
International Medical Graduate Physicians In The United States: Changes Since 1981

The United States relies on IMGs to serve as family practice physicians, especially in underserved and rural areas.

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ABSTRACT: Nearly a quarter of all active U.S. physicians are international medical graduates (IMGs)—physicians trained outside the United States and Canada. We describe changes in characteristics of IMGs from 1981 to 2001 and compare them with their U.S. medical graduate (USMG) counterparts. Since 1981, the leading source countries for IMGs have included India, the Philippines, and Mexico. IMGs were more likely to be generalists and to practice in designated underserved areas than USMGs but slightly less likely to practice in isolated small rural areas and persistent-poverty counties. IMGs are an important source of primary care physicians in rural and underserved areas. [*Health Affairs* 26, no. 4 (2007): 1159–1169; 10.1377/hlthaff.26.4.1159]

INTERNATIONAL MEDICAL GRADUATES (IMGs)—physicians working in the United States who graduated from medical schools outside of the United States and Canada—account for almost a quarter of all of the nation's active physicians.¹ IMGs play a major role in the U.S. health system—approximately 180,000 are currently practicing—but the future of that role is part of the debate about whether physicians are in shortage or oversupply in the United States.²

After graduating from foreign medical schools, IMGs must pass multiple hurdles to practice medicine in the United States, including combinations of securing a visa, obtaining Educational Commission for Foreign Medical Graduates (ECFMG) certification, completing residency training, and acquiring visa waivers. Fitzhugh Mullan indicates that 12.5 percent of IMGs were born in the United

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States.³ The avenues through which noncitizen IMGs can obtain visas to study and practice have changed over several decades, with restrictions heightening in the 1970s as a result of physician surplus fears, and again after the terrorist attacks of September 2001, when general immigration policy became more restrictive.⁴

About half of the IMGs who are not already citizens or permanent residents begin their U.S. medical careers by obtaining J-1 visas that allow training through U.S. residencies.⁵ Following their training, J-1 visa recipients must leave the United States for at least two years before applying to return. An exception is made if the IMG obtains a J-1 visa waiver, which usually requires agreement to practice for a specified period in a federally designated health professional shortage area (HPSA). Those who strongly support large inflows of IMGs have been from states with rural areas and large urban hospitals with physician shortages.

The number of J-1 waivers allowed and granted, and how they are administered, has varied over time, influencing the quantity and type of IMGs. With J-1 visa waivers, IMGs can practice, for example, under the Conrad 30 Program, which allows each state to recommend thirty new J-1 visa waivers per year. J-1 visa waivers can be recommended through other government entities, called “interested government agencies” (IGAs). The U.S. Department of Health and Human Services (HHS), the Delta Regional Authority, the Appalachian Regional Commission, and a few other entities provide the mechanisms by which waivers are issued.⁶ Many IMGs, including those with J-1 visa waivers, go on to seek visas that allow more permanent residence, and some become permanent residents or citizens.

To help inform the national policy debate about how many and what types of physicians should be trained and allowed to practice in the United States, this study examines temporal trends in IMG migration and practice and compares the roles and characteristics of IMGs with those of physicians trained at U.S. and Canadian medical schools from 1981 through 2001.

Study Data And Methods

■ **Data.** This study used data on all allopathic and most osteopathic physicians from five-year intervals from the American Medical Association (AMA) physician files: 1981, 1986, 1991, 1996, and 2001. IMGs were defined from the AMA file as having graduated from non-U.S. or Canadian medical schools.

Special case of Canadian graduates. Canadian medical school graduates (CMGs) were not counted among IMGs because the Association of American Medical Colleges (AAMC) accredits medical schools in both the United States and Canada, the medical school training in the two countries is very similar, the cultural and geographic milieu are similar, and it is unlikely that changes in U.S. IMG policies would include changes regarding CMGs. The number of CMGs practicing in the United States increased from 5,122 in 1981 to 7,559 in 2001, although the percentage of U.S. physicians that these numbers represent decreased from 1.6 percent to 1.3 percent. Of CMGs, 21 percent were born in the United States. Clearly,

CMSGs practicing in the United States make major patient care contributions and are excluded from IMG discussion because of the reasons cited above and because they are a special case.

Other exclusions. Physicians were not included in this study if they had military status, an “inactive” employment code, a non-U.S. address, resident-in-training status, or an age greater than 100 or if their location could not be determined.

Specialty designations. “Patient care” physicians were defined as those having of-fice-based, hospital staff, or locum tenens as their professional activity in the AMA file. Generalist providers were defined as having primary specialty designations of family practice (FP), general practice (GP), general pediatrics, or general internal medicine.

Demographics. AMA data were also used to determine providers’ demographics and practice locations. Area Resource Files (ARFs) were used as a source of geographic HPSA information for each of the five study years.⁷ A geographic HPSA is a federal designation that indicates the area (all or part of a county) has shortages of primary care physicians. Persistent-poverty counties are those counties having 20 percent or more of their population below the poverty level for three previous decades, as designated by the Economic Research Service from its 1994 Economic Typology. Approximately 535 of the nation’s nonmetropolitan counties qualified.⁸

The rural/urban location of each provider was determined by linking the AMA practice location ZIP code with Rural-Urban Commuting Area (RUCA) designations.⁹ RUCAs are a geographic taxonomy based on core populations and work commuting flows. Using the ZIP code version 1.11, the thirty RUCA categories were aggregated into urban, large rural, small rural, and isolated small rural areas.

■ **Analysis methods.** Statistical tests for differences were not applied in this study because the entire population of U.S. physicians being examined and the AMA Masterfile has near-universal coverage. Although such tests could have been employed, it was determined that although even small differences were statistically significant, all meaningful differences were statistically significant. For instance, the 95 percent confidence interval around the 2001 figure of 25.60 percent female IMGs is 25.37, 25.83.

Study Results

■ **Countries of medical schools.** In 2001 the majority of IMGs working in the United States graduated from medical schools in seven countries: 32,822 (20.3 percent) from India, 17,357 (10.7 percent) from the Philippines, 10,049 (6.2 percent) from Mexico, 7,310 (4.5 percent) from Pakistan, 5,311 (3.3 percent) from China, and 4,300 (2.7 percent) from the Republic of Korea.¹⁰ While India and the Philippines have retained the top two positions since 1981, the rankings of other countries have changed. Mexico and the Republic of Korea have remained among the top seven countries since 1981. Increases in graduates from Pakistan, China, and the Dominican Republic moved those countries into the most frequent seven as Italy, Germany,

“High percentages of the IMGs from certain countries consistently migrate to specific states with large cities.”

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and the United Kingdom dropped out of the top seven. Many foreign medical schools have more of their graduates practicing in the United States than do some individual U.S. medical schools.¹¹ IMGs from Mexico and many Caribbean medical schools were predominantly U.S.-born IMGs (USIMGs).

■ **Destinations.** The majority of IMGs were located in ten states, and the top ten have remained unchanged since 1981. By frequency of IMGs for 2001, they were New York, New Jersey, Pennsylvania, Ohio, Maryland, Florida, Illinois, Michigan, Texas, and California. These states contained 70.5 percent of the nation’s IMGs in 2001 (73.0 percent in 1981). The distribution of IMGs in 2001 was dominated by large cities, most of which tended to be located in the eastern United States.¹² The greatest increases in IMGs numbers by location since 1981 were in the areas of the country with the largest cities. Small increases and some decreases in the number of IMGs have occurred in more rural and less populated areas.

High percentages of the IMGs from certain countries consistently migrate to specific states with large cities. For instance, in 2001, relatively high percentages of the IMGs trained in Central and South American countries were in Florida: Colombia (25 percent), Cuba (67 percent), Dominican Republic (32 percent), Jamaica (29 percent), Nicaragua (48 percent), Panama (33 percent), and Venezuela (33 percent). Likewise, high percentages from Europe were in New York: Belgium (24 percent), Italy (34 percent), and Switzerland (35 percent); 34 percent of IMGs from Israel were in New York as well. California had high percentages from Pacific Asian countries such as China (24 percent) and Hong Kong (32 percent).

Some states have relatively high concentrations of IMGs from particular countries. For instance, physicians from India constitute 26 percent of the IMGs in Alabama, 25 percent of those in Georgia, 28 percent in Iowa, 26 percent in Mississippi, 25 percent in Montana, and 27 percent in West Virginia. IMGs from India are more evenly distributed across the nation than IMGs from nearly all other countries. These patterns are generally extensions of patterns that existed in 1981.

■ **Number and work settings.** During the study period, the total number of U.S. physicians increased 81 percent—from 380,300 to 687,019. The IMG percentage among all physicians increased from 21.6 percent to 23.6 percent—growth of 97 percent in numbers. In 2001, 9.7 percent of all IMGs were located in rural areas, compared with 13.0 percent of U.S. medical graduates (USMGs; that is, 15,678 IMGs and 68,005 USMGs).

There have been major changes in IMG and USMG distribution by major professional activity during the two decades. Compared with USMGs, relatively fewer IMGs are involved in administration, medical research, and teaching. The number of IMGs in office-based practice increased from 64.9 percent in 1981 to

72.7 percent in 2001, with a corresponding decrease in numbers of those in hospital-based practice from 16.6 percent to 11.8 percent (USMG figures are 78.0–79.2 percent and 7.1–8.2 percent). Among IMGs, those providing direct patient care increased from 81.5 percent in 1981 to 84.6 percent in 2001 (USMGs changed from 85.0 percent to 87.4 percent).

■ **Demographic characteristics.** The mean age of patient care IMGs was older in 2001 than in 1981, and IMGs in 2001 were on average nearly three years older than USMGs (Exhibit 1). Although the percentage of female IMGs was slightly higher than for USMGs in 2001, the gap closed dramatically over the study period. Most IMGs reported that they were non-Hispanic and either white or Asian/Pacific Islander, compared with USMGs, who are primarily non-Hispanic and white (Exhibit 1). The percentage of IMGs who are white or non-Hispanic decreased somewhat since 1981, whereas the percentage among USMGs increased 8 percent.

■ **Specialty.** In 2001, patient care IMGs were more likely than USMGs to be generalists, while the opposite was true in 1981 (Exhibit 2). Among generalist physicians across the study period, the percentage of IMGs who were general internists increased from 13 percent to 19 percent (Exhibit 3). The percentage of FPs decreased slightly; that of general pediatricians stayed about the same. USMGs changed little. The percentage of specialist IMGs decreased from 67 percent to 61 percent, and that of specialist USMGs increased slightly.

■ **IMGs in places of need.** *Rural areas.* In total, 14.9 percent of USMGs and 11.7 percent of IMGs practiced in rural areas in 1981, compared with 13.8 percent and

EXHIBIT 1
Number And Demographic Characteristics Of U.S. Medical Graduates (USMGs) And International Medical Graduates (IMGs) Providing Patient Care In The United States, 1981–2001

	1981		1986		1991		1996		2001	
	USMG	IMG	USMG	IMG	USMG	IMG	USMG	IMG	USMG	IMG
No. of MDs	253,415	67,045	289,694	81,552	348,683	92,909	399,225	115,082	459,090	137,000
Percent of all patient care MDs	79.1%	20.9%	78.0%	22.0%	79.0%	21.0%	77.6%	22.4%	77.0%	23.0%
Age (years) ^a										
<40	35.1%	32.5%	36.2%	23.9%	35.6%	17.0%	28.3%	17.4%	23.7%	17.5%
40–59	45.6%	56.7%	44.6%	63.0%	47.1%	65.4%	54.9%	63.0%	59.1%	57.4%
>60	19.3%	10.9%	19.2%	13.2%	17.4%	17.6%	16.7%	19.7%	17.2%	25.1%
Mean age (years)	47.2	45.8	47.0	47.5	46.5	49.5	47.5	50.2	48.6	51.5
Percent female	7.2%	16.8%	10.5%	18.9%	15.2%	20.0%	18.8%	22.6%	22.8%	25.6%
Percent white, not Hispanic ^b	95.4%	39.2%	94.1%	38.9%	92.4%	39.8%	90.4%	36.8%	87.4%	34.2%

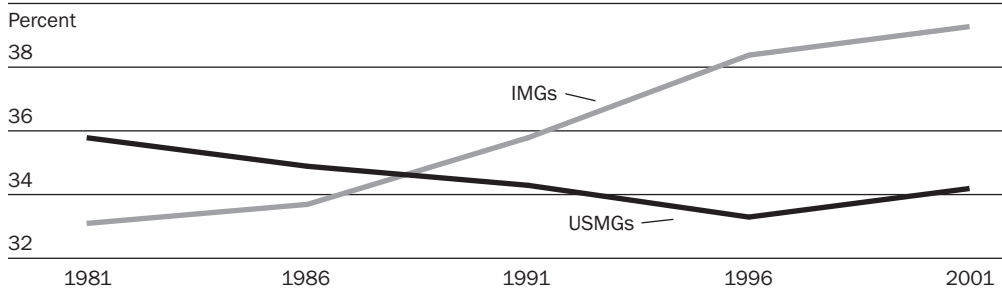
SOURCE: American Medical Association Physician Masterfile, 1981, 1986, 1991, 1996, and 2001.

^a Totals might not add to 100 percent because of rounding.

^b Percentage of respondents who answered the race/ethnicity question and reported their race/ethnicity as white, not Hispanic. Percentage “missing data” (percentage of all respondents who did not respond to the race/ethnicity question) was, from left to right: 43.5%, 59.3%, 40.7%, 53.9%, 42.6%, 53.9%, 41.3%, 56.3%, 36.7%, and 42.8%.

EXHIBIT 2

Percentage Of Patient Care International Medical Graduates (IMGs) And U.S. Medical Graduates (USMGs) Who Were Generalists, 1981–2001



SOURCE: American Medical Association Physician Masterfile, 1981, 1986, 1991, 1996, and 2001.

10.5 percent, respectively, in 2001. Nevertheless, despite this decline for both IMGs and USMGs, IMGs have remained relatively less likely than USMGs to practice in large rural (5.7 percent versus 7.8 percent), small rural (3.5 percent versus 4.2 percent), and isolated small rural areas (1.3 percent versus 1.9 percent). Nearly 17 percent of CMSGs practiced in U.S. rural areas in 2001.

When analysis is limited to generalist physicians, the percentage of IMGs providing care in isolated small rural areas remained relatively stable compared with USMGs: 2.4 percent of IMG generalists in 1981 and 2.0 percent in 2001, compared with 4.1 and 3.2 percent for USMGs (Exhibit 4). The percentage of all rural patient care generalist physicians accounted for by IMGs increased across the study period from 12.7 percent to 18.5 percent (from 2,864 to 6,827 IMGs). The rural

EXHIBIT 3

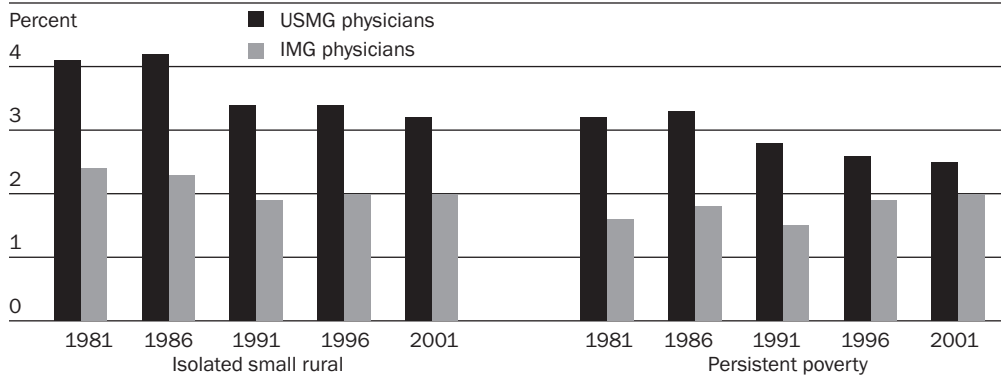
Percentage Of Patient Care U.S. Medical Graduate (USMG) And International Medical Graduate (IMG) Physicians, By Specialty, 1981–2001

	1981		1986		1991		1996		2001	
	USMG	IMG	USMG	IMG	USMG	IMG	USMG	IMG	USMG	IMG
No. of MDs	253,415	67,045	289,694	81,552	348,683	92,909	399,225	115,082	459,089	137,000
Generalists										
General internists	12.3%	12.6%	12.3%	13.0%	12.7%	15.0%	11.6%	18.0%	11.9%	19.4%
FPs/GPs	17.6	13.0	16.7	13.0	15.5	12.3	15.6	11.5	15.6	10.8
General pediatricians	5.8	7.5	5.9	7.8	6.2	8.5	6.1	8.9	6.5	9.0
Total generalists	35.7	33.1	34.9	33.8	34.4	35.8	33.3	38.4	34.0	39.2
Specialists										
Psychiatrists	6.0	8.1	5.7	7.9	5.6	7.8	5.3	7.4	4.8	6.9
General surgeons	6.5	7.1	5.7	6.3	5.0	5.7	4.3	4.8	3.9	4.0
Anesthesiologists	3.3	8.0	3.9	8.0	4.7	7.4	5.1	6.8	5.0	6.4
OB/GYNs	6.1	6.6	6.0	6.4	5.8	5.9	5.7	4.9	5.7	4.2
Other specialists	42.3	37.0	43.9	37.7	44.6	37.3	46.3	37.7	46.6	39.4
Total specialists	64.2	66.8	65.2	66.3	65.7	64.1	66.7	61.6	66.0	60.9

SOURCE: American Medical Association Physician Masterfile, 1981, 1986, 1991, 1996, and 2001.

NOTES: FP is family practitioner. GP is general practitioner. OB/GYN is obstetrician/gynecologist.

EXHIBIT 4
Percentage Of Patient Care International Medical Graduate (IMG) And U.S. Medical Graduate (USMG) Physicians In Isolated Small Rural Areas And Persistent-Poverty Counties, United States, 1981–2001



SOURCE: American Medical Association Physician Masterfile, 1981, 1986, 1991, 1996, and 2001.

population represented 22.4 percent of the U.S. population in 1998.¹³

Persistent-poverty counties. Few physicians practice in the nation's rural persistent-poverty counties. In 1981, patient care generalist IMGs were less likely than USMGs to practice in those counties, but by 2001, IMGs were nearly as likely as USMGs to do so (Exhibit 4). These counties contained 18.8 percent of the U.S. population in 1998.¹⁴ Only 1.3 percent of CMSGs were practicing in persistent-poverty areas in 2001.

HPSAs. The majority of rural patient care generalist physicians practiced in geographic HPSA counties (whole and part designated) (75.7 percent of IMGs and 67.2 percent of USMGs). Rural IMGs were relatively more likely than their USMG counterparts to practice in geographic HPSAs, and the more isolated the rural area, the greater the likelihood that IMGs worked in HPSA counties (Exhibit 4). In 2001, 84.0 percent of IMGs practicing in isolated small rural areas were in HPSAs, compared to 73.3 percent for USMGs. Between 1981 and 2001, there was an increase in the percentage of rural IMG and USMG physicians practicing in HPSAs, ranging from 51.2 percent to 69.6 percent for IMGs (47.2 percent to 62.4 percent for USMGs) in large rural areas to 64.8 percent to 84.0 percent for IMGs (64.6 percent to 73.8 percent for USMGs) in isolated small rural areas. The number of these IMGs in rural areas increased from 1,680 to 5,096 over the study period.

Discussion

■ **Study limitations/cautions.** This study has several limitations. It is dependent on AMA data, which have been shown to have several problems, especially delays in updating physician status changes in small areas.¹⁵ Because of this study's temporal trend nature, changes in AMA methods and data quality could influence

the findings. When we examined HPSAs, we looked at only geographic HPSAs, because it was not possible to determine whether physicians were practicing within population and facility HPSAs and whether they were caring for underserved populations. Rural location is emphasized more than urban location in the analyses because of the complexity of dealing with poverty and underserved areas in multifaceted urban environments. This study does not analyze graduation cohorts or their longitudinal changes, which mutes any cohort dynamics in favor of describing the aggregate situation in “snapshots.” The number of HPSAs and the nuances of their temporal definition modifications could account for some of the reported changes. The differential IMG/USMG effect should be small.

Also, it was not possible in this study to divide the IMG group into U.S.-born IMGs (USIMGs) and foreign-born IMGs, because the study's data did not include birth location. Even if the AMA data files had included birth location, these data were missing for 44.9 percent of IMGs.¹⁶ Most identifiable USIMGs attended medical school in Italy, Switzerland, the Philippines, Belgium, Israel, Mexico, and the Caribbean, with the latter three accounting for many of the graduates since 1990.¹⁷ It is increasingly important to perform research with more complete data that allow USIMGs and foreign-born IMGs to be differentiated, given the relative increases in USIMGs.

Finally, CMSGs were not counted among the IMGs in this study because of the reasons described in the methods section. Nevertheless, their numbers in 2001 (7,559) would make Canada the fourth-largest producer of medical school graduates of any nation outside the United States. More than 61 percent of CMSGs were located in eleven states (for example, California, 17 percent; New York, 8 percent; Texas, 7 percent, and Massachusetts, 6 percent). Owing to special circumstances, CMSGs need to be examined in detail separately from other IMGs.

■ **Shifting concentration of IMGs.** Since 1981, India, the Philippines, Mexico, and the Republic of Korea have remained leading IMG-origin countries. While the number of IMGs trained in many “developed” countries has increased, their rank (in training of total IMGs at each of the five points in time) has decreased because the number of IMGs from countries such as Pakistan, China, and the Dominican Republic has increased more rapidly. The greatest concentration of IMGs is in the urban centers and generally east of the Mississippi, and those centers attracted increasing numbers of IMGs from 1981 to 2001.

■ **Other complementary findings.** This study's findings complement the recent findings of John Boulet and colleagues.¹⁸ Their study provides information on the IMG training pipeline, while this study examines IMGs after entering U.S. practice. Because practicing physicians in 2001 entered residencies before 1998, the Boulet findings provide information that foreshadows changes after this study's 2001 results. The two studies' findings often agree, but because many IMGs return to origin countries after training and practice, examination of IMGs in post-training U.S. practice is needed to fully understand their changing role.

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■ **Summary of salient findings.** The number of both IMGs and USMGs increased dramatically since 1981, with the percentage who are IMGs increasing relatively more. IMGs are increasingly female since 1981, but the percentage of USMGs who are women is catching up. IMGs continue to be much more non-white and Hispanic than USMGs.

In 2001, IMGs were more likely than USMGs to be generalists, while the opposite was true in 1981. Among these generalists, the percentage who are FPs has decreased (for both IMGs and USMGs), but the percentage who are general internists has increased for IMGs (but not USMGs). Of the patient care hospital-based physicians, the percentage who are IMGs decreased.

Between 1981 and 2001, IMGs remained less likely than USMGs to practice in rural areas and persistent-poverty counties, despite their rural numbers' increasing by 90 percent and 203 percent, respectively. IMGs are more likely than USMGs to practice in rural HPSAs, which is not surprising because new IMGs with visa waivers are obligated to practice in HPSAs, although some USMGs are also so obligated through their participation in the National Health Service Corps (NHSC) and state repayment obligations. Regardless of whether the IMG contribution to rural, persistent poverty, and designated shortage areas is proportionately more or less than the USMG contribution, they are an important part of the nation's health care delivery system. The percentage of rural patient care generalist physicians accounted for by IMGs increased by more than 45 percent from 1981 to 2001, and IMGs have been shown to be essential to the nation's small rural Critical Access Hospitals.¹⁹

■ **Policy implications.** The United States relies on IMGs to provide nearly a quarter of its physician care. The debates continue as to how many and what types of physicians should be trained. Understanding the trends in IMG immigration and practice is important for determining how best to train an adequate supply of physicians. It also highlights the question regarding the extent to which medical education policy should continue to support the U.S. medical system as a “pull” factor that draws physicians from around the world, including many from developing countries with severe physician shortages. Mullan and Amy Hagopian and colleagues indicate that 63–64 percent of IMGs come from low- and lower-middle-income countries.²⁰ However, these concerns need to be weighed against limiting individual choice and in light of the existence of strong “push” factors in foreign IMG-source countries. “Push” and “pull” issues are multifaceted and complex and are colored by points of view and politics.²¹

The number of medical school graduates matching into FP residencies in the United States has declined every year since 1998, except for 2006, which showed

an increase of 147 (still 146 fewer than in 1998).²² Since 1998, the number of these matches filled by IMGs has dramatically increased.²³ There is more and more reliance on IMGs as FP providers, especially in designated underserved and rural areas. While the number of physicians per capita rose sharply for most of the nation during the study period, only small gains were experienced in small rural and previously underserved areas. In addition, the overall policy implications of increases in USIMGs need to be better understood, and the trends regarding origins, destinations, and practice need to be better quantified.

The AAMC recently advocated a 15 percent increase in the nation's medical school enrollment.²⁴ If this increase is implemented, the future generalist role of IMGs in the United States will be affected by the specialties selected by the growing number of USMGs, not to mention immigration policies and the growing number of USIMGs. This situation is further complicated because the current federal funding for primary care physician residency training is tenuous.

This paper highlights IMG trends through 2001. The visa and immigration situation was dramatically affected by the terrorist attacks in that year, and it is now more difficult for many foreigners to enter and practice in the United States. If the number of IMGs able to work in the United States in future years is reduced because of these restrictions, access to primary care might be further limited for underserved populations.

RESULTS FROM THIS STUDY should inform policy discussions regarding medical school enrollment, immigration and visa waiver policies, physician residency position numbers and specialty mix, NHSC numbers, Medicare Incentive Program payment, Title VII funding, and other programs affecting physician supply. The goal is for policymakers to best meet the needs of all of the nation's population; we hope that the information we have produced will heighten their consideration of how U.S. policies influence other countries.

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