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SPECIAL TOPIC
Education

Identifying US Plastic Surgery Training Programs that Effectively Establish Gender and Ethnically Diverse Faculty

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Background: Successful strategies to improve the representation of female and ethnically underrepresented in medicine (UIM) physicians among US plastic and reconstructive surgery (PRS) faculty have not been adequately explored. Accordingly, we aimed to identify programs that have had success, and in parallel gather PRS program directors' and chiefs/chairs' perspectives on diversity recruitment intentionality and strategies.

Methods: We conducted a cross-sectional analysis of the demographic composition of female and UIM faculty of PRS residency training programs. Separate lists of programs in the top quartile for female and UIM faculty representation were collated. Additionally, a 14-question survey was administered to program directors and chiefs/chairs of all 99 Accreditation Council for Graduate Medical Education-accredited PRS residency programs. The questions comprised three domains: (1) demographic information; (2) perceptions about diversity; and (3) recruitment strategies utilized to diversify faculty.

Results: Female and UIM faculty representation ranged from 0% to 63% and 0% to 50%, respectively. Survey responses were received from program directors and chiefs/chairs of 55 institutions (55% response rate). Twenty-five (43%) respondents felt their program was diverse. Fifty-one (80%) respondents felt diversity was important to the composition of PRS faculty. Active recruitment of diverse faculty and the implementation of a diversity, equity, and inclusion committee were among the most frequently cited strategies to establish a culturally sensitive and inclusive environment.

Conclusions: These findings reveal that female and UIM representation among US PRS faculty remains insufficient; however, some programs have had success through deliberate and intentional implementation of diversity, equity, and inclusion strategies. *(Plast Reconstr Surg Glob Open 2022;10:e4303; doi: 10.1097/GOX.0000000000004303; Published online 6 May 2022.)*

INTRODUCTION

Healthcare disparities persist in the field of plastic surgery, with access to quality surgical care among disadvantaged populations representing a serious challenge.[1] Minority populations experience reduced access to care and medically indicated procedures, in addition to less timely follow-up.[2] Diversifying the surgical workforce has been one strategy suggested to mitigate such disparities, through improving relationships with minority patient populations and facilitating the delivery of more culturally competent care.[1,3–5]

The field of plastic surgery faces inadequate representation of women and persons from ethnically underrepresented in medicine (UIM) backgrounds.[3,6] The Association of American Medical Colleges defines UIM

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as physicians from African American, Latino, and indigenous (American Indian/Alaskan Native, and Native Hawaiian/other Pacific Islander) backgrounds.[7] Women, African American, Hispanic, and American Indian/Alaskan Native physicians remain underrepresented among US plastic surgery resident physicians, accounting for 37%, 3.5%, 7.0%, and less than 1% of residents, respectively.[4,5] UIM students make up less than 12% of medical school graduates,[8] whereas women account for approximately 50% of medical school graduates.[9] The transition between medical school and residency acts as an inflection point where UIM and female students are less likely to transition into a surgical specialties.[10] Therefore, attempts to address the deficit of UIM and female plastic surgeons should target the residency pipeline.

When evaluating potential residency programs, female and UIM students consider factors related to culture, inclusion, and diversity at a higher rate than at other groups.[10] As such, improved diversity among plastic surgery faculty increases racial and gender diversity of the plastic surgery workforce as a whole.[11,12] Furthermore, women and UIM academicians provide essential mentorship and sponsorship to medical school students seeking a plastic surgery residency.[10] In this way, the presence of UIM and female faculty plays an essential role in promoting diversity and inclusion that UIM and female applicants consider when evaluating programs.

This study aims to identify the plastic and reconstructive surgery (PRS) residency programs with the highest representation of UIM and female faculty, while evaluating key characteristics that are associated with greater diversity. Additionally, we investigate program directors' (PDs) and chiefs/chairs' (CC) perspectives on strategies to establish a culturally sensitive and inclusive environment.

Takeaways

Question(s): (1) Which plastic and reconstructive surgery (PRS) residency programs possess the highest representation of UIM and female faculty; and (2) What are training program leaders' perspectives regarding strategies to establish an inclusive environment?

Findings: Female and UIM faculty representation ranged from 0% to 63% and 0% to 50%, respectively. Active recruitment of diverse faculty and the implementation of a diversity, equity, and inclusion (DEI) committee were among the most frequently cited strategies to establish inclusivity.

Meaning: These findings reveal that female and UIM PRS faculty representation remains insufficient; however, some programs have had success through intentional implementation of DEI strategies.

METHODS

Study Sample and Data Collection

All US independent and integrated Accreditation Council for Graduate Medical Education-accredited PRS residency programs were identified from publicly-available information published by the American Council of Academic Plastic Surgeons in October of 2020.[13] Full-time core faculty members were identified for each program from online faculty profiles, LinkedIn, Doximity, and public records.[14,15] Programs with less than five faculty members were excluded. Faculty member demographics and plastic surgery residency program characteristics (independent versus integrated, geographic region) were compiled. Race and gender were determined using faculty profile photographs and surnames—methods previously described by Smith et al.[12]

Survey

An electronic 14-question survey was created and distributed to 170 plastic surgery residency PDs and CCs (to include all PRS training programs) using REDCap electronic data capture tools. (**See table, Supplemental Digital Content 1,** which displays the survey questions. **http://links.lww.com/PRSGO/C18**.) The online questionnaire was composed of questions designed to characterize the current attitudes of PDs and CCs toward diversity in their respective programs and factors they believe can cultivate a climate that values diversity. Questions elicited information about recipients in three main domains: (1) demographic information; (2) perceptions about gender and ethnic diversity in plastic surgery; (3) program recruitment strategies employed to diversify faculty. Surveys were distributed in July 2021, and responses were collected through August 2021. Responses were collected anonymously; no identifying information was solicited or recorded. The survey was approved by the institutional review board at the University of Pennsylvania.

Statistical Analysis

All responses were reviewed for completeness, and data were incorporated. Content analysis was applied to short answer responses to characterize content and themes. Survey recipients were stratified into the following three groups for analysis: (1) faculty of programs in the top-25 highest proportion of UIM faculty; (2) faculty of programs in the top-25 highest proportion of female faculty; (3) faculty of programs in neither the top-25 female or UIM representation. Descriptive statistics were applied to each group.

RESULTS

Ninety-nine PRS residency training programs were identified: 79 solely integrated pathway or combination integrated and independent pathways, and 20 solely independent pathway. Eleven programs had fewer than five faculty and were excluded. Thus, 88 programs were included in the final analysis.

Program Characteristics

The two programs with the highest proportion of UIM faculty were the Medical College of South Carolina and University of Nevada Las Vegas with 50% and 40%,

respectively (Table 1). The two programs with the highest proportion of female faculty were the Virginia Commonwealth University and Wayne State – Detroit with 63% and 57%, respectively (Table 2). Herein, we will refer to these group of programs as "top-25-UIM" or "top-25-female." Eight programs fell into both the top-25-UIM and top-25-female faculty cohorts.

The geographical distribution of the top-25-UIM programs is as follows: 20% in the Northeast, 12% in the West, 36% in the South and 32% in the Midwest (Fig. 1). The geographical distribution of the top-25-female programs is as follows: 28% in the Northeast, 8% in the West, 36% in the Midwest, 28% in the South (Fig. 2). There was no association between a geographical region and the density of top-25-UIM and top-25-female programs.

Survey Response Rates

Surveys were distributed to 170 PDs and CCs representing all 99 plastic surgery residency programs in the United States. A total of 63 questionnaires were completed, representing a 37% response rate. Survey responses represented 55 of the 99 PRS residency programs, a 55% institutional response rate. The institutional response rate of surveys completed by leadership from top-25-UIM programs was 68% (n = 17). For surveys completed by leadership from top-25-female programs, the institutional response rate was 80% (n = 20). For surveys completed by program leadership in neither group, the institutional response rate was 40% (n = 25).

Respondent Demographics

Survey recipient demographics are reported in Table 3. Forty-nine (74%) respondents were men, 14 (21%) were women, two (3%) preferred not to specify, and one (2%) was nonbinary. Fifty-five (80%) respondents were White, eight (12%) were Asian, three (4%) were Black, one (1%) was Hispanic, two (3%) preferred not to disclose, and one (1%) was other. Six (9%) respondents came from programs in the Northeast, 14 (21%) in the Northwest, 17 (25%) in the Southeast, 24 (36%) in the Midwest, five (7%) in the West, and one (1%) in the Southwest.

Survey Responses

Survey responses are reported in Table 4. In total, 53% of program leadership in the top-25-UIM and top-25-female programs answered that their program was composed of more racially/ethnically diverse faculty relative to other PRS programs. In contrast, 35% of program leadership in non-top-25-UIM/female programs answered that their program was composed of more racially/ethnically diverse faculty relative to other PRS programs.

When asked whether they believed their program is composed of younger faculty relative to other residency programs, 51% of program leadership in the top-25-UIM and top-25-female faculty agreed. In contrast, 44% of program leadership in non-top-25-UIM/female programs agreed.

When asked about maintaining a relationship with an identity-based surgical society (ie, *Association of Women Surgeons, Society of Black Academic Surgeons,* etc), 44% of program leadership in top-25-UIM programs indicated there was a relationship, 36% of leadership in top-25-female programs indicated a relationship, and 26% of leadership in non-top-25-UIM/female programs indicated a relationship.

Respondent Assumptions and Beliefs

Most respondents (n = 51, 80%) reported that diversity is an important consideration in the composition of PRS

Table 1. Top-25 US Plastic Surgery Residency Programs with UIM Faculty Members

Program Name	Program Type	% UIM	Total Faculty
Medical University of South Carolina	IN/ID	50	6
University of Nevada Las Vegas	IN	40	5
University of Mississippi	IN/ID	33	6
Mayo Rochester	IN/ID	25	12
Wright State	IN	25	8
University of Alabama	ID	20	10
University of Kentucky	IN	20	5
University of South Illinois	IN	20	5
Baylor	IN	20	10
University of Tennessee Health Science	IN/ID	18	11
University of Nebraska	ID	17	6
University of California – Davis	IN/ID	17	6
University of North Carolina	IN/ID	17	6
Northwestern	IN	14	14
Wayne State – Detroit	ID	14	7
Wayne State – Henry Ford	ID	13	8
University of Michigan	IN	12	17
Hofstra/Northwell	IN	11	9
Johns Hopkins	IN/ID	11	18
Lehigh Valley	IN	11	9
University of Texas – Medical Branch	IN	11	9
Georgetown	IN	10	10
Houston Methodist	ID	10	10
University of Chicago	IN	9	11
University of Colorado	IN/ID	8	12

ID, independent; IN, integrated; IN/ID, integrated and independent.

Table 2. Top-25 US Plastic Surgery Residency Programs with Female Faculty Members

Program Name	Program Type	% Women	Total Faculty
Virginia Commonwealth University	IN	63	8
Wayne State – Detroit	ID	57	7
University of Florida	IN	56	9
University of North Carolina	IN/ID	50	6
Cooper	IN/ID	50	6
University of Miami	IN/ID	50	8
Rush	IN/ID	50	8
Washington University in St. Louis	IN	47	15
Oregon Health Sciences University	IN	44	9
University of Kentucky	IN	40	5
Southern Illinois	IN	40	5
University of Cincinnati	ID	40	5
Lahey	IN/ID	40	5
Wayne State – Henry Ford	ID	38	8
Medical College of Wisconsin	IN	36	14
University of Nebraska	ID	33	6
University of Texas – Medical Branch	IN	33	9
University of Colorado	IN/ID	33	12
Wake Forest	IN	33	12
Temple	ID	33	6
University of California – San Francisco	IN	33	12
Indiana University	IN/ID	31	16
Brown	IN	30	10
University of Washington	IN	30	17
Albany	IN	29	7

IN, integrated; ID, independent; IN/ID, integrated and independent.

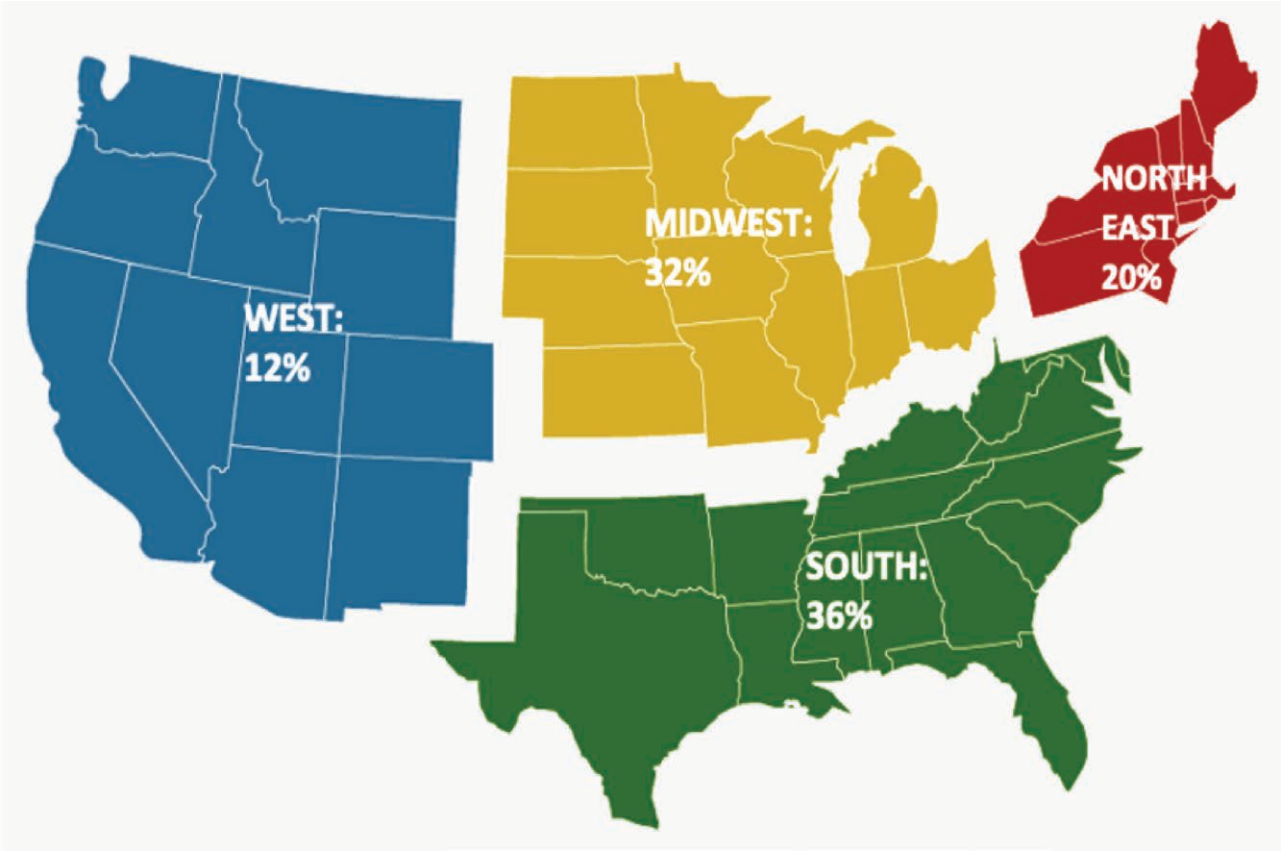

Fig. 1. Distribution of the top-25-UIM plastic surgery residency programs by geographical region.

faculty, whereas 25 (43%) of respondents reported feeling that their program was diverse. Half of respondents (50%) reported having a program in place to recruit ethnic minority and female faculty (Table 4).

Respondents were asked to describe what steps their program has taken to cultivate a climate that values gender and ethnic diversity, equity, and inclusion (DEI) in surgery. Frequent themes included: "recruitment of diverse faculty and residents;" "DEI committee;" and "scholarship for visiting minority students" (Table 5). Other comments included, "departmental conferences on gender and ethnic diversity;" "unconscious bias training;" "research focused on diversity, equity, and inclusion efforts;" "DEI mentorship program;" and "grand rounds topic on DEI."

DISCUSSION

Our analysis of the 99 Accreditation Council for Graduate Medical Education-accredited PRS programs found that 60% of the residency programs do not have a single UIM faculty member in their cohort, while 18% of programs lack a female faculty member. Moreover, of all the PDs and CCs who responded to the survey, only 4 (6%) identified as ethnically UIM and 14 (22%) identified as female. These findings highlight the persisting deficit of UIM and female faculty, and specifically leadership, in academic plastic surgery. It reinforces the notion that there is still significant work that must be done to create a plastic surgery workforce more reflective of the national demographics of the patients we are obligated to treat.

Despite the increasing emphasis on ethnic diversity and gender equity within plastic surgery, UIM and female underrepresentation has shown limited improvement in recent years.[4,10,16–18] Overall representation in academic plastic surgery increased by 0.3% for African Americans and 1.7% for Latino Americans from 2006 to 2018,[12] and there was an 8% increase in the proportion of female faculty members from 2006 to 2016.[19] The leaky pipeline phenomenon explains this trend, wherein female and UIM medical students do not apply to surgery residencies at the same rates as their better-represented counterparts.[20,21] Notably, effective mentorship broadens trainee diversity in surgical specialties,[12,22,23] as female and UIM students place considerable importance on the gender and ethnic diversity of faculty.[10,24] Thus, this strategy—female and UIM mentorship—relies heavily on the presence of female and UIM faculty for these mirroring mentorship experiences to take place. In this study, we assessed the proportion of female and UIM faculty members in plastic surgery residency programs. Secondarily, we surveyed PDs and CCs to obtain the perspectives of PRS academic leaders on DEI efforts and elucidate successful strategies to establish a culturally sensitive and inclusive environment.

The PRS programs with the highest proportion of UIM faculty included The Medical College of South Carolina, University of Nevada Las Vegas, and University

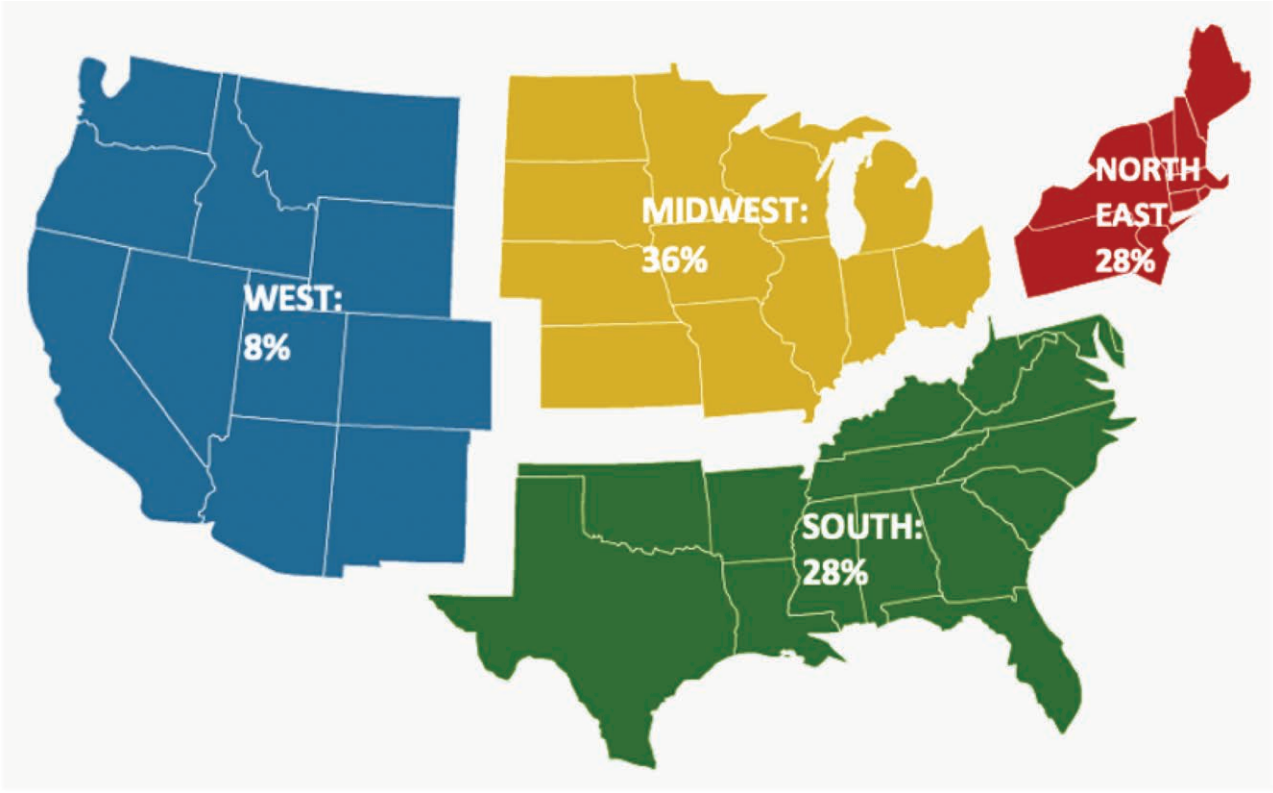

Fig. 2. Distribution of the top-25-female plastic surgery residency programs by geographical region.

of Mississippi. Virginia Commonwealth University, Wayne State – Detroit, and University of Florida had the highest proportion of female faculty. Eight programs fell into both the top-25-UIM and top-25-female faculty cohorts: University of Kentucky, Southern Illinois University, University of Nebraska, University of North Carolina, Wayne State – Detroit, Wayne State – Henry Ford, University of Texas Medical Branch, and University of Colorado.

Previous studies have demonstrated that programs and prospective applicants emphasize geography when creating rank lists,[25–27] and residency programs prefer applicants who graduated from medical school or residency training in the same state.[25] US senior plastic surgery applicants ranked geographic location second only to program reputation when applying.[28] Given this, our study examined the role of geography in the diversity of

Table 3. Demographic Characteristics of Survey Respondents

Characteristic		No. (%) Respondents		
		Neither Top-25 UIM/Women (n = 31)	Top-25-UIM (n = 18)	Top-25-Women (n = 21)
Gender				
	Men	24 (77)	14 (78)	11 (65)
	Women	5 (16)	4 (22)	5 (29)
	Nonbinary	1 (3)	—	—
	Prefer not to disclose	1 (3)	—	1 (6)
Race				
	White	25 (81)	12 (67)	18 (86)
	Hispanic	—	1 (6)	—
	Asian	3 (10)	3 (17)	2 (10)
	Black/African American	1 (3)	2 (11)	—
	Other	1 (3)	—	—
	Prefer not to disclose	1 (3)	—	1 (5)
Area				
	Northeast	—	2 (13)	4 (20)
	Northwest	14 (45)	—	—
	Midwest	7 (23)	8 (50)	9 (45)
	Southeast	8 (26)	5 (31)	4 (20)
	Southwest	—	1 (6)	—
	West Coast	2 (6)	—	3 (15)

Table 4. Average Response for each Component of the Survey

	Program Type		
	Neither Top-25 UIM/Female Representation	Top-25-UIM Representation	Top-25-Female Representation
Is your program composed of more racially/ethnically diverse faculty relative to other PRS programs?	Neutral	Accurate	Accurate
Do you believe your program is composed of younger faculty relative to other residency programs?	Neutral	Agree	Agree
Do you think diversity is an important consideration in the composition of PRS faculty?	Very important	Very important	Very important
Do you have a program in place to recruit ethnic minority/female faculty?	55% indicated there was a program	50% indicated there was a program	33% indicated there was a program
Do you believe there are aspects of your program that make it more attractive to ethnic minority/female faculty?	Agree	Agree	Strongly agree
Do you maintain a relationship with affinity surgical societies?	26% of respondents indicated a relationship	44% of respondents indicated a relationship	36% of respondents indicated a relationship

faculty. The distribution of programs with the most UIM faculty varied by region, with the Midwest and Northeast containing the highest density of these programs. For the distribution of top-25-female programs, the Northeast and Midwest also contained the highest distribution of programs.

Although most PDs and CCs believe diversity is important to the composition of faculty, only 49% of respondents have a program in place to recruit ethnic minorities. When asked to elaborate on specific programs, the vast majority of respondents claimed to have a diversity task force or departmental recruitment process to facilitate the hiring of female or UIM faculty members, regardless of their institution's achieved diversity. Despite the common theme of "diversity task force," there is evidently variation in their effectiveness between residency programs. Differentiating factors may include task force longevity, resources allocation, implementation practices, and accountability. A closer examination of these programs is warranted to better understand why certain programs can achieve more success than others.

The survey prompted PDs and CCs to consider the most important qualities they believe are responsible for making their program more attractive to ethnic minority and female faculty. Program location, diversity of the patient population, and the presence of female/ethnic minority faculty and residents topped the list, followed by availability of mentors, diversity in leadership and urban environment. Although qualities such as location and diversity of patient population cannot be controlled, other qualities like gender and ethnic diversity in program leadership and available mentorship can be improved. UIM and female medical students interested in a career in plastic surgery routinely encounter barriers to an academic career, including the lack of role models.[18,21] A significant positive association has been found between plastic surgery chair gender and program director gender, as well as the gender makeup of faculty and residents.[6] When paired with an early exposure to plastic surgery, mentorship can be the catalyst that leads to a student pursuing plastic surgery as a career.[29] By extension, access to a diverse selection of mentors in faculty positions can be a powerful force in increasing recruitment of women and UIM medical students to plastic surgery. Additionally, lack of effective mentorship negatively impacts academic entry and promotion for minority physicians. Thus, improving minority faculty representation would also help solve this problem further down the "pipeline."[3,12,21] Furthermore, the availability of female mentors and role models plays an important role in the recruitment and retention of women surgeons in academic positions.[6,30,31]

Table 5. Qualitative Feedback on the Steps Taken to Cultivate a Climate that Values Gender and Ethnic DEI

Topic Area	No. Responses
Recruitment of diverse faculty and residents	15
DEI Committee	7
Scholarship for visiting minority students	4
Department conferences on gender and ethnic diversity	4
Unconscious bias training	3
Research focused on DEI	3
DEI mentorship program	2
Grand Rounds topic on DEI	2

Importantly, we found that an established relationship with a national gender or ethnic affinity surgical society, such as the *Society of Black Academic Surgeons, Latino Surgical Society,* or the *Association of Women Surgeons,* was a primary mechanism facilitating successful recruitment of UIM and female faculty. Among PDs and CCs of the top-25-UIM and top-25-female faculty programs, 44% and 36% of respondents indicated a relationship with an identity-based surgical society, respectively. On the other hand, only 26% of respondents from less successful programs indicated a relationship with an identity-based surgical society. The benefits of establishing a relationship with an identity-based surgical society are two-fold: (1) this can improve recruitment efforts by providing a channel to disseminate information about faculty appointment opportunities directly to UIM or female surgeons and (2) provide a more inviting environment for current students, trainees, and faculty in their respective programs.[3] The latter is an effective tool particularly for programs that currently lack sufficient

gender/ethnic representation, but want to ensure their current learners and junior faculty have mirroring mentorship opportunities.

Therefore, when examining factors that are in a program's control, intentional programmatic recruitment and mentorship interventions, in addition to fostering institutional relationships with national identity-based surgical societies are two promising strategies to improve a program's future diversity efforts.

Limitations

Potential study limitations include data collection methods that relied on public information on institutional websites. These websites might not have been accurate, thereby rendering some of the data potentially outdated. The decision to use top-25 programs representing UIM or female faculty was an arbitrary number, therefore our metrics of academic productivity within diverse faculty programs may have been overestimated or underestimated. Determinations of race were made using photographic and surname data. This may not have reflected self-identified race, but it likely captured the effect of race as a societal metric. Additionally, the size of the plastic surgery program should be taken into account when considering the proportion of UIM or female faculty, as smaller programs may have an inflated proportion relative to those with a higher number of faculty. For this reason, we excluded programs with less than five faculty to reduce this effect. Finally, although 55% of training programs were represented with responses, the modest overall survey response rate (37%) was another study limitation.

CONCLUSIONS

This study identified PRS programs that were most successful in recruiting UIM and female faculty and reveals that these programs often engage in recruitment strategies that incorporate a diversity task force and have established relationships with national identity-based surgical societies. As the number of available faculty positions continue to grow, this study may inform program recruitment of diverse faculty members, with the goal of improving UIM and female representation to create a more societal reflective academic plastic surgery workforce.

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