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The State of Diversity Based on Race, Ethnicity, and Sex in Otolaryngology in 2016

Ceisha C. Ukatu, MD; Lauren Welby Berra, BS; Qiwei Wu, MA; Christine Franzese, MD

INTRODUCTION

Diversity within the medical profession with respect to sex, racial, and ethnic minorities continues to receive attention as the nation’s population grows more diverse. Minorities currently make up 37% of the population and are expected to comprise 57% of the population in 2060, making the United States a majority-minority nation, and the ratio of women to men is expected to remain stable at about 100:104.7. Minorities include all but the single-race, non-Hispanic white population (13% black, 5% Asian, 17% Hispanic of any race).1 Several studies have shown that a diverse physician workforce has a positive effect on health and health care.2,4 Race or ethnicity concordant patient–physician relationships result in patient perception of improved communication,2 increased patient satisfaction,2,5,6 and greater healthcare utilization.7 With this predicted change in the composition of the population, it is more important than ever that our physician workforce is equally diverse to meet the needs of the public.

The distribution of women and other minorities in medicine continues to be a topic of concern, especially in surgical specialties. A 2010 study on diversity in orthopedic surgery8 found minorities and women to be underrepresented in most surgical specialties, except general surgery which was relatively diverse with the minority representation in medical school graduates similar to the representation at the resident level. The study also showed that there is a decrease in representation of racial minorities in each subsequent level of training. A lack of diversity at the faculty level is unfavorable because women and minority faculty serve an important role in medical education as role models for future trainees and help eradicate potential cultural and gender biases.9 Efforts to increase diversity are unique to each institution and typically address recruitment, admissions, retention, and professional development.4 Despite efforts aimed to increase representation of women and minorities within the medical profession, it remains unclear whether these efforts have been effective.

In the field of otolaryngology, a recent study examined the evolution of diversity in residency programs from 1975 to 2010.10 This study found a steady increase in the number of women but minimal increase in minority representation at the resident level. The study also showed that there is a decrease in representation of racial minorities in each subsequent level of training. A lack of diversity at the faculty level is unfavorable because women and minority faculty serve an important role in medical education as role models for future trainees and help eradicate potential cultural and gender biases.9 Efforts to increase diversity are unique to each institution and typically address recruitment, admissions, retention, and professional development.4 Despite efforts aimed to increase representation of women and minorities within the medical profession, it remains unclear whether these efforts have been effective.

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Send correspondence to Christine Franzese, MD, Department of Otolaryngology–Head and Neck Surgery, University of Missouri-Columbia, One Hospital Drive, Suite MA314, Columbia, MO 65212.

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Objective: To compare the representation of women and racial minorities among otolaryngology residents and faculty to other surgical specialties.

Methods: Information from 2016 regarding female and minority representation among medical school graduates, otolaryngology applicants, otolaryngology residents, otolaryngology faculty and residents, and faculty in other surgical specialties was obtained from the publicly available registries from the American Medical Association and the American Association of Medical Colleges. The data obtained was used to explore the differences between the various stages of training in otolaryngology and to compare the female and minority diversity of otolaryngology residents with residents in other surgical specialties.

Results: Women and African Americans were underrepresented at the resident level compared with their level of representation as medical school graduates. Women were underrepresented in otolaryngology resident applicants (P < .001), but equally represented between otolaryngology residency applicants and residents (P = .582). African Americans were equally represented between medical school graduates and otolaryngology resident applicants (P = .871), but underrepresented in otolaryngology residents (P < .001). Asian Americans and Hispanics were underrepresented among otolaryngology faculty compared with their representation in otolaryngology residency programs (P < .001, P < .001, respectively). Otolaryngology has the lowest percentage of African-American residents and faculty compared to other surgical specialties. The representation of women in otolaryngology residencies is higher than most surgical specialties but worse than general surgery, integrated plastics, and medical school graduates.

Conclusion: Otolaryngology lags behind other surgical specialties in representation of minorities and women. Continued efforts should be made to increase diversity in the field of otolaryngology, especially in regard to underrepresented minorities.

Key Words: Diversity, otolaryngology, residency, minority, female, race, ethnicity.

Level of Evidence: 3

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representation in otolaryngology residency programs. This represents an opportunity in our field to correct persistent disparities in female and minority representation. The current study presents a glimpse of changes that have occurred 6 years after the findings of 2010. The purpose of this study is to analyze the current representation of women and minorities in otolaryngology throughout the various stages of training and to compare the diversity of otolaryngology residents to other surgical specialties.

MATERIALS AND METHODS

Since data collected for this study was obtained from publicly available registries, an institutional review board evaluation exemption was obtained.

The variables studied were race, ethnicity, and sex and these groups were defined as consistent with the U.S. Census Bureau. Racial groups were defined as African American or black, Asian, white, and other. Other, as defined in this study, included American Indian/Alaskan Native (AI/AN), Native Hawaiian/Pacific Islander (NH/PI), those who identified with multiple races, and those with unknown racial information. Ethnic groups were defined as Hispanic and non-Hispanic. Demographic data was collected from multiple sources so these categories were used to standardize racial and ethnic groups across these sources. The Other category was not included in the analysis since it included individuals who identified with multiple racial groups, who had an unknown race or whose racial group not commonly represented in otolaryngology. Sex was defined as male or female, according to biological sex.

Medical student graduate data was collected from the Association of American Medical Colleges (AAMC) FACTS database, 2016–2017. Otolaryngology applicant data was collected from AAMC Electronic Residency Application Service data from 2016. Resident data was collected from Journal of the American Medical Association Medical Education supplement, 2016–2017. Faculty data was collected from the Association of Medical Colleges Faculty Rosters, 2016. These registries were used to determine the makeup of medical school graduates and otolaryngology applicants in 2016, as well as the makeup of residents and faculty in the fields of otolaryngology, general surgery, obstetrics and gynecology, orthopedic surgery, neurosurgery, urology, and integrated plastic surgery in 2016. Of note, faculty data was only available for otolaryngology, general surgery, obstetrics and gynecology, and orthopedic surgery.

Demographic data of otolaryngology residents and applicants in 2016 was compared to the results found in the 2010 study on diversity in otolaryngology.

Differences in racial, ethnic, and sex distribution among medical school graduates, otolaryngology applicants, otolaryngology residents, and otolaryngology faculty were also investigated. This was done by comparing race, ethnicity and sex group percentages at each level of the otolaryngologist career.

The composition of otolaryngology residents in regards to race, ethnicity, and sex was compared with that of residents in other surgical specialties using the 2016 Journal of the American Medical Association Medical Education supplements. The surgical specialties analyzed were as above: general surgery, obstetrics and gynecology, orthopedic surgery, neurosurgery, urology, and integrated plastic surgery. Faculty data for comparison between surgical specialties was only available for otolaryngology, general surgery, obstetrics and gynecology, and neurosurgery.

Statistical analysis was performed using statistical software R. Data was compared with the use of two-sample z tests for proportion. A P value of <.05 was considered statistically significant.

RESULTS

Diversity Representation in Otolaryngology in 2016.

Table I reports the percentage of each resident demographic group in otolaryngology compared to other surgical specialties.

African American Representation

Figure 1 reports the representation of African Americans at each level of training. African Americans are underrepresented as otolaryngology residents and faculty as compared to representation in the general population. Otolaryngology had the lowest representation of African-American residents and faculty when compared to all surgical specialties. There was a significant decrease in the proportion of African Americans who applied to otolaryngology as compared with the proportion of African Americans in the otolaryngology residency class in 2016 (P < .001). There was no significant difference between the proportion of African-American medical school graduates and applicants to otolaryngology. African Americans represented 5.56% of medical school graduates, 5.73% of otolaryngology applicants, but only 2.10% of otolaryngology residents. No other demographic group experienced a significant drop between otolaryngology applicants and otolaryngology residents. Since 2010, there has been a decrease in African American representation in residency programs but this was not found to be

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<th>TABLE I. Resident Representation in 2016 in Otolaryngology versus Other Surgical Specialties.</th>
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significant \((P = .09)\). This is the only minority group that has experienced a decrease in representation at the resident level.

**Asian Representation**

Figure 2 reports the representation of Asians at each level of training.

Asians remain overrepresented in otolaryngology residency programs (23.44%) as compared to the general population (5.20%). The proportion of Asian residents was second highest in otolaryngology at 23.44%, only barely surpassed by neurosurgery at 23.70%. Since 2010, there has been a small increase in Asian representation in the otolaryngology resident pool. Despite high Asian representation in otolaryngology residency programs (23.44%), this representation did decrease significantly at the faculty level (17.04%). The percentage of Asian faculty in otolaryngology was higher than all surgical specialties.

**Caucasian Representation**

Figure 3 reports the representation of Caucasians at each level of training. Caucasians are underrepresented in otolaryngology at all levels of otolaryngology as compared to their proportion of the general United States population. There was a significant increase in the proportion of Caucasians who applied to otolaryngology as compared with the proportion of Caucasians in the otolaryngology residency class in 2016 \((P < .001)\).

**Hispanic Representation**

Figure 4 reports the representation of Hispanics at each level of training.

Hispanics are underrepresented in otolaryngology at all levels of otolaryngology as compared to their proportion of the general population. There is no significant difference between the representation of Hispanics as medical school graduates, otolaryngology applicants, and otolaryngology residents. There was a decline in the proportion of Hispanic otolaryngology residents as compared with the proportion of Hispanic otolaryngology faculty but this difference was not significant \((P = .05)\). The two surgical specialties that fared worse than otolaryngology in regard to Hispanic representation at the resident level (5.52%) were orthopedic surgery (5.45%) and urology (5.41%). These differences were not significant. There was
a significant difference when comparing Hispanic representation in otolaryngology residency to general surgery (8.42%) and obstetrics and gynecology (9.84%; \( P < .001 \)). The percentage of Hispanics significantly declined from the resident (5.52%) to the faculty (2.91%) level.

**American Indian/Alaskan Native/Native Hawaiian/Pacific Islander Representation**

Analysis was not done on neither the American Indian/Alaskan Native nor the Native Hawaiian/Pacific Islander groups because the numbers were too low to extract meaningful data. For context, there were three AI/AN otolaryngology residents and one NH/PI otolaryngology resident in 2016.

**Female Representation**

Figure 5 reports the representation of women at each level of training.

Women are underrepresented at all levels of otolaryngology as compared to their level of representation in the general population. There was a smaller proportion of female applicants to otolaryngology than that of medical school graduates (\( P < .001 \)). Women represented 47.36% of medical school graduates but only 34.7% of otolaryngology applicants and 34.7% of otolaryngology residents. No other demographic group experienced a significant drop between medical school graduates and otolaryngology applicants. Otolaryngology had the highest proportion of female residents of the surgical subspecialties, but was lower than general surgery and obstetrics and gynecology. Otolaryngology had the second highest percentage of female faculty (32.21%) after obstetrics and gynecology (63.5%).

Table II shows the raw data for all groups evaluated.

**DISCUSSION**

The evidence that increasing diversity in medicine is necessary is abundant. Improved patient care outcomes are arguably the most important benefit of a diverse physician workforce but the list is long.\(^2\)\(^-\)\(^7\) In 2004, the AAMC defined underrepresented in medicine (URM) as “those racial and ethnic populations that are underrepresented in the medical profession relative to their numbers in the general population.”\(^1\)\(^7\) This includes African Americans, Hispanics, American Indian/Alaskan Natives, and Native Hawaiian/Pacific Islanders. Otolaryngology historically has fallen behind other medical and surgical specialties in regards to representation of URM.

The percentage of women in medicine has steadily increased. The year 2017 was the first year that the number of women enrolled in US medical schools (50.7%) exceeded the number of men.\(^8\) However, this increase in women in medicine as a whole has not directly translated to an increase of women in surgical subspecialties. Historically, the percentage of women in otolaryngology has been high as compared to other surgical subspecialties but women remain underrepresented as compared to their percentage of the US population. Increasing the number of women in surgery is important because it positively influences health outcomes.\(^1\)\(^9\),\(^2\)\(^0\) There have also been preliminary studies reporting improved postoperative outcomes of patients treated by female surgeons.\(^2\)\(^0\) Research to elucidate if health outcomes in the field of otolaryngology are improved by increasing women representation may be helpful.

Our analysis of diversity based on race, ethnicity, and sex in otolaryngology revealed that racial and ethnic minorities as well as women are currently significantly underrepresented in the field of otolaryngology as compared to the overall US population and medical school graduates. Comparing this data to the results of the otolaryngology diversity study in 2010 demonstrates that there has not been a significant increase in diversity based on race, ethnicity or sex since that time. Hispanics and African Americans seem to be the most underrepresented.

| TABLE II. 2016 Demographic Distribution by Sex, Ethnicity, and Race of the US Population, US Medical School Graduates, and Otolaryngology Residency Applicants, Residents, and Faculty. |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                 | White           | African American| Asian           | Hispanic        | Male            | Female          | Total           |
| US Census\(^1\) | (73.3)          | (12.6)          | (5.2)           | (17.3)          | (49.2)          | (50.8)          | (19259)         |
| US Medical school graduates | 10932 (56.8) | 1071 (5.6) | 4038 (21.0) | 978 (5.1) | 10137 (52.6) | 9122 (47.4) | 19259         |
| Otolaryngology applicants | 280 (55.2) | 29 (5.7) | 105 (20.7) | 24 (4.7) | 338 (66.7) | 169 (33.3) | 507            |
| Otolaryngology residents | 1017 (66.8) | 32 (2.1) | 357 (23.4) | 84 (5.5) | 995 (65.3) | 528 (34.7) | 1523           |
| Otolaryngology faculty | 1536 (69.8) | 52 (2.4) | 375 (17.0) | 64 (2.9) | 1492 (67.8) | 709 (32.2) | 2201           |

Data are numbers of individuals. Numbers in parentheses are percentages. Percentages were rounded.

\(^1\)Raw numbers were not included for US Census Bureau data since they were estimates extrapolated from 2010 data.
at all levels of training as compared to the US population. Women have experienced some growth since 2010 but this increase is not significant ($P = .25$). The number of Asians in otolaryngology is high as compared to the US population and continues to grow.

This study reveals that for women in otolaryngology, there is a decline from the proportion of female medical school graduates to the proportion of female otolaryngology applicants. This represents a continued opportunity to capture a proportion of women in otolaryngology that is more consistent with the population of women in medical schools and in the general population. There are numerous reasons that women may not be as interested in surgical specialties including interest and preference, but another reason may be because of concerns about work-life balance. Perhaps this is not insurmountable—obstetrics and gynecology, which is considered to be a specialty with long and unpredictable hours, has attracted a large number of women to the field, and is struggling with underrepresentation of men in the field. Males now make up only 17.3% of residents in obstetrics and gynecology. However, the patient population is mostly women. Interestingly, despite a decline in the number of males in obstetrics and gynecology, women remain underrepresented in academic departmental leadership roles. Regardless, additional efforts to excite interest in otolaryngology among women in medical school should be made.

There have been many theories as to why the number of underrepresented minorities in surgical subspecialties is low. One reason that has been posited is interest is lost at the medical school level due to lack of exposure and mentorship. Our findings seem to challenge that hypothesis. Our data reveals that African Americans are applying to otolaryngology at a proportion similar to their representation in medical school. However, there is a significant drop in the proportion of African Americans who apply to otolaryngology residency versus those enrolled in residency ($P < .0001$). Additional research as to why this occurs would be insightful. Avoiding unconscious bias when making judgments and decisions about patients is being integrated into the medical school curriculum. It may be beneficial to investigate this type of training for faculty to determine if it could have an impact on resident selection. If qualified women and minorities are overlooked, their educational and career opportunities can be negatively affected. Mentored clerkship is one method that has been investigated to avoid these consequences.

In 2009, Johns Hopkins Department of Otolaryngology set up a mentored clerkship for URM interested in otolaryngology with the ultimate goal of increasing diversity within the field of otolaryngology. The clerkship allowed minority students to be more involved clinically, set up otolaryngology-focused research projects and benefit from individualized mentorship. This program proved to be successful with six out of seven students applying to otolaryngology and matching. Programs like these are valuable because it not only increases interest in the specialty but also increases the likelihood of matching into otolaryngology for these groups.

Newsome et al. recently published a report on diversity in otolaryngology residency by surveying program directors. Only one third of the 30% of program directors surveyed had matriculated an URM in their program in the last 15 years. Matriculation of an URM into the program was more likely to occur if there was a minority faculty member in the program. While mentorship is important, this study hints that advocacy during the interview process may be just as important in increasing the number of minority residents within otolaryngology. However, minority advocates are more likely to exist if we are able to increase minority representation at the faculty level.

Our analysis is limited in that groups were mainly compared at only 1 year, 2016. It is important to realize that otolaryngology applicants in 2016 would not become residents until 2017 so the years are not congruent. Although manuscript data was only presented from one year, data was collected from multiple years and there were not significant changes in percentages from year to year. Additional limitations of this study include that the AAMC and JAMA data used from this study are mostly compiled from self-reported demographic information. AI/AN/NH/PI individuals, individuals with multiple races or other, and those who chose not to respond were not included in our analysis. The present study did not examine differences in the otolaryngology pipeline across time but data was compared to the study published in 2010.

CONCLUSION

The data presented indicates otolaryngology is slowly progressing in representation of minorities and women. Further efforts to improve the diversity of the physician workforce should continue to help our specialty match more closely with the racial, ethnic, and gender composition of a changing country. When implementing diversity initiatives, consideration should be given to different levels of training depending on the population being targeted.

BIBLIOGRAPHY


