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Surgical time out: Our counts are still short on racial diversity in academic surgery

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ABSTRACT

Background: This study provides an updated description of diversity along the academic surgical pipeline to determine what progress has been made.**Methods:** Data was extracted from a variety of publically available data sources to determine proportions of minorities in medical school, general surgery training, and academic surgery leadership.**Results:** In 2014–2015, Blacks represented 12.4% of the U.S. population, but only 5.7% graduating medical students, 6.2% general surgery trainees, 3.8% assistant professors, 2.5% associate professors and 2.0% full professors. From 2005–2015, representation among Black associate professors has gotten worse (–0.07%/year, $p < 0.01$). Similarly, in 2014–2015, Hispanics represented 17.4% of the U.S. population but only 4.5% graduating medical students, 8.5% general surgery trainees, 5.0% assistant professors, 5.0% associate professors and 4.0% full professors. There has been modest improvement in Hispanic representation among general surgery trainees (0.2%/year, $p < 0.01$), associate (0.12%/year, $p < 0.01$) and full professors (0.13%/year, $p < 0.01$).**Conclusion:** Despite efforts to promote diversity in surgery, Blacks and Hispanics remain underrepresented. A multi-level national focus is imperative to elucidate effective mechanisms to make academic surgery more reflective of the US population.**Summary:** We determined the proportions of minorities along the surgical pipeline. Despite efforts to promote diversity in surgery, Blacks and Hispanics continue to be underrepresented. A multi-level national focus will be imperative to increase racial diversity among medical students, surgery trainees and faculty.

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1. Introduction

Health care disparities according to race and ethnicity remain a persistent and insidious problem despite several decades of initiatives to improve them.^{1–3} Increasing diversity of the physician workforce may be one method to improve the care of minority patients. Although there are no documented studies proving that physician-patient racial concordance leads to improved clinical outcomes, there is significant evidence that underrepresented minority (URM) patients have higher patient satisfaction scores,^{4–6}

better compliance, and an increased likelihood of participating in clinical research studies when a member of their physician provider team is also a URM.^{7,8} It has been repeatedly cited that URM physicians are more likely than Caucasian physicians to treat Medicaid patients, patients without health insurance, and patients of color. Additionally, it has also been documented that physicians of color are for more likely to actually work and even live in many of these underserved communities.^{9–14} Therefore, increasing diversity may be one mechanism for reducing health care disparities. In addition, creating a more diverse workforce contributes to innovation and facilitates recruitment of talented personnel.¹⁵ As the US population grows increasingly more diverse, these trends will undoubtedly become more impactful. Documented benefits of enhancing the diversity of our health care workforce exist in parallel with the moral imperative to create a physician workforce that is more

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reflective of the patient population in which it is obligated to equitably treat.¹⁶ Historically, the challenges in physician diversity have been amplified when assessing the field of surgery and its respective subspecialties.¹⁷

There has been a focus on examining the demographics of faculty at academic medical centers as these individuals not only treat patients and carry out research, but also are responsible for selecting and training the next generation of physicians.^{18–20} Several previous studies have demonstrated that diversity among academic surgical faculty is scarce and distinctly lag behind other medical disciplines.^{17,21,22} In an attempt to help alleviate these disparities, several recent initiatives have been created to increase the number and presence of URMs among surgical trainees and faculty.^{23–25} Although these programs have reported some success, there has not been a recent assessment of diversity in academic surgery at the national level over the past decade.

This study provides an updated description of the academic surgical pipeline to determine what progress, if any, has been made and to further characterize the trajectory of URM representation in the surgical workforce. We hypothesized that although Blacks and Hispanics remain underrepresented, there has been improvement in this underrepresentation over time.

2. Materials and methods

We performed a cross-sectional and longitudinal analysis of annual data covering medical school graduates, surgical trainees, and surgical faculty collected by the Association of American Medical Colleges (AAMC), American Medical Association (AMA), and Accreditation Council of Graduate Medical Education (ACGME). AAMC FACTS is a database that includes data on U.S. medical school applicants, matriculants, enrollments, and graduates for MD as well as PhD programs.²⁶ AAMC also maintains a Faculty Roster database using a web-based application called FAMOUS (Faculty Administrative Management Online User System).²⁷ Data are available on the absolute number of full-time faculty in LCME-accredited (Liaison Committee on Medical Education) U.S. medical schools, which is further sorted by department, faculty rank, tenure status, gender, race and ethnicity. Analysis of this data source is only possible for general surgery since there is no specification for academic rank among surgery subspecialties. Finally, ACGME publishes annual reports detailing the number of trainees in each specialty.²⁸ In addition to information for general surgery, each report provides data for surgical subspecialties that offer board certification through the American Board of Surgery such as colon and rectal, pediatric, critical care, vascular, and thoracic surgery. Similar to other sources used for this analysis, these reports provide classification of participants based on gender, race, and ethnicity. The ACGME also publishes a Data Resource Book that began reporting race and ethnicity of trainees in 2011.²⁹ Data from these various sources were from 2005 to the last year available for each source. In addition to absolute numbers of medical school graduates, FACTS data are broken down by gender, race and ethnicity.

The percent of race and ethnicity in each phase of surgical training was calculated by only including surgical subspecialties available through general surgery residency training: colorectal, pediatric, critical care, thoracic, and vascular surgery. Of note, integrated vascular and thoracic surgery programs were established in 2007 and 2008, respectively. The number of trainees for these subspecialties was determined based on the sum of the integrated and traditional tracks at these time points. Given the lack of historical data for complex general surgical oncology since it was created 2013, this subspecialty was excluded from longitudinal analysis. Cross-sectional analysis of other medical disciplines (anesthesiology, family medicine, internal medicine, neurosurgery,

obstetrics/gynecology, orthopedic surgery, pediatrics, and psychiatry) was also performed for the last year of data available for trainees. Finally, the U.S. Census Bureau American Communities Survey 1-year estimates were used to normalize the proportion of each racial and ethnic group relative to the general population of the corresponding year.³⁰ This provided a sense for how diverse each step of the surgical pipeline was in relation to the diversity of the general population.

STATA v13.1 was used to perform linear regression to calculate the average percent change in each race and ethnicity for medical school graduates, surgical trainees, and full-time surgical faculty over time. Race/ethnicity groups evaluated were White, Asian, Black, Hispanic and Other (includes American Indian, other, multiple race, unknown). Statistical significance was set at $p < 0.05$. This study was deemed exempt by the Institutional Review Board at Weill Cornell Medicine (Protocol No. 1601016879).

3. Results

3.1. Medical students

While the total number of graduating medical students increased 17.4% from 2005 to 2014 (15,927 vs. 18,705), the number of Black medical students graduating from medical school decreased 5.5% (1123 vs. 1061) over the same time period. Of all graduating medical students, Blacks decreased from 7.1% to 5.7%. Over this period, the number of Blacks in the overall US population increased from 11.9 to 12.3%, meaning that the percent of graduating Black students as a proportion to their representation in the US population declined from 59.2% to 46.1%. Meanwhile, the number of graduating Hispanic medical students also dropped by 37.4% (1364 vs. 854). Similarly, the proportion of graduating Hispanic medical students decreased 46.7% (8.6% vs. 4.6%) and the proportion normalized by the general population also decreased from 59.0% to 26.3% (Fig. 1). This demonstrates that although the general population has become more diverse, diversity has worsened for medical school graduates.

3.2. Surgical trainees

The number of general surgery trainees expanded 5.4% over the study period (7628 vs. 8043). During this same time, the number and proportion of Black trainees in general surgery increased 21.0% (409 vs. 495) and 14.8% (5.4% vs. 6.2%), respectively, although this was not a statistically significant increase over time (0.1%/year, $p = 0.31$). Similarly, the number and proportion of Hispanic general surgery trainees grew 46.7% (467 vs. 685) and 39.1% (6.1% vs. 8.5%), respectively, with an average increase of 0.2%/year ($p < 0.01$) (Fig. 2; Table 1a).

The highest proportion of Blacks by surgical subspecialties in 2014 was in complex general surgical oncology (6.9%, $n = 7$) and surgical critical care (6.2%, $n = 13$). The lowest proportion was in pediatric surgery (1.3%, $n = 1$). In contrast, the highest proportion of Hispanics by surgical subspecialty in 2014 was in colorectal surgery (11.6%, $n = 10$) and vascular surgery (9.9%, $n = 44$). Coincidentally, the lowest proportion of Hispanics by surgical subspecialty was also in pediatric surgery (3.8%, $n = 3$) (Table 2).

Obstetrics/gynecology and family medicine had the highest proportion of Black (8.2% and 7.2%, respectively) and Hispanic (6.3% and 6.7%, respectively) trainees of the other medical disciplines evaluated.

3.3. Medical school full-time surgery faculty

Despite a growth in the total number of Black assistant

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