

Surgical Education

Trends in the match rate and composition of candidates matching into categorical general surgery residency positions in the United States



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Residency;
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Abstract

BACKGROUND: The aim of this study was to analyze the trends in the proportion of students from various educational backgrounds who matched into categorical general surgery (GS) residency positions.

METHODS: National Resident Matching Program reports (1994 to 2014) were analyzed, and regression was used to estimate the trends for each group.

RESULTS: The match rate into GS-categorical residency has remained stable; however, since 1994, we witnessed a 13% decrease in US seniors matching into GS. This has corresponded to proportional increases in matches for US citizens from international medical schools (US IMG, 1350%) and a 62% increase for non-US citizen international medical graduates (non-US IMG) into GS. In comparison, US IMG matches into all first-year postgraduate positions increased by 468%, whereas non-US IMG matches decreased by 15%.

CONCLUSIONS: The stable match rates into categorical GS residencies are not because of US seniors but rather because of a rise in the number of IMGs. In contrast to the decreased reliance on non-US IMGs in all other specialties, GS is accepting a larger proportion of non-US IMGs.

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The high rate of unfilled general surgery (GS) categorical positions in 2001 and 2002¹ were a source of concern for the GS community.^{2,3} Since then, the match rates have stabilized with nearly 100% of first-year positions being filled in each year since 2003.¹ The results and data of the 2013 main residency match show a match rate of 99.6%, with only 3 unfilled programs and 5 unfilled positions.¹ Similarly, the match results of 2014 main residency match reveal that there were only 4 unfilled programs out of 251 programs and 7 unfilled positions of the 1,205 that were offered.¹

Although the match rates have stabilized, it is not clear whether this is because of an actual increase in matches by seniors graduating from allopathic medical schools in the United States (US). In addition to the US seniors, candidates from several other pathways apply to GS residency programs through National Resident Matching Program (NRMP). They include graduates of international medical schools who were born outside the US (non-US IMG), graduates of international medical schools who were born in the US (US IMG), graduates from osteopathic medical schools (DO), Canadian Medical Schools (CAN), and 5th pathway programs (FPP), and prior-year graduates from US allopathic schools (GRAD). There is a paucity of data on the long-term trends in the relative match rates of students from these diverse educational pathways into GS residencies. Because the personal and career goals of NRMP applicants from these diverse backgrounds are likely to be diverse as well, it is important to disaggregate these figures to foresee the composition of the future GS work force.

The aim of this study was to describe and analyze the long-term trends in the match rates of applicants from various educational pathways, who matched into first-year GS categorical residency programs in the US. Although with additional data and extensive analysis of explanatory factors underlying recent trends might be justified, the present study illuminates the existing trends and should dictate future studies of this topic.

Methods

This study used data published by the NRMP. NRMP reports are compiled from the data contained in applications and successful matches for first-year residency positions in the Main Residency Match each year. NRMP data have been published on an annual basis in report form and are available at the NRMP Web site.¹ The use of human subject data for this study was approved by the Institutional Review Board of the University of Nebraska Medical Center as exempt research. The relevant raw data were identified in NRMP reports and extracted for use in this study. The data that were analyzed for this study are presented as percentages in Table 1; the raw data are displayed in Table 2. To accomplish the study goals, these data were aggregated or disaggregated, as necessary, to analyze trends across the various educational pathways into a GS career.

Data collected for this study were limited to post-1994 because GS matches were not segregated by the NRMP into "GS categorical" or "Surgery preliminary" for all applicant groups until that year. Because our study focused on GS categorical programs, only years for which separate groups were reported were relevant to the study questions. Additionally, only data for first-year residency positions were included in the study. Residents do change specialties or career paths after their first year; however, such changes are not reported in NRMP data and are not the focus of this study.

To represent and compare the data trends over the course of this 21-year period, we used ordinary least-square regression to estimate the trend line for each type of applicant. Each of the estimated regression coefficients was evaluated statistically to determine whether the line was increasing, decreasing, or indeterminate (ie, not statistically different than zero).

Results

The match rate into GS categorical positions was noticeably lower in the years 1998 to 2003 but returned to a rate of almost 100% filled since 2003. This is illustrated by the data points for "Total Filled-Gen Surg Cat" in Fig. 1. Over the same time period, the percentage of those GS positions that were filled by US decreased steadily at a rate of one-half percentage point each year. This trend for US is emphasized in Fig. 1 by the data points and the regression lines. In comparison, Fig. 1 also illustrates that the overall match rate for all other first-year postgraduate (PGY1) specialties collectively was consistently lower than for GS for all years of this study. Also noteworthy is that the percentage of PGY1 positions filled by the US was lower for all other specialties collectively than for GS. The percentages of US matching into GS or into another PGY1 position have been decreasing at a similar rate. This is shown by the parallel trend lines in Fig. 1.

Given the decreasing percentage of PGY1 positions that are being filled by US, as shown in Fig. 1, the lines in Fig. 2 depict the trends for the 4 other routes through NRMP (ie, not US seniors) into GS positions. (For the sake of visual clarity, the raw data points are not illustrated in this figure. The adjusted R^2 statistics indicate how closely the trend lines resemble the raw data.) These trend lines indicate that there have been statistically significant increases in the number of GS positions that have been filled by US IMG and non-US IMG applicants as well as applicants through DO+CAN+FPP. The large R^2 values for these 3 trend lines indicate that a consistently increasing number of PGY1 positions in GS have been filled by these types of applicants. There was no statistically significant change in the number of matches for GRADs.

The data presented in Fig. 3 correspond to those presented in Fig. 2; however, Fig. 3 shows the match rates into all other PGY1 positions, excluding GS. Consistent with data shown in Fig. 1, Figs. 2 and 3 show the overall percentage of non-US applicants matching in NRMP to be increasing at the same rate for both GS and all other PGY1 positions (B coefficient for non-US into Gen Surg Cat = .51; B coefficient for non-US into all other programs = .53). But, further comparison of the 2 figures shows that the composition of those non-US cohorts differed.

Fig. 2 shows that the percentage of non-US IMG matches into GS has increased over the period of the study (B coefficient = .17). In stark contrast, the percentage of

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