

Perceptual Barriers to Becoming a Plastic Surgeon among Underrepresented Medical Students

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Background: The field of plastic surgery has experienced difficulty increasing diversity among trainees, despite significant efforts. Barriers to recruitment of underrepresented in medicine (URM) students are poorly understood. This study assesses URM students' exposure to plastic surgery, access to mentors and research opportunities, and the importance of diversity in the field.

Methods: A survey was designed and distributed to members of the Student National Medical Association over 3 months. Survey data were collected using Qualtrics and descriptive statistics, and logistical regressions were performed using SAS.

Results: Of the 136 respondents, 75.0% identified as Black (n = 102/136), and 57.4% (n = 66/115) reported a plastic surgery program at their home institution. Of the total respondents, 97.7% (n = 127/130) were concerned about racial representation in plastic surgery, and 44.9% (n = 53/114) would be more likely to apply if there were better URM representation. Most respondents disagreed that there was local (73.4%, n = 58/79) or national (79.2%, n = 57/72) interest in URM recruitment. Students whose plastic surgery programs had outreach initiatives were more likely to have attending (OR 11.7, $P < 0.05$) or resident mentors (OR 3.0 $P < 0.05$) and access to research opportunities (OR 4.3, $P < 0.05$).

Conclusions: URM students feel there is an evident lack of interest in recruiting URM applicants in plastic surgery. Programs with outreach initiatives are more likely to provide URM students access to mentorship and research opportunities, allowing students to make informed decisions about pursuing plastic surgery. (*Plast Reconstr Surg Glob Open* 2023; 11:e5156; doi: [10.1097/GOX.00000000000005156](https://doi.org/10.1097/GOX.00000000000005156); Published online 22 August 2023.)

INTRODUCTION

Plastic surgery remains one of the most competitive residency programs in medicine.¹ Although efforts to increase diversity have been a point of emphasis in recent years, the number of minority applicants to plastic surgery residencies has remained largely unchanged for the last decade.^{2,3} A better understanding of this underrepresentation is critical to targeting recruitment efforts.⁴

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The AAMC defines students who are underrepresented in medicine (URM) as “[t]hose racial and ethnic populations who are under-represented in the medical profession...namely, African Americans, Latinos, Native Americans, and mainland Puerto Ricans.” Efforts to increase the presence of URM students in medical school have been somewhat successful, but inclusion efforts have been less successful at the residency level. The most competitive specialties, including plastic surgery, have seen URM representation in their resident corps remaining static over the last 10 years despite concerted focus on improving trainee diversity.^{5–7}

This statistic warrants further investigation. Resource differences in early education lead to achievement gaps among URM students, manifesting chiefly as lower United States Medical Licensing Examination scores, lower rates of AOA membership, lower clerkship

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grades, and less favorable Medical Student Performance Evaluation descriptions.^{4,7-10} Shifting the relative weight of traditional (ie, grades and examination scores) and nontraditional criteria (ie, problem-solving and communication skills) led to an increased number of URM matriculants to medical school.^{10,11} Within medical education, interventions such as active recruitment and increasing faculty representation and mentorship have been shown to increase URM recruitment to residency programs.¹²⁻¹⁷

To determine the barriers URM students face in pursuing training in plastic surgery, a survey was developed and distributed to the largest minority medical student association, the Student National Medical Association (SNMA). Survey data on student exposure to plastic surgery, access to mentors and research opportunities, and importance of representation in the field will inform outreach efforts to improve diversity in plastic surgery.

METHODS

The protocol for the cross-sectional study was approved for exemption by the institutional review board at the University of Pittsburgh. The subject population was student members of the SNMA, and the distribution was overseen by the SNMA national organization leadership. Inclusion criteria were limited to current medical students.

Study design included the development of an anonymous survey using yes/no questions and five-point Likert scale questions. The survey was distributed through the SNMA initially as an email bulletin sent to all members asking for survey participation. Subsequently, it was included in the weekly SNMA newsletter, for a total collection time of 2 months (March–April 2021). Survey data were collected using Qualtrics software, version March 2021 (Qualtrics, Provo, Utah).

Analysis consisted of frequency analysis for the Likert scale questions and yes/no questions. Fisher exact test was used to evaluate associations between categorical data. Analyses were performed using SAS University Edition 9.04.01 (SAS Institute Inc., Cary, N.C.).

RESULTS

A total of 136 medical student members of the SNMA responded to the survey. Of the respondents, 83.3% (n = 115/136) were enrolled in allopathic medical schools (85.2%, n = 115/135), 75.0% (n = 102/136) identified as Black, and 80.9% (n = 110/136) as female sex (Table 1). There was an equal distribution of MS1–MS4s among respondents. Of the total students 57.4% (n = 66/115) reported having a home plastic surgery program. There was an almost equal distribution of responses regarding outreach initiatives; 52.2% (n = 35/67) of students reported having outreach events within their home plastic surgery department; and 66.0% (n = 66/100) of students have a plastic surgery interest group at their school. Response rates are not available due to the nature of email-based participation solicited from a large list. It is unknown whether each individual viewed the email, and

Takeaways

Question: What perceptual barriers exist that prevent increased numbers of Black medical students matriculating into plastic and reconstructive surgery?

Findings: Our survey of the Student National Medical Association found that Black medical students do not believe there is an interest in recruiting them, that they have access to PRS mentorship, and would be more likely to apply to PRS if representation was higher.

Meaning: A deliberate effort must be made to reach URM students early and frequently to improve diversity in plastic surgery education, as there is a strong connection between outreach efforts and increasing interest in plastic surgery residency.

Table 1. Demographics

	n	Percent (%)
Gender		
Masculine	26	19.1
Feminine	110	80.9
Race		
Black	102	75
Hispanic or Latino	9	6.6
Asian	5	3.7
American Indian or Alaskan Native	4	2.9
White	2	1.5
Multiple races	14	10.3
Home plastic surgery program		
Yes	66	57.4
No	49	42.6

as a result, this is classified as a poll-based study rather than as a true survey of the SNMA experience. In addition, the email may have been sent to individuals who were not eligible for the study (ie, recent graduates). As such, nonresponders are all classified as “unknown eligibility, ‘non-interview’: nothing known about respondent or address.”¹⁸

Nearly all respondents (97.7%, n = 127/130) were concerned that minorities are underrepresented in plastic surgery, and 80.5% (n = 107/133) of students agreed or strongly agreed that plastic surgeons make meaningful changes in their patients’ lives. However, only 29.8% (n = 34/114) agreed or strongly agreed that plastic surgery is a realistic career option. Of the total students, 41.5% (n = 49/118) agreed or strongly agreed that they would apply into plastic surgery if it was less competitive.

Most respondents disagreed or strongly disagreed that there was a local (73.4%, n = 58/79) or national (79.2%, n = 57/72) interest in URM recruitment. Half (50.0%, n = 55/110) felt that their experiences in medical school did not give them enough information to make an informed decision about pursuing plastic surgery, and 28.2% (n = 31/110) responded neutrally. The majority of URM students reported not having access to attending mentors (59.6%, n = 56/94), resident mentors

(66.3%, $n = 53/80$), or research opportunities (63.1%, $n = 53/84$) and did not know how to get involved in national plastic surgery organizations (69.1%, $n = 56/81$). The majority of students (70.5%, $n = 55/78$) disagreed or strongly disagreed that they knew anyone outside their institution who could help facilitate plastic surgery opportunities. [See figure, Supplemental Digital Content 1, which displays Likert scales of URM experiences (with numbers representing the average response, 1 being strongly disagree and 5, strongly agree). <http://links.lww.com/PRSGO/C733>.]

Those with plastic surgery programs involved in outreach initiatives were more likely to say they had attending (OR: 11.7, 3.9–34.8 $P < 0.05$) and resident mentors (OR: 3.0, 1.1–8.3 $P < 0.05$) in addition to access to research opportunities (OR: 4.3, 1.5–12.4 $P < 0.05$). This cohort of students were also more likely to report being able to make an informed decision about pursuing plastic surgery (OR: 7.3, 2.7–19.9 $P < 0.05$).

DISCUSSION

URM Perception of Plastic Surgery

This study provides the first data describing URM students' perceptions of plastic surgery and access to resources. URM students often lack access to mentors and research opportunities, and almost half do not have home plastic surgery programs. Of the respondents, 98% were concerned about underrepresentation in plastic surgery. Indeed, underrepresentation of URM students was seen as a larger barrier to applying than the competitiveness of the application process (45% versus 42%). Thus, it is not necessarily a lack of self confidence in their ability to be a competitive applicant that deters URM students from applying to plastic surgery. Rather, it may also be a lack of perceived interest in recruitment of URM students, lack of available resources, and lack of exposure.

URM Performance by the Numbers

Racial disparities in education can begin as early as elementary school and persist throughout professional education.¹⁹ These disparities result in URM students underperforming in many of the selection criteria used in the residency evaluation process.⁴ Indeed, plastic surgery residency programs often narrow their applicant pools based on objective thresholds but fail to account for racial disparities in these metrics. To address this, the United States Medical Licensing Examination Step 1 recently moved to pass or fail. However, the achievement gap includes much more than Step 1 performance.^{3,6–8} To address this disparity in a manner that still selects for the best candidates, a rebalancing of applicant metrics could be useful. In medical school admissions, efforts to reduce the weight of MCAT and grade point averages and increase the weight of problem-solving, communication skills, and letters of recommendation led to an increase in URM matriculants.²⁰ Similarly, many medical schools are choosing to abandon election to AOA honor societies, given documented racial disparities.²¹ Although these

results are not perfectly congruous, they demonstrate the utility in re-examining the definition of desirable candidates to plastic surgery.^{4,7,8,10} In our study, 46% of surveyed students do not view plastic surgery as a realistic career option. However, these results are difficult to interpret in this context, as plastic surgery is an extremely competitive field and many factors can influence why a career in plastic surgery may seem unrealistic.

Mentorship and Outreach for URM Students

Long-term mentorship is an established method of increasing recruitment in medicine, regardless of racial congruence.^{22–24} We found that very few SNMA students surveyed feel that there is an interest in recruiting URM students to plastic surgery. Furthermore, most respondents indicated they did not have access to mentors or research opportunities.

A clear way to improve access to plastic surgery among URM students is to encourage faculty and resident engagement with URM students within their institution. As this study shows, respondents who were exposed to outreach efforts were more likely to have access to mentors and research, and were more likely to make an informed decision about applying to plastic surgery residency.

Pre-clerkship electives for medical students are another way to boost plastic surgery exposure for all students. At our institution, the initiation of a plastic surgery “mini-elective” for first and second year medical students led to a 34% increase in plastic surgery as a top residency choice. Additionally, 86% wanted to become more involved in research, and 100% of students felt more comfortable seeking out a mentor.¹² However, we recognize that this type of intervention primarily targets students at an institution with a large, academic plastic surgery department.

On a national stage, plastic surgery programs can participate in conferences where URM students have a significant presence, thereby demonstrating an interest in recruiting URM students. Examples include national and regional conferences hosted by the SNMA, Latino Medical Student Association, Association of Women Surgeons, and Society of Black Academic Surgeons. Increasing plastic surgery presence at these conferences would be an effective method of increasing exposure for those without home programs. A presence at conferences could also provide an opportunity to explain the areas of plastic surgery that may particularly appeal to URM students, such as caring for medically underserved communities.²⁰ In addition, highlighting the need for more surgeons contributing to the existing literature on reconstructive and aesthetic differences in bodies of different ethnicities could also be useful (ie, rhinoplasty in African American patients).²⁵

Limitations and Future Directions

This study has significant limitations that warrant discussion. Limitations of this study include the predominance of female respondents (80%). The survey was in distribution through the SNMA for 2 months, and many of the members of the SNMA did not respond.

This is a cross-sectional study and has no control group of non-URM students. The benefit of having a home program involved with the medical student body is significant, though the degree of this benefit is not investigated in this study.²⁶ We suspect that URM students are likely to be more greatly affected than non-URM students; however, without a control group we cannot know the extent of that disadvantage and understand the implications of not having a home PS program. This study design also predisposes to selection, recall, and information bias. Our survey was not validated, and the questions may have been interpreted differently than we intended. Furthermore, none of the questions were required to complete the survey, and therefore, many of the questions had varied response rates. Future directions for this study include distributing the survey to other national URM student groups and further exploring the sentiments of URM students. The results of this nationwide study, mainly URM students' lack of exposure to plastic surgery and low access to mentors and research, could represent examples of structural racism in medical education. Given the existing research that quantifies the disparities between URM students and their non-URM peers, these findings highlight potential targets for intervention that can be further investigated through prospective studies or direct action.

CONCLUSIONS

This study reflects the sentiment of a large group of URM students toward plastic surgery. It is the first of its kind to use survey responses from URM students interested in plastic surgery to inform potential interventions that may improve diversity in this field. Most respondents did not feel that national plastic surgery institutions are interested in recruiting them as URM, nor did they have access to mentorship or exposure to the field. Although some of these trends can be explained by a significant lack of home plastic surgery programs, these data show a relationship between outreach efforts and increasing interest in plastic surgery residency. A deliberate effort must be made to reach URM students early and frequently to improve diversity in plastic surgery education.

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DISCLOSURE

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

REFERENCES

1. Asserson DB, Sarac BA, Janis JE. A 5-year analysis of the integrated plastic surgery residency match: the most competitive specialty? *J Surg Res.* 2022;277:303–309.

2. Lett E, Murdock HM, Orji WU, et al. Trends in racial/ethnic representation among US medical students. *JAMA Netw Open.* 2019;2:e1910490.
3. Nieblas-Bedolla E, Williams JR, Christophers B, et al. Trends in race/ethnicity among applicants and matriculants to US surgical specialties, 2010–2018. *JAMA Netw Open.* 2020;3:e2023509.
4. Jones AC, Nichols AC, McNicholas CM, et al. Admissions is not enough: the racial achievement gap in medical education. *Acad Med.* 2021;96:176–181.
5. Acheampong C, Davis C, Holder D, et al. An exploratory study of stress coping and resiliency of black men at one medical school: a critical race theory perspective. *J Racial Ethn Health Disparities.* 2019;6:214–219.
6. Nieblas-Bedolla E, Williams JR, Christophers B, et al. Trends in race/ethnicity among applicants and matriculants to US surgical specialties, 2010–2018. *JAMA Network Open.* 2020;3:e2023509.
7. Teherani A, Hauer KE, Fernandez A, et al. How small differences in assessed clinical performance amplify to large differences in grades and awards: a cascade with serious consequences for students underrepresented in medicine. *Acad Med.* 2018;93:1286–1292.
8. Low D, Pollack SW, Liao ZC, et al. Racial/ethnic disparities in clinical grading in medical school. *Teach Learn Med.* 2019;31:487–496.
9. Lucey CR, Saguil A. The consequences of structural racism on MCAT scores and medical school admissions: the past is prologue. *Acad Med.* 2020;95:351–356.
10. Boatright D, O'Connor PG, Miller J E. Racial privilege and medical student awards: addressing racial disparities in alpha omega alpha honor society membership. *J Gen Intern Med.* 2020;35:3348–3351.
11. Ballejos MP, Rhyne RL, Parkes J. Increasing the relative weight of noncognitive admission criteria improves underrepresented minority admission rates to medical school. *Teach Learn Med.* 2015;27:155–162.
12. Roy E, Anstadt EE, Losee JE, et al. Evaluation of a simulation-based minielective on medical student interest in plastic surgery. *Plast Reconstr Surg.* 2021;148:527e–528e.
13. Roberts SE, Shea JA, Sellers M, et al. Pursuing a career in academic surgery among African American medical students. *Am J Surg.* 2020;219:598–603.
14. Santos-Parker JR, Santos-Parker KS, Caceres J, et al. Building an equitable surgical training pipeline: leadership exposure for the advancement of gender and underrepresented minority equity in surgery (LEAGUES). *J Surg Educ.* 2021;78:1413–1418.
15. Okike K, Phillips DP, Johnson WA, et al. Orthopaedic faculty and resident racial/ethnic diversity is associated with the orthopaedic application rate among underrepresented minority medical students. *J Am Acad Orthop Surg.* 2020;28:241–247.
16. Butler PD, Britt LD, Longaker MT. Ethnic diversity remains scarce in academic plastic and reconstructive surgery. *Plast Reconstr Surg.* 2009;123:1618–1627.
17. Mindlis I, Livert D, Federman AD, et al. Racial/ethnic concordance between patients and researchers as a predictor of study attrition. *Soc Sci Med.* 2020;255:113009.
18. Bailar B, Couper M, Dillman D, et al. Standard definitions final dispositions of case codes and outcome rates for surveys. Available at https://www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf. Published 2016. Accessed November 12, 2022.
19. Bailey ZD, Krieger N, Agénor M, et al. Structural racism and health inequities in the USA: evidence and interventions. *Lancet.* 2017;389:1453–1463.
20. Ballejos MP, Rhyne RL, Parkes J. Increasing the relative weight of noncognitive admission criteria improves underrepresented minority admission rates to medical school. *Teach Learn Med.* 2015;27:155–162.

21. Boatright D, Ross D, O'Connor P, et al. Racial disparities in medical student membership in the alpha omega alpha honor society. *JAMA Intern Med.* 2017;177:659–665.
22. Haggins A, Sandhu G, Ross PT. Value of near-peer mentorship from protégé and mentor perspectives: a strategy to increase physician workforce diversity. *J Natl Med Assoc.* 2018;110:399–406.
23. Ulloa JG, Viramontes O, Ryan G, et al. Perceptual and structural facilitators and barriers to becoming a surgeon: a qualitative study of African American and Latino surgeons. *Acad Med.* 2018;93:1326–1334.
24. Barker JC, Rendon J, Janis JE. Medical student mentorship in plastic surgery: the mentee's perspective. *Plast Reconstr Surg.* 2016;137:1934–1942.
25. Peng GL, Nassif PS. Rhinoplasty in the African American patient: anatomic considerations and technical pearls. *Clin Plast Surg.* 2016;43:255–264.
26. Keane CA, Akhter MF, Sarac BA, et al. Characteristics of successful integrated plastic surgery applicants from US allopathic medical schools without a home integrated program. *J Surg Educ.* 2022;79:551–557.