Letters

RESEARCH LETTER

Trends in Female Physicians Entering High-Compensation Specialties, 2008 to 2022

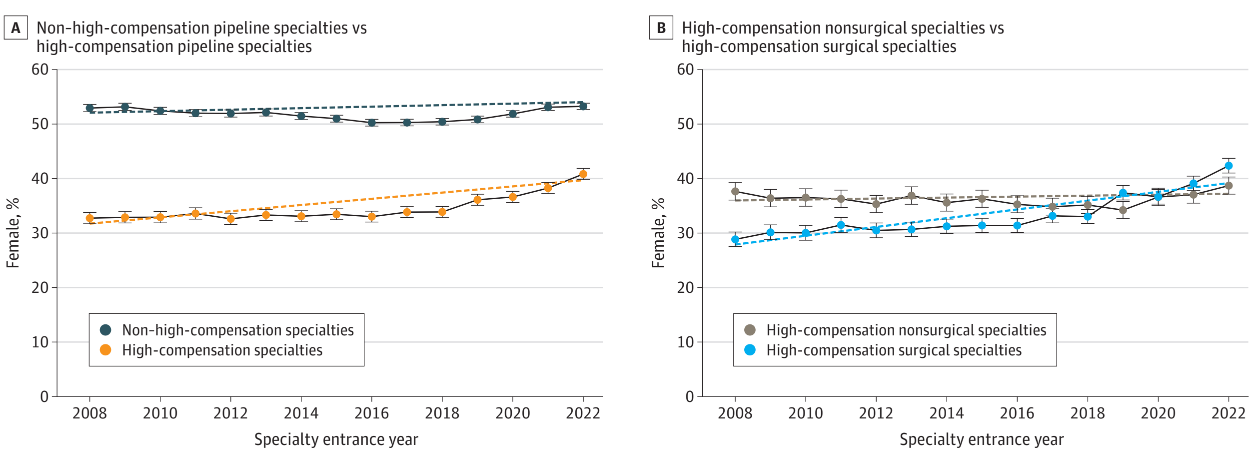
National reports show that women constituted 55% of incoming US medical students in 2023 and 38% of the physician workforce in 2022.[1,2] However, women remain underrepresented in high-compensation specialties, which contributes to broader gender inequities in compensation, along with other factors.[3,4] This study examined national trends in the proportion of female applicants and matriculants to residency programs for high-compensation surgical and nonsurgical pipeline specialties during 2008-2022.

Supplemental content

Methods | We assessed the sex composition of matriculants and applicants to Accreditation Council for Graduate Medical Education–accredited residency programs in pipeline specialties (leading to primary board certification) using National Graduate Medical Education Census and Electronic Residency Application Service (ERAS) data from 2008 to 2022 (eAppendix in Supplement 1). Because data were aggregated and deidentified, this study was exempt per University of Michigan Institutional Review Board criteria. Of 26 specialties with matriculant data for all years, 14 were identified as high-compensation based on Doximity's national physician compensation survey.[4] Given prior research indicating a disproportionate underrepresentation of women in surgical residencies,[5] we stratified high-compensation specialties into surgical (n = 9) and nonsurgical (n = 5) (**Figure 1**; eAppendix in Supplement 1).

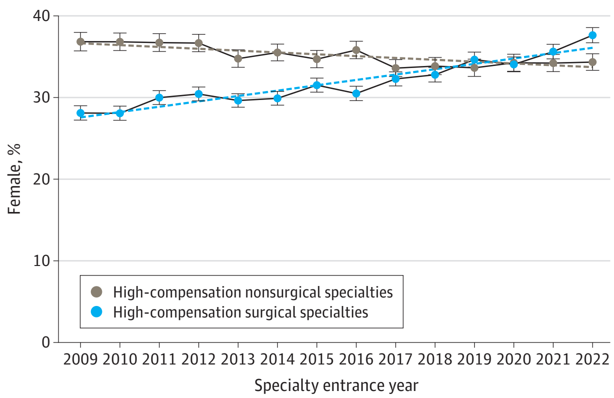
We used Prais-Winsten regression with Cochrane-Orcutt transformation to evaluate trends in the proportion of female residents matriculating to high-compensation vs non-high-compensation specialties. Similarly, we used Prais-Winsten regression with Cochrane-Orcutt transformation to test for interactions between specialty category (surgical vs nonsurgical) and time (specialty entrance year) to examine differences between specialty categories in the temporal trends of the (1) proportion of female matriculants; (2) proportion of female applicants; and (3) sex ratio of matriculants relative to applicants (sex ratio = [female matriculants ÷ female applicants] ÷ [male matriculants ÷ male applicants]). A sex ratio greater than 1 indicates that female applicants were more successful than male applicants in entering a category. For analyses involving applicant data, we adjusted the ERAS year by +1 for specialties requiring a preliminary year and excluded specialties with a low program participation rate in ERAS (<95% in 2022) (eAppendix in Supplement 1). A 2-sided $P < .05$ was considered statistically significant. Analyses were performed in R version 4.2.2 (R Foundation).

Figure 1. Trends in the Proportion of Female Matriculants to Residency Pipeline Specialties Over Time



High-compensation pipeline surgical specialties included neurosurgery, ophthalmology, orthopedic surgery, otorhinolaryngology, plastic surgery (integrated), surgery (general), thoracic surgery (integrated), urology, and vascular surgery (integrated). High-compensation pipeline nonsurgical specialties included anesthesiology, dermatology, nuclear medicine, radiation oncology, and radiology (diagnostic). Non–high-compensation pipeline specialties included child neurology, emergency medicine, family medicine, internal medicine, internal medicine/pediatrics, medical genetics and genomics, neurology, nuclear medicine, obstetrics and gynecology, pathology, pediatrics, physical medicine and rehabilitation, and psychiatry. Pipeline specialties were those leading to primary board certification. High-compensation specialties were those included among the top 20 highest-compensation specialties according to the latest Doximity survey on physician compensation.[4] Dashed lines represent predicted percentages based on Prais-Winsten regression models.

Figure 2. Trends in the Proportion of Female Applicants to High-Compensation Pipeline Specialties



High-compensation surgical specialties with eligible applicant data included neurosurgery, orthopedic surgery, otorhinolaryngology, surgery (general), thoracic surgery (integrated), and vascular surgery (integrated). High-compensation nonsurgical specialties with eligible applicant data included anesthesiology, dermatology, radiation oncology, and radiology (diagnostic). Pipeline specialties were those leading to primary board certification. High-compensation specialties were those included among the top 20 highest-compensation specialties according to the latest Doximity survey on physician compensation.[4] For high-compensation specialties that require a preliminary year (anesthesiology, dermatology, radiation oncology, and radiology [diagnostic]), the specialty entrance year is the ERAS year +1. Dashed lines represent predicted percentages based on Prais-Winsten regression models.

Results | Of 490 437 matriculants to pipeline specialties, 490 188 (99.9%) had sex data (female = 232 371 [47.4%]). Of those, 124 982 (25.5%) entered high-compensation specialties (female = 43 183 [34.6%]; surgical = 71 963 [57.6%]; nonsurgical = 53 019 [42.4%]). The proportion of female matriculants to high-compensation specialties significantly increased from 32.7% in 2008 to 40.8% in 2022 (*P* = .003) but remained lower than the proportion in non-high-compensation specialties (from 53.0% in 2008 to 53.3% in 2022; *P* = .44). For high-compensation specialties, we identified a significant interaction between specialty category and time (*P* < .001), with an increase in the proportion of female matriculants to surgical specialties from 28.8% in 2008 to 42.4% in 2022 (*P* < .001) and no significant change among nonsurgical specialties (from 37.6% in 2008 to 38.7% in 2022; *P* = .55) (Figure 1).

The proportion of female applicants to high-compensation nonsurgical specialties decreased from 36.8% in 2009 to 34.3% in 2022 (*P* = .001), whereas the proportion of female applicants to high-compensation surgical specialties increased from 28.1% in 2009 to 37.6% in 2022 (*P* < .001; specialty-category × time interaction, *P* < .001) (**Figure 2**). The sex ratio of matriculants to applicants modestly increased across both surgical specialties (2009: 1.0 [95% CI, 1.0-1.1]; 2022: 1.2 [95% CI, 1.2-1.3]; *P* = .005) and nonsurgical specialties (2009: 1.0 [95% CI, 0.9-1.0]; 2022: 1.2 [95% CI, 1.1-1.3]; *P* = .003) (specialty category × time interaction, *P* = .79).

Discussion | This study found that female physicians were underrepresented among residents entering high-compensation specialties compared with non-high-compensation specialties. However, while high-compensation surgical specialties experienced a steady increase in the proportion of female applicants and matriculants over time, high-compensation nonsurgical specialties experienced an overall decrease in the proportion of female applicants and no significant changes in the proportion of female matriculants. Furthermore, similar trends in success rates of female relative to male applicants across both specialty categories suggest that the different matriculation trends identified were due to greater increases in female applicants to surgical compared with nonsurgical specialties, rather than different acceptance rates between categories.

Limitations include lacking individual-level demographic data (eg, race and ethnicity),[6] which may interact with sex in predicting matriculation rates. Additionally, 4 specialties were excluded from applicant-related analyses due to low or no ERAS participation. Prior research[5] highlights possible approaches for greater inclusion of women in surgical specialties. Future studies should identify which strategies were successful in attracting women to these specialties and whether they could be implemented by high-compensation nonsurgical specialties.

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