TRENDS

The International Medical Graduate Pipeline: Recent Trends In Certification And Residency Training

IMGs could provide an important source of physician labor in underserved areas, but several policy issues remain problematic.

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ABSTRACT: International medical graduates (IMGs) represent a large proportion of the population entering graduate medical education (GME) programs. Many of these internationally trained physicians go on to practice medicine in the United States. To be eligible for GME, IMGs must be certified by the Educational Commission for Foreign Medical Graduates (ECFMG). The number of certificates issued by the ECFMG has varied over time and historically has exceeded the number of available training positions. More detailed longitudinal analyses are required to better understand the interwoven issues of physician supply, consumers' needs, and the role of IMGs in the U.S. health care system. [*Health Affairs* 25, no. 2 (2006): 469–477; 10.1377/hlthaff.25.2.469]

PHYSICIANS WHO DID not attend medical schools in the United States or Canada, referred to as international medical graduates (IMGs), play an integral role in the U.S. health care system. Such physicians now represent approximately 25 percent of practicing doctors nationwide.[1] Because successful residency training is a prerequisite for licensed practice in the United States, IMGs also make up a sizable portion of physicians in graduate medical education (GME).[2] The large number of IMGs in the United States, in both graduate training and licensed practice, demands that this physician cohort be considered when studying present and future U.S. health care practitioners' needs.[3]

To enter a U.S. GME program accredited by the Accreditation Council for Graduate Medical Education (ACGME), IMGs are required to achieve certification by the Educational Commission for Foreign Medical Graduates (ECFMG).[4] Requirements for certification have varied over time, but they have typically included both a check of medical credentials and one or more examinations.[5] Throughout the credentialing process, the ECFMG has maintained comprehensive records on all applicants, including detailed demographics, examination results, and, more recently, resi-

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dency training status. In addition, starting in 1971, the U.S. Department of State designated the ECFMG as the visa sponsor for all J-1 exchange visitor physicians who participate in clinical training programs. To train in a residency program, physicians who are not U.S. citizens or permanent residents must secure an appropriate work visa. Unfortunately, while additional information is available for J-1-sponsored IMGs entering GME, the majority of IMG trainees neither need nor use this nonimmigrant visa pathway to work legally in the United States. More important, other than J-1 sponsorships, the ECFMG has no responsibility for tracking IMGs' visa status.

Historically, a large number of available GME positions have been secured by IMGs. In fact, there are more entry-level positions than available U.S. medical graduates (USMGs). Depending on societal needs and immigration issues, including available visa sponsorships and associated waivers to obligations to return to the home country following GME, IMGs can remain in the United States once they complete residency training, contributing to both the patient care and academic workforces.[6] Knowing the characteristics and specialty training choices of these people provides an early, albeit somewhat imperfect, marker of the future composition of the U.S. physician workforce.

Obtaining an ECFMG certificate marks the point at which it becomes possible for an IMG to enter the U.S. health care system. Therefore, from a workforce perspective, it is crucial to know the number of internationally trained physicians who have the potential to train in U.S. GME programs. Likewise, since many IMGs remain in the United States after this specialty training, knowing their demographic characteristics is also important.

We have two goals in this study: first, to document ECFMG certification trends during 1980–2004, and second, to describe residency placement of IMGs during 1995–2003.

Study Data And Methods

■ **Data sources.** For the description of certification trends during 1980–2004, we used ECFMG records. Available ECFMG applicant information includes demographics such as citizenship at medical school, sex, age, country of medical school, year of certification, and so on; performance data (for example, U.S. Medical Licensing Examination, or USMLE, and Clinical Skills Assessment, or CSA); and various international medical school characteristics (such as location). For this study, we used citizenship at medical school and certification date.

Once IMGs started GME in the United States, they were all required to have their certificates permanently validated by the ECFMG by submitting a Form 246. Permanent validation was essential since two obligatory elements of the certificate (Test of English as a Foreign Language, or TOEFL, and CSA) lapsed if the person did not obtain a qualified residency position within three years of its issuance. Permanent validation was instituted in 1995–1996 and dropped in 2004 when both TOEFL and the CSA were discontinued as certification requirements. To describe the residency placement of IMGs, we used information from Form 246, including the institution entered, institution address, graduate program identification, program specialty, and the date the applicant started the ACGME-accredited program. Personal data were supplied by individual residents. Residency program information was supplied by an appropriate official in charge of the program. Form 246 data can be linked to ECFMG certification data through a common identifier.

Since residency data for 2004 were incomplete, this part of the study was restricted to people who entered a program between 1995 and 2003. These data are based on IMGs whose certificates were permanently validated; thus, they do not necessarily include all IMGs in all programs, especially more recent GME trainees. Unfortunately, although visa information is known for certain people (such as those having ECFMG J-1 sponsorships) and can be linked to other ECFMG data, this group represents only approximately 20 percent of the IMG population in residency programs. Therefore, questions concerning visa

status were not addressed in the analysis.

■ **International medical school graduates.** Physicians who completed their medical education in schools outside the United States and Canada, regardless of citizenship, are considered IMGs; USMGs are physicians who have graduated from Liaison Committee on Medical Education (LCME)–accredited medical schools in the United States and Canada.

Although most IMGs are not U.S. citizens, a sizable proportion of all ECFMG certificate holders were born in the United States or became U.S. citizens. For purposes of this study, a U.S. citizen IMG (USIMG) was defined as a person who was a U.S. citizen at the start of medical school. The remaining IMGs are referred to as non-USIMGs.

Study Results

■ **Trends in ECFMG certification.** Between 1992 and 1998 there was a general upsurge in the total number of ECFMG certificates issued (Exhibit 1). In 1999 there was an appreciable drop in the number of certificates

EXHIBIT 1
ECFMG Certificates Issued To USIMGs And Non-USIMGs, 1980–2004

		USIMGs		Non-USIMGs	
Year	Total certified	Number	Percent	Number	Percent
1980	5,886	682	11.6	5,202	88.4
1981	7,263	1,177	16.2	6,085	83.8
1982	6,952	1,360	19.6	5,592	80.4
1983	7,363	1,491	20.3	5,870	79.7
1984	7,811	1,574	20.2	6,236	79.9
1985	4,743	1,105	23.3	3,634	76.7
1986	3,885	731	18.8	3,153	81.2
1987	3,938	803	20.4	3,134	79.6
1988	4,200	830	19.8	3,368	80.2
1989	4,337	605	14.0	3,731	86.1
1990	4,982	581	11.7	4,401	88.3
1991	4,946	448	9.1	4,497	90.9
1992	12,246	610	6.6	11,436	93.4
1993	10,857	525	4.8	10,331	95.2
1994	8,707	427	4.9	8,281	95.1
1995	9,525	528	5.5	8,997	94.5
1996	12,128	749	6.2	11,378	93.8
1997	10,297	907	8.8	9,390	91.2
1998	11,815	1,059	9.0	10,756	91.0
1999	5,652	1,234	21.8	4,419	78.2
2000	5,132	1,388	27.0	3,745	73.0
2001	5,934	1,519	25.6	4,410	74.4
2002	5,429[a]	1,423	26.3	3,989	73.7
2003	9,164	1,573	17.2	7,576	82.8
2004	6,004[b]	1,360	22.6	4,644	77.4
Total[c]	179,209	24,916	13.9	154,259	86.1

SOURCE: Educational Commission for Foreign Medical Graduates (ECFMG).

NOTE: USIMG is U.S. citizen international medical graduate—someone who was a U.S. citizen when he or she started medical school in another country.

[a] The availability of exam results for candidates taking the Clinical Skills Assessment (CSA) in the fall of 2002 was delayed untili January 2003. As a result, the number of certificates issued does not reflect increased demand for the required exams experienced in 2002, compared with 2001.

[b] The availability of exam results for candidates taking the U.S. Medical Licensing Examination (USMLE) Step 2 Clinical Skills (CS) examination in the fall of 2004 was delayed until January 2005. As a result, the number of certificates issues in 2004 does not reflect the overall demand.

[c] Includes thirty-four certificate holders with missing data for citizenship at medical school.

granted, followed by relatively stable volumes for the following five years.

Based on all certificates issued between 1980 and 2004, 13.9 percent have been awarded to USIMGs (Exhibit 1). This cohort represented approximately 20 percent of all certificates issued between 1982 and 1988. From 1989 to 1996 the number of certificates issued to U.S. citizens was much lower, averaging less than 600 per year. In 1997, USIMG certificate holders started to increase both in total numbers and as a percentage of the total certificate-holder population. During 2000–2004, 7,263 certificates were issued to USIMGs—22.9 percent of certificates issued.

Historically, ECFMG certificates have been issued to citizens of more than 170 countries (Exhibit 2). Data are presented for only the top fifteen countries in terms of overall certification volume during 1980–2004. More than half of ECFMG certificate holders were citizens of only six countries, at least as of entry to medical school. In terms of overall certification numbers, nearly 20 percent of all certificate holders were Indian citizens at medical school entry. The second-largest cohort was U.S. citizens.

Concentrating on 1995–2004, we observed a pattern of decreasing numbers of certificates issued for many countries, including Pakistan, the Philippines, the former Soviet Republics, China, Germany, Egypt, Israel, and Australia. Based on percentages of all certificates issued, some countries, such as Syria, Iran, and Lebanon, increased their representation in the certificate-holder pool, albeit only slightly. In terms of overall growth, at least during 1995–2004, U.S. citizens represent an increasing proportion of the certificate-holder population.

■ **IMGs in residency programs.** Between 1995 and 1998, the number of IMGs entering GME programs averaged about 5,400 (Exhibit 3). Between 1998 and 1999 there was an appreciable jump in this number. Consistent with this growth, the number of USIMGs entering

EXHIBIT 2
ECFMG Certificates Issued During 1980–2004 (Percent Of All Certificates), By Citizenship At Entry To Medical School

Citizenship at medical school entry	1980–84	1985–89	1990–94	1995–99	2000–04	Total, 1980–2004	Percent, 1980–2004
India	18.7%	12.9%	21.3%	20.4%	21.8%	35,224	19.7
United States	17.8	19.3	6.7	9.1	23.0	24,916	13.9
Pakistan	3.1	3.5	9.5	5.9	6.3	10,671	6.0
Philippines	7.5	3.9	7.6	4.2	2.6	9,543	5.3
USSR[a]	2.3	0.7	2.7	4.6	3.3	5,481	3.1
China	0.8	0.7	2.0	6.1	2.8	5,154	2.9
Germany[b]	2.6	5.0	2.2	2.8	1.7	4,790	2.7
Egypt	2.9	2.2	2.3	3.0	1.4	4,387	2.5
United Kingdom	2.5	3.5	2.6	1.7	1.3	3,965	2.2
Syria	1.4	1.6	2.6	1.8	1.9	3,380	1.9
Nigeria	0.7	1.2	2.4	2.4	1.9	3,307	1.9
Iran	1.3	1.8	1.2	2.2	2.3	3,159	1.8
Lebanon	1.2	1.2	1.4	1.3	1.8	2,606	1.5
Israel	1.6	2.9	1.2	1.4	0.6	2,535	1.4
Australia	1.1	2.8	1.8	1.1	0.5	2,380	1.3

SOURCE: Educational Commission for Foreign Medical Graduates (ECFMG).

NOTES: Countries are presented in the order of greatest percentage during the entire period. Space limitations precluded presenting the numbers from each country in each year. To obtain these data, contact the authors.

[a] Includes Ukraine, Georgia, Russia, Lithuania, Belarus, Uzbekistan, Moldova, Latvia, Estonia, Kazakhstan, Kyrgyzstan, Azerbaijan, Turkmenistan, and Armenia.

[b] Includes former East and West Germany.

EXHIBIT 3
Certified International Medical Graduates (IMGs) Entering Residency Programs, By Entry Year, 1995–2003

		USIMGs		Non-USIMGs	
Entry year	Total[a]	Number	Percent	Number	Percent
1995	5,410	413	7.6	4,997	92.4
1996	5,379	514	9.6	4,865	90.4
1997	5,414	674	12.5	4,740	87.5
1998	5,371	908	16.9	4,463	83.1
1999	5,905	1,049	17.8	4,856	82.2
2000	6,907	1,415	23.2	4,682	76.8
2001	6,170	1,453	23.6	4,717	76.5
2002	6,208	1,373	22.1	4,835	77.9
2003	6,004	1,150	19.2	4,854	80.8
Total[b]	51,958	8,949	17.2	43,009	82.8

SOURCE: Educational Commission for Foreign Medical Graduates (ECFMG).
NOTE: USIMG is U.S. citizen IMG—someone who was a U.S. citizen when he or she started medical school in another country.
[a] Total residents, based on Form 246 filings as of August 2004.
[b] 1995–2003.

GME also increased, reaching a peak of 1,453 in 2001.

More than 61 percent of all IMGs certified between 1995 and 2003 obtained residency positions (Exhibit 4). As a group, more-recent certificate holders (1999–2001) had a higher probability of obtaining a residency position. Although only approximately one-third of 2003 certificate holders had obtained residency positions, this reflects the time it takes to get accepted to a graduate training program, the potential lag in filing the Form 246, and incomplete residency data for 2004. Overall, USIMGs were far more likely than others to have obtained residency positions.

For the five specialties in which IMG most often train, we calculated the percentage of IMGs by residency program entrance year (Exhibit 5). This exhibit provides information, both cross-sectionally and longitudinally, concerning IMGs' specialty choices relative to all IMGs; it does not reflect the overall IMG composition of individual training programs.

Approximately half of all IMGs specialized in internal medicine during the years we examined. Family practice has seen relatively large growth in the number and percentage of IMGs. In 1995 only 6.3 percent of IMGs entering GME entered family practice residencies. In 2003, 15.8 percent did so. In contrast, between 1999 and 2003 the number of IMGs entering psychiatry residencies decreased from 8.5 percent to 5.8 percent.

In 1995, 4.7 percent of all residents entering programs in that year started residency programs in Pennsylvania (Exhibit 6). By 2003 this number had grown to 7.3 percent. The number of IMGs in training programs in New York also rose from 1999 to 2003, with nearly 27 percent of all certified IMGs training there in 2003. In contrast, between 1995 and 1997 approximately 8.5 percent of all IMGs entering GME programs went to California. In 2003 (the most recent year available) only 3.8 percent of IMGs entered GME programs there.

Discussion

Over time, the ECFMG has issued certificates to a large number of IMGs. Although these people are required to meet strict, albeit changing, certification requirements, including having to pass many of the same licensure examinations as students who attended LCME-accredited medical schools, many still

EXHIBIT 4
ECFMG Certificate Holders Obtaining Residency Positions, By Year Of Certification, 1995–2003

Year of certification	Certificates issued			Obtained residency position					
				Total[a]		USIMGs		Non-USIMGs	
	Total	USIMGs	Non-USIMGs	Number	Percent	Number	Percent	Number	Percent
1995	9,525	528	8,997	5,806	61.0	429	81.3	5,377	59.8
1996	12,128	749	11,378	7,135	58.8	607	81.0	6,528	57.4
1997	10,297	907	9,390	6,136	59.6	771	85.0	5,365	57.1
1998	11,815	1,059	10,756	6,620	56.0	915	86.4	5,705	53.0
1999	5,652	1,234	4,419	4,066	71.9	1,125	91.2	2,941	66.6
2000	5,132	1,388	3,745	4,164	81.1	1,315	94.7	2,849	76.1
2001	5,934	1,519	4,410	4,901	82.6	1,427	93.9	3,474	78.8
2002	5,429	1,423	3,989	4,137	76.2	1,264	88.8	2,873	72.0
2003	9,164	1,573	7,576	3,191	34.8	958	60.9	2,233	29.5
Total[b]	75,076	10,380[a]	64,660[c]	46,166	61.5	8,811	84.9	37,345	57.8

SOURCE: Educational Commission for Foreign Medical Graduates (ECFMG).

NOTE: USIMG is U.S. citizen international medical graduate—someone who was a U.S. citizen when he or she started medical school in another country.

[a] Based on Form 246 filings as of August 2004.

[b] 1995–2003.

[c] Total of values is less than 75,076 because citizenship data were missing for thirty-six IMGs.

do not secure residency positions. This is certainly linked to a restricted supply of available positions, but it also could be related to changing individual preferences. From a workforce perspective, if the number of training positions should increase, this relatively large pool of certified but untrained physicians could be available to serve the American public in a relatively short period of time. For IMGs who secure positions, the certification requirements have ensured that from a basic and clinical science perspective, they are ready to enter supervised GME training programs in the United States.[7] Overall, although there might be continuing controversy over the future role of IMGs in the U.S. health care system, this

EXHIBIT 5
Specialty Of International Medical Graduates (IMGs), By Entry Year, 1995–2003

Entry year	Internal medicine	Family practice	Pediatrics	Surgery—general	Psychiatry	Total
1995	3,004 (55.5)	342 (6.3)	697 (12.9)	329 (6.1)	423 (7.8)	5,410
1996	2,838 (52.8)	297 (5.5)	667 (12.4)	341 (6.3)	470 (8.7)	5,379
1997	2,753 (50.9)	330 (6.1)	599 (11.1)	426 (7.9)	471 (8.7)	5,414
1998	2,673 (49.8)	413 (7.7)	455 (8.5)	498 (9.3)	502 (9.3)	5,372
1999	2,872 (48.6)	591 (10.0)	448 (7.6)	580 (9.8)	504 (8.5)	5,905
2000	2,916 (47.8)	700 (11.5)	509 (8.4)	673 (11.0)	493 (8.1)	6,096
2001	3,020 (49.0)	864 (14.0)	489 (7.9)	642 (10.4)	452 (7.3)	6,163
2002	2,919 (47.0)	926 (14.9)	613 (9.9)	646 (10.4)	384 (6.2)	6,206
2003	3,000 (49.8)	949 (15.8)	603 (10.0)	484 (8.0)	346 (5.8)	6,019
Total[a]	25,995 (50.0)	5,412 (10.4)	5,080 (9.8)	4,619 (8.9)	4,045 (7.8)	

SOURCE: Educational Commission for Foreign Medical Graduates (ECFMG).

NOTE: Percentages within each year are shown in parentheses.

[a] 1995–2003.

EXHIBIT 6
State Of Program Entered By International Medical Graduates (IMGs), By Residency Entry Year, 1995–2003

Entry year	State								
	NY	PA	IL	CA	NJ	MI	TX	OH	Total
1995	858 (16.0)	255 (4.7)	299 (5.6)	456 (8.5)	258 (4.8)	269 (5.0)	338 (6.3)	232 (4.3)	5,410
1996	926 (17.3)	258 (4.8)	281 (5.3)	457 (8.6)	304 (5.7)	230 (4.3)	288 (5.4)	243 (4.6)	5,379
1997	1,052 (19.5)	256 (4.8)	327 (6.1)	456 (8.5)	295 (5.5)	216 (4.0)	292 (5.4)	235 (4.4)	5,414
1998	1,198 (22.4)	289 (5.4)	295 (5.5)	385 (7.2)	279 (5.2)	276 (5.2)	259 (4.8)	241 (4.5)	5,372
1999	1,409 (23.9)	409 (6.9)	379 (6.4)	361 (6.1)	398 (6.8)	319 (5.4)	234 (4.0)	297 (5.0)	5,905
2000	1,629 (26.9)	469 (7.7)	455 (7.5)	288 (4.8)	382 (6.3)	337 (5.6)	271 (4.5)	288 (4.8)	6,096
2001	1,635 (26.6)	442 (7.2)	434 (7.1)	271 (4.4)	359 (5.8)	402 (6.5)	290 (4.7)	325 (5.3)	6,163
2002	1,673 (27.0)	498 (8.1)	421 (6.8)	318 (5.1)	356 (5.8)	358 (5.8)	251 (4.1)	318 (5.1)	6,206
2003	1,611 (26.8)	441 (7.3)	385 (6.4)	226 (3.8)	340 (5.7)	339 (5.6)	304 (5.1)	332 (5.5)	6,019
Total[a]	11,991 (23.2)	3,317 (6.4)	3,276 (6.3)	3,218 (6.2)	2,917 (5.7)	2,746 (5.3)	2,527 (4.9)	2,511 (4.9)	

SOURCE: Educational Commission for Foreign Medical Graduates (ECFMG).
NOTE: Percentages within each year are shown in parentheses.
[a] 1995–2003.

group of physicians makes up a sizable proportion of the workforce, caring for millions of patients each year.[8]

Changes in certification volume, especially for certain physician cohorts, will certainly affect GME training and physician supply, both in the United States and abroad. In 1992 the number of certificates issued by the ECFMG rose, probably reflecting IMGs' desire to avoid the initial administration of the USMLE. In 1999 the overall number of certificates issued dropped considerably, likely at least in part because of changes in ECFMG certification requirements (that is, introduction of the CSA), computerized examination delivery, and examination cost. Regardless of the cause, changes in the number of IMG certificate holders, especially among people who are more likely to stay in the United States or who are more recent graduates, or both, could eventually have an impact on physician supply and, depending on their numbers, relative abilities, and distribution, the quality of care.

In parallel with recent increases in number of ECFMG certificates issued to U.S. citizens, the number of USIMGs entering GME programs has also grown. They now account for approximately 20 percent of the approximately 6,000 IMGs in postgraduate year 1 GME training positions. Although this trend might simply reflect a lengthier process, often involving visa petitions, that non-USIMGs must endure to secure residency positions, USIMGs, as a percentage of the overall yearly certification volume, were far more likely than non-USIMGs to secure training positions. Here, certain selection-related factors (such as clinical experience in the U.S. medical care systems and immigration and visa issues) could favor the USIMG group. Regrettably, although studies have been completed to document where USIMGs obtain their medical degrees, specific information concerning the quality of their training is limited.[9] If USIMGs are going to continue to make up a large proportion of the IMG residency population, and assuming that these people are more likely to eventually become part of the practicing U.S. physician pool, physician workforce projections, including practice patterns and locations, need to account for this trend.[10]

Similar to results from previous research, our data show that IMGs tend to be selected, at least initially, to primary care residency programs.[11] Training in a primary care specialty does not preclude eventual subspecialization; however, the majority of IMGs who finish internal medicine training do not subspecialize.[12] Furthermore, their subspecialization rate is only marginally higher than that of U.S.

graduates. Therefore, if the number of IMGs in GME positions were to change, and specialty choices remain steady over time, access to generalist physicians could be affected. For some specialties (such as family medicine), the overall number and proportion of IMGs in programs have been growing steadily. Interestingly, the percentage of U.S. students matching to primary care specialties (internal medicine, pediatrics, and family medicine) peaked at 53.2 percent in 1998 and declined to 44.2 percent in 2002.[13] Some primary care functions might be being met by nurse practitioners and physician assistants; however, increases in the number of IMGs training in the associated specialties would suggest that this group is filling gaps left vacant because of changes in U.S. medical students' career preferences. For IMGs who are not U.S. citizens or permanent residents, this might reflect their willingness to enter specialties that could increase their odds of being able to remain in the United States because of societal need for their services.[14]

"Changes in the characteristics of certificate holders and IMG residents underscore the complex nature of physician migration."

We also found that IMGs' residency locations tend to be concentrated in relatively few states, with a large proportion training in New York. This finding in itself is not remarkable, in that a large percentage (13.4 percent) of the approximately 8,000 residency programs are located in this state.[15] More important, for states such as California, the number of IMGs entering training programs has dropped considerably over time. This trend could be the result of USMGs' residency choices or the disapproval of certain international medical schools by the licensing division of the Medical Board of California, but it highlights the nonuniform distribution of IMGs in residency training, both longitudinally and geographically.[16] These data are important from a practice perspective, since IMGs tend to remain in the same state as their GME training, practice where IMG networks already exist, and locate in communities with large numbers of people of the same ethnicity.[17] Given the overall disparity in the racial/ethnic distribution of the training physician population relative to the U.S. population, tracking the distribution of IMGs in residency training programs—especially those who constitute underrepresented minorities—will certainly be worthwhile.[18]

Changes in the characteristics of certificate holders and IMG residents underscore the complex nature of physician migration. Unfortunately, although changes in ECFMG certification rates point to patterns of migration to the United States, data are not available to classify the reasons for relocation or, for the non-USIMG cohort, the complex and ever-changing immigration pathways that must be navigated to secure employment. Although not a particular focus of this study, world events and U.S. immigration policy could certainly affect the flow and composition of foreign-national physicians coming to the United States. Even without more specific research, recent increases in the number of certificates issued to U.S. citizen IMGs combined with comparable decreases in other country-based cohorts (such as Pakistan) suggest that an array of political, economic, and cultural factors influence physicians' migration to the United States. Here, from both the policy and planning perspectives, it would certainly be valuable to gather and analyze data related to the specific visa pathways that non-USIMGs follow to gain entry into the U.S. medical system. More specifically, for physicians who stay in the United States, especially those who were initially sponsored with an obligation to return home (those using J-1 visa) and subsequently received a waiver to that obligation, a detailed analysis of their practice patterns and the associated benefit to rural or underserved areas is required.

Taken as a whole, additional focused national studies that relate physician supply, GME training, immigration policy (for example, changes in the apportion of and regula-

tions concerning work-based visas or use of visa waiver programs to stay and practice medicine in the United States), and societal health care needs are required to address these and other workforce issues.[19]

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