Leading From the Front

An Approach to Increasing Racial and Ethnic Diversity in Surgical Training Programs

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The challenges with enhancing racial and ethnic diversity in the medical workforce have been well documented over the last several decades.[1] Unfortunately, the surgical specialties have revealed the least amount of progress in this arena.[2] Individuals from ethnic backgrounds underrepresented in medicine (UIM), as defined by the Association of American Medical Colleges (AAMC), include African American, Hispanic/Latino, and Native American/Alaskan Native/Native Hawaiians, and mainland Puerto Ricans.[3] The benefits of enhancing racial and ethnic diversity in the physician workforce are numerous. Physicians coming from these groups have proven to provide care to minority and medically underserved communities, in addition to all Medicaid and indigent patients, at a greater propensity than their majority physician counterparts.[4–6] In addition, African American and Latino patients are more likely to seek out and feel increasingly comfortable with UIM physicians and are more likely to participate in clinical trials if a UIM clinician/academician is on the investigative team.[7–9] Despite this growing evidence of the benefits of enhancing racial and ethnic diversity in the physician workforce, little to no advancements have been revealed nationwide.

Concerned about this glaring shortcoming, the surgical subspecialties at the University of Pennsylvania assessed the racial and ethnic demographics of our residency trainees. Although the University of Pennsylvania's Perelman School of Medicine had 23% of its student body coming from UIM backgrounds, 7% of the institution's surgical residents were from UIM groups, statistics echoed in national data.[2] Not satisfied with the magnitude of our deficit and realizing that improvements would not come easily, we collectively devised a strategy to increase our racial and ethnic representation at the University of Pennsylvania Health System (UPHS). We proposed that by implementing a three-faceted approach, we could successfully increase our yield of newly matched surgical residents from UIM groups.

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LITERATURE REVIEW AND THREE-FACETED APPROACH

A literature review was initially performed to determine best practices for UIM recruitment specifically at the resident level. Due to limited findings, this was extended to UIM medical student and faculty recruitment.[10] Using information garnered from the literature review in addition to innovating our own strategies based on our opinion, we formalized a three-faceted approach for UIM surgical resident recruitment.

The first facet was the development of UIM-focused, 4-week, visiting clerkship programs (VCPs). Our UIM VCPs offered $1500 reimbursement stipends for lodging and traveling expenses to interested students who were accepted after application review. The UIM VCPs were funded from the individual divisions' budget with each program determining the number of positions they could fund (range of 1–4 positions). These UIM VCPs were advertised nationally and regionally. The selected students came to UPHS from accredited US medical schools for a 4-week sub-internship during their fourth year of medical school in the summer or fall of the year that they were participating in the National Resident Matching Program (NRMP).

The second facet involved the use of holistic review of residency applications. Holistic review of applications has received the full endorsement from the Association of American Medical Colleges (AAMC). Holistic review is a flexible, individualized way for institutions' selection committees to assess and evaluate an applicant's capabilities, providing balanced consideration to experiences, talents, and academic metrics.[10] The premise is to attenuate the focus on traditional metrics (board scores, grades, number of authored publications) while heightening the emphasis on candidates' experiences and attributes as that may be more indicative of their success as a future physician.[10] UPHS surgical faculty members involved in residency selection were provided educational resources including a series of Graduate Medical Education (GME) sponsored symposia and workshops focused on the use of holistic review of residency applications. Speakers with experience in the topics of unconscious bias and UIM recruitment/retention educated attendees on the paucity of UIMs in residency training programs and the potential benefits of holistic review of applicants. Programs were provided tools to implement holistic review and asked to reduce, if not abolish, threshold scores for metrics such as candidates' USMLE scores and number of authored publications.

The third facet involved implementing targeted outreach to candidates with the assistance of members of the University of Pennsylvania's Alliance of Minority Physicians (AMP). AMP is a UIM-focused house staff, junior faculty, and medical student support and mentorship network that was established in 2014. Outreach by members of AMP to UIM surgical residency applicants before interviewing at UPHS, contact with the candidates during their

interview day, and follow-up communication after the interview day (if requested by the applicant) were performed to ensure all questions about UPHS had been answered.

ASSESSMENT DESIGN AND METRICS ASSESSED

Before 2014, our institution had inconsistent and unreliable recording of residency candidates' ethnic demographic information. This shortcoming was rectified starting with the 2014 to 2015 application cycle. Penn residency applications, interviews, and matching demographic data from 2015 to 2018 were retrospectively (2015) and prospectively (2016–2018) collected and evaluated for the following programs: general surgery, orthopedic surgery, plastic surgery, urology, otorhinolaryngology, vascular/thoracic surgery integrated, and neurosurgery. Only categorical surgical positions were included; preliminary surgical positions were not included in this assessment. The 2014 to 2015 academic year served as our baseline. Beyond the inception of the Alliance of Minority Physicians (AMP) in 2014, none of these initiatives had been implemented before 2014 to 2015. The following metrics were evaluated from 2015 to 2018 (4 residency matching cycles):

1. Total number and percentage of all interviewed candidates who were self-identified to be from a UIM group.
2. Total number and percentage of all matched candidates who were self-identified to be from a UIM group.

We also sought to determine if these initiatives impacted the historical metrics that programs used to assess the competitiveness of their program as well as their matched candidates. There are very few ways to evaluate the level of competitiveness or national reputation of residency training programs. After significant discussion among the authors, that represent the participating surgical specialties, we felt that United State Medical License Examination (USMLE) Step 1 scores and maximum rank number reached to fill all positions were not perfect, but the best metrics available. The ''mean maximum rank number'' reflects the average of the lowest number each program descended to on their rank lists to fill their categorical positions. Both the USMLE Step 1 scores and maximum rank number were then averaged among the 8 specialties and assessed over this 4-year period.

The description of our experience is not intended to be a scientifically rigorous; however, the presence of statistical significance and/or positive correlation provides some quantification of these qualitative metrics. Thus, for the assessment of percentage of UIM candidates interviewed, a chi-squared test of homogeneity between 2 proportions comparing each year to 2015 was performed. Due to the small counts for percentage of UIM candidates matched, a Fisher exact test and a Spearman correlation comparing each year to 2015 were performed. Wilcoxon-signed rank tests were performed to test the difference of the means of the USMLE Step 1 scores and means of maximum rank numbers, between 2015 and each subsequent year, across the surgical specialties. Statistical significance was defined as $P < 0.05$.

PROMISING RESULTS

In our baseline year (2014–2015), UIMs represented 11.2% of all candidates interviewed for categorical surgical residency positions at UPHS. In the subsequent 3 years, the UIM representation among residency interviewees increased to 12.1%, 12.5%, and 18.8%, respectively (Fig. 1A). For 2018, this increase reached the level of statistical significance when comparing it with the baseline year ($P < 0.05$). During the baseline year (2014–2015), UIMs represented just 12.1% of all matched candidates into UPHS surgical residency programs. In 2015 to 2016, UIM representation among matched residency candidates at UPHS slightly declined to 9.1%. In 2016 to 2017, the UIM representation within the matched residency candidates significantly increased to 20.6%. Then in 2017 to 2018, UIM representation among UPHS matched surgical residency candidates increased again to 23.5% (Fig. 1A). Although the 2018 increase did not reach statistical significance ($P = 0.33$), the Spearman correlation of 0.8 suggests a strong upward trend of UIM matches. We were also pleased to find that this increase in UIM-matched candidates included several students that participated in our UIM VCP, although the majority had not partaken in the program. Further statistical analyses on the effectiveness of our UIM VCP will be performed as we obtain a larger cohort of participants.

There were no measurable differences in the success of these efforts among the 8 specialties. In each specialty, the number of total matched residents per yearly cycle ranges from as low as 3 (plastics, ENT, integrated vasc/thoracic) to as high as 8 (general surgery, orthopedic surgery). All of the specialties showed an increase in UIM matches by at least 1 UIM candidate and 2017 marked the first time that a UIM matched in each surgical specialty at UPHS in our institution's history. This accomplishment was replicated in 2018.

We appreciated increases in both African American and Latino interviewees and matched candidates. Unfortunately, we did not see an increase in the representation of Native American/Alaskan Native candidates. Although not ideal, we recognize this deficit and plan to continue to work diligently to recruit all UIM candidates. To this end, in addition to recruitment representation to both the Student National Medical Association (African American students) and Latino Medical Student Association annual national meetings, we plan to extend these efforts to the Association of Native American Students annual meeting.

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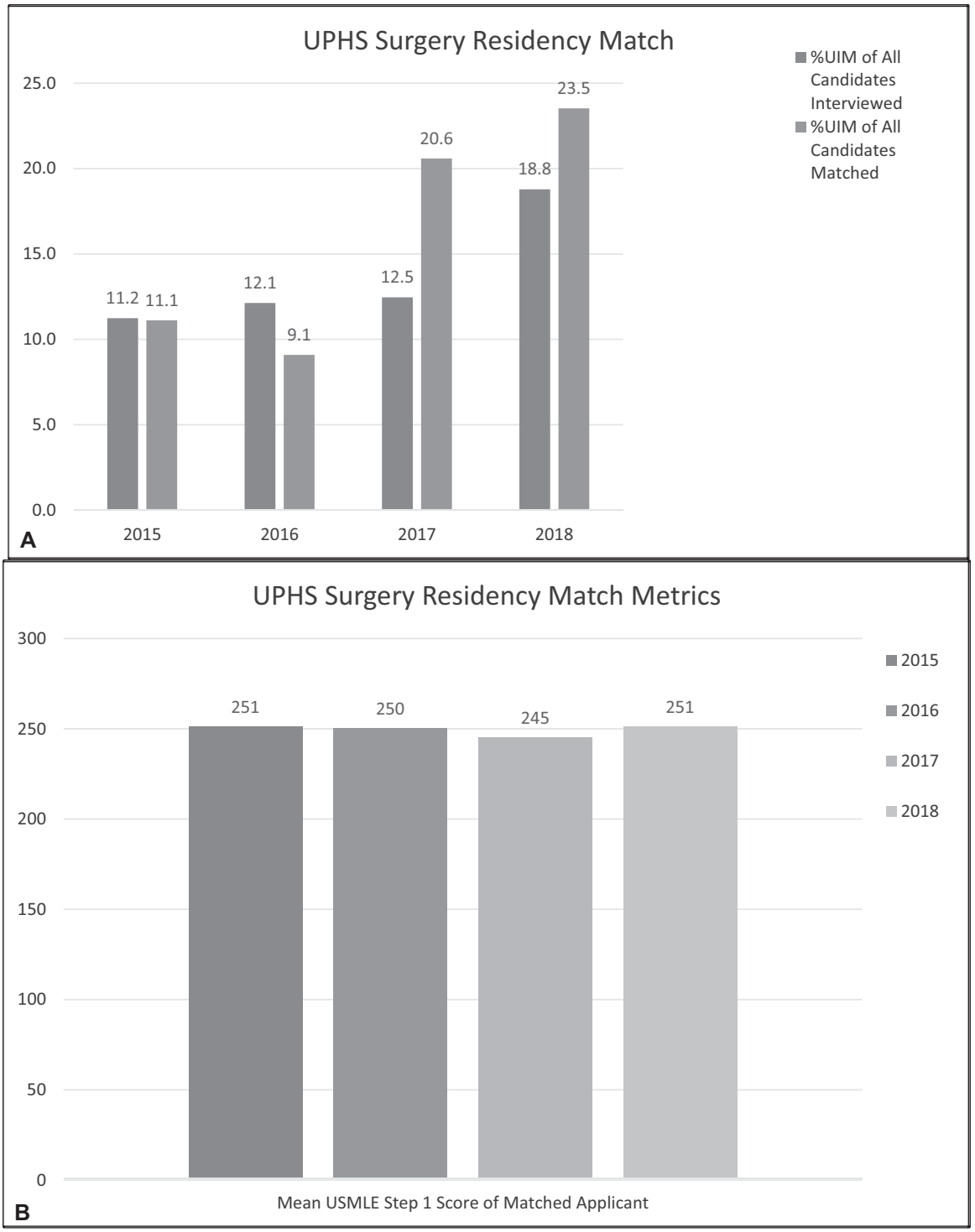
We were also extremely pleased to determine that the traditional metrics used to assess both the competitiveness of programs (mean maximum rank # to fill all positions) and matched candidates (mean USMLE Step 1 scores) were unchanged over this same period (Fig. 1B). The average maximum rank number reached to fill the categorical surgical residency positions during the base line year of 2014 to 2015 was 16. In 2017 to 2018, it was 15. The average USMLE Step 1 score for all matched categorical surgical residency candidates at UPHS during the baseline year (2014–2015) was 251. In 2017 to 2018, the average USMLE Step 1 score was exactly the same, 251. There was no statistically significant difference in either metric when comparing 2015 to 2018 ($P = 0.84$ and $P = 0.85$, respectively). We believe these findings address concerns that by enhancing racial and ethnic diversity among trainees, a program would potentially be jeopardizing the ''quality'' of its program or the candidates it selects. Importantly, since 2014 to 2015 there has been no attrition of these matched UIM surgical residents, which suggests that recruits progress appropriately through their respective training programs.

LEADING FROM THE FRONT

The field of surgery has historically taken significant pride in leading our profession in safety, quality, innovation, and education. Thus, it would only be appropriate if surgical training programs began leading the way for the enhancement of racial and ethnic diversity in our physician workforce.

Through the implementation of a three-faceted approach, UPHS surgical training programs experienced a more than doubling of UIM representation among matched candidates into our surgical residency training programs in just 4 years. Admittedly, this is not a randomized controlled study but rather a single institution's retrospective assessment of UIM residency interview and match results



UPHS=University of Pennsylvania Health System; UIM=Underrepresented In Medicine; USMLE=United States Medical License Exam

FIGURE 1. UPHS surgery residency match results and metrics (2014–2018). UIM indicates underrepresented in medicine; UPHS, University of Pennsylvania Health System; USMLE, United States Medical License Examination.

before and then after instituting our approach. The resources necessary for making this effort scalable are primarily in human capital and leadership commitment. The only direct cost associated with our efforts involved the $1500 reimbursement stipends provided to our visiting clerkship students. Holistic review of applications and candidate outreach efforts did not require new faculty hires or expensive marketing consultants. With that being said, the dedication and time spent by our faculty and residents in these UIM recruitment efforts has been paramount and is admittedly an indirect cost these individuals have graciously absorbed.

It will inevitably be institutional dependent, but our recommendations for transferring our experience nationally include program directors' and chairpersons' commitment to holistic review of applications as well as appointing faculty members to lead the suggested outreach efforts. Our experience reveals that by implementing a well-thought-out strategy, an institution can enhance UIM representation among its surgical trainees. The diversification of our physician workforce will be dependent on efforts such as these, and surgery should undeniably lead the way.

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