International Medical Graduates And The Primary Care Workforce For Rural Underserved Areas

IMGs do not appear to be the solution to the nation's rural health care workforce shortage, absent further policy changes.

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ABSTRACT: The proportion of international medical graduates (IMGs) serving as primary care physicians in rural underserved areas (RUAs) has important policy implications. We analyzed the 2000 American Medical Association Masterfile and Area Resource File to calculate the percentage of primary care IMGs, relative to U.S. medical graduates (USMGs), working in RUAs. We found that 2.1 percent of both primary care USMGs and IMGs were in RUAs, where USMGs were more likely to be family physicians but less likely to be internists or pediatricians. IMGs appear to have been no more likely than USMGs were to practice primary care in RUAs, but the distribution by specialty differs.

The Council on Graduate Medical Education (COGME), Institute of Medicine (IOM), American Medical Association (AMA), and other national organizations have concluded that there is an oversupply of physicians but that they are poorly distributed geographically and by specialty.[1] This surplus is the result of efforts since the early 1970s to expand the U.S. physician workforce that resulted from a perceived shortage.[2] These efforts included increasing domestic production through funding for new medical schools and postgraduate training programs, as well as purposefully increasing the number of international medical graduates (IMGs) who came to the United States for postgraduate training.[3] As a result, from 1970 to 1994 the U.S. population increased 21 percent, the number of medical students increased 66 percent, and the number of residents and fellows increased 259 percent.[4]

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Recommendations from these bodies to reduce the subsequent physician oversupply include reducing residency positions and curbing the number of IMGs. Recommendations to address specialty maldistribution include increasing the percentage of residency graduates practicing one of the primary care specialties: family and general practice, general internal medicine, and general pediatric medicine.[5] The percentage of residents who are IMGs slowly increased from 25.5 percent in 1996 to 26.4 percent in 2000 but dropped back to 25.5 percent in 2001.[6] The composition of the IMG population in residency training has also shifted, with an increasing proportion of U.S. citizens who graduated from medical schools outside the United States. While the number of matching foreign-born IMGs (FB-IMGs) obtaining residency positions through the National Residency Matching Program from 1997 to 2001 decreased 18 percent, the number of U.S.-born IMGs (US-IMGs) increased 64 percent.[7] Recent reductions in IMGs, specifically FB-IMGs, could be attributed to a decrease in residency training positions as a result of the Balanced Budget Act of 1997, the introduction of a single-site Clinical Skills Assessment Test (CSAT) required for IMGs, and a reduction in the number of J-1 visas.[8]

The extent to which IMGs become primary care physicians and locate in rural underserved areas (RUAs) has important policy implications. Some studies suggest that IMGs are more likely than USMGs are to locate in such areas, but others contradict this.[9] These studies used various definitions for *rural* or *underservice* and different levels of analysis, but none analyzed primary care specialties individually or provided analyses comparing FB-IMGs with US-IMGs.

Given the context of recent federal legislation, the reduction in IMGs matching in residency programs with a relative rise in US-IMGs, and policy recommendations from a variety of organizations for reducing reliance on IMGs, we recognized a need to evaluate evidence regarding IMG service to rural underserved populations. This paper builds upon previous research by investigating the extent to which IMGs practice primary care in RUAs, compared with USMGs, by primary care specialty and by whether the IMGs were born in the United States.

Study Methods

The 2000 AMA Physician Masterfile was used to obtain information on nonfederal allopathic and osteopathic physicians who had completed residency training and were involved in direct patient care.[10] Each Masterfile record includes birth country and medical school. Additional data such as preferred and secondary addresses, type of practice, residency training, and board certifications are added to the Masterfile from primary data sources as the physician's career develops. The Masterfile does not contain information on visa status. Specialty assignment is based on self-designation when available; otherwise, on primary data sources. *Primary care* was defined for study purposes as family practice, general practice, general internal medicine, and general pediatric medicine. Physicians

graduating from medical schools outside the United States were considered IMGs, and birth country was used to establish US-IMG or FB-IMG status. Birth country data were missing for 5.4 percent of IMGs.

The preferred mailing addresses recorded in the Masterfile were linked to county records in the Bureau of Health Professions 2000 Area Resource File (ARF) to determine location relative to non–metropolitan statistical area (non-MSA) counties and whether the counties were Health Professional Shortage Areas (HPSAs). Non-MSA whole-county HPSAs were designated as being rural underserved areas.

Pearson's chi-square was used to test for statistical significance in bivariate analysis comparing USMGs with IMGs or US-IMGs with FB-IMGs. Logistic regression was performed to calculate the odds ratios of working in RUAs; independent variables were country of medical school training (USMG or IMG) with IMGs divided by birth country (US-IMG or FB-IMG) for each primary care specialty. USMG family physicians were the referent group in the logistic regression.

Study Results

Of the 524,404 physicians in the AMA Masterfile meeting the inclusion criteria, 35.4 percent were primary care (11.8 percent family physicians, 3.1 percent general practitioners, 13.2 percent internists, and 7.2 percent pediatricians). IMGs accounted for 21.7 percent of all practicing physicians and 24.3 percent of primary care physicians. US-IMGs constituted 14.6 percent of IMGs and 16.2 percent of primary care IMGs.

IMGs were more likely than USMGs were to be practicing one of the primary care specialties. However, the proportions of USMGs and IMGs varied considerably by specialty and birth country (Exhibit 1). Most notably, 13.0 percent of USMGs were family physicians, compared with 7.7 percent of IMGs, whereas 11.8 percent of USMGs were internists, compared with 18.6 percent of IMGs. In addition, US-IMGs were more likely than FB-IMGs were to be practicing primary care, particularly family practice.

Overall, 2.1 percent of both USMGs and IMGs were practicing primary care in non-MSA whole-county HPSAs. Again, the proportions varied considerably by specialty and birth country (Exhibit 2). Whereas USMG family physicians made up 61.1 percent of the USMG primary care physicians in non-MSA HPSAs, they made up only 21.8 percent of the IMG primary care workforce in RUAs. IMGs practicing primary care in non-MSA HPSAs were predominantly internists. US-IMGs were overall less likely than FB-IMGs were to practice one of the primary care specialties in RUAs, but the distribution by specialty for US-IMGs was similar to that for USMGs.

The likelihood of an IMG's working in a rural underserved area differed by primary care specialty and birth country (Exhibit 3). Of note, FB-IMG internists were three times as likely as USMG internists were, and FB-IMG pediatricians

EXHIBIT 1
Number Of Practicing Primary Care Physicians In The United States, 2000

Physician specialty	USMG	IMG	US–IMG	FB–IMG
Total physicians	410,684	113,720	15,678	91,885
Primary care physicians				
Number	140,587	45,043	6,764	34,987
Percent of total	34.2%	39.6%	43.1%	38.1%
Family practice physicians				
Number	53,346	8,786	2,115	6,151
Percent of total	13.0%	7.7%	13.5%	6.7%
Percent of primary care	37.9	19.5	31.3	17.6
General practice physicians				
Number	12,239	4,220	449	3,707
Percent of total	3.0%	3.7%	2.9%	4.0%
Percent of primary care	8.7	9.4	6.6	10.6
Internal medicine physicians				
Number	48,263	21,204	3,185	16,083
Percent of total	11.8%	18.6%	20.3%	17.5%
Percent of primary care	34.3	47.1	47.1	46.0
Pediatric medicine physicians				
Number	26,739	10,833	1,015	9,046
Percent of total	6.5%	9.5%	6.5%	9.8%
Percent of primary care	19.0	24.1	15.0	25.9

SOURCES: American Medical Association Physician Masterfile, 2000; and Health Resources and Services Administration Area Resource File, 2000.
NOTES: Nonfederal allopathic and osteopathic physicians who had completed residency training and were involved in direct patient care. USMG is U.S. medical graduate. IMG is international medical graduate. US-IMG is a U.S.-born IMG. FB-IMG is foreign-born IMG. Except for the difference between the percentage of primary care physicians for US-IMGs and FB-IMGs in internal medicine ($p = .09$), all differences between USMGs/IMGs and between US-IMGs/FB-IMGs were statistically significant at $p < .01$.

were twice as likely as USMG pediatricians were, to work in an RUA. In contrast, US-IMG internists were as likely as USMG internists were, but US-IMG pediatricians were less likely than USMG pediatricians were, to practice in an RUA.

Discussion

As of 2000, IMGs were no more likely than USMGs were to locate in rural underserved areas. Interventions to use IMGs as primary care physicians in RUAs, such as visa programs, have been no more effective overall than natural selection by USMGs has been. However, the primary care specialty distribution of IMGs in RUAs differed from that of USMGs: USMGs were more likely to be family physicians, and IMGs were more likely to be internists and pediatricians.

■ **Policy implications.** Because USMGs are more likely than IMGs are to be family physicians in RUAs, policies increasing the number of USMGs may be more desirable than those that would increase the number of IMGs. Because the specialty distribution of US-IMGs in RUAs resembles that of USMGs, targeted policies that distinguish U.S.-born from foreign-born IMGs may also be beneficial. Family physicians are trained to provide primary care to both children and adults and can also

EXHIBIT 2
Number Of Practicing Primary Care Physicians In Rural Underserved Areas (RUAs), 2000

Physician specialty	USMG	IMG	US–IMG	FB–IMG
Total primary care physicians	140,587	45,043	6,764	34,987
Primary care physicians in RUAs				
Number	3,017	925	99	718
Percent of total primary care	2.1%	2.1%	1.5%	2.1%
Family practice physicians in RUAs				
Number	1,843	202	51	136
Percent of total primary care	1.3%	0.4%	0.8%	0.4%
Percent of primary care in RUA	61.1	21.8	51.5	18.9
General practice physicians in RUAs				
Number	644	131	21	110
Percent of total primary care	0.5%	0.3%	0.3%	0.3%
Percent of primary care in RUA	21.3	14.2	21.2	15.3
Internal medicine physicians in RUAs				
Number	383	459	24	361
Percent of total primary care	0.3%	1.0%	0.4%	1.0%
Percent of primary care in RUA	12.7	49.6	24.2	50.3
Pediatric medicine physicians in RUAs				
Number	147	133	3	111
Percent of total primary care	0.1%	0.3%	<0.1%	0.3%
Percent of primary care in RUA	4.9	14.4	3.0	15.5

SOURCES: American Medical Association Physician Masterfile, 2000; and Health Resources and Services Administration Area Resource File, 2000.
NOTES: Nonfederal allopathic and osteopathic physicians who had completed residency training and were involved in direct patient care. USMG is U.S. medical graduate. IMG is international medical graduate. US-IMG is U.S.-born IMG. FB-IMG is foreign-born IMG. Except for the difference between the percentage of total primary care physicians for USMGs and IMGs in primary care in RUAs ($p = .24$), the difference between the percentage of total primary care physicians for US-IMGs and FB-IMGs in general practice in RUAs ($p = .96$), and the difference between the percentage of total primary care physicians in RUAs for US-IMGs and FB-IMGs in general practice in RUAs ($p = .13$), all differences between USMGs/IMGs and US-IMGs/FB-IMGs were statistically significant at $p < .01$.

provide obstetrical care. The geographic distribution of family physicians reflects the distribution of the U.S. population, and eliminating family physicians would increase the number of whole-county HPSAs by 170 percent.[11] If, however, the goal is to have a supply of internists and pediatricians in areas with high concentrations of geriatric and pediatric populations, respectively, then current polices encouraging IMGs may be useful. Since a substantial number of rural areas continue to be underserved, having any primary care physician may be preferable to having no primary care physician.

Irrespective of whether resident physicians graduated from medical schools in or outside the United States, only 2.1 percent of people training in primary care specialties are expected to locate in RUAs. Based on our findings, IMGs do not appear to be the solution to physician shortages in RUAs, since their pattern of contributing to the overall physician supply and distribution in these is similar to that for USMGs. Although IMGs are a means of increasing the physician supply without increasing the number of U.S. medical students, some have suggested increas-

EXHIBIT 3
Odds Of Primary Care Physicians' Working In Rural Underserved Areas (RUAs) Compared With USMG Family Physicians, 2000

	Odds ratio	Standard error	*p* value
Family practice			
USMG	1.00		
US-IMG	0.69	0.14	.01
FB-IMG	0.63	0.09	<.01
General practice			
USMG	1.55	0.05	<.01
US-IMG	1.37	0.22	.16
FB-IMG	0.85	0.10	.11
Internal medicine			
USMG	0.22	0.06	<.01
US-IMG	0.21	0.21	<.01
FB-IMG	0.64	0.06	<.01
Pediatric medicine			
USMG	0.16	0.09	<.01
US-IMG	0.09	0.57	<.01
FB-IMG	0.35	0.10	<.01

SOURCES: American Medical Association Physician Masterfile, 2000; and Health Resources and Services Administration Area Resource File, 2000.
NOTES: Nonfederal allopathic and osteopathic physicians who had completed residency training and were involved in direct patient care. USMG is U.S. medical graduate. US-IMG is U.S.-born international medical graduate (IMG). FB-IMG is foreign-born IMG.

ing the number of U.S. medical students.[12] The goal of workforce policy should not necessarily be to increase the absolute number of primary care resident physicians, but rather to increase the percentage that locate in RUAs.

Effectively recruiting physicians to rural underserved areas has been demonstrated for some programs. These include the Physician Shortage Area Program in medical school, scholarship and loan forgiveness programs through states, and federal Title VII programs.[13] Physicians participating in federal programs that function to increase health care access in RUAs, such as the Indian Health Service and National Health Service Corps (NHSC), were not included in this study. The NHSC alone provides more than 800 physicians, 27 percent of the nonfederal USMGs in our study, working in rural HPSAs.[14] Increasing the size of the NHSC is another option to provide more primary care physicians to RUAs.

■ **Study limitations.** Although HPSAs are well entrenched in federal health policy, our use of whole-county HPSA designation as a proxy for medical underservice has limitations. By excluding rural partial-county HPSAs, we avoided including physicians who practiced in the county but did not care for the underserved; however, we also recognize that this may exclude physicians who did care for the underserved. In attempting to be conservative by using whole-county HPSAs, we also miss population HPSAs. Using a more precise unit of analysis such as rural-urban commuting areas or other measures of underservice such as infant mortality rate, socioeconomic status, and proportion nonwhite population might have pro-

duced more accurate estimates. However, we believe that our definition of *rural underservice* allows our findings and conclusions to be reasonably made.[15]

This study examines only the physician workforce in rural underserved areas, and no conclusions can be made about urban underserved areas. Preferred mailing addresses may not be the same as office addresses; however, a previous study estimated that 70 percent of preferred addresses in the Masterfile were office addresses and suggested that substantial confounding between country of medical school training and choice of preferred mailing address is unlikely.[16] We were unable to match county with preferred mailing address because of county designation problems in the ARF for 4.8 percent of USMGs and 8.6 percent of IMGs (16.4 percent of US-IMGs and 6.3 percent of FB-IMGs), which may confound results. We also were not able to evaluate visa status. Further research incorporating visa status is warranted.

This study presents the most current assessment of the effect of previously enacted physician workforce policies and provides a benchmark for future comparison. With current policies in place, primary care IMGs are no more likely than primary care USMGs are to practice in rural underserved areas, although their specialty distribution differs. Given the belief by many groups that physicians are oversupplied but poorly distributed, the focus of future policies should be directed at increasing the percentage of primary care physicians who locate in rural underserved areas, with attention given to the appropriate primary care specialty distribution.

Statements made in this paper do not represent the official policy or endorsement of the U.S. government. Also, the information and opinions contained in research from the Robert Graham Center do not necessarily reflect the views or policy of the American Academy of Family Physicians.

NOTES

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