists, with East South Central having proportionately the fewest. At the state level their relative contribution to the rural generalist workforce varied even more widely. For instance, DOs represented over 20% in Missouri, Oklahoma, West Virginia, Michigan and Iowa but lower than 3% in Massachusetts, Louisiana, Nebraska, Wyoming, North Dakota and North Carolina (Appendix A).

In every division, DOs comprised a far greater proportion of the rural family medicine workforce than general internal medicine and pediatrics combined. However, in the West North Central Division, where DOs made up a larger proportion of the rural generalist workforce than in any other division, DOs also made

up almost 10% of all rural general internists, although their family medicine contribution, at 17.3%, was much greater. At the state level, with two exceptions, states where DOs accounted for at least 10% of all rural generalists also had osteopathic medical schools (Appendix A). The exceptions, Kansas and Delaware, were both bordered by two states that did have such schools.

RURAL, GENERALIST IMGS

IMGs comprised 22.2% of all physicians who met study criteria and 25.4% of all generalist physicians. Overall, among all patient care physicians, IMGs were more likely than U.S. medical school graduates (USMGs) to be generalists (41.2 versus 34.4%) and to practice in persistent poverty counties (2.9 versus 2.4%) but less likely to practice in rural areas (10.1 versus 11.8%) (results not tabled). IMGs accounted for 19.3% of rural generalists (Table 3). Of all rural generalists, IMGs were more likely than USMGs to practice in persistent poverty counties (12.4 versus 9.1%) and in large (57.5 versus 56.0%) and small (29.9 versus 29.6%) rural areas and less likely to practice in isolated small rural areas (12.6 versus 14.4%) (results not tabled).

Census Bureau Division and state-level analyses highlighted the variability of IMG contributions to the nation's rural, generalist workforce. Among the Census Bureau Divisions, the Middle Atlantic (30.6%) and New England (8.7%) Divisions represented the two extremes in IMG proportional contribution to the rural generalist workforce. IMGs were also strongly represented in the South Atlantic Division while the Mountain and Pacific Divisions had proportionally fewer. In every division, of the three generalist specialties, rural IMG general internists had proportionally the greatest representation, followed by general pediatricians (Table 3).

The contribution of IMGs to the rural generalist workforce in each state showed wide variation. Less than 2% of rural, generalist physicians in Idaho were IMGs while in Florida they represented almost 52% of this group (Appendix A). However, behind these percentages there can lie substantial differences in the size of each states rural generalist workforce and, therefore, the actual number of IMGs.

Seven states, Florida, New Jersey, Delaware, New York, West Virginia, Maryland and Illinois, had over 30% of their rural generalist population made up of IMGs. Five states had less than 6%: Idaho, Vermont, Colorado, Alaska and Montana.

PATIENT CARE GENERALIST DEMOGRAPHICS

Age: Nationally, there were no remarkable differences in either the mean age of generalists or in the percentage age 55 or older (Table 4). By both measures, for family medicine and general pediatricians, the more rural the practice location the older the physicians. General internists in isolated small rural areas were younger by both age measures than were their counterparts in other rural or urban areas and were also notably younger than family practitioners and general pediatricians in isolated small rural areas.

Table 4: Demographic Characteristics of Patient Care Generalist Physicians

	U	LR	SR	ISR	Total
Family medicine					
Mean age	47.3	47.7	48.1	48.7	47.5
% 55 and older	24.4	25.0	27.5	28.2	24.9
% female	31.8	23.4	21.6	23.3	29.7
% office based	94.0	93.9	93.0	92.0	93.9
General internal medicine					
Mean age	46.8	47.6	47.2	46.0	46.9
% 55 and older	21.9	24.6	24.0	18.7	22.1
% female	31.8	22.0	20.2	22.9	30.7
% office based	93.1	94.5	92.0	90.3	93.2
General pediatrics					
Mean age	46.8	47.1	47.4	47.6	46.8
% 55 and older	24.6	26.8	27.9	29.4	24.9
% female	54.8	45.6	51.3	59.3	54.2
% office based	91.6	94.9	91.9	94.0	91.8
Total	84.6	8.6	4.6	2.2	100.0

U = Urban, LR = Large Rural, SR = Small Rural, ISR = Isolated Small Rural.

Percent Female: Among rural generalists, females were less likely than males to practice in small rural areas (27.7 versus 30.3%) and in persistent poverty counties (9.0 versus 10.0%). They were also less likely to be family medicine physicians (54.3 versus 62.9%) or general internists (23.3 versus 28.7%) but were over two and one half times more likely to be general pediatricians (22.5 versus 8.4%) (results not tabled). Although female generalists were less likely to locate their practices in small isolated rural areas, in these places females comprised 59.3% of all general pediatricians (Table 4).

TRAVEL TIME

The family medicine/population ratio in all rural areas was higher in places where travel time was 60 minutes or more to the nearest urbanized area and was almost always higher than for urban areas (Table 5). The other two generalist specialties had physician/population ratio results that were more mixed.

Table 5: Physician/Population Ratios by Travel Time from an Urbanized Area by Rural-Urban Status

Travel Time to Nearest Urbanized Area*	Physician Population Ratio Per 100,000				
	U	Rural Total	LR	SR	ISR
Family medicine					
Less than 60 minutes travel	26.4	31.9	31.2	38.2	24.1
60 minutes travel or greater	†	35.5	35.0	43.0	28.8
General internal medicine					
Less than 60 minutes travel	29.2	15.3	18.6	13.1	7.5
60 minutes travel or greater	†	14.5	20.8	13.7	6.6
General pediatrics					
Less than 60 minutes travel	16.2	7.0	9.4	4.7	2.3
60 minutes travel or greater	†	5.9	9.3	5.4	1.8
% 2004 GE 60 minutes travel time	0.1%	38.3%	31.4%	40.2%	52.2%
Mean one-way travel time if GE 60 minutes‡	75 min.	106 min.	109 min.	102 min.	106 min.

* 50,000 or greater population.
† Numbers too small to report.
‡ Weighted by 2004 ZIP population.
U = Urban, LR = Large Rural, SR = Small Rural, ISR = Isolated Small Rural.

Table 6: Physician/Population Ratios by Persistent Poverty within Rural-Urban Status

	Physician/Population Ratio Per 100,000				
	U	Rural Total	LR	SR	ISR
Family medicine					
Not persistent poverty county	26.5	34.3	33.0	41.9	27.7
Persistent poverty county	22.3	26.2	26.4	30.5	20.4
General internal medicine					
Not persistent poverty county	29.3	15.3	19.6	13.6	6.9
Persistent poverty county	21.3	12.4	16.3	12.2	7.6
General pediatrics					
Not persistent poverty county	16.2	6.7	9.4	5.0	2.0
Persistent poverty county	15.3	5.7	9.5	4.7	*2.0*

Italics indicates a rate with a numerator of less than 100.
U = Urban, LR = Large Rural, SR = Small Rural, ISR = Isolated Small Rural.

Almost 40% of the rural population lived in areas with a travel time of at least 60 minutes to the nearest urbanized area and their weighted mean travel time was 106 minutes. In isolated small rural areas, over 50% of the population lived in such places.

PERSISTENT POVERTY

The family medicine/population ratios for persistent poverty areas were notably lower in all RUCA types than their counterparts in nonpersistent poverty areas (Table 6). The same comparison for the other generalist specialties revealed differences that were not as consistent.

DISCUSSION

Changes in U.S. physician supply and location over time have been documented by a number of studies that have also documented ongoing disparity in distribution (Frenzen, 1991; GAO, 2003; Kindig & Movassaghi, 1989). Because of this, knowledge of current supply and distribution of physicians in rural areas is fundamental to effective construction of rural health policy, allocation of state and federal funds and decision-making regarding physician training and recruitment.

Our study showed that the 2005 distribution of physicians continued to be uneven. Urban areas had a disproportionately larger share of physicians but among rural areas distribution was also uneven. Physician/population ratios in large rural areas at times more closely resembled those in urban locations

than other rural places. Although nationally about one third of physicians were generalists, in rural areas overall the proportion of generalists was close to 50%. Large rural areas, like urban ones, had proportionally more specialists than generalists while small and isolated small rural areas had proportionally far fewer specialists.

Specialized physicians will continue to be more likely to locate in urban areas. The diagnostics tools, hospital infrastructure and population base needed to support their practices can often only be found in urban settings. The many rural places that are not able to accommodate these necessities, whether because of economic constraints or lack of sufficient population, are not likely to attract these physicians and will remain underserved by specialized physicians. Chan et al. (2006) showed that rural Medicare recipients in five states had fewer physician visits overall than their urban counterparts as well as fewer specialist and more generalist visits. This study also showed that for most of rural resident needs, they relied much more on care available in rural areas than in urban places.

In all rural areas family practitioners continued to be the most important source of physician care, especially in small, isolated rural areas where they comprised over 50% of the physician workforce. However, rural areas continue to be underserved and recent trends may exacerbate this problem.

Women represent a growing presence in the physician workforce and it has been projected that by the year 2020 women will represent 40% of the family medicine workforce (Colwell & Cultice, 2003, in Larson et al., 2003). However, although about one quarter of rural generalists were women, they are less likely than men to practice in rural areas (Doescher et al., 1998) or work full time. Recently, though, the proportion of women entering rural practice has increased (Chen et al., 2007).

While fewer USMGs are opting for primary care specialties (Chen et al., 2007), IMGs are filling more slots in family practice residency programs (Hart et al., 2007). However, IMGs, who provided 20% of rural generalists, are a little less likely to locate in rural places than their USMG counterparts. Hart et al. (2007) showed that between 1981 and 2001 the percent of all rural, patient care generalists who were IMGs increased. If the trends continue, IMGs may represent a larger share of rural family practitioners while overall rural family practitioner ratios decline.

Other factors are also influencing the flow of primary care providers to rural areas and include large reductions in Title VII funding for primary care training, post-9/11 changes in visa and immigration requirements making entering and practicing in the United States more difficult for many foreign physicians (Hart et al., 2007) and a proportional increase in H-1B and decrease in J-1 visas (Fitzpatrick & Wallowicz, 2008). The importance of this last issue lies in the fact that unlike J-1 visas, H-1B visas do not require the physician to practice in an underserved area in order to remain in the country after completion of training. The overall effect of these developing trends is not yet apparent in the data. However, these considerations raise serious policy questions about the future of generalist supply in rural areas.

There are other considerations as well. In response to a projected shortfall of physicians, the Association of American Medical Colleges (AAMC) recommendation to increase medical school enrollment (AAMC, 2005) could affect IMG supply and rural primary care supply in ways that are not currently predictable. It is not clear how much of the U.S. medical school enrollment will result in increased numbers of USMG generalists. If medical schools are not able to meet anticipated demand for physicians, supply of IMGs may increase or, conversely, substantial changes in the health care delivery system might reduce the need for more physicians (AAMC, 2006) and thus decrease demand for IMGs. The availability of residency slots will also play a significant role. If the trend away from primary care specialties continues as more USMGs are produced, IMGs may turn more often toward the generalist specialties. It is also unknown what role the recent large cuts in Title VII funding for primary care will play in the call for increased enrollment and what specialties medical students will select. And finally, the changes in the numbers and roles of nurse practitioners and physician assistants will influence the future.

Critical access hospitals (CAHs), located in isolated rural areas and receiving cost-based reimbursement from Medicare, comprise an important and growing segment of small rural hospitals. Approximately one quarter of all CAH admitting physicians are IMGs (Hagopian, 2004). Changes in the flow of IMGs to rural areas will also affect these essential hospitals, of which there are currently about 1,280.

DOs are also an important component of rural health care and have a history of providing health care in rural areas (Frenzen, 1991; Tooke-Rawlins, 2000;). Frenzen (1991) found DOs contributed up to 36% of physicians in nonmetropolitan rural counties in some states and our study has shown they continue to contribute substantially to rural primary care, with their level of their participation varying considerably across the country.

The delivery of primary care in rural areas is often stressed in osteopathic schools and rural clinical training is required by many. However, the closing and merger of osteopathic hospitals in small towns has resulted in more osteopathic training being offered in an urban environment (Tooke-Rawlins,

2000). As a means of ensuring the ongoing role of DOs in rural primary care, Tooke-Rawlins advocates maintaining currently existing rural family practice osteopathic residencies and creating new ones, with osteopathic medical schools taking a leadership role in this process. Given the increasing enrollment in schools of osteopathy in recent years (Griffin & Sweet, 2006) including new school openings, the issues of availability of rural osteopathic residencies, and attracting physicians to them, are critical ones if DOs are to retain their place as an important provider of rural primary care.

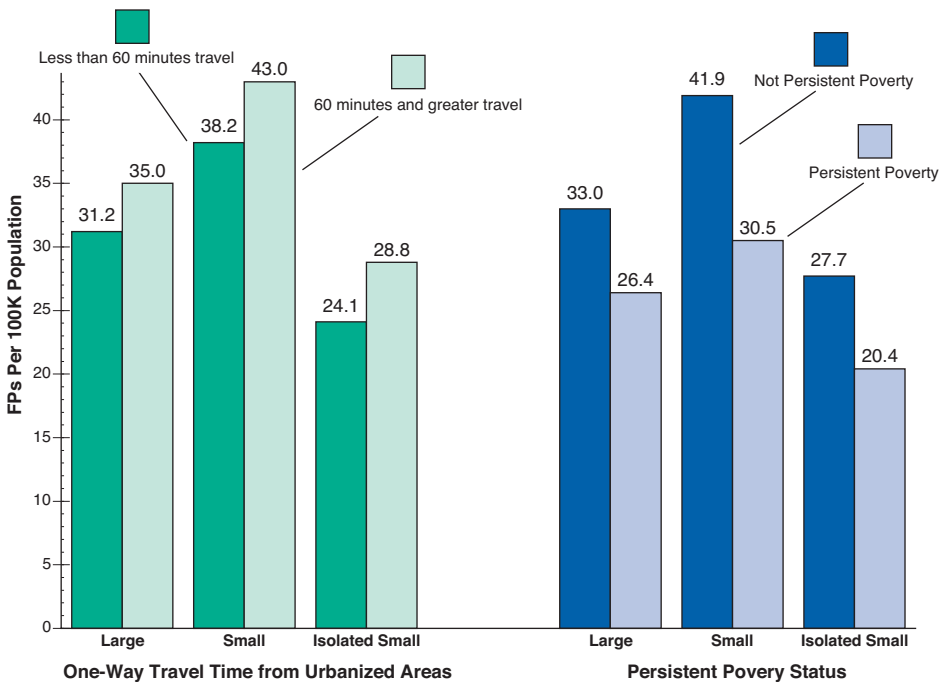
Level of geographic aggregation has a substantial effect on reported supply and distribution of physicians. National-level results of rural-urban differences give an overview of physician supply and distribution issues but conceal differences within smaller geographic units. Division, state, urban-rural and intrarural analyses showcased the variability that exists in distribution of rural primary care providers across the United States.

Interpreting results of Census Bureau Division and state analyses in a meaningful way depends on understanding the nature of rural places in different areas. There are wide variations among rural places with regard to economic base and stability, demographic makeup, the proportion and number of rural residents compared to the rest of the divisions or states and also in the proportion of residents who live in small or isolated rural areas.

At the state and local levels, the complex interplay of economic concerns, demography, degree of rurality and health care infrastructure creates unique sets of conditions that must be addressed by health care policy and legislation tailored to those conditions. Within a single state there may be many types of rural areas. Each of them may have different health care challenges, each requiring its own particular solutions. It is important to differentiate the solutions for rural areas able to support an adequate supply of physicians from those that cannot because of poverty. Likewise, some areas have difficulty recruiting physicians for a variety of reasons including such things as dysfunctional delivery systems, being amenity challenged and being remote from larger population areas.

Lengthy travel time to a physician and residence in a persistent poverty area are considered impediments to accessing health care. In all rural areas the family physician/population ratio was highest where the travel time to an urbanized area was 60 minutes or greater. While distance was not specifically reported, it correlates strongly with longer travel times. However, family physician/population ratios within persistent poverty counties were consistently lower within each RUCA category than their travel time counterpart. Although more remote rural areas are generally perceived to be at greater risk than less remote ones, residence in a persistent poverty county appeared to represent an even greater risk (Figure 3).

Figure 3: Family Physician Rates per 100,000 Population by Rural Type by Travel Time and Persistent Poverty Status



Finally, along the Gulf Coast, where some of the lowest state-level physician population ratios were found, there have been substantial changes in physician supply and distribution since the data used in this study were gathered. In the aftermath of Hurricane Katrina, close to 6,000 patient care physicians were estimated to have left the Gulf Coast region. Of these, approximately 4,500 were patient care physicians practicing in the three most heavily affected New Orleans parishes

(Ricketts, 2005) and as of March 2006, only about 1,200 had returned to practice there (Rudowitz et al., 2006).

This study has several limitations. Data in the AMA physician file may overestimate physician supply in small, rural towns by 20% (Konrad et al, 2000). In their study, Konrad et al. used knowledgeable local informants, in this case local pharmacists, to confirm the accuracy of the AMA listing of physicians practicing in 57 rural towns. The authors concluded that although the AMA Masterfile is the most comprehensive available national physician database, reliance on it to make local estimates of physician supply might lead one to believe that there are 20% more physicians in small rural communities than are actually there. Physician supply estimates could also be affected by lag time in updating AMA information (Kletke, 2004). Physician self-reporting of specialty and practice ZIP code information is known to contain inaccuracies, although at a level considered acceptable (Chen et al., 2005). Exclusion of 10,000 DOs who did not have employment status could introduce bias but we believe it is minimal.

CONCLUSIONS

Generalists play an important role in both rural and urban areas but in rural areas overall and particularly in small and isolated rural places their function is especially important. Specialists are located predominantly in urban areas, and to a lesser degree in large rural cities, with their presence decreasing as rurality increased, leaving rural areas underserved with regard to most specialties. DOs were more likely than MDs to practice in rural areas and contributed substantially to the rural generalist workforce in some areas of the country. IMGs, who were a little less likely than USMGs to practice in rural areas, still provided almost 20% of the rural, primary care workforce and, with USMGs turning more to other specialties, the percentage of IMG generalists in rural areas may increase while overall rural physician ratios decrease. Although generalists are the mainstay of rural health care, recent ongoing developments have the potential to affect the flow of these physicians to rural areas.

Also notable was the degree of variability that existed in physician supply and distribution at all geographical scales. The effect of this on access to health care must be considered within a broader context that includes consideration of the complex interaction of socioeconomic, demographic and health care infrastructure characteristics. These interactions create conditions that vary not only from state to state but also at the local level within states. While national-level analyses portray an overall picture, effective policy and legislation must be informed by conditions within smaller geographic units. A one-size-fits-all approach to health care problems cannot be effective. Furthermore, regardless of federal and state overall workforce policies, there will not be an adequate supply of rural physicians unless the environment is acceptable to physicians regarding their professional, economic and social needs.

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APPENDIX A:

GENERALIST PATIENT CARE PHYSICIAN/POPULATION RATIOS BY RURAL STATUS BY STATE

State	Physician/Population Ratio Per 100,000				% DO	% IMG
	LR	SR	ISR	Total		
Alabama	48.7	47.4	34.1	44.4	8.5	21.9
Alaska	99.9	96.8	*44.0*	75.9	7.7	5.5
Arizona	48.0	46.8	*25.6*	44.8	13.1	25.3
Arkansas	58.0	54.2	28.5	51.3	5.4	13.2
California	51.6	46.4	39.5	49.1	5.7	22.3
Colorado	73.1	71.3	48.5	65.6	9.4	5.3
Connecticut	66.0	*49.9*	*92.8*	69.1	6.4	18.2
Delaware	70.6	*50.1*	*20.1*	61.7	13.2	38.7
District of Columbia	N/A	N/A	N/A	N/A	N/A	N/A
Florida	56.2	41.1	*26.4*	47.3	11.0	51.6
Georgia	56.5	49.2	33.7	50.1	5.9	23.3
Hawaii	85.6	*113.5*	*40.3*	85.5	5.9	8.5
Idaho	54.6	67.5	*27.9*	51.2	9.9	1.5
Illinois	62.1	52.8	*17.0*	52.0	8.7	32.9
Indiana	53.7	51.8	23.5	48.9	9.2	20.9
Iowa	68.5	65.7	27.4	53.6	22.7	12.7
Kansas	62.8	65.2	39.0	57.3	13.7	13.1
Kentucky	59.9	51.8	37.4	51.2	4.5	24.4
Louisiana	45.4	38.8	*13.7*	39.6	1.1	20.4
Maine	93.0	108.3	72.3	87.6	12.9	10.3
Maryland	61.6	62.5	*15.6*	56.7	7.8	33.3
Massachusetts	81.6	103.0	*47.3*	84.0	0.7	9.9
Michigan	65.2	66.9	34.4	59.5	22.8	21.6
Minnesota	84.8	88.6	40.2	71.8	4.5	10.8
Mississippi	53.3	37.5	23.9	43.0	7.8	13.9
Missouri	74.4	52.0	31.3	55.1	32.2	16.2
Montana	79.3	87.2	40.8	68.6	4.7	5.7
Nebraska	67.5	71.9	35.2	57.8	2.2	7.2
Nevada	58.3	*48.0*	*33.2*	51.2	11.1	29.9
New Hampshire	97.4	90.1	67.9	88.6	4.1	7.7
New Jersey	56.2	N/A	N/A	56.2	*11.9*	*41.8*
New Mexico	62.8	53.5	*29.5*	56.3	7.8	23.8
New York	59.7	64.1	33.6	54.4	6.0	35.5
North Carolina	54.4	51.7	41.5	51.5	2.9	16.1
North Dakota	75.9	*75.1*	44.4	59.1	2.4	26.0
Ohio	56.7	46.6	32.7	52.4	17.5	24.0
Oklahoma	58.1	52.1	26.2	49.4	26.4	15.1
Oregon	75.8	63.4	*24.7*	65.7	8.5	9.8
Pennsylvania	60.3	62.2	32.7	55.4	19.6	25.8
Rhode Island	N/A	N/A	N/A	N/A	N/A	N/A
South Carolina	59.0	42.9	*28.4*	52.0	3.5	14.1
South Dakota	79.6	72.4	41.7	61.9	7.6	10.4
Tennessee	56.0	53.0	36.9	51.9	6.6	21.3
Texas	50.4	48.9	25.0	44.7	12.7	21.3
Utah	*45.5*	70.8	*24.0*	49.4	7.4	10.1
Vermont	98.4	107.3	64.5	87.2	3.7	4.0
Virginia	63.0	67.9	42.3	56.9	4.9	18.8
Washington	76.0	66.0	44.5	66.8	8.9	11.7
West Virginia	65.1	83.8	38.3	60.8	22.9	34.5
Wisconsin	80.0	81.8	42.3	68.0	6.0	16.5
Wyoming	60.8	79.6	*34.5*	61.2	2.3	11.2

Italics indicate a rate numerator of less than 50 or a percentage denominator of less than 100.
U = Urban, LR = Large Rural, SR = Small Rural, ISR = Isolated Small Rural.

APPENDIX A NUMBERS:

TOTAL GENERALIST PATIENT CARE PHYSICIANS AND 2004 POPULATION BY RURAL STATUS WITHIN STATE

	Large Rural		Small Rural		Isolated Small Rural		Total Rural			
State	MD+DO Generalists	2004 Population	MD+DO Generalists	2004 Population	MD+DO Generalists	2004 Population	MD+DO Generalists	2004 Population	# Rural Generalist DOs	# Rural Generalist IMGs
Alabama	266	546,704	223	470,797	124	363,183	613	1,380,684	52	134
Alaska	62	62,076	76	78,500	43	97,801	181	238,377	14	10
Arizona	191	397,862	171	365,767	26	101,714	388	865,343	51	98
Arkansas	355	611,970	242	446,720	68	238,298	665	1,296,988	36	88
California	816	1,580,417	242	521,083	112	283,381	1,170	2,384,881	67	261
Colorado	155	212,098	210	294,607	92	189,827	457	696,532	43	24
Connecticut	80	121,234	6	12,034	24	25,866	110	159,134	7	20
Delaware	84	119,046	19	37,896	3	14,919	106	171,861	14	41
District of Columbia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Florida	318	566,222	136	330,722	38	144,123	492	1,041,067	54	254
Georgia	520	920,855	318	645,909	107	317,955	945	1,884,719	56	220
Hawaii	246	287,408	49	43,167	11	27,293	306	357,868	18	26
Idaho	109	199,780	114	168,902	41	146,862	264	515,544	26	4
Illinois	516	831,300	357	676,300	43	253,091	916	1,760,691	80	301
Indiana	491	914,233	247	477,334	53	225,903	791	1,617,470	73	165
Iowa	281	410,127	338	514,332	129	470,658	748	1,395,117	170	95
Kansas	410	652,819	148	227,114	115	294,890	673	1,174,823	92	88
Kentucky	496	827,993	353	681,991	207	553,196	1,056	2,063,180	47	258
Louisiana	294	648,005	144	370,892	18	131,461	456	1,150,358	5	93
Maine	225	241,972	155	143,161	202	279,230	582	664,363	75	60
Maryland	165	267,966	59	94,465	7	44,751	231	407,182	18	77
Massachusetts	82	100,538	51	49,529	9	19,026	142	169,093	1	14
Michigan	582	892,295	422	631,067	134	389,800	1,138	1,913,162	259	246
Minnesota	560	660,096	346	390,650	193	480,414	1,099	1,531,160	49	119
Mississippi	470	882,248	209	557,181	75	313,889	754	1,753,318	59	105
Missouri	534	718,119	261	501,813	162	517,236	957	1,737,168	308	155
Montana	178	224,431	145	166,357	81	198,378	404	589,166	19	23
Nebraska	232	343,487	132	183,543	92	261,507	456	788,537	10	33
Nevada	72	123,503	33	68,716	12	36,185	117	228,404	13	35
New Hampshire	279	286,405	73	81,033	87	128,155	439	495,593	18	34
New Jersey	67	119,285	N/A	N/A	N/A	N/A	67	119,285	8	28
New Mexico	311	495,244	57	106,456	32	108,420	400	710,120	31	95
New York	599	1,003,894	294	458,396	156	464,480	1,049	1,926,770	63	372
North Carolina	914	1,679,828	288	556,885	202	487,141	1,404	2,723,854	40	226
North Dakota	88	116,000	37	49,299	83	186,894	208	352,193	5	54
Ohio	965	1,701,353	255	546,997	70	214,395	1,290	2,462,745	226	309
Oklahoma	403	694,217	227	435,694	81	308,983	711	1,438,894	188	107
Oregon	464	611,832	124	195,527	35	141,586	623	948,945	53	61
Pennsylvania	877	1,455,081	214	343,927	138	421,532	1,229	2,220,540	241	317
Rhode Island	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
South Carolina	482	817,072	108	251,716	42	147,801	632	1,216,589	22	89
South Dakota	154	193,587	50	69,041	85	204,103	289	466,731	22	30
Tennessee	511	913,082	317	598,273	108	292,715	936	1,804,070	62	199
Texas	939	1,863,159	464	949,098	186	745,045	1,589	3,557,302	202	338
Utah	45	98,977	83	117,179	20	83,494	148	299,650	11	15
Vermont	125	127,012	137	127,693	114	176,652	376	431,357	14	15
Virginia	170	269,977	351	517,258	213	503,435	734	1,290,670	36	138
Washington	342	450,256	144	218,248	79	177,708	565	846,212	50	66
West Virginia	253	388,660	197	235,047	121	315,971	571	939,678	131	197
Wisconsin	468	584,811	447	546,194	240	567,990	1,155	1,698,995	69	191
Wyoming	112	184,211	80	100,492	23	66,720	215	351,423	5	24
Total	17,358	28,418,747	9,153	15,655,002	4,336	12,164,057	30,847	56,237,806	3,213	5,952

APPENDIX B: TABLE 3 NUMBERS

TOTAL GENERALIST PATIENT CARE PHYSICIANS AND 2004 POPULATION BY RURAL STATUS WITHIN CENSUS BUREAU DIVISIONS

Division	Large Rural		Small Rural		Isolated Small Rural		Total Rural			
	MDs+ DOs	2004 Population	MDs+ DOs	2004 Population	MDs+ DOs	2004 Population	Total Physicians	Total Rural 2004 Population	Total DOs	Total IMGs
1. New England		877,161		413,450		628,929		1,919,540		
All generalists	**791**		**422**		**436**		**1,649**		**115**	**143**
Family medicine	366		198		261		825		84	39
General internal medicine	293		143		124		560		21	86
General pediatrics	132		81		51		264		10	18
2. Middle Atlantic		2,578,260		802,323		886,012		4,266,595		
All generalists	**1,544**		**509**		**294**		**2,347**		**312**	**717**
Family medicine	702		271		179		1,152		250	177
General internal medicine	593		179		85		857		43	403
General pediatrics	249		59		30		338		19	137
3. East North Central		4,923,992		2,877,892		1,651,179		9,453,063		
All generalists	**3,021**		**1,728**		**540**		**5,289**		**707**	**1,212**
Family medicine	1,698		1,245		430		3,373		609	406
General internal medicine	914		362		91		1,367		77	602
General pediatrics	409		121		19		549		21	204
4. West North Central		3,094,235		1,935,792		2,415,702		7,445,729		
All generalists	**2,258**		**1,312**		**859**		**4,429**		**656**	**574**
Family medicine	1,402		1,119		738		3,259		565	221
General internal medicine	579		159		108		846		80	270
General pediatrics	277		34		13		324		11	83
5. South Atlantic		5,029,626		2,669,898		1,976,096		9,675,620		
All generalists	**2,907**		**1,476**		**733**		**5,116**		**371**	**1,242**
Family medicine	1,371		877		482		2,730		316	374
General internal medicine	999		420		192		1,611		45	634
General pediatrics	537		179		59		775		10	234
6. East South Central		3,170,027		2,308,242		1,522,983		7,001,252		
All generalists	**1,743**		**1,101**		**514**		**3,358**		**220**	**696**
Family medicine	855		695		342		1,892		197	174
General internal medicine	595		292		135		1,022		15	377
General pediatrics	293		114		37		444		8	145

APPENDIX B (CONTINUED)

Division	Large Rural		Small Rural		Isolated Small Rural		Total Rural			
	MDs+ DOs	2004 Population	MDs+ DOs	2004 Population	MDs+ DOs	2004 Population	Total Physicians	Total Rural 2004 Population	Total DOs	Total IMGs
7. West South Central		3,817,351		2,202,404		1,423,787		7,443,542		
All generalists	**1,991**		**1,077**		**353**		**3,421**		**431**	**626**
Family medicine	1,128		824		285		2,237		390	211
General internal medicine	560		191		50		801		35	293
General pediatrics	303		62		18		383		6	122
8. Mountain		1,936,106		1,388,476		931,600		4,256,182		
All generalists	**1,173**		**893**		**327**		**2,393**		**199**	**318**
Family medicine	658		622		280		1,560		177	122
General internal medicine	348		197		38		583		16	139
General pediatrics	167		74		9		250		6	57
9. Pacific		2,991,989		1,056,525		727,769		4,776,283		
All generalists	**1,930**		**635**		**280**		**2,845**		**202**	**424**
Family medicine	1,033		432		236		1,701		172	159
General internal medicine	597		148		32		777		24	194
General pediatrics	300		55		12		367		6	71
Totals										
Generalists	**17,358**		**9,153**		**4,336**		**30,847**		**3,213**	**5,952**
Family medicine	9,213		6,283		3,233		18,729		2,760	1,883
General internal medicine	5,478		2,091		855		8,424		356	2,998
General pediatrics	2,667		799		248		3,694		97	1,071
Total 2004 population		28,418,747		15,655,002		12,164,057		56,237,806		

APPENDIX C: TABLE 5 NUMBERS

TOTAL GENERALIST PATIENT CARE PHYSICIANS AND 2004 POPULATION RATIOS BY TRAVEL TIME WITHIN RURAL-URBAN STATUS

Travel Time to Nearest Urbanized Area*	Urban		Rural Total		Large Rural		Small Rural		Isolated Small Rural	
	MDs+ DOs	2004 Population	MDs+ DOs	2004 Population	MDs+ DOs	2004 Population	MDs+ DOs	2004 Population	MDs+ DOs	2004 Population
Family medicine										
Less than 60 minutes travel	62,454	236,429,612	11,075	34,679,990	6,093	19,506,448	3,580	9,362,622	1,402	5,810,920
60 minutes travel or greater	61	269,268	7,654	21,557,816	3,120	8,912,299	2,703	6,292,380	1,831	6,353,137
General internal medicine										
Less than 60 minutes travel	69,031	236,429,612	5,293	34,679,990	3,627	19,506,448	1,229	9,362,622	437	5,810,920
60 minutes travel or greater	17	269,268	3,131	21,557,816	1,851	8,912,299	862	6,292,380	418	6,353,137
General pediatrics										
Less than 60 minutes travel	38,399	236,429,612	2,416	34,679,990	1,838	19,506,448	442	9,362,622	136	5,810,920
60 minutes travel or greater	4	269,268	1,278	21,557,816	829	8,912,299	337	6,292,380	112	6,353,137
Total family medicine	62,515		18,729		9,213		6,283		3,233	
Total general internal medicine	69,048		8,424		5,478		2,091		855	
Total general pediatrics	38,403		3,694		2,667		779		248	
Total population		236,698,880		56,237,806		28,418,747		15,655,002		12,164,057

* 50,000 or greater population.

APPENDIX D: TABLE 6 NUMBERS

TOTAL GENERALIST PATIENT CARE PHYSICIANS AND 2004 POPULATION RATIOS BY PERSISTENT POVERTY COUNTY WITHIN RURAL-URBAN STATUS

	Urban		Rural Total		Large Rural		Small Rural		Isolated Small Rural	
	MDs+ DOs	2004 Population	MDs+ DOs	2004 Population	MDs+ DOs	2004 Population	MDs+ DOs	2004 Population	MDs+ DOs	2004 Population
Family medicine										
Not persistent poverty county	61,468	231,999,431	16,955	49,457,079	8,553	25,919,550	5,555	13,267,150	2,847	10,270,379
Persistent poverty county	1,047	4,699,449	1,774	6,780,727	660	2,499,197	728	2,387,852	386	1,893,678
General internal medicine										
Not persistent poverty county	68,046	231,999,431	7,582	49,457,079	5,071	25,919,550	1,800	13,267,150	711	10,270,379
Persistent poverty county	1,002	4,699,449	842	6,780,727	407	2,499,197	291	2,387,852	144	1,893,678
General pediatrics										
Not persistent poverty county	37,686	231,999,431	3,307	49,457,079	2,430	25,919,550	667	13,267,150	210	10,270,379
Persistent poverty county	717	4,699,449	387	6,780,727	237	2,499,197	112	2,387,852	38	1,893,678

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