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The climb to break the glass ceiling in surgery: trends in women progressing from medical school to surgical training and academic leadership from 1994 to 2015

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Abstract

BACKGROUND: There have been many efforts to increase the number of women surgeons. We provide an update of women surgeon representation along the pathway to surgical academia.

METHODS: Data was extracted from Association of American Medical Colleges FACTS and Faculty Administrative Management Online User System as well as GME annual reports starting in 1994 until the last year available for each.

RESULTS: The proportion of graduating women medical students has increased on average .5% per year from 1994 to 2014. Women general surgery trainees have more than doubled in number over the same period but represented 38.3% of all general surgery trainees in 2014. Women Full Professors increased on average .3% from 1994 to 2015 but still make up less than 10% of all Full Professors.

CONCLUSIONS: Despite improvements over the past 20 years, there are still large gender gaps in surgery for trainees and academic leadership. At the current rate of increase, women Full Professors will not achieve gender parity until in 2136.

Since 2005, the number of women entering medical school has been nearly equal to that of men. Yet, the number and percent of women in surgical training and academic leadership positions remain low. Over the past 30 years, there have been multiple efforts to increase the number of women in surgery and to evaluate why women continue to be underrepresented in academic leadership positions compared with their male counterparts.[1–3] Among the many reasons cited for the gender gap, common themes include gender discrimination, lack of visible role models, lack of support and mentorship throughout their careers, difference in salary, and lifestyle concerns.[4–10] This issue has garnered significant attention, not only in the medical literature but also more recently in the public domain through mainstream and social media campaigns.[11]

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Although there have been some reports that have characterized national trends of women's involvement in the surgical profession,[4,5,12–14] there have been none in nearly a decade and none that have included surgical subspecialties in their analysis. Given an increased focus on gender disparity in surgery, we sought to provide an update of women surgeon representation along each step of the pathway to surgical academia. In addition, we provide the first detailed analysis of the trends of women in surgical subspecialty training over the same period.

Methods

Data in this manuscript were extracted from several different sources. The number and gender of graduates from US medical schools were collected through Association of American Medical Colleges FACTS, a centralized database administered by the Association of American Medical Colleges that collects demographics and numbers of applicants, matriculates, enrollees, and graduates of US medical schools each year.[15] The number and gender of surgery trainees were extracted from Graduate Medical Education (GME) reports published yearly in the Journal of American Medical Association from 1994 to 2014. Percent of women in each phase of training was calculated when raw numbers of men and women were available. We included only surgical subspecialties that are accessible through the general surgery track: colorectal, pediatric, critical care, thoracic, and vascular. Data on the number of integrated vascular surgery trainees were first reported in 2007. From 2007 onward, the number of vascular trainees who were women was calculated as the sum of women vascular surgery residents within the general surgery track and the integrated vascular surgery track combined. Similarly, the number of integrated thoracic surgery trainees was first reported in 2008. From 2008 onward, the number of thoracic surgery trainees who were women was calculated as the sum of women thoracic surgery residents within the general surgery track and the integrated thoracic surgery track combined. Recent reports have included data for complex general surgical oncology but not for a long enough period of time to include in our trends analysis.

The number and gender of US medical school surgery faculty were obtained through Faculty Administrative Management Online User System from 1994 to 2015.[16] Department is specified for surgery as a whole and does not include detail on subspecialties identified in GME reports such as colorectal, pediatric, critical care, vascular, and thoracic surgery.

Statistical trend tests were performed using *t*-test and chi squared wherever appropriate with STATA v13.1. Linear regression was performed of the proportion of women medical school graduates, surgical trainees, and surgical faculty over each year in our analysis to obtain the average percent change per year as measured from the slope of the equation. This analysis was performed using Microsoft Excel (Microsoft, Redmond, WA). Statistical significance was set at $P < .05$ for all tests.

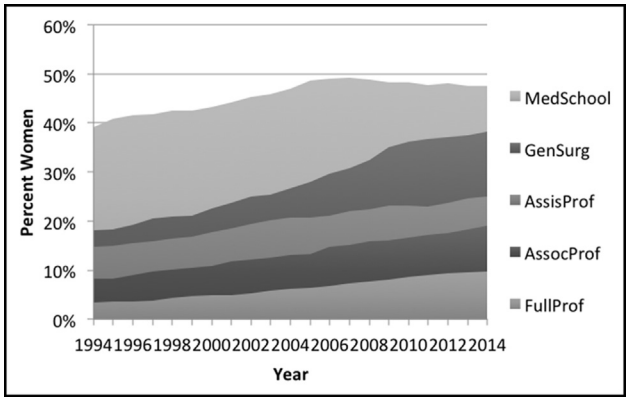

Figure 1 Trends over time of the proportion of women along the pipeline to becoming a leader in academic surgery.

This study was submitted to the Institutional Review Board at Weill Cornell Medicine (protocol no. 1601016879) and was deemed exempt.

Results

Medical students

The total number of graduating medical students increased 17.8% from 1994 to 2014 (15,883 vs 18,705), whereas the number of women graduating from medical school increased 43.0% over the same time period (6,228 vs 8,907). The proportion of women graduating from medical school increased on average .5% per year from 1994 to 2014, although since 2004, the proportion has been relatively stable (range 47.0% to 49.3%).

Surgery trainees

The number of general surgery trainees decreased slightly (2.1%) over the study period (8,217 vs 8,043 residents). During the same period however, the number of women trainees in general surgery more than doubled from 1,492 to 3,082 and the proportion of general surgery trainees increased on average 1.1% increase per year.

There was a wide range in change in number of total Accreditation Council for Graduate Medical Education (ACGME) general surgery and surgical subspecialty positions during our study period (Supplementary Table 1). Unfortunately, we do not have data on non-ACGME accredited or other nonaccredited fellowships. However, we do note that there were significant increases in the absolute number and proportion of women trainees in a variety of surgical subspecialties. The highest average increase per year was seen in critical care (1.4%), colorectal (1.3%), and