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# Diversity and Inclusion in Plastic Surgery Education: A National Survey by the American Council of Academic Plastic Surgeons

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**Introduction:** To date, there have been few studies in the field of plastic surgery examining the knowledge, attitudes, and behavior of educators and residents regarding diversity and inclusion, especially for the purposes of enhancing resident education, improving diversity efforts, and addressing health care disparities.
**Methods:** An anonymous survey was provided electronically to a total of 462 American Council of Academic Plastic Surgeon members and 91 program coordinators (PCs), and 1,029 plastic surgery residents at 91 institutions across the United States. We analyzed the responses from PCs and program directors (PDs).
**Results:** We collected responses from 34 institutions (37%), and 16.8% of American Council of Academic Plastic Surgeon members including 34 PCs and 44 PDs. We found that PDs were more likely to be male (86%) and above the age of 40 years (97%) compared with PCs (5% male and 61% above 40 years). Both groups were majority White. Fifty-nine percentage of PDs have a parent/guardian who attained a graduate degree versus 15% of PCs. Forty-eight percentage of PDs speak another language compared with 16% of PCs. More importantly, 95% of PDs had an opportunity to engage in diversity and inclusion-related activities in the last 6 months as compared with 43% of PCs; however, we did not find a statistical difference based on knowledge of increasing institutional capacity of diversity and inclusion between the 2 groups. PCs were more likely to witness discrimination (64%) than PDs (40%) in the health care setting, with body type/weight emerging as the most common type of discrimination. Very few respondents (10%) indicated they discriminated against others.
**Conclusions:** Plastic surgery educators are committed to diversity and inclusion. Improvements can be made by incorporating PCs more frequently in activities related to the topic along with focused training on improving diversity on an institutional rather than individual level. Our study suggests body type/weight is the most common type of discrimination witnessed by the entire cohort and that diversity and inclusion remains a sensitive topic. (*Plast Reconstr Surg Glob Open 2017;5:e1469; doi:10.1097/GOX.0000000000001469; Published online 25 September 2017.*)

## INTRODUCTION

Enhancing health care system performance is married to recognizing the complex intercalation between disease and the social determinants of health as a means of systematically addressing health disparities in the United States. Between 1980 and 2000, minority populations in the United States began to multiply faster than that of the White majority,[1] creating new challenges for educators and resident physicians in training. In this context, building institutional capacity (BIC) for Diversity and inclusion (D&I) has become a core competency for bridging health disparities to improve health care delivery, quality, and cost. However, the field of academic surgery and plastic surgery, in particular, has been slow to adapt D&I as a core performance tool. Thus, the American Council of Academic Plastic Surgeon (ACAPS) members set out to assess the knowledge and attitudes of educators, faculty, residents, and medical students toward D&I as a means to move forward. ACAPS is a group of plastic surgery program directors (PDs), program coordinators (PCs), chairpersons, and associates

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of the American College of Graduate Medical Education (ACGME) who provide leadership and educational support for curricular enhancements for plastic surgery residents in accredited institutions in the United States.

In 2016, the National Institutes of Health and the American College of Surgeons Summit on Surgical Disparities Research recommended reducing surgical disparities by directing funding and research toward patients' prospectives, diversifying and training the workforce, and systematically evaluating health technologies.[2] Meeting the stated national objectives requires redefining the traditional understanding of diversity (i.e., race) and committing to a long-term institutional framework for D&I. Smith[3] proposes that systematic implementation of D&I requires 4 core competencies outlined in the mission statement of an institution: Institutional viability and vitality, education and scholarship, access and success, and lastly, climate and intergroup relations. Further, he redefines diversity as the intersection of multiple demographic identities such as disability, legal status, and gender. In other words, educational curricula in plastic surgery must use these identities to guide their understanding of how individual and patient populations perceive, respond, and adhere to specific surgical treatments. For example, a study in the Bronx, N.Y., found that 58% of Hispanic home attendants associated surgical resection of breast cancer with metastasis. Subsequently, attendants experienced a higher percentage of adverse outcomes due to resistance to earlier treatments such as nipple-sparing lumpectomies. Thus, it is imperative to train residents and physicians on how to identify, address, and educate different patient populations. Per Smith[3], the process of BIC requires inclusion. Inclusion is defined as the practice of valuing the contributions of individuals from diverse backgrounds into the work of a group or institution by fully integrating them. BIC is the decisive commitment by administration to sustained D&I via purposeful structural changes and allocation of resources.

To our knowledge, there have not been any studies in the field of plastic surgery that have attempted to begin implementing the 2016 National Institutes of Health and American College of Surgeon recommendations in the context of using D&I to enhance the training of residents and educators as a way of ameliorating health disparities. The purposes of this study were to gauge improvement in recruitment and retention of diverse faculty and educators by comparing the current demographics in the field to prior studies; to compare and contrast PD's and PCs attitudes and knowledge of systematic implementation of D&I; and lastly, to identify challenges and potential areas for improvement.

## METHODS

### Study Participants, Design, and Data Analysis

From October to November 2016, we conducted an Internal Review Board (IRB) approved prospective observational survey study distributed to 462 ACAPS members (including PDs), 91 PCs, 1,029 integrated and independent plastic surgery residents, and lastly, 720 medical students from the University of North Carolina at Chapel Hill (UNC) who served as controls. The survey instrument was anonymous, incentivized using five $50 Amazon gift cards and consisted of 17 questions administered electronically via Qualtrics®. Due to lack of previously validated survey instruments assessing knowledge and attitudes toward diversity in the field, we developed the survey instrument based on relevant literature searches on PubMed. The survey was piloted for wording and consistency with 8 individuals before distribution including 2 UNC plastic surgery faculty, 3 UNC medical students, a DrPh candidate, the UNC plastic surgery PC, and 1 nonmedically trained individual. Statistical analyses were conducted via Excel (Microsoft Corporation, Redmond, Wash.) and STATA Software (StataCorp, College Station, Tex.). Dependent variables were examined for normal distribution. Categorical variables were analyzed using Chi-square and Fisher's exact test ($P < 0.05$). For this article, we only analyzed the responses from PDs and PCs and did not include free response answers.

A total of 355 individuals consented to participate in the survey, but only 341 were included in the analysis because 14 individuals did not begin the survey after providing consent. Individual surveys were automatically closed after 2 weeks of inactivity.

### Inclusion and Exclusion Criteria

Inclusion criteria included ACAPS membership, PCs at any accredited plastic residency program, integrated or independent plastic surgery residents, and UNC Medical students. Exclusion criteria were age less than 18, nonplastic surgery faculty and residents, non-UNC medical students, non-English speakers, and responders not employed by U.S. accredited institutions.

### Recruitment

The study period was a total of 6 weeks. ACAPS members, residents, and PCs were contacted twice in the first 3 weeks. UNC medical students were contacted with the same frequency using class listservs in the last 3 weeks due to IRB-related privileges.

Invitation to complete the survey was sent to ACAPS members via e-mail from the chief of the plastic surgery department at UNC (also the president elect of ACAPS at the time). The UNC PC (also president elect of the PC committee) invited PCs via e-mail to participate and forward the study to the residents in their respective institutions. We did not ask PCs to inform us if they forwarded the e-mail to residents due to potential conflicts of interest or perceived coercion to participate. UNC medical students were contacted via e-mail by the principal investigator.

## RESULTS

A total of 341 ACAPS faculty, PCs, residents, and medical students participated in the survey study. A total of 2,302 participants were contacted for an overall response rate of 14.8%. The response rate for PCs (and thus plastic surgery residencies nationally) was 38.4% (35 of 91) and 17.9% (83 of 462) for ACAPS faculty members. PCs from each institution were asked to forward the e-mail invitation to participate to their respective residents; thus, the exact number of residents who were contacted is unknown. We used the total number of plastic surgery residents per ACGME for an estimate.

**Table 1. Demographic Data Comparing PDs and PCs**

| | PD (N = 44) | PC (N = 34) | *P* (< 0.05) |
|---|---|---|---|
| Age < 40 y (%) | 1 (2.1) | 13 (37.1) | < 0.001 |
| Gender (male; %) | 38 (87.5) | 2 (5.7) | < 0.0001 |
| Race (White; %) | 31 (72.3) | 23 (70.5) | 0.075 |
| Race (Asian; %) | 9 (21.2) | 1 (2.9) | 0.017 |
| Parent/guardian with graduate degree (%) | 26 (60.4) | 5 (14.3) | < 0.05 |
| Parent with HS or GED, (%) | 1 (2.3) | 7 (20.6) | < 0.05 |
| Intermediate proficiency or better in second language*, (%) | 19 (40.5) | 5 (12.9) | 0.032 |

*Intermediate proficiency was defined as "the ability to speak in extended conversations about current events, work, family, or personal life. Native speakers notice many errors in speech or understanding."[4]
HS, high school; GED, General Educational Development.

In terms of demographics (Table 1), 1 PD (2.1%) was less than 40 years compared with 13 PCs (37.1%) ($P < 0.001$). Majority of PDs were male 38 (87.5%) compared with 2 PCs (5.7%) ($P < 0.0001$). Both groups were majority Caucasian 31 (72.3%) and 23 (70.5%) for PDs and PCs, respectively ($P = 0.075$). PDs had a higher percentage of Asians 9 (21.2%) compared with 1 (2.9%) of PCs ($P = 0.017$). The groups did not differ statistically with regard to the number of African Americans in each group: 2 PDs (4.6%) and 3 PCs (9.0%). Each group had 1 multiracial individual. As a surrogate for socioeconomic status (SES), 26 PDs (60.4%) had at least 1 parent or guardian complete a graduate degree as compared with 5 PCs (14.3%) ($P < 0.05$). Conversely, only 1 PD (2.3%) had a parent who only completed high school or General Educational Development compared with 7 PCs (20.6%) ($P < 0.05$). Nineteen PDs (40.5%) spoke a second language with intermediate proficiency or better versus 5 PCs (12.9%) ($P < 0.05$) (intermediate proficiency was defined as "the ability to speak in extended conversations about current events, work, family, or personal life. Native speakers notice many errors in speech or understanding").[4] We did not find any statistically significant difference in the prevalence of each language between the 2 groups. Only PDs reported speaking Chinese, French, and German. Spanish and Gujarati were most common to both PDs and PCs.

In the D&I portion of the survey (Table 2), both groups were overwhelmingly committed to D&I-related matters ($P = 0.37$): 41 (93.2%) fully committed, 2 (4.5%) partially committed, and 1 (2.20%) not committed PDs compared with 23 (67.6%) fully committed, 9 (28.1%) partially committed, and 0 not committed PCs. We also did not find a statistically significant difference between the groups in terms of their confidence addressing D&I-related concerns ($P = 0.26$); 27 (67.5%) of PDs were confident, 13 (32.5%) somewhat confident, and 2 (5.0%) were not confident compared with 16 (53.1%) confident, 15 (46.8%) somewhat confident, and 1 (6.2%) not confident PCs. About half of each group felt that their educational training in D&I thus far either fully or partially addresses needs of diverse patient populations ($P = 0.80$). Twenty-two PDs (53.6%) and 16 PCs (50.0%) indicated that their training fully addresses those needs compared with 18 PDs (43.9%) and 12 PCs (41.3%) who felt that their education only partially addresses them.

In contrast to the findings above, 38 PDs (95.0 %) had ample opportunities to engage in D&I-related activities in the last 6 months compared with only 14 PCs (43.7%) ($P \leq 0.001$). D&I-related activities were reading peer-reviewed research articles, mentoring a medical student, resident, or faculty member of an underrepresented group for greater than 2 weeks, attending meetings, delivering lectures, resolving a conflict related to D&I such as loss of operating room time due to maternity leave, and financially supporting D&I efforts. Surprisingly, we did not find statistically significant differences between the 2 groups related to their level of knowledge for BIC for D&I (Table 3). Participants were asked to choose 2 of 4 examples of BIC; only 2 of the choices were correct: IRB minority recruitment and D&I integration in medical student curriculum.

**Table 2. D&I-Related Results Comparing PDs and PCs**

| | PD | PC | *P* (< 0.05) |
|---|---|---|---|
| Commitment to D&I, n (%) | **N = 44** | **N = 34** | 0.106 |
| Fully committed | 41 (93.2) | 23 (67.6) | |
| Partially committed | 2 (4.5) | 9 (28.1) | |
| Not committed | 1 (2.2) | 0 | |
| Confidence addressing D&I concerns, n (%) | **N = 42** | **N = 32** | 0.170 |
| Confident | 27 (67.5) | 16(53.1) | |
| Somewhat confident | 13 (32.5) | 15 (46.8) | |
| Not confident | 2 (5.0) | 1 (6.2) | |
| D&I training adequately addresses needs of diverse patient populations, n (%) | **N = 41** | **N = 29** | 0.901 |
| Fully addresses | 22 (53.6) | 16 (50.0) | |
| Partially addresses | 18 (43.9) | 11 (41.3) | |
| Does not address | 1 (2.4) | 1 (3.4) | |
| Opportunity to participate in D&I activities in last 6 months, n (%) | **N = 40** | **N = 32** | < 0.001 |
| Had opportunity | 38 (95.0) | 14 (43.7) | |
| Have not had opportunity | 2 (5) | 18 (56.3) | |
| Witnessed discrimination in health care* | N = 18 | N = 22 | 0.037 |
| Self-reported discrimination* | N = 5 | N = 3 | 0.71 |

*N repesents the total number of individuals who responded to the question; Individuals who did not respond to the question either omitted the question or did not complete the survey, therefore no percentages are provided.

**Table 3. Comparing PDs and PCs Knowledge of BIC in D&I**

| BIC for D&I | N = 40 | N = 30 | *P* (< 0.05) |
|---|---|---|---|
| IRB minority recruitment, n (%) | 10 (25) | 8 (26.6) | 0.87 |
| D&I in MS curriculum, n (%) | 15 (37.5) | 13 (43.3) | 0.62 |
| Increasing pipeline programs, n (%) | 30 (75) | 18 (60) | 0.18 |
| Required D&I training for hospital employees focused on patients from diverse groups, n (%) | 28 (70) | 18 (60) | 0.38 |

Ten PDs (25%) and 8 PCs (26.6%) selected IRB minority recruitment compared with 15 (37.5%) and 13 (43.3%) of PDs and PCs who selected D&I integration in medical student curriculum. A higher percentage of PDs and PCs selected the alternate answers: 30 PDs (75%) and 18 PCs (60%) selected increasing pipeline programs for minority recruitment; 28 PDs (70%) and 18 PCs (60%) selected required D&I training for hospital employees focused on treating patients from diverse groups.

Although PCs had less opportunities to engage in D&I-related activities, they are more likely to witness discrimination in the health care setting ($P = 0.037$). We did not find a difference in the prevalence of the different types of discrimination witnessed between the 2 groups likely due to small sample size. The most frequently witnessed types of discrimination for PDs were gender (19%), race (15%), sexual orientation (14%), and weight/body type (13%). In contrast, PCs reported witnessing discrimination related to weight/body type (22%), age (22%), legal status (10%), medical condition (9%), and sexual orientation (9%). Incidence of self-reported discrimination were the same for both groups ($P = 0.71$) likely due to limited disclosure (PD, n = 6; PC, n = 3). Self-reported discrimination for PDs was as follows: 3 (50%) by age, 3 (50%) by weight/body type, 1 (16.6%) by race, 3 (50%) by medical condition, and 2 (33.3%) by legal status. For PCs, self-reported discrimination included 3 (100%) by age, 2 (66.6%) by weight/body type, 1 (33.3%) by race, 3 (100%) by medical condition, and 2 (66.6%) by legal status. Interestingly, none of the participants indicated that they discriminated by veteran status, sexual orientation, religion, or gender.

Lastly, we did not find a statistically significant difference between the perceived barriers to implementing D&I between PDs and PCs (Table 4). We asked PDs and PCs to select all that applied from a list of 5 barriers to D&I they perceived to exist at their respective institutions. Nine PDs (40.9%) and 9 PCs (50%) highlighted that the culture of their institution was prohibitive to advancing D&I endeavors. Thirteen PDs (59.1%) and 6 PCs (33.3%) indicated that lack of funding was a culprit. Nine PDs (40.9%) compared with 4 PCs (22.2%) sighted lack of administrative support as a barrier. In contrast to earlier findings regarding adequacy of educational training, 13 PDs (59.1%) and 11 PCs (61.1%) selected lack of proper training as a deterrent. Further, the 2 groups did not differ in both confidence in addressing diversity-related concerns of patient populations ($P = 0.170$) and adequacy of educational training received in diversity ($P = 0.90$). It is important to note that none of the participants selected time constraints as a detrimental factor to D&I progress in their respective institutions.

**Table 4. Barriers to Implementation of D&I at PDs and PCs Respective Institutions**

| Barriers to D&I in Institution(s) | N = 22 | N = 18 | *P* (< 0.05) |
|---|---|---|---|
| Culture of institution, n (%) | 9 (40.9) | 9 (50) | 0.57 |
| Inadequate funding, n (%) | 13 (59.1) | 6 (33.3) | 0.10 |
| Lack of admin support, n (%) | 9 (40.9) | 4 (22.2) | 0.21 |
| Lack of proper training, n (%) | 13 (59.1) | 11 (61.1) | 0.89 |
| Time constraints | 0 | 0 | 1.0 |

## DISCUSSION

Our study found an overwhelmingly positive commitment to D&I for both PDs and PCs at 97.7% and 100%, respectively ($P = 0.106$). However, our study demographics confirm the overall impression in literature that the field of academic surgery and, particularly, plastic surgery has been slower to diversify its workforce. Butler et al.[5] published a study in 2009 tabulating demographic data from the Association of American Medical Colleges between 1966 and 2006 for academic plastic surgery faculty and found that 74.9 % were White, 10.9% Asian, 1.4% African American, and 3.6% Latino. Our study findings were parallel to those in the study with 72.3% of PDs and 70.5% of PCs identifying as White, 21.2% of PDs and 2.9% of PCs are Asian, 4.6% of PDs and 9% of PCs are African American, 0% of PDs and 9% of PCs are Latino. Our findings reflect, in part, needed improvements in the recruitment and retention of diverse faculty and administrators in academic institutions and conversely, improvements in college student, medical student, and resident physician recruitment as well. An example of a structured initiative that has led to improvements is the diverse surgeons initiative program that provided focused training in minimally invasive surgery for underrepresented minorities. By 2009, the program had 76 graduates, 57% of which ascended to assistant, associate, or full professors in academic surgical centers.[6] Although pipeline programs such as diverse surgeons initiative have noted improvements, careful integration of these programs into the standard practice of surgical academic centers is needed to ensure sustained results with improved opportunities for mentorship for future underrepresented minorities.[3]

Linguistic, cultural, and socioeconomic barriers are cited as a mitigating factors for continued health care disparities in the United States.[7,8] We found that PDs fashioned a wealth of linguistic diversity where 40.5% spoke a second language with an intermediate level of fluency or better as compared with only 12.9% of PCs ($P = 0.032$). Additionally, 60.4% of PDs compared with 14.3% of PCs reported a parent or guardian with a graduate degree as opposed to only 2.2% of PDs versus 20.5% of PCs whose parents/guardians only had high school diplomas ($P < 0.05$). The implications are that households with graduate degrees typically belong to a higher SES and afford better educa-

tional opportunities including linguistic fluency.[9] Thus, the systematic improvement of health care disparities via residency education hinges on bridging communication and experiential gaps between administrative employees and faculty. On the one hand, the linguistic adaptability of PDs position them to better navigate the shifting planes of U.S. patient demographics, whereas PCs may provide opportunities for mentorship and institutional support for students, residents, and faculty that matriculate from lower SES brackets who may present with different personal and professional challenges as a result.[9] Integration of these diverse perspectives into institutional and educational policies would conceivably increase the agility and performance of the system by taking into account the social determinants of health beginning with trainees and employees and extending to patient populations.

Education and scholarship is 1 of 4 core foundations of systematic BIC for D&I.[3] We found that while 95% PDs compared with only 43.7% of PC had an opportunity to engage in D&I-related activities in the last 6 months ($P < 0.001$), the majority of respondents in each group did not correctly identify methods of systematic implementation of D&I, and instead, selected conventional methods of addressing D&I such as requiring D&I training focused on diverse groups (as opposed to D&I training focusing on the intersection of multiple demographic identities and the effect on response to treatment for both majority and minority individuals). Further, only half of the respondents for both groups felt that their educational training in D&I was adequate ($P = 0.90$). Culture of institution, inadequate funding, lack of administrative support, and lack of training were all equally identified as barriers to D&I by our cohort for their respective institutions ($P = 0.89$). Interestingly, no one identified time constraints as a possible barrier. Thus, we suggest the following goals for implementation: affording PCs increased opportunities for training, shifting the focus of D&I training to the applied practice of integrating the social determinants of health in clinical evaluation and increasing research related to local populations of interest to directly inform resident training, patient treatment, and D&I training improvement. Lastly, it is critical to continually reassess related improvements in bridging health disparities as a result of these efforts.

Discrimination, explicit, and implicit bias have been reported to encourage health disparities along with varying implications on specific surgical procedures. In this study, PCs reported witnessing more discrimination than PDs ($P = 0.037$). This is perhaps due to differential treatment and behavior toward individuals with higher leadership positions as compared with program staff. Thus, consistently incorporating the input of PCs and administrative staff to identify and address D&I-related concerns is necessary for a more comprehensive approach. As reported earlier, we did not find statistically significant results regarding the prevalence of the types of discrimination that PDs and PCs witnessed likely due to the low power of the study, and thus, further investigation is warranted. Similarly, we did not find a statistically significant difference between PDs and PCs related to explicit self-reported discrimination as very few respondents opted to self-disclose likely due to concerns regarding breech of anonymity. In addition, the survey tool did not offer respondents the option to select "Do Not Discriminate" and thus, it is possible that a subset of individuals did not respond to that particular item for that reason. Further studies are needed to directly assess explicit and implicit bias as related to specific treatment options and patient outcomes in the field of plastic surgery. The implications of discrimination and bias have been inconsistent in the surgical literature. For example, 2 studies demonstrated that physicians, including trauma surgeons had implicit bias toward White Americans and against lower SES and African American individuals but did not find a correlation between bias and clinical decision making.[10,11] Contradictory to those findings, negative gender bias was found to negatively affect female physicians in plastic surgery,[12] whereas African American patients experienced significantly lower rates of morbidity and mortality in hospitals with high inpatient racial diversity when adjusted for other factors such as gender, hospital location, insurance, and cost of care (adjusted odds ratio, 0.80; 95% confidence interval, 0.74–0.86).[13] Thus, a focused institutional mission statement related to D&I is needed to guide concerted research endeavors to evaluate areas needed for improvement and ways in which bias for or against specific patient populations is related to particular surgical procedures and outcomes.

**Study Limitations**

We are aware of several limitations to our study. Namely, we had a high attrition rate where only 22 PDs (50%) and 18 PCs (52.9%) completed the survey. This is likely due to a combination of general survey fatigue and the sensitive nature of the both witnessed and self-reported discrimination questions asked. Conflict of interest also presented a challenge to our study dissemination methodology. The UNC PC, who is also the president elect of the Program Coordinator Committee, contacted all the PCs by e-mail for their voluntary participation and asked them to forward the study to the residents in their respective institutions. To prevent conflict of interest, we did not require any participants to respond confirming that they received the e-mail invitation to participate or if they forwarded the e-mail on to the residents. Thus, we used the reported number of existing PCs and plastic residents published by ACAPS and ACGME, respectively, for our cohort and survey response rates. There is measurement bias in the survey portion inquiring about witnessed and self-reported discrimination because the survey tool did not include an "I do not discriminate" option; thus, we calculated $P$ values based on the total numbers of PDs and PCs who participated. Additionally, low disclosure regarding discrimination practices may have also been due to concerns of losing anonymity as participants were invited to provide their e-mail addresses at the end of the survey if they wished to be considered for a randomized incentive.

## CONCLUSIONS

Our study shows that the overwhelming majority of educators in the field are committed to D&I improvement although it remains a difficult topic to address. Enhance-

ments to D&I training specifically in the area of BIC is needed along with increasing the number of opportunities for PCs to participate in training. Further, studies exploring existing explicit and implicit bias as related to specific surgical treatment options and subsequent patient outcomes are needed to focus and improve D&I training and resident education in the future.

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