

Prevalence of International Medical Graduates in Integrated Plastic Surgery Programs

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Background: International medical graduates (IMGs) are physicians who did not attend medical school in the USA or Canada. IMGs comprise nearly one-quarter of the physician workforce and play a vital role in health care. Here, we aimed to identify the prevalence of IMGs in integrated programs and evaluate factors that influence their success in the residency match.

Methods: The annual match reports from 2010 to 2020 were retrieved and summarized. Electronic surveys for program directors and program coordinators were distributed to US integrated plastic surgery programs. Each program's website was appraised for information regarding the eligibility of IMGs. Websites were also used to identify the number of IMG residents.

Results: The number of applicants who matched into integrated programs ranged from 69 to 180 per year, of which US applicants comprised 61–165. US IMGs filled one to three positions per year, whereas non-US IMGs filled two to seven. Although 48% of programs have matched non-citizen IMGs and 79% have not encountered difficulties during the visa process, 67% of coordinators reported that the onboarding process is more challenging for IMGs. There are no IMGs in 52% of programs, and most institutions offer information on their website regarding visa sponsorship.

Conclusion: IMGs make up less than 10% of filled positions per cycle. Although most programs accept IMGs, a small number matriculate. This may be explained by the competitiveness of integrated programs and the volume of IMG applications. Further research is needed to identify contributing factors of low IMG representation in plastic surgery programs. (*Plast Reconstr Surg Glob Open* 2023; 11:e5140; doi: [10.1097/GOX.0000000000005140](https://doi.org/10.1097/GOX.0000000000005140); Published online 11 August 2023.)

INTRODUCTION

Each year, physicians from all over the world try to secure residency in the United States.¹ International medical graduates (IMGs) are physicians who did not attend medical school in the United States or Canada. Although IMGs could be US or Canadian citizens who complete medical school abroad, most are foreign nationals. To enter the US graduate medical education process, IMGs must go through the US medical licensing examination and credentialing verification process.¹ The Educational

Commission for Foreign Medical Graduates is the entity that governs the evaluation and credentialing of IMGs. Not only is Educational Commission for Foreign Medical Graduates certification needed to enter a graduate medical education (GME) program, but it is also a requirement for medical licensing and a prerequisite for taking the United States Medical Licensing Examination Step 3.

IMGs have historically experienced a lower probability of matching yet play a vital role in the health-care system of the United States, not to mention they make up nearly one-quarter of the trainee and physician workforce.^{2,3} In plastic surgery, matching is even more difficult, given the competitiveness of the field.⁴ Plastic surgery is among the most competitive specialties, with integrated programs having the highest rate of unmatched applicants.^{4,5} Even upon matching, IMGs are more likely to matriculate at unranked or lower-ranked programs.^{6,7} To become competitive and attempt to aim for an equal chance of matching as that

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of US graduates, many foreign graduates choose to complete several years of research and clinical rotations in the United States before applying for residency.⁸

Specialties with greater representation of foreign graduates include pathology, internal medicine, neurology, family medicine, and psychiatry, whereas those with minimal representation are otolaryngology, orthopedic surgery, and dermatology.⁹ As a whole, plastic surgery has been slower to diversify than other specialties,⁹ and the extent to which IMGs represent GME trainees is unknown. In this study, we aimed to identify the prevalence of IMGs in integrated plastic surgery residencies in the United States and identify contributing factors that may influence their representation in training programs.

METHODS

Internet Search

A broad internet search was conducted on the integrated plastic and reconstructive surgery programs listed on Doximity,¹⁰ to determine whether there is publicly available information for IMGs applying into the program. Websites were assessed for information regarding eligibility and visa sponsorship. Additionally, each website was evaluated for the number of IMGs in each residency class, based on the affiliated medical schools listed.

Program Surveys

Two electronic surveys, one each for program directors and program coordinators, were sent to all accredited integrated plastic surgery training programs through the Qualtrics platform. Email addresses were obtained through public websites, including the program site or affiliated health system site and Doximity. Both surveys were sent four times, separated by 2–4 weeks. The surveys were designed based on a 2019 study by Lujan-Hernandez et al.¹¹ (See appendix, Supplemental Digital Content 1, which displays the survey questions for program directors. <http://links.lww.com/PRSGO/C739>.) (See appendix, Supplemental Digital Content 2, which displays the survey questions for program coordinators. <http://links.lww.com/PRSGO/C740>.) This study was determined to be exempt by the institutional review board.

National Residency Matching Program

Data from the 2010–2020 National Residents Matching Program (NRMP; <https://www.nrmp.org/match-data/nrmp-historical-reports>) was evaluated to quantify the number of IMGs who secured residency positions in the United States during that time. Information collected included the total number of integrated plastic surgery program applicants, applicants who graduated from US medical schools, IMGs, and matched and unmatched applicants.

RESULTS

Internet Search

Of the programs listed on Doximity, 14 stated on the program website whether they sponsor a visa. Of these, 13

Takeaways

Question: What is the prevalence of foreign medical graduates in integrated plastic surgery residencies from 2010 to 2020?

Findings: This observational, cross-sectional study showed that foreign medical graduates filled one to seven positions per year compared with 61–165 for US graduates.

Meaning: Foreign graduates bring diversity and talent to the US healthcare system, and efforts must be made at an institution and national level to not only improve recruitment but also assist applicants in their transition to the United States.

sponsor the J-1 visa, and one mentioned applicants must be US citizens. Among all programs, seven did not have information on visa sponsorship on either the program website or the main GME page. Six programs did not have information on the plastic surgery program or GME pages but rather on other specialty pages such as internal medicine or general surgery. Of these, three sponsor the J-1 and H-1B visas, two sponsor the J-1 visa only, and one program mentioned applicants must be US citizens or permanent residents. Fifty-four programs did not have information on the plastic surgery program page but did have information on the main GME page. Of these, 30 sponsor a J-1 visa only, and 24 sponsor both. One program provided an email on the GME page for applicants to contact for individualized counseling on immigration status, whereas a second program contained information about the H-1B visa without additional details. Two programs had vague information regarding the type of visa they sponsor. One program did not have an associated website.

In terms of identifying the number of IMGs in each program, eight (9%) did not share the residents' affiliated medical schools, two (2%) did not have a web page with the residents listed, two (2%) had a web page but it was outdated, two (2%) listed the medical school for some but not all residents, and one (1%) program had a web page but no residents listed in the "current residents" tab. Forty-five (52%) programs have no IMGs in any resident class, 18 (21%) have one foreign graduate, four (5%) have two, two (2%) programs have three, and one (1%) program has six IMGs (Fig. 1). The citizenship status of each resident was not listed on any program website, and the country of origin was inconsistently reported across all websites. Figure 1 displays the results from the internet search.

Program Surveys

The response rate from program directors was 30%, whereas that for program coordinators was 29%. Almost half of programs have matched IMGs in the past, and most (79%–89%) have not encountered difficulties with the visa process (Fig. 2). Close to half (47%) of programs have matched non-US citizens from international medical schools, and one-third (32%) have matched non-US citizens from US medical schools (Fig. 2). A similar pattern was seen for US citizen IMGs (32%) (Fig. 2). Among

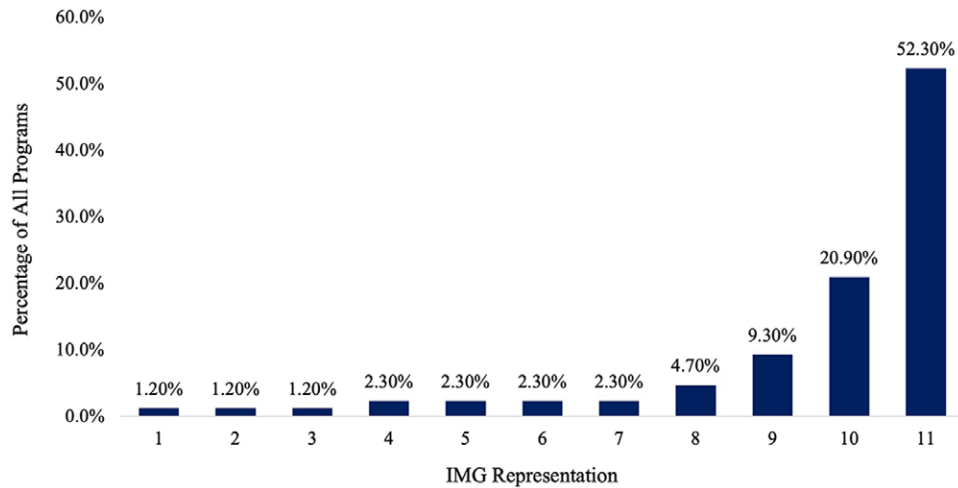


Fig. 1. A graph illustrating IMG representation in programs based on each program’s website. 1, One program (1.2%) does not have a website. 2, One program (1.2%) has a web page, but no residents listed. 3, One program (1.2%) has six IMGs. 4, Two programs (2.3%) lack a page within their website with resident names. 5, Two programs (2.3%) have a web page with the residents, but it is outdated with alumni rather than current residents. 6, Two programs (2.3%) list a medical school for some residents but not all. 7, Two programs (2.3%) have three IMGs. 8, Four programs (4.7%) have two IMGs. 9, Eight residencies (9.3%) do not have medical school information listed. 10, Eighteen programs (20.9%) have one foreign graduate. 11, Forty-five residencies (52.3%) have no foreign graduates.

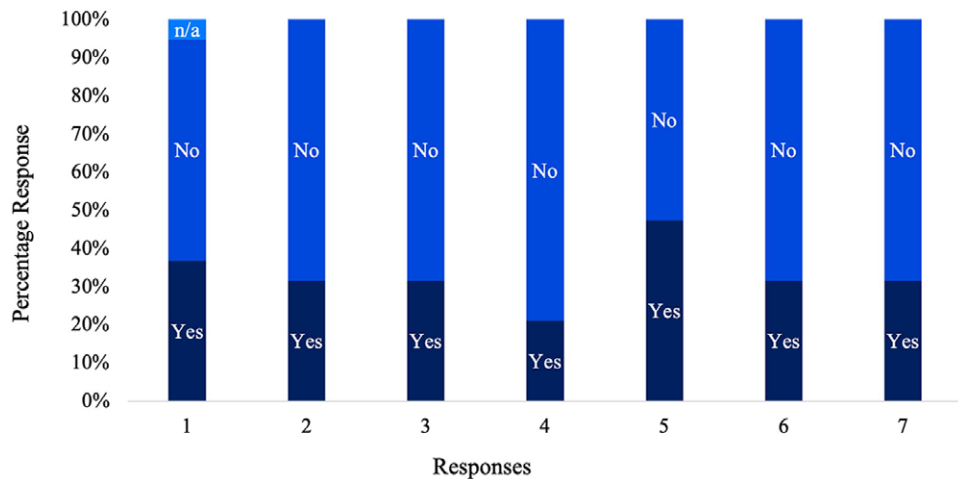


Fig. 2. A graph of program director responses to the following questions. 1, Have you matched IMG applicants in the integrated program? 2, Has your program matched non-US citizens from a US medical school? 3, Has your program matched US citizens from international medical schools? 4, Have you had difficulties handling visa issues for any matched applicant? 5, Has your program matched non-US citizens from international medical schools? 6, Has your program matched non-US citizens from a US medical school? 7, Has your program matched US citizens from international medical schools?

all respondents, 40% mentioned that visa requirements were a limitation of matching noncitizens. Although 67% of program coordinators reported that the onboarding process was more challenging for IMGs, 90% denied experiencing immigration-associated delays in start dates (Fig. 3). Most program coordinators reported that graduating IMGs did not have increased difficulty securing employment after residency (Fig. 3). Figure 2 displays a selection of the responses from the program director

survey. Figure 3 shows a portion of the responses from the program coordinator survey.

National Residency Matching Program

The total number of applicants to integrated plastic surgery programs ranged from 177 to 291 with an upward trend from 2010 to 2020. The number of applicants that matched into integrated programs was 69–180 per year. Of the total number of applicants that matched, 61–165

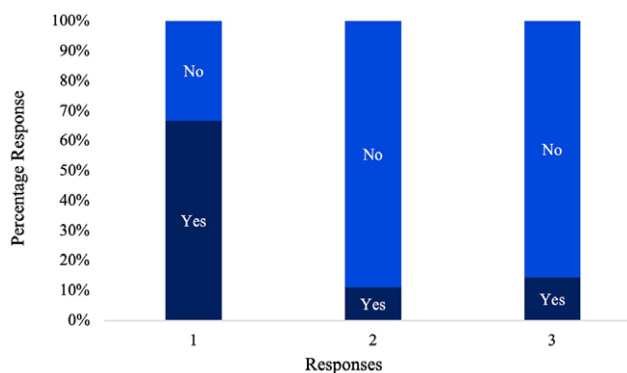


Fig. 3. A graph of program coordinator responses to the following questions. 1, Was the onboarding process more complicated than for US medical school graduates? 2, Was there ever a situation in which they had a delayed start due to visa issues? 3, Upon completion of the program, have they had trouble securing employment or fellowship?

of them were students from US medical schools. The total percentage of spots filled by fourth-year US students was 86%–96%. US IMGs filled one to three positions per year, whereas non-US IMGs filled two to seven. From 2010 to 2020, there were 14 US IMGs and 31 non-US IMGs that matched successfully to integrated programs. Table 1 displays the data gathered from the NRMP files.

DISCUSSION

IMGs are a vital component of the US health-care system.¹² A 2016 study found that of all the health-care professionals, 16.6% are non-US-born and 4.6% are noncitizens. Among US practicing physicians, 29.1% are born outside of the United States, and 6.9% are noncitizens.¹³ Plastic surgery is one of the most competitive specialties. In the 2021 integrated plastic surgery match, 416 applicants applied for 187 spots, meaning there were 2.2 applicants per spot.¹⁴ Plastic surgery is consistently among the highest average USMLE Step 1 and Step 2 scores for matched applicants.⁵ Asserson et al found that integrated plastic

surgery was tied for the highest average USMLE Step 2 CK score for matched applicants and the second highest average number of abstracts, presentations, or publications for matched applicants.⁵ Interestingly, in a survey conducted by Sarac and Janis, 37% of program directors reported increasing the number of interview spots in the recent application cycle. This provides hope that perhaps applicants have a higher chance of matching despite the competitiveness of the field.¹⁴

Research has found that IMGs outperform US medical graduates on in-service examinations and objective assessments.^{15,16} In a report published by the American Medical Association, 98% of IMGs speak two or more languages, and therefore help overcome language barriers that negatively influence the delivery of high-quality care.¹⁷ Despite scoring higher on the board examinations, IMGs have a lower probability of matching into a residency program.¹⁸ We found that IMGs comprise less than 10% of filled positions per application cycle, and that over half of integrated plastic surgery programs have no IMG representation. This could be explained by a combination of fewer applications from IMGs compared with those from US graduates, and a lower likelihood of matching once they choose to apply. IMGs improve access to care and are more likely to practice in lower-income communities that are underserved by US medical graduates. Importantly, IMGs increase diversity and contribute to scientific discoveries and medical education. As such, efforts must be made to not only recruit IMGs into plastic surgery but also assist them with their transition to the US health-care system.

Assisting with their transition is especially important given that IMGs face significant challenges when starting residency in the United States. Navigating cultural differences, for example, is the most commonly reported challenge by foreign graduates.¹⁹ In addition to cultural barriers, adaptation to a new health-care system is the second most common challenge encountered by IMGs. For example, residents have reported that clinical decision-making in their home countries is largely dependent on physician opinion and that patient-centered care is not as common as in the United States.^{20,21} IMGs have also reported feeling overwhelmed with the increased amount

Table 1. NRMP Data on Matched Total versus US Applicants, and US versus IMG Matched Applicants

Year	No. US Senior Applicants	No. Total Applicants	No. US Matches	No. Total Matches	% Filled US Seniors	% Filled Total	No. Positions	No. Filled	US Senior	US Grad	US IMG	Non-US IMG
2010	168	200	61	69	88.4	100.0	69	69	61	5	0	3
2011	166	194	65	70	92.9	100.0	70	70	65	4	0	0
2012	141	177	87	97	86.1	96.0	101	97	87	9	1	0
2013	179	203	111	115	95.7	99.1	116	115	111	2	0	2
2014	181	215	120	130	92.3	100.0	130	130	120	1	2	7
2015	168	206	136	144	91.9	97.3	148	144	136	3	1	3
2016	178	216	133	151	87.5	99.3	152	151	133	11	3	3
2017	200	246	148	157	93.1	98.7	159	157	148	5	1	2
2018	185	229	156	167	92.9	99.4	168	167	156	5	1	3
2019	188	234	158	172	91.9	100.0	172	172	158	8	2	2
2020	236	291	165	180	91.7	100.0	180	180	165	5	3	6

US Senior = a fourth year medical student in a US allopathic medical school accredited by the LCME with a graduation date after July 1 in the year before the match. US Grad = a graduate of a US allopathic school of medicine accredited by the LCME with a graduation date before July 1 in the year before the match. US IMG = a US citizen who attended an international medical school. Non-US IMG = a non-US citizen who attended an international medical school.

of paperwork associated with medical practice in the United States and have reported concerns about not having enough time to spend with each patient to provide high-quality care.^{22,23} Residents have also reported experiencing language and communication barriers.¹⁹ IMGs are more likely to have a native language other than English, and components of the language such as accent variations, speech speed and tone, and colloquialisms can preclude effective communication.^{20,22,24,25} Additionally, the visa solicitation process can be stressful for newly matched applicants, and the uncertainty surrounding immigration policies can deter highly-qualified students from pursuing training in the United States.^{26,27}

Notably, foreign graduates often experience significant financial constraints, not only during the application cycle but also throughout their transition to the United States. Participating in US clinical rotations requires the financial capital to travel to the United States and secure housing for at least several weeks, often months, or even years. Away rotations can cost more than \$3591, and oftentimes are more available in areas where the cost of living is higher. For IMGs, this is in addition to their US clinical rotation, which is theoretically already an away rotation because they do not have a home integrated program.²⁸ Although many research opportunities are funded, foreign-trained physicians may have additional expenses not covered by their research salary. Furthermore, not all US hospitals accept IMGs for clinical rotations, and if they do, they often require extensive prerequisites and application fees.^{27,28} In addition, applicants have reported an average cost of \$250–\$499 per in-person interview, with some reporting expenses of more than \$700. During the entire interview season, applicants have reported spending anywhere from \$2645 to \$10,845.^{29,30} To improve the representation of IMGs in US residency programs, efforts must be made to counteract these barriers.

Early orientation to the program that incorporates information about the US GME and health-care system is an important step in easing the transition of IMGs into their program. Seminars on improving communication skills and proficiency in the English language, and support and resources that promote wellness, are ways to support IMGs during the transition process. Research stipends are an important component of recruiting foreign graduates to US residency programs. Through research, applicants can gain experience with the academic aspect of medicine and become more competitive. Scholarships and grants to participate in clerkships would allow applicants to become exposed to the US health-care system and develop mentorship relationships with faculty and trainees. To improve IMG representation in plastic surgery programs specifically, further research is needed to identify factors that prevent foreign graduates from applying and matching into integrated residencies. Improving IMG representation among trainees will not only increase diversity within the field and enrich the educational environment, but it can also bridge disparities in plastic surgery care, especially for historically marginalized groups.

This project has limitations. First, although the response rate was low for both surveys, the data gathered

were valuable and critical in revealing challenges that come with matching IMG applicants from a program leadership perspective. Second, the NRMP data do not provide information on the number of US medical graduates that are not citizens. Most studies focus on US citizen or non-US citizen IMGs; however, there are students who are not citizens who matriculate in US medical schools every year. International students face similar immigration policies to IMGs, and many graduate with private loan debt they acquired during college and medical school. Third, although it is understood that programs regularly update their websites, it is unclear, without contacting the program directly, whether policies on visa sponsorship have changed. Although this study has limitations, it provides valuable data on the representation of IMGs in integrated plastic surgery programs as well as trends in applicant numbers and match rates in the last decade.

CONCLUSIONS

IMGs comprise less than 10% of filled positions per cycle. Although most programs accept IMGs, a small number, if any, matriculate each year. This may be explained by both the competitiveness of integrated programs and the volume of IMG applications. Further research is needed to identify the contributing factors of IMG representation in integrated programs to develop and implement interventions that increase the recruitment and successful matching of IMGs in plastic surgery residency programs.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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