Trends in Racial, Ethnic, and Sex Representation Among Surgical Faculty Members and Medical Students in the US, 2011-2020

Diversity in medicine improves patient outcomes and decreases health disparities.1-3 Despite ongoing diversity, equity, and inclusion initiatives, however, several groups remain underrepresented in medicine (URIM). In 2021, Zhu et al4 reported racial disparities among Black and Hispanic academic surgeons with little change over the past 12 years. Among medical schools in the US, the proportion of female matriculants has increased over time and ultimately surpassed male matriculants in 2017.5 However, sex disparities among leadership roles persist and include editor-in-chief positions for medical student journals.5 While several studies demonstrate disparities within particular levels of medical training, few explore the association between diversity among faculty members and diversity among learners over the course of undergraduate and graduate medical education. To better understand diversity over time and throughout the journey from learner to attending physician, we examined trends in racial, ethnic, and sex representation among medical students and surgical faculty members in the US from 2011 to 2020.

Methods | Data were obtained from the American Association of Medical Colleges for proportions of medical students and full-time surgical faculty members, categorized by self-reported sex, race, and ethnicity (American Indian or Alaskan Native; Asian; Black or African American; Hispanic, Latino, or of Spanish origin; Native Hawaiian or other Pacific Islander; White; multiple races and ethnicities; other; and unknown) from the 2011-2012 academic year through the 2019-2020 academic year at participating MD-granting programs. The study was granted exempt status by Duke University’s institutional review board and informed consent was not required because of the use of deidentified data.

Underrepresented in medicine was defined as being American Indian or Alaskan Native; Black or African American; Hispanic, Latino, or of Spanish origin; or Native Hawaiian or other Pacific Islander. Non-White categories included URIM, Asian, and other race and ethnicity. Race, ethnicity, and sex were summarized with mean (SD) values by year for medical students and faculty members. Analysis of variance was used to test for differences over time. Race, ethnicity, and sex were compared between faculty members and medical students using Wilcoxon signed rank tests. Linear regression was used to estimate the association of year and proportions of female and URIM faculty members with proportions of female students and URIM students (outcomes). We deemed $P < .05$ significant for all analyses, and no adjustments were made for multiple comparisons. All statistical analyses were conducted using SAS version 9.4 (SAS Institute).

Results | Medical student and full-time surgical faculty member data were available for 140 programs. Across all medical schools and all years, 48.1% of students were women; 0.2% were American Indian or Alaskan Native; 6.1% were Black or African American; 20.1% were Asian; 0.1% were Native Hawaiian or other Pacific Islander; 6.1% were Hispanic, Latino, or of Spanish origin; 0.1% were Native Hawaiian or other Pacific Islander; 55.9% were White; and 7.7% were multiracial. In contrast, 22.4% of faculty were women; 0.2% were...
American Indian or Alaskan Native; 15.9% were Asian; 4.9% were Black or African American; 5.3% were Hispanic, Latino, or of Spanish origin; 0.1% were Native Hawaiian or other Pacific Islander; 66.6% were White; and 3.7% were multiracial.

Overall, medical students had higher proportions of women (48.1% vs 22.4%), Asian individuals (20.1% vs 15.9%), and individuals who are URIM (12.5% vs 10.4%) compared with faculty members (all P < .001). On unadjusted analysis, the proportion of female faculty members increased from 19.1% in 2011-2012 to 26.4% in 2019-2020 (P < .001), but among faculty members who identified as URIM, there was no change in proportion from 2011-2012 to 2019-2020 (P > .99; Figure 1). Linear regression revealed that the proportion of students who are URIM increased over time (0.5% [95% CI, 0.2%-0.7%] per year; P < .001), but there was no change in the proportion of female medical students (Figure 2). The presence of more faculty members who were URIM in a program was associated with a program's having more students who were URIM (70.1% [95% CI, 64.2%-75.9%] of students for every 100% increase in faculty members; P < .001) and female medical students (6.2% [95% CI, 2.3%-10.2%] of students for every 100% increase in faculty members; P = .002), but having more female faculty members was not associated with either outcome (Figure 2).

Discussion | We found that having more racially and ethnically diverse surgical faculty members was associated with greater racial, ethnic, and sex diversity among medical students. The same association was not observed with having more female surgical faculty members, although there are studies that demonstrate both measurable and experiential benefits of increased sex diversity, including female representation in leadership roles at surgical conferences. Although limited in the ability to draw causative conclusions in this cohort study, our findings suggest that efforts to diversify faculties may improve representation among future generations of physicians. Intentional and thoughtfully constructed initiatives should become and remain a priority at all stages of medical training, but particularly in the retention, recruitment, and support of faculty members who are URIM.

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were not collected for this study. The standardized CT diag-

nostic criteria are presented in the Box. The study was approved by ethics committee of the Hospital District of Southwest Finland and by institutional research boards at each participating site. All patients gave written informed consent. The trial was performed in accordance with the tenets of the Declaration of Helsinki and followed the relevant portions of the Consolidated Standards of Reporting Trials (CONSORT) reporting guideline. The trial protocol and statistical analysis plan are available in Supplement 1. This APPAC II trial subgroup analysis compares patients with primary nonresponsiveness to antibiotics with at least 1 of the following: Appendicolith: >3 mm stone within appendix Abscess: periappendiceal walled-off collection with enhancing walls Perforation: appendiceal wall enhancement defect and periappendiceal excess of fluid and/or infectious phlegmon and/or extraluminal air Tumor: tumorlike prominence of appendix

### Factors Associated With Primary Nonresponsiveness to Antibiotics in Adults With Uncomplicated Acute Appendicitis: A Prespecified Secondary Analysis of a Randomized Clinical Trial

Contemporary research suggests that physicians could offer patients with computed tomography (CT)-confirmed uncomplicated acute appendicitis a choice between surgery and antibiotics. In the recent Appendicitis Acuta (APPAC) II trial aiming to optimize antibiotic treatment of uncomplicated acute appendicitis in adults, 70.2% of the patients (207 of 295) randomized to receive oral antibiotic monotherapy and 73.8% of patients (213 of 288) randomized to receive intravenous antibiotics followed by oral antibiotics avoided surgery at 1-year follow-up. To further improve patient selection and subsequently the success rate of nonoperative treatment for uncomplicated acute appendicitis, accurate differential diagnosis between uncomplicated and complicated acute appendicitis ruling out complicated appendicitis is essential. The objective of this study was to assess potential preintervention findings associated with primary nonresponsiveness to antibiotics in the APPAC II trial.

### Methods

This study is a predefined secondary analysis of the APPAC II randomized clinical trial comparing oral antibiotic monotherapy with intravenous followed by oral antibiotics for CT-confirmed uncomplicated acute appendicitis in adults aged 18 to 60 years in 9 Finnish hospitals. Data were obtained from a trial that enrolled patients from April 2017 to November 2018. Data were analyzed from December 1, 2018, to July 20, 2020. The detailed methods and primary results have been previously published. Data on race and ethnicity were not collected for this study. The standardized CT diag

### Box. Structured Radiological Report Including Radiological Criteria and Categorization of Acute Appendicitis

#### Appendix Visualization

Report 1 of the following:
- Not visualized
- Partly or unclearly visualized
- Completely visualized

#### Appendix Transverse Diameter (mm)

#### Probability of Appendicitis

Report 1 of the following:
- Not likely
- Rather unlikely
- Rather likely
- Very likely

#### Categorization of the Appendicitis

Report either uncomplicated appendicitis or complicated appendicitis, if any:
- Uncomplicated appendicitis: transverse diameter >6 mm with typical findings
  - Wall thickening and enhancement
  - Periappendiceal edema and/or minor amount of fluid
- Complicated appendicitis: above-mentioned criteria for appendicitis with at least 1 of the following:
  - Appendicolith: >3 mm stone within appendix
  - Abscess: periappendiceal walled-off collection with enhancing walls
  - Perforation: appendiceal wall enhancement defect and periappendiceal excess of fluid and/or infectious phlegmon and/or extraluminal air
  - Tumor: tumorlike prominence of appendix

#### Other Diagnosis

Report if any:
- Diverticulitis
- Complicated ovarian cyst
- Pelvic inflammatory disease
- Colitis
- Ileitis
- Intestinal obstruction or ileus
- Ureter stone
- Hydronephrosis
- Tumor
- Other diagnosis