TRENDS


Changes in the quantity and quality of USIMGs could affect both the supply and the distribution of U.S. primary care physicians.

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ABSTRACT: The number of U.S. citizens attending medical schools outside the United States and Canada has increased recently. Because these people tend to return to the United States to practice medicine, it is important to know more about their characteristics and educational experiences. Based on summary data from certifying examinations, U.S. citizens trained abroad do not perform as well as either other international medical graduates (IMGs) or U.S. graduates. Moreover, they are more likely than non-U.S. citizens to be engaged in primary care activities. Changes in the composition of the IMG pool could affect the makeup and quality of the U.S. physician workforce. [Health Affairs 28, no. 1 (2009): 226–233; 10.1377/hlthaff.28.1.226]
and graduates, assess basic science (Step 1), clinical knowledge (Step 2 CK, formerly Step 2), and clinical skills (Step 2 CS). The final examination in the sequence, USMLE Step 3, which is required for unrestricted licensure in all states, is often taken during or after residency. Although certification signifies that a person is ready to enter residency training, it does not guarantee a residency position. The ECFMG typically awards more certificates in a given year than the number of residency positions that are available to physicians educated outside the United States.

The characteristics of the pool of IMGs seeking ECFMG certification have changed over time. For example, increasing numbers of foreign students applying for certification have attended medical school outside their native countries. More noteworthy, more U.S. citizens have attended medical school outside the United States or Canada. This latter group, referred to as USIMGs, consists of second-generation Americans who sought education in the home country of their parents, people who were not successful with applications to U.S. allopathic and osteopathic programs, and others who simply preferred an international training experience. Although the flow of U.S. citizens to international medical schools is not new, questions concerning the quality of these programs persist. Given potential physician workforce shortages and calls for the expansion of the number of medical school positions, these concerns need to be addressed. Since the combined enrollment of allopathic and osteopathic schools in the United States is rising only a few percentage points per year, the market for U.S. citizens seeking medical education abroad is likely to persist and even grow.

Studies have documented the quality of ECFMG applicants and certificate holders. Some data have also been reported concerning the U.S. citizen cohort, including medical schools attended, success on certification examinations, and rates of specialty board certification. Nevertheless, given that USIMGs who obtain U.S. clinical experience during medical school tend to obtain residency positions and, for the most part, eventually practice in the United States, it is important to know more about their educational pathways, characteristics, and abilities.

The purpose of this paper is to provide a comprehensive overview of USIMGs who applied for ECFMG certification, including their performance on certification exams and their success in achieving certification and entry into the U.S. workforce. Because more recent applicants form the pipeline of physicians who may eventually be certified, accepted to residency programs, and practice in the United States, we chose to focus our analysis on the ECFMG applicant cohort over the fifteen-year period from 1992 to 2006.

**Study Data And Methods**

Data for this study came from ECFMG application and certification records, the International Medical Education Directory (IMED), and the American Medical Association (AMA) Physician Masterfile. The ECFMG collects many variables, including medical school characteristics, basic demographic data (such as citizenship), and performance on the various exams required for ECFMG certification. The “initial application year” was taken as the date of first registration for any exam required for ECFMG certification. The “initial application year” was taken as the date of first registration for any exam required for ECFMG certification. For most applicants, medical school matriculation occurred one to three years before this date. For ECFMG applicants, a USIMG was defined as someone with U.S. citizenship at time of entry to medical school. All others are referred to as non-USIMGs.

IMED contains detailed information on medical schools throughout the world. The AMA Masterfile contains demographic, educational, and practice information on all U.S. physicians, including IMGs who reside in and are eligible for practice in the United States. Data on IMGs are incorporated into the Masterfile when IMGs enter a residency program accredited by the Accreditation Council for Graduate Medical Education (ACGME). These data can be linked to ECFMG data through a common identifier and used to summarize practice patterns of IMGs in the U.S.
physician workforce.

Performance data on USMLE Step 1 and USMLE Step 2 CK were available from 1992 to 2006. In July 1998, the ECFMG introduced the Clinical Skills Assessment (CSA), a performance test designed to evaluate IMGs’ clinical skills. In 2004, the USMLE introduced Step 2 CS, a similar performance-based examination for U.S. medical students and graduates. At this point, the CSA was discontinued, and all IMGs were required to take and pass Step 2 CS to achieve ECFMG certification. To investigate clinical skills performance for IMGs, we combined the 1998–2006 outcome results from the CSA and Step 2 CS. To provide a reference point, we obtained summary data on the performance of U.S. medical students on the various components of the USMLE.

Study Results

■ Application trends. From 1992 through 2006, more than 217,000 people registered for an initial examination, of whom 28,483 (13 percent) were USIMGs (Exhibit 1). Between 1992 and 1997, more than 15,000 IMGs began the certification process each year. In 1998–1999, with the introduction of the CSA and the computerization of the Step 1 and Step 2 CK examinations, there was a dramatic drop in initial IMG applications. From 1999 onward, however, the total number of initial applications has steadily increased (Exhibit 1).

There was close to a fourfold increase in the number of USIMG applicants, from 769 in 1992 to 2,772 in 2006. In 1999, following the introduction of the CSA, there were 1,716 USIMG applications, representing 22.7 percent of the total applications in that year. Although the 2,772 USIMG applications in 2006 represented only 18.1 percent of the yearly applicant total, this corresponds to an increase in USIMG applications of nearly 62 percent in the previous seven years (1999–2006).

■ Certification trends. USIMG certifications have increased steadily over the past ten years. In 1997, 907 ECFMG certificates were issued to U.S. citizens; by 2006, that number had more than doubled to 1,858.

■ Demographics. There were significant differences between USIMGs and non-USIMGs during the period studied. At the time of initial application, USIMGs were younger than non-USIMGs (mean age at initial application: 28.8 years versus 29.2 years), less likely to be female (37.6 percent versus 39.4 percent), more apt to claim English as a native language (70.3 percent versus 9.8 percent), and more likely to have received medical school instruction in English (90.5 percent versus 66.3 percent).

■ Medical schools attended. In total,
USIMG applicants in the 1992–2006 cohort attended 819 different medical schools located in 123 countries and territories. In contrast, non-USIMGs attended 1,621 medical schools in 165 countries and territories. Although USIMGs attended many different schools, more than half attended one of four institutions. Of the total 28,931 USIMG applicants, 5,060 (17.8 percent) attended Ross University (Dominica), 4,719 (16.6 percent) attended St. George’s University (Grenada), 2,375 (8.3 percent) attended Universidad Autonoma de Guadalajara (Mexico), and 2,271 (8.0 percent) attended American University of the Caribbean (AUC) School of Medicine (Netherlands Antilles). Moreover, there has been a steady increase in the number of ECFMG applicants attending medical schools anywhere in the Caribbean. In 1992, 321 USIMG applicants attended a medical school located somewhere in the Caribbean, representing 41.7 percent of the USIMG applicant pool in that year; in 2006, 1,966 applicants—nearly 71 percent of all U.S. citizen applicants—did so.

Certification success. There are a number of ways, both relative and absolute, to assess USIMGs’ performance and abilities. Although certification is the ultimate marker of success, some may quit the process for reasons not related to performance. Nevertheless, for large groups, or comparisons between representative cohorts, the ultimate certification rate provides a rudimentary marker of proficiency.

Exhibit 2 shows the percentage of IMGs, by group and application year, who achieved certification. Since certification can take place a number of years after the initial application, the data are only shown through the 2001 application year. For all USIMGs who made an initial application between 1992 and 1996, 66.2 percent achieved certification. In contrast, only 53.9 percent of non-USIMGs who applied in this time frame eventually achieved certification. For the more recent cohort (1997–2001 applicants), 70.9 percent of the USIMGs achieved certification, whereas only 52.6 percent of the non-USIMGs did so.

Performance on certification examinations. Exhibits 3 and 4 contrast the first-attempt performance of USIMG and non-USIMG cohorts on the USMLE Step 1 and Step 2 CK. To provide a reference point for IMGs’ performance, first-attempt passing rates are also presented for U.S. medical graduates. Across these two exams and years, U.S. graduates outperformed IMGs, regardless of whether they were U.S. or non-U.S. citizens at entry to medical school. For Step I (Exhibit 3), the non-USIMG cohort has outperformed the USIMG cohort since 1999. In 2006, the first-attempt passing percentage for USIMGs was...
In contrast, 72.9 percent of non-USIMGs passed Step 1 on their first attempt. For Step 2 CK, performance differences between the USIMG and non-USIMG cohorts were also most marked in the last five years (Exhibit 4).

There were only small performance differences between USIMGs and non-USIMGs on the CSA/Step 2 CS. Between 2000 and 2006, the percentage passing on the first attempt for USIMGs was approximately 5 percent greater than that for non-USIMGs. However, the performance gap narrowed in 2006, with 83.8 percent of USIMGs passing Step 2 CS on the first attempt, compared with 80.2 percent of non-USIMG examinees.

Nearly 92 percent of the 10,840 USIMGs who achieved certification during 1992–2001 were found to be active in the 2005 AMA Masterfile. Compared with non-USIMGs, practicing USIMGs were proportionately more likely to be male (66.2 percent versus 57.9 percent) and more likely to be involved in primary care activities (57.1 percent versus 50.6 percent). With respect to education (data not shown), more than 66 percent (6,620) of the active USIMGs had attended medical school in the Caribbean, and more than 60 percent had attended medical schools in either Grenada, 2,348; Dominica, 2,156; or Netherlands Antilles, 1,456). The three universities in these countries accounted for 56 percent (3,569) of all active USIMG physicians in this cohort.
Discussion

For many decades, the United States has been dependent on IMGs to satisfy the demand for medical services. Non-USIMGs come from many source countries, and they seek opportunities not only in the United States but in other countries. USIMGs are, for the most part, simply that segment of the overall U.S. medical student applicant pool that has chosen to attend an international school, either by primary choice or because of failure to gain entry to a U.S. allopathic or osteopathic medical school. Although the United States relies on IMGs, a sizable proportion of this workforce segment is U.S. citizens, who can contribute to the U.S. workforce without adding to international “brain drain.”

EXHIBIT 4
Comparison Of First-Time Pass Rates For U.S. Medical Graduates, USIMGs, And Non-USIMGs (USMLE Step 2, Clinical Knowledge), 1992–2006

<table>
<thead>
<tr>
<th>Exam year</th>
<th>U.S. medical graduates</th>
<th>Non-USIMGs</th>
<th>USIMGs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>90</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>1994</td>
<td>80</td>
<td>70</td>
<td>50</td>
</tr>
<tr>
<td>1996</td>
<td>70</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>1998</td>
<td>60</td>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>2000</td>
<td>50</td>
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<tr>
<td>2002</td>
<td>40</td>
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</tr>
<tr>
<td>2004</td>
<td>30</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>2006</td>
<td>20</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

SOURCES: Educational Commission on Foreign Medical Graduates (ECFMG) database; and U.S. Medical Licensing Examination (USMLE) data.
NOTE: USIMG is U.S. international medical graduate.

EXHIBIT 5
Eventual Disposition Of 1992–2001 Cohort Of Medical Residency Applicants

<table>
<thead>
<tr>
<th>Group</th>
<th>Applicants (1992–2001)</th>
<th>Certified (as of April 2007)</th>
<th>In AMA Masterfile (all)</th>
</tr>
</thead>
<tbody>
<tr>
<td>USIMG</td>
<td>15,672</td>
<td>10,840 (69.2%)a</td>
<td>9,932 (91.6%)b</td>
</tr>
<tr>
<td>Non-USIMG</td>
<td>136,667</td>
<td>73,074 (53.5%)a</td>
<td>51,584 (70.6%)b</td>
</tr>
<tr>
<td>Total</td>
<td>152,333c</td>
<td>83,914 (55.1%)a</td>
<td>61,516 (73.1%)b,d</td>
</tr>
</tbody>
</table>

NOTE: USIMG is U.S. international medical graduate.
b Percentage of ECFMG certificate holders from 1992–2001 initial applicant cohort who were listed in the AMA Physician Masterfile (all professional activities, including residents, excluding inactive).
c Missing citizenship data for 494 applicants.
d Missing citizenship data for 22 physicians.
As the size of the certified USIMG group increases, there will be fewer opportunities for foreign nationals, a culturally mixed group, to train and practice in the United States. Interestingly, many USIMG applicants indicated that English was not their native language, which suggests that second-generation U.S. citizens are attending medical schools outside the United States. Nevertheless, although the USIMG applicant pool might not be homogeneous, and a sizable portion does not achieve ECFMG certification, increasing numbers of USIMGs could decrease the future diversity of the U.S. physician workforce.

Although enrollment at U.S. medical schools is increasing and more new schools are planned, it seems likely that capacity constraints, combined with an increasing demand for physicians, will offer opportunities for IMGs for some time to come. Based on the number of ECFMG applications, there appears to be a growing interest in certification by both USIMGs and non-USIMGs. More specifically, as capacity for training U.S. students at international medical schools has increased, particularly in the Caribbean, there has been a steady increase in the number of U.S. citizen medical students and graduates seeking ECFMG certification. Given these trends, alongside expanding U.S. medical school enrollment, it will be extremely important to determine the size of the potential U.S. medical school applicant pool and to track USIMGs’ medical school application pathways. From a quality perspective, it is also essential to know how, and with whom, the expanded medical education capacity is filled, both in the Caribbean and the United States.

ECFMG certification requirements are quite demanding and, from an examination perspective, are the same as the USMLE requirements for U.S. students. Although both USIMGs and non-USIMGs underperformed U.S. students, first-attempt pass rates among both groups of IMGs varied considerably. During 2002–2006, non-USIMGs consistently outperformed USIMGs in basic science (USMLE Step 1) and clinical knowledge (Step 2 CK). For the CSA/Step 2 CS, USIMGs tended to outperform non-USIMGs, although the differences were small. Although the USIMGs who take these examinations may not be representative of all matriculants, and schools vary in the achievement levels of their students, average performance is inferior relative to U.S. medical students and non-USIMGs. This suggests that at least for some international medical schools, student selection and education could be improved.

Based on first attempts, USIMGs performed less well on Step 1 and Step 2 CK than non-USIMGs did. Nonetheless, they were more likely than non-USIMGs to complete the certification process and, having done so, more likely to enter the U.S. workforce. Indeed, nearly 70 percent of USIMGs who applied to the ECFMG during 1992–2001 ultimately achieved certification, and nearly 92 percent of these were professionally active. It is possible that non-USIMGs, especially those who repeated failed examinations or were required to travel to sit for an assessment, lacked the financial resources to complete the certification process. From the GME perspective, it is also reasonable to postulate that entry into residency may be influenced by factors other than basic science or clinical knowledge, such as English language ability, clinical training at a U.S. institution, and visa requirements. If this is the case, the potential contribution of the IMG physician workforce in the United States could be diluted.

Among IMGs in active practice, USIMGs are more likely than non-USIMGs to be involved in primary care activities. Based on the academic attainment of U.S. graduates who match to primary care residencies, this may reflect the fact that these specialties are less competitive than others. Previous research also indicates that USIMGs are also less likely than non-USIMGs to achieve board certification. As U.S. medical schools expand and the potential pool of USIMGs shifts, these patterns may change. Nevertheless, to the extent that USIMGs choose career paths that are different from those of both non-USIMGs and U.S. graduates, changes in the quantity and quality of USIMGs could affect both the sup-
ply and the distribution of physicians in certain specialties and, ultimately, the quality of U.S. patient care.

This research project was supported by the Educational Commission for Foreign Medical Graduates and the Foundation for Advancement of International Medical Education and Research. However, the findings and conclusions do not necessarily reflect the opinions of these organizations.

NOTES
17. An IMG who first applied for certification in 2001 may achieve certification in 2001 or later. The data are current as of April 2007.
18. Missing citizenship for 494 applicants.
23. See Norcini et al., “Specialty Board Certification.”