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The Increase in International Medical Graduates in Family Practice Residency Programs

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Background and Objectives: *The number of filled positions in family practice residency programs decreased by 18.6% from 1997–2001. This study sought to determine the degree of reliance on international medical graduates (IMGs) to fill family practice residency positions and the relative proportion of US citizen IMGs.* Methods: *We analyzed the 1992–2001 National Resident Matching Program results, the 2000 American Medical Association Masterfile, and the 1992–2001 American Academy of Family Physicians Annual Survey of Family Practice Residency Programs.* Results: *The percentage of IMGs matching in family practice remained stable between the years of 1992–1996 (10.0%–11.8%) but since 1997 has increased to a high of 21.4% in 2001. This rise in IMGs corresponds with a drop in the total percentage of family practice residency positions filled in the Match from 90.5% in 1996 to 76.3% in 2001. Despite the drop in Match numbers, the percentage of first-year family practice positions filled in July has remained in the range of 95.5%–97.8% since 1996. IMGs account for an increasing percentage of post-Match fills from 16.7% in 1996 to 47.9% in 2001. In 1999, a majority of family practice programs (279 [55.6%]), had at least one IMG. Of these, 48 programs (9.6%) had at least 50% of residents who were IMGs, and eight programs (1.6%) were entirely composed of IMGs. In five states (Connecticut, Illinois, Michigan, New Jersey, and New York), more than 25% of family practice residents were IMGs.* Conclusions: *Family practice is becoming increasingly reliant on IMGs to fill residency positions.*

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International medical graduates (IMGs) are physicians in residency training and in practice in the United States who have graduated from medical schools in countries other than the United States and Puerto Rico. The influx of IMGs to the United States began with the establishment of the US Information and Educational Exchange Act of 1948.[1] Since then, the number of international graduates in graduate medical education (GME) has steadily increased. Between 1989 and 1996, the number of IMGs in US residency programs in all specialties more than doubled to 26,763.[2] International graduates are a heterogeneous group. Of the 5,134 IMGs entering a first-year residency in 1998, 22.7% were US citizens, 39.0% were permanent US residents, and 32.6% were foreign nationals.[3]

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The increase in the number of international graduates matching in all specialties has sparked contentious debate among policy makers about the role of foreign-trained physicians in the US health care system. A primary concern is that IMGs may exacerbate a purported nationwide oversupply of physicians. While it is impossible to precisely extrapolate future supply and demand, a number of reports have projected an oversupply of physicians in the 21st century.[4,5] This predicted surplus of physicians is largely attributed to the increased numbers of physicians entering residency training programs. From 1982 to 2000, the number of residents in all specialties increased from 69,142 to 97,989 and now constitutes more than 140% of the annual number of graduates from US allopathic and osteopathic medical schools.[2,6]

Another concern about IMGs is that many remain in the United States after completing residency training rather than returning to their native countries. A study of IMGs conducted in New York in 1999 showed that, even among those on temporary J-1 visas, 72% of graduating residents were planning to stay in the United States

after completing training.[7] This is consistent with other projections that 70%–75% of IMGs in residency training will eventually enter practice in the United States[8] This loss of return of IMGs to their country of origin may create a significant "brain drain" for developing countries.

Simultaneous with the increased numbers of IMGs, the capacity of family practice residency programs has undergone significant expansion in the last decade. Between 1992 and 2001, the number of family practice residency positions offered increased by 24.5% (2,486 to 3,096).[9] The rapid increase in the number of family practice residency positions over the past decade exceeds that of every other primary care specialty.[10]

Given the increase in the number of IMGs in US residencies overall and the increased number of family practice residency positions, this study sought to determine the number and distribution of international graduates in family practice residency programs. The results will help us understand better the extent to which family practice residency programs rely on IMGs to fill their positions.

Methods

The data on Match results for family practice residency programs were obtained from the National Resident Matching Program (NRMP). Based on the numbers of NRMP-filled positions, the percentages of IMGs and US medical graduates (USMGs) matching in family practice were calculated for the years 1992–2001.

We used the American Academy of Family Physicians (AAFP) *Annual Survey of Family Practice Residency Programs* from the years 1992–2001 as the source of information on July 1st fill rates. Using these numbers, the post-Match fill rates were calculated.

The 2000 American Medical Association (AMA) Masterfile was used to determine (1) the percentage of IMGs in family practice residency programs, (2) the distribution of IMGs in family practice residency programs by state, (3) the top 10 birth countries of IMGs in family practice residency programs, and (4) the top 10 countries of medical school training for IMGs in family practice residency programs. Data from the AMA Masterfile in this paper are from 1999 because the 2000–2001 data from the GME archives were not yet Y2K compliant.

Results

Match Fill Rates

Table 1 contains the NRMP results for family practice over the past 10 years. The percentage of filled positions through the Match increased from 67.5% in 1992 to a high of 90.5% in 1996 and then decreased to 76.3% in 2001. During the same time period, the percentage of positions filled by USMGs remained stable from 1992–1997 (80.1%–83.3%) and then decreased to 64.2% in 2001. In contrast, the percentage of positions filled by IMGs has increased since 1997 from 10.3% to 21.4% in 2001. Since 1992, the proportion of IMGs who are US citizens increased from 31.7% to 40.6% in 2001 but remains a minority of IMGs matching in family practice residency programs.

Post-Match Fill Rates

Table 2 summarizes the post-Match fill rates in family practice from 1992–2001. The number of positions filled after the Match decreased from 852 in 1992 to a low of 654 in 1996 and has since increased to 1,036 in

Table 1

Family Practice National Resident Matching Program Results 1992–2001

	Positions Offered	*Positions Filled*		*USMGs*		*IMGs*		*US Citizen IMGs*		*Non-US citizen IMGs*	
Year	*#*	*#*	*(% of offered)*	*#*	*(% of filled)*	*#*	*(% of filled)*	*#*	*(% of IMGs)*	*#*	*(% of IMGs)*
1992	2,486	1,678	(67.5)	1,398	(83.3)	180	(10.7)	57	(31.7)	123	(68.3)
1993	2,589	2,002	(77.3)	1,636	(81.7)	229	(11.4)	51	(22.3)	178	(77.7)
1994	2,774	2,293	(82.7)	1,850	(80.7)	271	(11.8)	71	(26.2)	200	(73.8)
1995	2,941	2,563	(87.1)	2,081	(81.2)	291	(11.4)	64	(22.0)	227	(78.0)
1996	3,137	2,840	(90.5)	2,276	(80.1)	284	(10.0)	72	(25.4)	212	(74.6)
1997	3,262	2,905	(89.1)	2,340	(80.6)	298	(10.3)	103	(34.6)	195	(65.4)
1998	3,293	2,814	(85.5)	2,179	(77.4)	340	(12.1)	131	(38.5)	209	(61.5)
1999	3,265	2,697	(82.6)	2,024	(75.0)	405	(15.0)	153	(37.8)	252	(62.2)
2000	3,206	2,603	(81.2)	1,833	(70.4)	454	(17.4)	189	(41.6)	265	(58.4)
2001	3,096	2,363	(76.3)	1,516	(64.2)	505	(21.4)	205	(40.6)	300	(59.4)

USMGs—US medical graduates
IMGs—international medical graduates

Source: National Resident Matching Program results 1992–2001

Table 2

Post-Match Fill Rates for First-year Family Practice Residents, 1992–2001

Year	Positions Filled #	USMGs #	USMGs (% of filled)	IMGs #	IMGs (% of filled)	US Citizen IMGs #	US Citizen IMGs (% of IMGs)	Non-US citizen IMGs #	Non-US citizen IMGs (% of IMGs)
1992	852	296	(34.7)	473	(55.5)	168	(35.5)	305	(64.5)
1993	796	267	(33.5)	451	(56.7)	156	(34.6)	295	(65.4)
1994	747	359	(48.1)	322	(43.1)	120	(37.3)	202	(62.7)
1995	775	440	(56.8)	172	(22.2)	126	(73.3)	46	(26.7)
1996	654	489	(74.8)	109	(16.7)	102	(93.6)	7	(6.4)
1997	665	422	(63.5)	218	(32.8)	210	(96.3)	8	(3.7)
1998	761	507	(66.6)	183	(24.0)	163	(89.1)	20	(10.9)
1999	841	602	(71.6)	254	(30.2)	214	(84.3)	40	(15.7)
2000	872	460	(52.8)	335	(38.4)	240	(74.3)	86	(25.7)
2001	1,036	410	(39.6)	496	(47.9)	366	(73.8)	130	(26.2)

USMGs—US medical graduates
IMGs—international medical graduates

Source: National Resident Matching Program and American Academy of Family Physicians Annual Survey Results of Family Practice Residency Programs 1992–2001

2001. The percentage of post-Match positions filled by USMGs increased from 34.7% in 1992 to 74.8% in 1996 and has since decreased to 39.6% in 2001. Conversely, the percentage of IMGs decreased from 55.5% in 1992 to a low of 16.7% in 1996 and has since increased to 47.9% in 2001. The majority of post-Match IMGs fills are with US citizen IMGs, although this percentage has decreased from 93.6% in 1996 to 73.8% in 2001.

The percentage of post-Match fills who were IMGs in 2001 (47.9%) is more than double the percentage of IMGs that filled through the Match (21.4%). Of the IMGs filling positions after the 2001 Match, 73.8% were US citizen IMGs, compared with only 26.2% of non-US citizen IMGs. Therefore, US citizen IMGs disproportionately fill post-Match slots while non-US citizen IMGs comprise the majority of IMGs who fill through the Match.

July 1 Fill Rates

The July fill rates for first-year family practice positions are listed in Table 3. The percentage of positions filled has remained over 90% throughout the past 10

Table 3

July Fill Rates for First-year Family Practice Residents, 1992–2001

Year	Positions Offered #	Positions Filled #	Positions Filled (% of offered)	USMGs #	USMGs (% of filled)	IMGs #	IMGs (% of filled)	US Citizen IMGs #	US Citizen IMGs (% of IMGs)	Non-US citizen IMGs #	Non-US citizen IMGs (% of IMGs)
1992	2,789	2,530	(90.7)	1,694	(67.0)	653	(25.8)	225	(34.5)	428	(65.5)
1993	2,950	2,798	(94.8)	1,903	(68.0)	680	(24.3)	207	(30.4)	473	(69.6)
1994	3,159	3,040	(96.2)	2,209	(72.7)	593	(19.3)	191	(32.2)	402	(67.8)
1995	3,338	3,252	(97.4)	2,521	(77.5)	474	(14.6)	190	(41.0)	273	(59.0)
1996	3,572	3,494	(97.8)	2,765	(79.1)	393	(11.2)	174	(44.3)	219	(55.7)
1997	3,661	3,570	(97.5)	2,762	(77.4)	516	(14.5)	313	(60.7)	203	(39.3)
1998	3,723	3,575	(96.0)	2,686	(75.1)	523	(14.7)	294	(56.2)	229	(43.8)
1999	3,644	3,538	(97.1)	2,626	(74.2)	659	(18.6)	367	(55.7)	292	(44.3)
2000	3,623	3,475	(95.9)	2,293	(66.0)	789	(22.7)	438	(55.5)	351	(44.5)
2001	3,528	3,399	(96.3)	1,926	(56.7)	1,001	(29.4)	571	(57.0)	430	(43.0)

USMGs—US medical graduates
IMGs—international medical graduates

Source: American Academy of Family Physicians Annual Survey Results of Family Practice Residency Programs 1992–2001

Table 4

Percentage of IMGs in Family Practice Residency Programs in 1999

% IMG Residents	# Programs	% of Total Family Practice Programs
0	223	44.4
.1–10	96	19.1
10.1–20	60	12.0
20.1–30	31	6.2
30.1–40	18	3.6
40.1–50	26	5.2
50.1–60	17	3.4
60.1–70	7	1.4
70.1–80	10	2.0
80.1–90	1	.2
90.1–99.9	5	1.0
100	8	1.6
Total	502	100

IMGs—international medical graduates

Source: June 2000 American Medical Association Masterfile

Note: Shaded area demarcates programs that are "dependent" on IMGs, ie, > 50% of residents are IMGs.

years despite the drop in Match numbers since 1996. USMGs are accounting for a decreasing percentage of the overall July fill numbers (79.1% in 1996 and 56.7% in 2001), while the percentage of IMGs is increasing (11.2% in 1996 and 29.4% in 2001). Since 1997, the majority of IMGs entering first-year family practice positions have been US citizens.

Overall Enrollment of IMGs

Table 4 outlines the percentages of residents in family practice residency programs who were IMGs in 1999. Although 319 (63.5%) family practice programs had 10% or less of IMGs, the majority of family practice programs, 279 (55.6%), had at least one IMG. Forty-eight programs (9.6%) were dependent on IMGs (ie, >50% of residents are IMGs), and eight programs (1.6%) were composed entirely of IMGs.

Geographic Distribution of IMGs

The distribution of IMGs in family practice residency programs by state in 1999 is listed in Table 5. Overall, 15.1% of family practice residents were IMGs. In five states, more than 25% of family practice residents were IMGs: New York with 304 IMGs out of 623 residents (48.8%), Michigan with 139 IMGs out of 434 residents (32.0%), New Jersey with 79 IMGs out of 259 residents (30.5%), Illinois with 160 IMGs out of 566 residents (28.3%), and Connecticut with 15 IMGs out of 54 residents (27.8%).

Table 5

Distribution of IMGs in Family Practice Residency Programs by State, Including Washington, DC, in 1999

State	Total # of Residents	# of IMG Residents	% of Residents Who Are IMGs
Alabama	155	27	17.4
Alaska	23	3	13.0
Arizona	127	8	6.3
Arkansas	152	25	16.4
California	1,001	68	6.8
Colorado	194	2	1.0
Connecticut	54	15	27.8
DC	74	5	6.8
Delaware	41	3	7.3
Florida	374	38	10.2
Georgia	252	21	8.3
Hawaii	39	0	0
Idaho	36	1	2.8
Illinois	566	160	28.3
Indiana	265	26	9.8
Iowa	166	13	7.8
Kansas	145	13	9.0
Kentucky	108	25	23.1
Louisiana	170	36	21.2
Maine	93	4	4.3
Maryland	76	7	9.2
Massachusetts	127	6	4.7
Michigan	434	139	32.0
Minnesota	343	44	12.8
Mississippi	40	0	0
Missouri	228	15	6.6
Montana	18	1	5.6
Nebraska	133	22	16.5
Nevada	24	2	8.3
New Hampshire	25	3	12.0
New Jersey	259	79	30.5
New Mexico	56	2	3.6
New York	623	304	48.8
North Carolina	276	9	3.3
North Dakota	59	14	23.7
Ohio	470	79	16.8
Oklahoma	140	21	15.0
Oregon	55	2	3.6
Pennsylvania	657	107	16.3
Rhode Island	39	0	0
South Carolina	201	14	7.0
South Dakota	41	1	2.4
Tennessee	197	15	7.6
Texas	745	98	13.2
Utah	81	1	1.2
Vermont	17	0	0.0
Virginia	235	24	10.2
Washington	258	9	3.5
West Virginia	103	12	11.7
Wisconsin	267	32	12.0
Wyoming	40	0	0

IMGs—international medical graduates

Source: June 2000 American Medical Association Masterfile

Table 6

Top 10 Birth Countries of IMGs in Family Practice Residencies in 1999

Rank	*Birth Country*	*# of IMGs*
1	India	190
2	United States	189
3	Philippines	59
4	China	39
5	Pakistan	34
6	Nigeria	24
7	Egypt	18
8	Iran	17
9	Former USSR	15
10	Poland	14

IMGs—international medical graduates

Geographic Source of IMGs

The top 10 birth countries of IMGs in family practice residencies in 1999 are shown in Table 6. India and the United States were the top two birth countries, with 190 and 189 IMGs, respectively.

The top 10 countries of medical school training for IMGs in family practice residency programs in 1999 are listed in Table 7. India was the top country of medical school training, followed by three Caribbean nations: Montserrat, Grenada, and Dominica.

Discussion

Based on the results of this study, it is evident that, over the past 6 years, family practice has become increasingly reliant on international graduates to fill residency positions. This coincides with a decrease in the percentage of total family practice positions filled in the Match over the same time period. Almost half of the positions filled after the Match in 2001 were filled by IMGs.

Concerns Raised by the Increase in IMGs

There are two important reasons why the increased enrollment of IMGs in family practice residencies is of concern. The first concern is that the rise in the number of international graduates enrolling in family practice residencies may not represent enrollment of individuals with a sustained commitment to the specialty. A 1994 study showed an attrition rate for IMGs in family practice residency programs of 18.5%, compared with 7.8% for USMGs.[11] International graduates left family practice residencies to enter other specialties 63% of the time. As greater numbers of IMGs enter family practice residency positions unfilled by USMGs, this attrition rate may continue to increase and threaten program stability as programs become more dependent on IMGs to fill positions.

The second concern relates to quality. Some argue that IMGs are less qualified and less competent because they have not completed the same rigorous stages of training, entrance, and screening examinations required of USMGs. Numerous studies have demonstrated that IMGs do perform more poorly on standardized examinations of medical knowledge.[12] However, studies of clinical competence in hospital and ambulatory settings have shown no difference between IMGs and USMGs,[13,14] so it is difficult to know if the concern about quality is a valid concern.

Future

It is unclear whether the increase in the number of international graduates entering family practice residency programs will continue. After the implementation of the day-long Clinical Skills Assessment (CSA) examination requirement by the Educational Commission for Foreign Medical Graduates (ECFMG) in 1998, the number of IMGs certified by the ECFMG dropped from 11,814 in 1998 to 5,133 in 2000 (56.6% decrease).[15] As a result, the NRMP reported IMG registration for the Match dropped by 22.5% in 1999 and 18.5% in 2000.[16] Whether the decline in IMG applicants is due to the cost of the CSA exam ($1,200) or other factors, the decline in IMG applicants is concerning given the increasing reliance of family practice training programs on international graduates.

The proportion of US citizen IMGs certified by the ECFMG increased after the implementation of the CSA requirement from 9% in 1998 to 27% in 2000.[15] In 2001, US citizen IMGs represented an increasing percentage of the IMGs who filled positions through the Match and comprised the majority of IMGs entering family practice programs in July. US citizen IMGs may therefore represent an increasingly relied-on source of residents to fill family practice positions.

Table 7

Top 10 Countries of Medical School Training for IMGs in Family Practice Residencies in 1999

Rank	*Country of Medical School*	*# of IMGs*
1	India	299
2	Montserrat	127
3	Grenada	122
4	Dominica	117
5	Philippines	89
6	Mexico	82
7	Pakistan	73
8	Former USSR	67
9	China	61
10	Nigeria	46

IMGs—international medical graduates

Source: June 2000 American Medical Association Masterfile

Health Workforce Implications

Three of the top four countries of medical school training for IMGs are Montserrat, Grenada, and Dominica (the Montserrat school was relocated to St Marten after a volcanic eruption in Montserrat). These three countries are current and former British protectorates that provide offshore training for many US-born IMGs. While US-born IMGs tend to have similar specialty career plans to USMGs,[12] more studies are needed to know whether they practice in the same practice settings.

Three of the top six countries of medical school training for IMGs in family practice residencies are India, the Philippines, and Mexico. These three countries traditionally have had high rates of immigration to the United States. Graduates of medical schools from India, the Philippines, and Mexico may provide important language and cultural skills for serving the health care needs of these immigrant populations.

The extent to which international graduates contribute to the family physician practice pool is partially dependent on whether they practice in areas of local physician shortages. A "gap filling" hypothesis has been used to argue that IMGs can fill a special role in the US health care system by practicing in settings that USMGs tend to avoid.[17] In support of this argument, a recent study showed that 60% of IMG-dependent residency programs (as defined by at least 50% of the first-year residents being IMGs) provide a disproportionate amount of hospital care to the poor.[18]

After completing residency, a disproportionate number of IMGs locate in poverty areas in a number of large cities.[19] IMGs are also disproportionately located in needy rural counties in more states than USMGs, although the disproportion is smaller among primary care physicians than specialty physicians. A study of general pediatricians found that while international graduates are less likely to practice in rural areas than US graduates, IMGs were more likely to be located in shortage areas.[20] Further studies are needed to determine whether IMGs in family practice disproportionately practice in underserved areas.

Limitations

Although the AMA Masterfile is the most comprehensive information source available, with data on more than 892,000 US doctors, including those who are not members of the AMA, using the Masterfile for conducting this study had some limitations. Although data were complete for country of medical school training, data for birth country were missing for 1,643 out of 10,395 of the records examined. Of the missing data, 763 of unknown birth countries were for IMGs. A June 2000 Masterfile was used; however, the task of maintaining more than 854,000 records means that some lag time in annotating changes is unavoidable. In particular, data beyond 1999 could not be obtained because of incomplete Y2K compliance.

Another limitation of this study was that the AAFP *Annual Survey of Family Practice Residency Programs* results do not specify the number of USMGs for each year. The number used in Table 3 was extrapolated by taking the total number of first-year residents and subtracting first-year IMGs (US citizen and non-US citizen) + first year osteopaths + first year Canadian medical graduates. This number is not entirely accurate because it does not include USMGs who graduated from medical school prior to that year.

Conclusions

The rise in IMGs in family practice residency programs and the recent decline in fill rates may be indicators that family practice GME has expanded its capacity too rapidly. The increased number of IMGs entering family practice may not represent a sustained commitment to the specialty or a stable source of applicants. A clearly defined goal for the number of residency positions offered in family practice and an understanding of the role of international graduates in meeting that objective are critical. The full implication of the rise in IMGs in family practice residency programs will only be ascertained by further studies to determine the practice patterns of US citizen and non-US citizen IMGs in family practice, particularly in physician shortage areas.

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