

Closing the Gap: Training Experiences and Career Outcomes for Underrepresented Minorities in Plastic Surgery

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Background: The present study assesses training characteristics, scholastic achievements, and traditional career accomplishments of ethnically underrepresented in medicine (UIM) plastic and reconstructive surgery (PRS) faculty relative to non-UIM PRS faculty.

Method: A cross-sectional analysis of core PRS faculty appointed to accredited United States residency training programs (n = 99) was performed.

Results: Of the 949 US PRS faculty, a total of 51 (5.4%) were identified as UIM. Compared with non-UIM faculty, there were few differences when evaluating medical education, residency training, pursuit of advanced degrees, and attainment of subspecialty fellowship training. UIM faculty were more likely than non-UIM faculty to have graduated from a medical school outside the United States (25% versus 13%, $P = 0.014$). In addition, UIM faculty did not differ from non-UIM counterparts in traditional career accomplishments, including promotion to full professor, obtaining NIH funding, serving as program director, receiving an endowed professorship, appointment to a peer-reviewed editorial board, scholarly contributions (H-index and number of publications), and appointment to chief/chair of their division/department.

Conclusions: The historical lack of ethnic diversity that comprise US academic PRS faculty persists. This study reveals that those UIM faculty who are able to obtain faculty appointments are equally successful in achieving scholastic success and traditional career accomplishments as their non-UIM counterparts. As we strive toward increasing representation of UIM physicians in academic plastic surgery, the field will benefit from efforts that promote a pipeline for underrepresented groups who traditionally face barriers to entry. (*Plast Reconstr Surg Glob Open* 2022;10:e4300; doi: 10.1097/GOX.0000000000004300; Published online 6 May 2022.)

INTRODUCTION

Individuals from particular ethnic backgrounds are underrepresented in academic medicine. While African American and Latino people make up 13.4% and 18.5% of the United States population,¹ they constitute 3.6% and 3.2% of full-time faculty at medical

schools, respectively.² Shining a spotlight on this disparity, in 2004 the American Association of Medical Colleges coined the term “underrepresented in medicine” (UIM), which refers to the collective underrepresentation of African American, Latino, and indigenous (American Indian/Alaskan Native and Native Hawaiian/other Pacific Islander) individuals in the physician workforce.³ This new vernacular along with the Institute of Medicine report⁴ highlighted the medical profession’s recognition that enhanced efforts to increase representation of historically marginalized groups was indicated.

Nearly 20 years later, UIM physicians continue to remain scarce in academic medicine, especially in plastic and reconstructive surgery. The percentage of African American and Latino plastic surgeons in academia remained nearly the same over a recent 12-year period,

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2006–2018.⁵ For African Americans, the resident-to-faculty transition is the primary point of attrition, with nearly half lost; however, the need for increased recruitment and retention of UIM physicians has not gone unnoticed.⁶ Ongoing efforts to tackle this problem are in place at the institutional⁷ and national level, including the American Association of Plastic Surgeons' creation of the Diversity Task Force.⁸

Although it is too soon to measure the impact of such initiatives, we can potentially guide these approaches by analyzing current UIM physicians in the field. In this present cross-sectional analysis, we compare the training background, research productivity, and leadership positions of UIM to non-UIM faculty in the United States. Our objective is to (1) unveil predictors associated with entering academia and (2) determine level of achievement of UIM physicians relative to non-UIM physicians when granted the opportunity for academic appointment. By doing this, we hope to shed light on potential roadblocks for UIM faculty appointments and, if scholastic achievement of plastic and reconstructive surgery faculty is found to be agnostic of race/ethnicity, advocate for more efforts to be adopted to create a more societal reflective plastic surgery workforce.

MATERIALS AND METHODS

Study Design

We conducted an institutional review board exempt, retrospective, cross-sectional comparative analysis of plastic surgeons affiliated with United States Accreditation Council for Graduate Medical Education accredited integrated and/or independent residency training programs during the 2020–2021 academic calendar year. Integrated and independent plastic surgery residency programs were obtained from the American Council of Academic Plastic Surgeons website (acaplasticsurgeons.org). Faculty lists were obtained from each institution's plastic surgery residency website (n = 99). All full-time faculty were included except for adjunct faculty, voluntary/gratis faculty, and nonplastic surgery trained faculty, such as podiatrists and dentists.

Data Collection

Data were collected primarily from faculty biographies on program websites. Missing data were searched for on Doximity, LinkedIn, private-practice websites, and other public records or news report websites. Relevant data included gender, race/ethnicity, medical school, advanced degrees, plastic surgery residency program type (independent or integrated), subspecialty fellowship training (aesthetic surgery, craniofacial surgery, microsurgery, hand surgery, and "other"), research fellowship, academic position (assistant, associate, full professor), endowed professorship, last year of training, and chief/chair status. Years in practice was calculated by subtracting the last year of training from 2020. Research output (number of publications, number of citations, H-index) and NIH funding data were collected using

Takeaways

Question(s): (1) What are the predictors associated with entering academic plastic and reconstructive surgery (PRS); and (2) Is there variation in level of achievement of UIM physicians relative to non-UIM physicians when granted an academic appointment?

Findings: The lack of ethnic diversity in academic PRS persists, but UIM PRS surgeons who are able obtain faculty appointments are equally successful in achieving scholastic success and career accomplishments as non-UIM PRS surgeons.

Meaning: As we strive toward increasing representation of UIM physicians in academic PRS, the field will benefit from efforts that promote a pipeline for UIM groups who traditionally face barriers to entry.

Scopus Author Identifier (scopus.com) author search and NIH Reporter (projectreporter.nih.gov). Editorial board membership was determined using listings on websites for the following journals: *Plastic and Reconstructive Surgery*, *Plastic and Reconstructive Surgery – Global Open*, *Annals of Plastic Surgery*, *Journal of Craniofacial Surgery*, *Cleft Palate-Craniofacial Journal*, *Journal Plastic, Reconstructive, & Aesthetic Surgery*, *Microsurgery*, *Journal of Reconstructive Microsurgery*, *Aesthetic Surgery Journal*, and *Journal of Hand Surgery, and Hand*.

U.S. News & World Report Best Research Medical Schools (www.usnews.com) was used to measure the rank of each institution's medical school. Doximity (residency.doximity.com) was used to measure the rank of each institution's residency program sorted by "reputation" and "research output." Reputation rankings are statistically weighted to produce reputation values that represent the opinion of all survey-eligible physicians, while research output rankings are based on the collective H-index of graduating alumni within the past 15 years of that institution.⁹

Determination of race and ethnic background was accomplished using photographic data at the discretion of two data collectors (FD and MPM) as well as geographical prevalence data of surnames. Faculty were split into two groups, UIM and non-UIM, based on the American Association of Medical Colleges definition. Ethnic/racial backgrounds included White and Asian, which were combined as non-UIM, and African American, Latino, American Indian/Alaskan Native, Native Hawaiian, and other Pacific Islanders as UIM.³ US Census Bureau standards on race and ethnicity were used for regional classifications.¹⁰

Descriptive statistics were implemented for all study variables. Medians and interquartile ranges were reported for continuous variables of interest. Statistical comparisons were made between the UIM faculty and non-UIM faculty using chi-squared/Fisher exact tests for dichotomous variables and *t*-tests or Mann–Whitney *U* tests for continuous variables. Mann–Whitney *U* tests were used when continuous variables demonstrated

nonparametric distributions using the Shapiro–Wilk test. Stepwise multivariate logistic and linear regression tests were used to identify dichotomous and continuous predictors, respectively, of career outcomes of interest. The threshold for statistical significance was set at an alpha value of 0.05. All statistical analyses were completed using JASP, an open-source program for statistical analysis (jasp-stat.org).

RESULTS

Demographics, Medical Education, and Advanced Education

Among the 949 academic plastic surgery faculty, a total of 51 UIM physicians were identified (Table 1). Women represented 22% of the identified faculty, and the proportion of women among UIM faculty and non-UIM faculty did not differ [29% versus 21%, respectively ($P = 0.170$)]. Compared with non-UIM faculty, UIM faculty have fewer years in practice [8 versus 12, $P = 0.007$], reflecting a significant increase in the number of UIM faculty becoming academic plastic surgeons in recent years. Degrees attained on the way to becoming an academic plastic surgeon did not differ between groups. The vast majority (96%) of UIM faculty have allopathic medical degrees (ie, MD) and 18% have an additional advanced degree (ie, MPH, MBA) ($P = 0.202$ and $P = 0.959$, respectively). The prestige of their medical institutions also did not differ with a median U.S. News and World Report ranking of 18 and 29 for UIM faculty and non-UIM faculty, respectively ($P = 0.108$). However, UIM faculty were more likely than non-UIM faculty to have a medical degree from an institution outside the United States [13 (25%) versus 119 (13%), respectively ($P = 0.014$)].

Table 1. Demographics, Medical Education, and Advanced Education of Underrepresented in Medicine (UIM) Faculty and Non-UIM Faculty

	Non-UIM (n = 898)	UIM (n = 51)	P
Women (n, %)	191 (21.269%)	15 (29.412%)	0.170
Mean number of years in practice (median, IQR)	12 (17.0)	8 (8.0)	0.007
Allopathic medical degree (MD) (n, %)	884 (98.441%)	49 (96.078%)	0.202
Osteopathic medical degree (DO) (n, %)	8 (0.891%)	1 (1.961%)	0.443
International medical graduate (n, %)	119 (13.252%)	13 (25.490%)	0.014
Medical school rank (U.S News & World report) (median, IQR)	29 (43.0)	18 (41.5)	0.108
Advanced degree (n, %)			
Any degree	161 (17.929%)	9 (17.647%)	0.959
PhD	53 (5.902%)	3 (5.882%)	0.995
MBA/EMBA	30 (3.341%)	2 (3.922%)	0.823
DDM/DDS/DMD	23 (2.561%)	1 (1.961%)	0.790
MA	9 (1.002%)	0 (0.000%)	0.473
MS/MSc	31 (3.452%)	1 (1.961%)	0.566
MPH	12 (1.336%)	2 (3.922%)	0.136

Bold values signify reaching the level of statistical significance ($p \leq 0.05$).

Characteristics of Surgical Training

There were no differences in clinical training characteristics between groups. Although UIM faculty were more likely to be international medical graduates (IMG), they were not more likely than non-UIM faculty to attend residency outside of the United States [5 (10%) versus 49 (5%), respectively ($P = 0.192$)] (Table 2). Comparable to non-UIM faculty, the majority of UIM faculty (65%) pursued the independent pathway, training in general surgery first ($P = 0.936$). Regardless of training pathway, the rank of the surgeon’s plastic surgery residency program did not differ between groups ($P = 0.700$ and $P = 0.643$ for Doximity reputation rank and Doximity research rank, respectively). The proportions of UIM faculty (76%) and non-UIM faculty (68%) who furthered their training in a subspecialty fellowship program were also similar ($P = 0.219$). While the most common subspecialty fellowship for non-UIM faculty was hand (25%), the most common for UIM physicians was craniofacial (31%).

Bivariate Analysis of UIM Status and Academic Career Outcomes

On bivariate analysis, UIM faculty and non-UIM faculty did not have significantly different career outcomes (Table 3). Both groups are currently on faculty at institutions with similarly ranked plastic surgery residency programs [32 versus 31 ($P = 0.265$) and 37 versus 31 ($P = 0.897$) for Doximity reputation and Doximity research rank, respectively]. At these institutions, UIM faculty have achieved similar rank to non-UIM counterparts. The combined cohort had few full professors [232 (26%) non-UIM versus 10 (20%) UIM, $P = 0.321$] with fewer endowed professorships [59 (7%) non-UIM versus 4 (8%) UIM, $P = 0.722$].

Table 2. Characteristics of Surgical Training of Underrepresented in Medicine (UIM) Faculty and Non-UIM Faculty

	Non-UIM (n = 898)	UIM (n = 51)	P
Rank of residency program attended			
Doximity, reputation (median, IQR)	21 (41.0)	22 (34.0)	0.700
Doximity, research (median, IQR)	20 (37.0)	25.5 (36.75)	0.643
International residency program (n, %)	49 (5.457%)	5 (9.804%)	0.192
Residency program type (n, %)			
Integrated	271 (30.178%)	15 (31.373%)	0.857
Independent	586 (65.256%)	33 (64.706%)	0.936
Clinical fellowship (n, %)			
Any fellowship	613 (68.263%)	39 (76.471%)	0.219
Microsurgery	189 (21.047%)	11 (21.569%)	0.929
Hand	227 (25.278%)	10 (19.608%)	0.363
Craniofacial	186 (20.713%)	16 (31.373%)	0.070
Aesthetic	25 (2.784%)	3 (5.882%)	0.203
Other	66 (7.350%)	3 (5.882%)	0.695
Research fellowship (n, %)	122 (3.586%)	8 (15.686%)	0.671

Table 3. Characteristics of Academic Career Outcomes for Underrepresented in Medicine (UIM) Faculty and Non-UIM Faculty

	Non-UIM (n = 898)	UIM (n = 51)	
Rank of current institution's residency program (median, IQR)			
Doximity (reputation)	32 (45)	31 (46)	0.265
Doximity (research)	37 (37)	31 (77.5)	0.897
Academic rank (n, %)			
Assistant	355 (39.532%)	20 (39.216%)	0.964
Associate	213 (23.719%)	12 (23.529%)	0.975
Professor	232 (25.835%)	10 (19.608%)	0.321
Endowed professorship (n, %)	59 (6.570%)	4 (7.843%)	0.722
Institutional leadership (n, %)			
Chair/chief	92 (10.245%)	4 (7.843%)	0.580
Program director	87 (9.688%)	5 (9.804%)	0.978
Fellowship director	63 (7.016%)	3 (5.882%)	0.757
Journal editorial board member (n, %)	172 (19.154%)	10 (19.608%)	0.936
Bibliometric indices (median, IQR)			
Publications	25 (50.75)	22 (40.25)	0.862
Citations	382 (1037.25)	273 (763.25)	0.367
H-index	10 (13.00)	8 (8.00)	0.360
National Institutes of Health (NIH) funding (n, %)			
At least 1 NIH grant	82 (9.131%)	2 (3.922%)	0.203

There was no statistically significant difference in leadership roles between UIM faculty and non-UIM faculty. There are four UIM chairs/chief of departments/divisions in the country (4% of total chairs/chiefs). Of the current 51 UIM faculty, 8% were chair/chief of their respective department/division, 10% were program directors, and 6% were clinical subspecialty fellowship directors. Of the current 898 non-UIM faculty, 10% were chair/chief of their respective department/division, 10% were program directors, and 7% were clinical subspecialty fellowship director, revealing no statistical difference compared with UIM faculty ($P = 0.580$, $P = 0.978$, and $P = 0.757$, respectively) (Table 3). Twenty percent (20%) of UIM faculty are on an editorial board and 19% of non-UIM faculty serve journals in this role ($P = 0.936$). Regarding research productivity, UIM faculty and non-UIM faculty do not demonstrate statistically significant differences. The data revealed the following: publications [25 non-UIM versus 22 UIM, ($P = 0.862$)], citations [382 non-UIM versus 273 UIM ($P = 0.367$)], and H-indices [10 non-UIM versus 8 UIM, ($P = 0.360$)]. Similarly, the proportion of UIM physicians and non-UIM physicians with at least one grant from the National Institutes of Health (NIH) did not reach a level of statistical significance [82 (9%) non-UIM versus 2 (4%) UIM, ($P = 0.203$)].

Multivariate Analysis of UIM Status and Academic Career Outcomes

To determine whether UIM status influences academic career outcomes controlling for potentially confounding

factors, multivariate logistic and linear regressions were conducted (Table 4). UIM status did not predict any outcome studied in models for the following outcomes: chair/chief status [OR: 1.154, $P = 0.823$], full professor status [OR: 1.721, $P = 0.355$], endowed professorship status [OR: 2.379, $P = 0.209$], attainment of NIH funding [OR: 0.690, $P = 0.639$], program director status [OR: 1.376, $P = 0.568$], editorial board member [OR:1.400, $P = 0.467$], H-index [Beta coefficient: -0.027 , $P = 0.431$], and number of peer-reviewed publications [Beta coefficient: -0.012 , $P = 0.749$]. Rather, the number of years in practice and H-index most consistently predicted career outcomes. Number of years in practice predicted chair/chief status [OR: 1.052, $P < 0.001$], full professor status [OR: 1.117, $P < 0.001$], editorial board member [OR: 0.972, $P = 0.014$], H-index [Beta coefficient: 0.357, $P < 0.001$], and number of publications [Beta coefficient: 0.240, $P < 0.001$]. H-index predicted chair/chief status [OR: 1.029, $P = 0.004$], full professor status [OR:1.127, $P < 0.001$], endowed professor status [OR:1.087, $P < 0.001$], attainment of NIH funding [OR:1.095, $P < 0.001$], and editorial board member [OR: 1.062, $P < 0.001$].

DISCUSSION

Summary of Findings

Historically, individuals from particular ethnic backgrounds have been underrepresented in the medical profession in the United States. The field of plastic and reconstructive surgery has not been immune to this lack of representation, with historically around 7% of academic surgeons falling under the category of UIM.¹¹ In our database, we found that UIM faculty represent just 5.4% of total faculty identified. As the field strives to create an inclusive environment with greater representation of historically marginalized groups, it is important to analyze the current cohort of UIM faculty—identifying factors not only related to their path to becoming academic plastic surgeons, but also to their success once they enter academia. In this cross-sectional study, we aimed to elucidate training characteristics, scholastic accomplishments, and career outcomes of UIM faculty when compared with non-UIM faculty across all Accreditation Council for Graduate Medical Education accredited academic plastic surgery programs in the United States. We found that UIM faculty have fewer years in practice than non-UIM faculty, suggesting that more UIM faculty are entering the field of academic plastic surgery in recent years. Interestingly, we found that UIM faculty were more likely to have earned their medical degree outside the United States. This finding may highlight the fact that the recruitment of UIM faculty trained in the United States is still insufficient. Nevertheless, once they have achieved faculty status at an academic institution, UIM academic plastic surgeons do not statistically differ from non-UIM faculty in terms of leadership attainment, research productivity, or obtaining federal research funding. Interestingly, and likely of no surprise, H-index and years in practice were found to be the strongest predictors of promotion and leadership

Table 4. Factors Independently Associated with Career Outcomes (Logistic and Linear Regressions)

	Chair/Chief		Full Professor		NIH Funded		Program Director	
	OR	P	OR	P	OR	P	OR	P
Race (UIM)	1.154	0.823	1.721	0.355	0.690	0.639	1.376	0.568
Residency program doximity rank (reputation)	1.006	0.219	0.995	0.354	0.982	0.046	1.002	0.738
Gender (women)	0.697	0.351	0.971	0.929	1.225	0.598	0.649	0.227
Years in practice	1.052	<0.001	1.117	<0.001	0.988	0.436	1.002	0.891
H-index	1.029	0.004	1.127	<0.001	1.095	<0.001	0.987	0.357
Medical school rank	1.003	0.590	1.001	0.830	0.998	0.738	0.996	0.430

	Endowed		Editorial Board		H-index		No. Publications	
	OR	P	OR	P	B	P	B	P
Race (UIM)	2.379	0.209	1.400	0.467	-0.027	0.431	-0.012	0.749
Residency program doximity rank (reputation)	0.988	0.203	0.995	0.327	-0.218	<0.001	-0.168	<0.001
Gender (women)	0.954	0.759	0.941	0.821	-0.104	0.003	-0.103	0.006
Years in practice	1.027	0.089	0.972	0.014	0.357	<0.001	0.240	<0.001
H-index	1.087	<0.001	1.062	<0.001	—	—	—	—
Medical school rank	1.017	0.017	0.999	0.746	-0.142	<0.001	-0.100	0.010

Bold values signify reaching the level of statistical significance ($p \leq 0.05$).

attainment as an academic plastic surgeon as previous literature has shown.¹²⁻¹⁵ These findings are encouraging but highlight the importance of active recruitment and retention of UIM faculty as a way of increasing the numbers of UIM faculty in academia.

Strength in Diversity

Several studies have highlighted the importance of mentorship in achieving equity and the added importance of mentors who look like their mentees.¹⁶⁻²⁰ A diverse community of plastic surgeons that reflects the complexity of the United States population is paramount to reducing inequities in access to reconstructive surgeries.^{21,22} Additionally, physicians from historically marginalized ethnic backgrounds are more likely to serve minority and underserved communities at a greater frequency than majority physicians.²³ There is recent evidence that patient reported outcomes and compliance can be influenced by the background of the plastic surgeons who treats them. These studies highlighted that race-concordant encounters can improve patient engagement and reduce communication barriers.²⁴⁻²⁶ Increased diversity has also been shown to improve the economic return of large corporations.²⁷ As proven in industry, a diverse set of team members can not only amplify existing organizational strengths, but also generate new ones.

Leadership Position and Promotion Opportunity

One key finding of our study was that UIM and non-UIM faculty were equally likely to hold leadership positions such as chair/chief, editorial board position, fellowship director and program director. This is an impressive achievement, considering the high prevalence of micro-aggressions experienced by female and minority physicians²⁸ in addition to the diversity, equity, and inclusion (DEI) related work that many UIM faculty assume, along with traditional activities associated with attaining promotion in academia. This DEI work, referred to by some as minority tax,^{29,30} includes dedicating significant time and energy to mentorship of other UIM trainees, outreach

into undeserved communities, and participation in diversity focused committees. Building a working environment predicated on inclusion means accounting for the work that UIM physicians do to promote DEI at their institution and in the field of plastic surgery. One way to improve the experience of UIM faculty and increase retention rates is through the creation of protected time dedicated to DEI efforts and the reframing of DEI related work in the context of promotion and leadership opportunities. Future studies may focus on quantifying the DEI focused work of academic plastic surgeons and determining how it is related to career advancement.

UIM physicians enrich programs in many ways, some of which were mentioned above. Their contribution to the field goes beyond their clinical acumen, as demonstrated by their higher propensity to work with underserved communities, sponsor aspiring UIM surgeons, and produce DEI focused research critical to improving the field and the wellbeing of their patients. Our study shows that despite all these well-documented additional responsibilities, UIM faculty still achieve promotion and research productivity at the same rate as non-UIM faculty (when granted the opportunity). Future studies should aim to quantify the percentage of UIM faculty time spent fulfilling DEI work and its correlation to promotion and career advancement.

Limitations

There are several limitations to our study. This study includes only information for academic plastic surgeons, and future studies may analyze the experiences of non-academic plastic surgeons to determine barriers to entry of UIM plastic surgeons into academia. Although frequently used in previous cross-sectional studies on plastic surgeons, our data collection methods rely on information from publicly available websites, which may not be completely accurate or up to date. While it has been previously described,⁵ we acknowledge that racial/ethnic background determination using photographic data—and the addition of surnames' geographical prevalence

as complementary data—may not accurately reflect self-identified race/ethnicity of the faculty in the study. While our list of variables is extensive, it is also non-exhaustive; so a scale attenuation effect may exist for some variables.

CONCLUSIONS

Our study demonstrates that UIM physicians who achieve faculty status achieve promotion and leadership positions at a statistically similar rate to non-UIM faculty. Addressing underrepresentation of UIM physicians in academic plastic surgery could improve disparities in access to care, bolster research efforts in minority-specific health care challenges, and provide improved mentorship/sponsorship for the next generation of UIM plastic surgeons.

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