Diversity, Equity, Inclusion, and Justice

An Analysis of Underrepresented in Medicine Away Rotation Scholarships in Surgical Specialties

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ABSTRACT

Background Underrepresented in medicine (UIM) visiting student clerkship scholarships provide an opportunity for supporting diversity. Although these scholarships have become a popular initiative to recruit diverse surgical applicants, they have not been thoroughly analyzed regarding which programs offer scholarships and the characteristics of the scholarships. UIM scholarship opportunity disparities may exist depending on location, funding, reputation, and program size among different specialties.

Objective To describe the characteristics and prevalence of UIM visiting student scholarships by examining institutional and program websites for the surgical specialties.

Methods Using the Accreditation Council for Graduate Medical Education (ACGME) Accreditation Data System for 2021, residency training and diversity websites were identified and evaluated for the availability of UIM visiting student scholarships in July 2021. Eight surgical specialties were examined. Scholarships were categorized by how UIM was defined, the funding amount provided, and scholarship application requirements. We analyzed the association of the program's National Institutes of Health funding, size, type, region, reputation, and population density of the program's area via Doximity on scholarship availability using chi-square and multivariate analysis.

Results Of the 1058 analyzed programs, 314 (29.7%) had a UIM visiting student scholarship. There were 4 different definitions of UIM used among the analyzed programs. The average scholarship amount offered was $1,852.25 ($500-$4,000). Depending on the specialty, different variables were associated with whether a program had a UIM scholarship.

Conclusions Currently, UIM scholarship offerings were variable between programs and surgical specialties.

Introduction

Diversity is essential in the medical profession, shown to benefit both medical education and underrepresented minority patient outcomes.[1-9] A diverse student body can foster cultural awareness through interactions with different students and faculty, creating a prosperous learning environment prepared to treat a racially and culturally diverse patient population, handle the unique challenges of a multicultural population, and eliminate existing health care disparities.[1] As such, efforts to improve diversity in medicine have become an important initiative across specialties. The Association of American Medical Colleges (AAMC) defines underrepresented in medicine (UIM) as racial and ethnic populations that are underrepresented in the medical profession relative to their numbers in the general population, including African Americans, Hispanics, American Indians, Alaska Natives, and Native Hawaiians.[10] In 2019, while 33.4% of the US population consisted of these racial and ethnic groups,[11] only 14.3% of surgical residency matriculants did.[12] Furthermore, there are significantly fewer UIM faculty in surgical specialties compared to many primary medical specialties.[13] Although there is a lack of diversity in surgical specialties, minimal improvement has been made to increase racial diversity.[14-19] Therefore, scholarships may be an initiative to start improving, recruiting, and fostering diversity within residency programs. Previous studies have indicated that extramural rotations positively correlated with a student's ability to match into a surgical specialty, since it provided the applicant an opportunity to show interest in a program, demonstrate surgical abilities, and receive a letter of recommendation from a faculty member.[20-23] According to a survey of 2015 Match applicants in all specialties, 67.4% of the surveyed applicants completed a visiting extramural rotation, and 36.0% matched at the program where they completed the rotation.[24] UIM scholarships for visiting fourth-year medical students became

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increasingly popular and successful in cultivating diversity, such as within emergency medicine residency programs.[25] While extramural rotations are important, they are expensive for the applicant. Additionally, one of the main reasons applicants' chose to forgo an extramural rotation was because of the cost.[26] According to a 2015 survey of plastic surgery residency applicants, the average cost of an extramural rotation was $3,591.[21] Additionally, a higher proportion of UIM medical students graduate with debt, specifically African Americans.[27] Therefore, UIM visiting student scholarships can provide necessary financial assistance to cover travel and housing accommodations, so the program may receive applications from socioeconomically diverse populations.

Due to the small percentage of UIM surgical resident matriculants,[12] residency programs may be competing to attract the same students to their programs for extramural rotations, applications, and interviews. Students may be more inclined to apply to extramural rotations at institutions with scholarships due to the financial burden of the extramural rotations. However, this may create more disparities since only programs with more resources may offer scholarships. Therefore, it is important to understand which programs offer scholarships.

Programs were categorized based on variables featured in previous literature that have been identified as factors that impact recruitment or methods of recruitment.[28-31] The purpose of the study was to examine the prevalence of UIM visiting student scholarships for surgical specialties. This study identifies scholarship opportunity differences between surgical specialties and program types.

Objectives
The purpose of this study is to illustrate the characteristics and prevalence of underrepresented in medicine (UIM) visiting student scholarships for surgical specialties.

Findings
UIM scholarship offerings vary between specialties; however, larger more reputable programs had higher rates of offering a UIM scholarship.

Limitations
This study is limited by the source of information since the scholarship information was only collected from program and institution websites.

Bottom Line
UIM scholarships are a possible intervention to help promote diversity, but additional studies are needed to understand how these scholarships impact residency recruitment.

Methods

The Accreditation Council for Graduate Medical Education (ACGME) accredited residency programs in general surgery, neurological surgery, orthopedic surgery, otolaryngology, integrated plastic surgery, integrated thoracic surgery, urology, and vascular surgery were identified from the ACGME Accreditation Data System in July 2021.[32] The identified institutional and program websites were examined, and data were independently collected and verified by 2 authors (S.L.B., C.W.). These specialties were chosen because they are primarily traditional general surgery and surgical subspecialties and had publicly available data.

Residency programs were classified by the following: program size (postgraduate year [PGY]-1 class size), program type (community, community with university affiliation, and university), and region (East North Central, East South Central, Mid-Atlantic, Mountain, New England, Pacific, South Atlantic, West North Central, West South Central, and Territory) using the Fellowship and Residency Electronic Interactive Database (FREIDA).[33] The National Institutes of Health (NIH) funding level for each program was obtained from the Blue Ridge Institute for Medical Research (BRIMR) database.[34] These data were not available for integrated plastic surgery, integrated thoracic surgery, or vascular surgery.[25] Program reputation and the population density of the program's location (urban or rural) were assessed using Doximity.[35] Doximity is a database of residency program information populated by annual surveys of practicing physicians.[35] Program reputation was stratified into 2 groups: top 20 versus not top 20 based on Doximity ranking. Reputation was not accessible for integrated thoracic surgery and vascular surgery residency programs on Doximity.[35] Funding was assessed as a categorical variable by stratifying into 2 groups—programs within the top 40 most funded by NIH and not top 40. According to FREIDA, 30 programs were defined as military residency programs, which were excluded from our analysis.[33] Military residency programs reimburse students for up to 2 extramural rotations provided they are part of the Health Professions Scholarship Program.[36] Since the scholarship is only available to individuals within the military, these programs were excluded from the analysis.[36]

Residency program and institution webpages were identified using a Google search with the keywords "institution + specialty + away rotation scholarships." Scholarships were categorized by the way UIM was defined, the number of funds provided, and the scholarship application requirements.

We directly calculated the diversity of each surgical specialty using the Simpson's Diversity Index (SDI).[37,38] This is a metric that assesses the diversity,

evenness, and richness of a specialty's population using the exact count of each ethnicity group as the following: American Indian/Alaska Native, Asian, Black/African American, Hispanic/Latino, Native Hawaiian, White, and multicultural. As the SDI increases, there is more diversity. This would allow us to calculate for correlations between specialty diversity and scholarship rate. We utilized the SDI on surgical residents.[37]

Univariate analyses were performed using SPSS 26 (IBM Corp, Armonk, NY). A multivariate regression analysis was also performed. A $P<.05$ was considered statistically significant.

Institutional Review Board approval was not required as the data was publicly available, did not involve human subjects, and does not contain any sensitive information.

Results

In total, 8 surgical specialties and 1058 programs were analyzed. While 314 (29.7%) programs had a UIM visiting student scholarship, this was as high as 46.0% (29 of 63) in vascular surgery and 62.1% (18 of 29) in integrated thoracic surgery (FIGURE). General surgery and orthopaedic surgery had the lowest percentage of total programs offering scholarships (21.9%, 24.9%, respectively; TABLE 1). On average, the amount of scholarship funding offered was $1,852.25±633.03. Integrated plastic surgery scholarships had the most funding ($2,007.69±474.90; TABLE 1). Of the programs that offered scholarships, the majority had a PGY-1 class program size of 3 or more residents (68.5%, 215 of 314) and were university programs (78.3%, 246 of 314), and most commonly were located in the East North Central region (23.6%, 74 of 314) and urban areas (93.8%, 244 of 260). When examining each of 6 specialties' top 20 list, 85 programs across the 5 specialties offered scholarships. Overall, across 6 specialties on Doximity, 85 programs on the top 20 list offered scholarships. Of the 5 specialties on the BRIMR list, 106 programs on the top 40 NIH-funded list offered scholarships. Of the 314 programs that had a UIM visiting student scholarship, UIM was defined in myriad ways, including the AAMC definition (46.2%, 145 of 314) as the most common description. The most common scholarship requirements (42.7%) included the compilation of academic information (USMLE Step 1 score, transcript, or CV), personal information (photo, race, family history, birth date, or contact information), a personal statement, and a letter of recommendation. Although the majority of the scholarships gave clear guidelines and descriptions, 27 definitions of UIM (8.6%), 61 application requirements (19.4%), and 47 stipend amounts (15.0%) were unspecified.

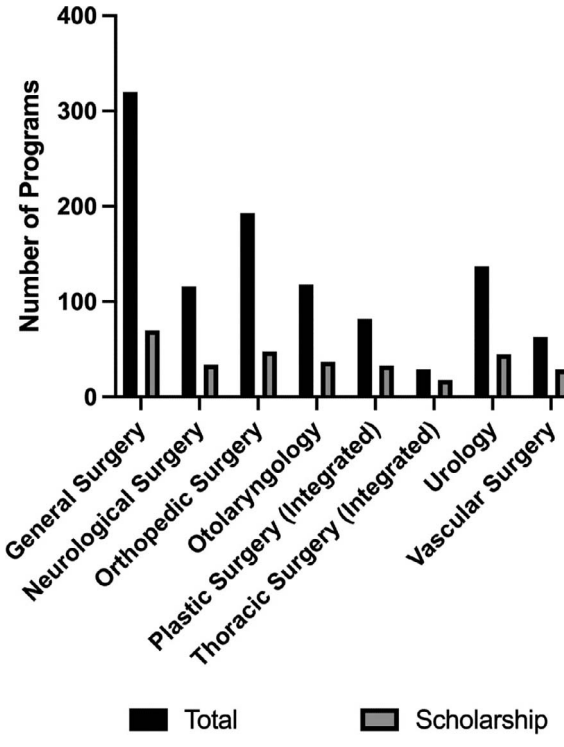

FIGURE
Surgical Specialties—Total Number of Programs and Scholarships

Univariate analysis demonstrated that the smaller programs were less likely to have UIM visiting student scholarships ($P<.001$; TABLE 2). As program size increased, from a PGY-1 class of 1 to 18 residents, there was an increase in 3.3% of UIM visiting scholarships. University programs were more likely to offer scholarships ($P<.001$; TABLE 2) in comparison to the community- and university-affiliated programs. Population density of the program's location was not associated with the prevalence of UIM visiting student scholarships ($P=.13$; TABLE 2). A significant difference was found among the number of UIM visiting student scholarships across the regions ($P<.001$; TABLE 2). Top ranking programs (defined by Doximity reputation ranking) were more likely to offer a UIM visiting scholars program (OR 5.206; 95% CI 3.483-7.781; $P<.001$; TABLE 2) and the top NIH-funded programs (defined by BRIMR database) were more likely to offer a UIM visiting scholars program (OR 5.153; 95% CI 3.667-7.241; $P<.001$; TABLE 2).

When assessing the SDI, vascular surgery was the most diverse surgical specialty in 2020 (SDI=0.60), while orthopedic surgery was the least diverse surgical specialty in 2020 (SDI=0.42; TABLE 3). A simple linear regression analysis was performed showing no

TABLE 1
Surgical Residency Program Scholarship Characteristics

				UIM Definition				Program Type[a]		
Surgical Programs	**Total Scholarships (N=314), No. (%)**	**Specialty Scholarships, % (N=Programs)**	**Amount of Funds, Mean±SD**	**UIM Defined by AAMC[b] (N=145), No. (%)**	**UIM Defined by AAMC[b] and LGBTQ+ (N=13), No. (%)**	**UIM Defined by AAMC[b] and UIM Advocate (N=52), No. (%)**	**UIM Defined by AAMC,[b] Socially, Economically, or Educationally Disadvantaged, and Unique (N=29), No. (%)**	**Community (N=10), No. (%)**	**Community With University Affiliation (N=58), No. (%)**	**University (N=246), No. (%)**
General surgery	70 (22.3)	21.9 (N=320)	$1,806.67±661.44	34 (23.5)	6 (46.2)	8 (15.4)	9 (31)	1 (10)	16 (27.6)	53 (21.5)
Neurological surgery	34 (10.8)	29.3 (N=116)	$1,962.96±535.76	16 (11)	0 (0)	7 (13.5)	2 (6.9)	2 (20)	9 (15.5)	23 (9.4)
Orthopedic surgery	48 (15.3)	24.9 (N=193)	$1,629.76±619.21	19 (13.1)	3 (23.1)	8 (15.4)	4 (13.8)	1 (10)	10 (17.2)	37 (15)
Otolaryngology	37 (11.8)	31.4 (N=118)	$1,875.00±718.42	20 (13.8)	1 (7.7)	7 (13.5)	1 (3.5)	1 (10)	6 (10.3)	30 (12.2)
Plastic surgery (integrated)	33 (10.5)	40.2 (N=82)	$2,007.69±474.91	15 (10.3)	2 (15.4)	5 (9.6)	4 (13.8)	1 (10)	4 (6.9)	28 (11.4)
Thoracic surgery (integrated)	18 (5.7)	62.1 (N=29)	$1,968.75±561.81	9 (6.2)	0 (0)	3 (5.8)	1 (3.5)	0 (0)	3 (5.2)	15 (6.1)
Urology	45 (14.3)	32.8 (N=137)	$1,833.33±577.35	18 (12.4)	1 (7.7)	9 (17.3)	4 (13.8)	1 (10)	7 (12.2)	37 (15)
Vascular surgery	29 (9.2)	46.0 (N=63)	$1,980.00±783.69	14 (9.7)	0 (0)	5 (9.6)	4 (13.8)	3 (30)	3 (5.2)	23 (9.4)

Abbreviations: UIM, underrepresented in medicine; AAMC, Association of American Medical Colleges.

[a] Variables were retrieved from the FREIDA AMA Residency & Fellowship Database (https://freida.ama-assn.org).

[b] AAMC defines UIM as racial and ethnic populations that are underrepresented in the medical profession relative to their numbers in the general population including African Americans, Mexican Americans, American Indians, Alaska Natives, Native Hawaiians, and mainland Puerto Ricans.

TABLE 2
Univariate Analysis Regarding Scholarship Opportunities

Surgical Programs	NIH Funding (Top 40),[a] *P* Value	Population Density (Doximity Urban/Rural),[b] *P* Value	Program Size (Based on PGY-1 Class),[c] *P* Value	Program Type,[c] *P* Value	Region (by FREIDA Breakdown),[c] *P* Value	Reputation (Doximity Ranking Top 20),[b] *P* Value
Overall	**<.001**	.13	**<.001**	**<.001**	**<.001**	**<.001**
General surgery	**<.001**	.25	**<.001**	**<.001**	.06	**<.001**
Neurological surgery	.128	.64	.74	.20	.67	**.001**
Orthopedic surgery	**<.001**	.60	**<.001**	**<.001**	.41	**<.001**
Otolaryngology	**<.001**	.70	**.003**	.27	.25	**<.001**
Plastic surgery (integrated)	N/A	.90	**.005**	.18	**.014**	**.002**
Thoracic surgery (integrated)	N/A	.47	.23	.57	.17	N/A
Urology	**.007**	.60	**<.001**	.13	.27	**<.001**
Vascular surgery	N/A	.70	.18	.95	.30	N/A

Abbreviations: NIH, National Institutes of Health; PGY, postgraduate year; FREIDA, Fellowship and Residency Electronic Interactive Database; N/A, not applicable.
Note: $P<.05$ is considered statistically significant and bolded.
[a] Accessed from The Blue Ridge Institute for Medical Research webpage (http://www.brimr.org/NIH_Awards/2020/).
[b] Accessed from the Doximity webpage (https://www.doximity.com).
[c] Variables were retrieved from the FREIDA AMA Residency & Fellowship Database (https://freida.ama-assn.org).

correlation between scholarship frequency and SDI ($R^2=0.04$, $P=.65$). Multivariate analysis was also performed to assess the variables that affect scholarship rate (TABLE 4). After adjustments from our analysis, we found that there were significantly more UIM scholarships available in all sub-surgical specialty residency programs compared to general surgery residency programs. As program size increased, these programs were more likely to provide UIM scholarships ($P<.001$; OR 1.5 [1.3-1.8]). Programs in the top 20 for reputation were more likely to have UIM scholarships ($P<.001$; OR 3.0 [1.7-5.3]). Community-based residency programs provided fewer UIM scholarship opportunities on their websites relative to university-based programs ($P=.04$; OR 0.4 [0.2-0.9]). The location did play a significant factor in some regions for providing UIM scholarships relative to the Mid-Atlantic region. Factors that did not have a significant impact on UIM scholarships were NIH funding status and population density.

Discussion

This current study assessed the prevalence, accessibility, and details of UIM scholarships offered on surgical residency program websites. We found that 22% to 62% of graduate medical education surgical programs currently fund and promote UIM visiting student scholarships, depending upon the specialty. Larger, more reputable training programs had higher rates of offering UIM scholarships although no correlation between specialty diversity and UIM

TABLE 3
Simpson Diversity Index of Various Surgical Specialties

Specialty	Simpson's Diversity Index[a]	Interpretation
General surgery	0.53	Your workforce is more ethnically diverse than 53% of midsize companies
Neurological surgery	0.53	Your workforce is more ethnically diverse than 53% of midsize companies
Orthopedic surgery	0.42	Your workforce is more ethnically diverse than 28% of midsize companies
Otolaryngology	0.50	Your workforce is more ethnically diverse than 47% of midsize companies
Plastic surgery (integrated)	0.45	Your workforce is more ethnically diverse than 43% of midsize companies
Thoracic surgery (integrated)	0.50	Your workforce is more ethnically diverse than 47% of midsize companies
Urology	0.53	Your workforce is more ethnically diverse than 53% of midsize companies
Vascular surgery	0.60	Your workforce is more ethnically diverse than 70% of midsize companies

[a] Determined using the Diversity Index Calculator (https://library.namely.com/diversity-calculator).

TABLE 4
Multivariate Analysis Regarding Scholarship Opportunities

Variable	*P* Value	Odds Ratio	95% CI
Specialty			
Orthopedic surgery vs general surgery	**.016**	2.3	1.2-4.5
Otolaryngology vs general surgery	**<.001**	5.9	2.6-13.7
Urology vs general surgery	**<.001**	7.2	3.2-16.6
Plastic surgery vs general surgery	**<.001**	13.2	5.0-35.4
Neurological surgery vs general surgery	**<.001**	8.4	3.3-21.4
Cardiothoracic surgery vs general surgery	**<.001**	60.4	17.0-215.0
Vascular surgery vs general surgery	**<.001**	37.8	12.8-105.6
Program size	**<.001**	1.5	1.3-1.8
Doximity top 20 vs others	**<.001**	3.0	1.7-5.3
Top 40 program NIH funding for their respective specialty	.66	1.1	0.7-1.8
Program status			
Community program with university affiliation vs university program	.13	0.7	0.4-1.1
Community program vs university program	**.040**	0.4	0.2-0.9
Program location			
Mountain vs Mid-Atlantic	.40	1.5	0.6-4.0
East North Central vs Mid-Atlantic	**.002**	2.5	1.4-4.6
West North Central vs Mid-Atlantic	.87	0.9	0.4-2.3
New England vs Mid-Atlantic	**.001**	3.3	1.6-7.0
South Atlantic vs Mid-Atlantic	.75	1.1	0.6-2.0
Pacific vs Mid-Atlantic	**.001**	3.1	1.6-6.1
West South Central vs Mid-Atlantic	**.005**	0.3	0.1-0.7
East South Central vs Mid-Atlantic	.20	0.6	0.2-1.4
Territory vs Mid-Atlantic	.99	N/A	N/A
Environment			
Urban vs rural	.10	0.6	0.3-1.1

Abbreviations: NIH, National Institutes of Health; N/A, not applicable.
Note: $P<.05$ is considered statistically significant and bolded.

scholarships was found. Our analysis demonstrated that several scholarship programs did not provide clear guidelines or important details, like stipend amounts, on their websites.

In a study completed in 2019 that analyzed general surgery residency program websites, university programs were more likely to incorporate diversity and inclusion content in their websites compared to non-university programs.[39] Additionally, our analysis found that university programs were associated with offering more scholarships. Therefore, it appears that university programs may be more attuned to the importance of diversity initiatives within residency recruitment. Scholarship opportunities could be more expansive to include a greater variety of programs, including but not limited to non-university programs. An analysis of 10 general surgery programs found that UIM applicants received a disproportionately smaller percentage of interview invitations, highlighting the current challenges that some general surgery programs have in achieving a diverse group of residents.[40] Thus, programs must find ways to foster and recruit a diverse group of applicants. Additionally, in 2019, 87.2% of general surgeons were located in urban areas.[41] Urban areas have a more racially and ethnically diverse population than suburban areas,[42] so these scholarships in the urban areas are an important initiative to recruit a diverse group of residents to reduce racial and ethnic discordance.

Offering UIM scholarships also displays a program's dedication to cultivating a diverse community. According to the 2017 National Resident Matching Program Applicant Survey, 37% of applicants in all specialties considered the cultural, racial, ethnic, and gender diversity of the institution an important factor in selecting programs to apply.[43] Although there are numerous methods to promote diversity initiatives, including social media, the majority of prospective applicants use program websites to find information.[44-46] Thus, we utilized both program and

institution websites to search for UIM scholarships. While these scholarships may showcase the program's commitment to diversity, there is a limited number of UIM applicants applying to these positions. Therefore, it is important to also implement other initiatives earlier in a student's medical school career, for example, mentorship programs that are focused on rotation choices, the field of practice, career trajectory, and research.[47]

This study has several limitations. This is a cross-sectional study, so available scholarships may change over time. The data were only collected from publicly available information on the program and institution websites and is likely limited by missing scholarship information on some websites. NIH funding was collected as a proxy for overall program funding, but this information was not available for 3 of the specialties. Similarly, Doximity's reputation rankings were not available for 2 of the specialties and these rankings are subjective and prone to bias. It is unknown whether programs that offer these scholarships in surgical specialties have an increase in the number of UIM residents, although, in an analysis of emergency medicine programs, they were found to be helpful.[25]

Additional studies should be performed to determine what impact offering such scholarships has on the goals of achieving greater diversity in surgical residency programs. Such programs are likely one of many interventions required to help recruit and promote UIM students within the surgical fields. Further action is needed to better understand how the diversity of both UIM students as defined by the AAMC and other underrepresented groups, for example, LGBTQ+ and socially, economically, or educationally disadvantaged students, can be increased.

Conclusions

UIM extramural rotation scholarships varies greatly across the surgical specialties and does not correlate with specialty diversity.

References

1. Saha S, Guiton G, Wimmers PF, Wilkerson L. Student body racial and ethnic composition and diversity-related outcomes in US medical schools. *JAMA*. 2008;300(10):1135-1145. doi:10.1001/jama.300.10.1135
2. Siotos C, Payne RM, Stone JP, et al. Evolution of workforce diversity in surgery. *J Surg Educ*. 2019;76(4):1015-1021. doi:10.1016/j.jsurg.2018.12.009
3. Hopkins Tanne J. Patients are more satisfied with care from doctors of same race. *BMJ*. 2002;325(7372):1057.
4. Takeshita J, Wang S, Loren AW, et al. Association of racial/ethnic and gender concordance between patients and physicians with patient experience ratings. *JAMA Netw Open*. 2020;3(11):e2024583. doi:10.1001/jamanetworkopen.2020.24583
5. Salsberg E, Richwine C, Westergaard S, et al. Estimation and comparison of current and future racial/ethnic representation in the US health care workforce. *JAMA Netw Open*. 2021;4(3):e213789. doi:10.1001/jamanetworkopen.2021.3789
6. Shen MJ, Peterson EB, Costas-Muñiz R, et al. The effects of race and racial concordance on patient-physician communication: a systematic review of the literature. *J Racial Ethn Health Disparities*. 2018;5(1):117-140. doi:10.1007/s40615-017-0350-4
7. Street RL, O'Malley KJ, Cooper LA, Haidet P. Understanding concordance in patient-physician relationships: personal and ethnic dimensions of shared identity. *Ann Fam Med*. 2008;6(3):198-205. doi:10.1370/afm.821
8. Dimant OE, Cook TE, Greene RE, Radix AE. Experiences of transgender and gender nonbinary medical students and physicians. *Transgend Health*. 2019;4(1):209-216. doi:10.1089/trgh.2019.0021
9. Aruguete MS, Roberts CA. Gender, affiliation, and control in physician–patient encounters. *Sex Roles*. 2000;42:107-118. doi:10.1023/A:1007036412480
10. Association of American Medical Colleges. Underrepresented in Medicine Definition. Accessed July 16, 2021. https://www.aamc.org/what-we-do/equity-diversity-inclusion/underrepresented-in-medicine
11. U.S. Census Bureau. QuickFacts United States. Accessed July 16, 2021. https://www.census.gov/quickfacts/fact/table/US/RHI225219
12. Nieblas-Bedolla E, Williams JR, Christophers B, Kweon CY, Williams EJ, Jimenez N. Trends in race/ethnicity among applicants and matriculants to US surgical specialties, 2010-2018. *JAMA Netw Open*. 2020;3(11):e2023509. doi:10.1001/jamanetworkopen.2020.23509
13. Shah KN, Ruddell JH, Scott B, et al. Orthopaedic surgery faculty: an evaluation of gender and racial diversity compared with other specialties. *JB JS Open Access*. 2020;5(3):e20.00009. doi:10.2106/JBJS.OA.20.00009
14. Valenzuela F, Romero Arenas MA. Underrepresented in surgery: (lack of) diversity in academic surgery faculty. *J Surg Res*. 2020;254:170-174. doi:10.1016/j.jss.2020.04.008
15. Erkman CP, Ortmeyer KA, Pelletier GJ, et al. An approach to diversity and inclusion in cardiothoracic surgery. *Ann Thorac Surg*. 2021;111(3):747-752. doi:10.1016/j.athoracsur.2020.10.056

16. Dorsey C, Ross E, Appah-Sampong A, et al. Update on workforce diversity in vascular surgery. *J Vasc Surg*. 2021;74(1):5-11.e1. doi:10.1016/j.jvs.2020.12.063
17. Ellis DI, Khubchandani JA. The state of diversity in American surgery. *Ann Surg*. 2021;273(1):e3-e4. doi:10.1097/SLA.0000000000004518
18. Torres MB, Salles A, Cochran A. Recognizing and reacting to microaggressions in medicine and surgery. *JAMA Surg*. 2019;154(9):868-872. doi:10.1001/jamasurg.2019.1648
19. Day MA, Owens JM, Caldwell LS. Breaking barriers: a brief overview of diversity in orthopedic surgery. *Iowa Ortho J*. 2019;39(1):1-5.
20. Baldwin K, Weidner Z, Ahn J, Mehta S. Are away rotations critical for a successful match in orthopaedic surgery? *Clin Orthop Relat Res*. 2009;467(12):3340-3345. doi:10.1007/s11999-009-0920-9
21. Drolet BC, Brower JP, Lifchez SD, Janis JE, Liu PY. Away rotations and matching in integrated plastic surgery residency: applicant and program director perspectives. *Plast Reconstr Surg*. 2016;137(4):1337-1343. doi:10.1097/PRS.0000000000002029
22. Becnel C, Mihalic A, McGrew P. Characterization of away rotation importance in general surgery: a cross-sectional analysis. *J Am Coll Surg*. 2020;231(4):241. doi:10.1016/j.jamcollsurg.2020.07.362
23. Camp CL, Sousa PL, Hanssen AD, et al. The cost of getting into orthopedic residency: analysis of applicant demographics, expenditures, and the value of away rotations. *J Surg Educ*. 2016;73(5):886-891. doi:10.1016/j.jsurg.2016.04.003
24. Winterton M, Ahn J, Bernstein J. The prevalence and cost of medical student visiting rotations. *BMC Med Educ*. 2016;16(1):291. doi:10.1186/s12909-016-0805-z
25. Duong DK, Samuels EA, Boatright D, Wilson T. Association between emergency medicine clerkship diversity scholarships and residency diversity. *AEM Educ Train*. 2020;5(3):e10547. doi:10.1002/aet2.10547
26. Higgens E, Newman L, Halligan K, Miller M, Schwab S, Kosowicz L. Do audition electives impact Match success? *Med Educ Online*. 2016;21:31325. doi:10.3402/meo.v21.31325
27. Toretsky C, Mutha S, Coffman J. *Reducing Educational Debt Among Underrepresented Physicians and Dentists*. San Francisco, CA: University of California, San Francisco, Healthforce Center; 2019.
28. Malyavko A, Kim Y, Harmon TG, et al. Utility of social media for recruitment by orthopaedic surgery residency programs. *JB JS Open Access*. 2021;6(3):e21.00076. doi:10.2106/JBJS.OA.21.00076
29. Stefanidis D, Miles WS, Greene FL. Factors influencing residency choice of general surgery applicants—how important is the availability of a skills curriculum? *J Surg Educ*. 2009;66(6):325-329. doi:10.1016/j.jsurg.2009.06.004
30. Venincasa MJ, Cai LZ, Gedde SJ, Uhler T, Sridhar J. Current applicant perceptions of the ophthalmology residency Match. *JAMA Ophthalmol*. 2020;138(5):460-466. doi:10.1001/jamaophthalmol.2020.0252
31. Weygandt PL, Smylie L, Ordonez E, Jordan J, Chung AS. Factors influencing emergency medicine residency choice: diversity, community, and recruitment red flags. *AEM Educ Train*. 2021;5(4):e10638. doi:10.1002/aet2.10638
32. Accreditation Council for Graduate Medical Education. Accreditation Data System (ADS). Accessed July 6, 2021. https://apps.acgme.org/ads/Public/Programs/Search
33. American Medical Association. FREIDA Residency Program Database: Medical Fellowship Database. Accessed July 10, 2021. https://freida.ama-assn.org/search/list
34. Blue Redige Institute for Medical Research. Roskoski R, Parslow TG. Ranking tables of National Institutes of Health (NIH) award data 2020. Accessed September 16, 2021. http://www.brimr.org/NIH_Awards/2020/default.htm
35. Doximity. Doximity Residency Navigator. Accessed July 9, 2021. https://www.doximity.com/residency/
36. Association of American Medical Colleges. The Armed Forces Health Professions Scholarship Program for Physicians. Accessed January 15, 2022. https://www.aamc.org/media/54446/download
37. Association of American Medical Colleges. Table B5. Number of Active MD Residents, by Race/Ethnicity (Alone or In Combination) and GME Specialty. Accessed January 15, 2022. https://www.aamc.org/data-reports/students-residents/interactive-data/report-residents/2020/table-b5-md-residents-race-ethnicity-and-specialty
38. Namely. Diversity Index Calculator. Accessed November 4, 2021. https://library.namely.com/diversity-calculator
39. Driesen AM, Romero Arenas MA, Arora TK, et al. Do general surgery residency program websites feature diversity? *J Surg Educ*. 2020;77(6):e110-e115. doi:10.1016/j.jsurg.2020.06.014
40. Jarman BT, Kallies KJ, Joshi ART, et al. Underrepresented minorities are underrepresented among general surgery applicants selected to interview. *J Surg Educ*. 2019;76(6):e15-e23. doi:10.1016/j.jsurg.2019.05.018
41. WWAMI Rural Health Research Center, University of Washington. Larson EH, Andrilla CHA, Kearny J, Garberson LA, Patterson DG. The Distribution of the General Surgery Workforce in Rural and Urban America in 2019 Policy Brief. Accessed August 8, 2022. https://familymedicine.uw.edu/rhrc/wp-content/

uploads/sites/4/2021/03/RHRC_PBMAR2021_LARSON.pdf
42. USDA Economic Research Service. Racial and ethnic minorities made up about 22 percent of the rural population in 2018, compared to 43 percent in urban areas. Accessed September 16, 2021. https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=99538
43. National Resident Matching Program. Results of the 2017 NRMP Applicant Survey by Preferred Specialty and Applicant Type. Accessed August 8, 2022. https://www.nrmp.org/wp-content/uploads/2021/07/Applicant-Survey-Report-2017.pdf
44. Chen VW, Hoang D, Garner W. Do websites provide what applicants need? Plastic surgery residency program websites versus applicant self-reported needs. *Plast Reconstr Surg Glob Open*. 2018;6(10):e1900. doi:10.1097/GOX.0000000000001900
45. Tang O, Ruddell JH, Hilliard RW, et al. Improving the online presence of residency programs to ameliorate COVID-19's impact on residency applications. *Postgrad Med*. 2021;133(4):404-408. doi:10.1080/00325481.2021.1874195
46. Steele TN, Galarza-Paez L, Aguilo-Seara G, et al. Social media impact in the Match: a survey of current trends in the United States. *Arch Plast Surg*. 2021;48(1):107-113. doi:10.5999/aps.2020.00836
47. Bhatnagar V, Diaz S, Bucur PA. The need for more mentorship in medical school. *Cureus*. 2020;12(5):e7984. doi:10.7759/cureus.7984

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