

Is There Still a Glass Ceiling for Women in Academic Surgery?

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Despite the dramatically increased entry of women into general surgery and surgical subspecialties, traditionally male-dominated fields, there remains a gross under-representation of women in the leadership positions of these departments. Women begin their careers with fewer academic resources and tend to progress through the ranks slower than men. Female surgeons also receive significantly lower salaries than their male counterparts and are more vulnerable to discrimination, both obvious and covert. Although some argue that female surgeons tend to choose their families over careers, studies have actually shown that women are as eager as men to assume leadership positions, are equally qualified for these positions as men, and are as good as men at leadership tasks.

Three major constraints contribute to the glass-ceiling phenomenon: traditional gender roles, manifestations of sexism in the medical environment, and lack of effective mentors. Gender roles contribute to unconscious assumptions that have little to do with actual knowledge and abilities of an individual and they negatively influence decision-making when it comes to promotions. Sexism has many forms, from subtle to explicit forms, and some studies show that far more women report being discriminated against than do men. There is a lack of same-sex mentors and role models for women in academic surgery, thereby isolating female academicians further. This review summarizes the manifestation of the glass-ceiling phenomenon, identifies some causes of these inequalities, and proposes different strategies for continuing the advancement of women in academic surgery and to shatter the glass ceiling.

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The term “glass ceiling” is a metaphor for the observation that despite increased entry of women into the fields traditionally held by men, their advancement into the most prestigious, highest-paying, and leadership positions is still limited.^{1,2} Although there are no obvious barriers or obstacles to impede women from climbing the academic or corporate ladder, it has been suggested that the “old boy’s club” mentality persists to date and promotes organizational cultures that favor men by excluding women from networking and mentoring.³ The glass-ceiling phenomenon is observed not only in medical professions, but also in most traditional male careers, such as dentistry, law, and business management.³ Even though, women make up more than 50% of the management and professional occupations, they hold only 16% of the top executive positions in the nation’s largest corporations.^{3,4} The term “sticky floor” is a more recent, supplemental term used to describe a phenomenon in academic medicine where

fewer women are promoted and/or given institutional resources at the start of their careers.^{1,5}

The number of women enrolled in US allopathic medical schools has increased from 10% in 1970 to nearly 50% today.^{6,7} In 2005, 49% of medical school graduates and 43% of residents were female.⁸ Women have also been entering academic medicine as faculty members in numbers equal to their male counterparts for several decades.⁹ In fact, the percentage of female faculty at medical schools in the United States has doubled over the last 3 decades, increasing from 13% in 1967 to 27% in 1992.¹⁰ Currently, 25% of practicing physicians in the United States are women, and they make up 34% of full-time faculty members of medical schools.^{6,7} However, women are grossly underrepresented in positions of power and leadership in academic medicine. For example, only 6% of departments were headed by women in 1998, and there were only 6 women deans at US colleges of medicine in 1992.¹⁰ Today, only 12% of female clinical faculty members as compared to 29% of male clinical faculty are full professors. Only 19% of tenured professors, 17% of full professors, 12% of department chairs, and 11% (14 out of 125) of medical school deans in US academic centers are women.^{6,11,12} Although this represents a slight improvement from almost 2 decades ago, it seems that the glass ceiling is far from being shattered (Table 1, Fig. 1).

Similar patterns have been observed in other countries as well. In Spain, for example, 1 study found that although gender distribution was similar for entry-level faculty members, the proportion of women decreased precipitously as the ranks increased, and only 4% to 6% of department leaders were females.¹³ A similar situation exists in Australia and New Zealand, where a very small pool of female senior faculty members exist despite an increase in female medical students and instructors from 1981 to 2005, mainly due to problems with retention.¹⁴

This global observation may be due to deeply embedded unconscious gender-based assumptions that stall the advancement of women.¹ Other disadvantages women face in academic medicine are a scarcity of female role models and extra challenges negotiating for critical resources such as salary, laboratory space, and recognition.¹⁵ Clinical and training demands also disproportionately affect women because of their family responsibilities. With a particular focus on surgical fields, this review summarizes recent findings on gender disparities, explores persistent barriers to the academic advancement of women, and outlines strategies to insure that general surgery and its subspecialties attract, develop, and retain the talent it needs, female and male, to retain it as an attractive, competitive, and excellent field.

EXISTING DISPARITIES

Despite the influx of women into academic medicine over the past 3 decades, there has not been equality for male and female faculty in terms of rank attainment, leadership roles, salaries, and treatment by colleagues or superiors. Female medical school faculty has not advanced to senior academic rank and leadership positions in proportion to their numbers.^{1,5,7,9,10,16–21} Women continue to begin their careers with fewer academic resources and tend to progress through the ranks slower than men.^{5,9,22} Even after adjusting for number of publications, amount of grant support, tenure versus other career track,

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TABLE 1. Men and Women in Academic Medicine (2007–2008)*

	Medical School		Residency Resident†	Faculty (Professorship)				Leadership	
	Matriculates	Graduates		Assistant	Associate	Full	Tenured	Department Head	Dean
Men	51.7	50.6	55.4	59.0	71.0	82.7	81.0	88.1	88.8
Women	48.3	49.4	44.6	41.0	29.0	17.3	19.0	11.9	11.2

*Data obtained from Women in US Academic Medicine Statistics 2007–2008, Summary at www.aamc.org. All values represent percent of men and women.

†Total residents in all specialties.

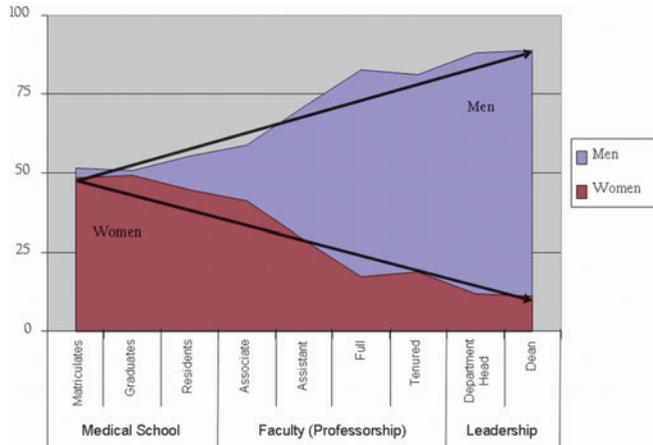


FIGURE 1. Despite nearly equal male and female matriculates and graduates of U.S. allopathic medical schools, the proportion of female representation decreases proportionally to the height of the academic ladder.

number of hours worked, and specialty, women remained substantially less likely than men to be promoted.^{5,18,20,23} Within academic medicine where research-based faculty tracks alone lead to top leadership, women are more likely to be clinicians and educators and more likely to assume the tasks that have been referred to as “institutional housekeeping.”^{5,22} Minority women faculty are the most vulnerable group to inequalities, experiencing a larger deficit in their salary and an even lower likelihood to be promoted not explainable by seniority or productivity.⁹

Wright et al²² found that at a large university hospital, the distribution of male and female faculty members differed significantly according to their rank and track. Women were predominantly in the nontenure track positions at the assistant professor level (49%), whereas more than half of the men (55%) were associate or full professors and/or tenured. The average time to promotion was 6.5 years for women and 5.2 years for men ($P < 0.05$).²² Women reported having less power and influence in their departments, such as decision-making authority over promotion of colleagues or over non-grant-related resources.²² Despite having no difference in self-assessed leadership ability or aspirations to hold leadership positions between the genders, women were significantly less likely than men to have been asked to serve in leadership roles (6% vs 25%).²² Not surprisingly, yet regrettably, women were more likely to feel discriminated against than men (33% vs 5%).²²

Ash et al used questionnaires to survey 1814 faculty members from 24 randomly selected US medical schools and found similar discrepancies. After logistic models were used to account for such confounding factors as total career publications, years of seniority,

hours worked per week, department type, minority status, medical versus nonmedical final degree, and school, large deficits in rank for senior faculty women still persisted.⁹ Each additional year of seniority was of significantly less value to women than to men in improving their chances of becoming full professor.⁹

Women physicians also receive lower salaries than their male counterparts.^{4,9,19,22,24,25} In 2000, women physicians earned 63 cents for every dollar earned by male physicians.²⁶ One study found that women earned 11% (\$12,777) less than men after adjusting for other factors, which increased with rank, so that female full professors earned \$23,764 less than men of the same rank.²² Another study found that female physicians received nearly \$12,000 less than male physicians, with the biggest differences in minority female faculty.⁹ According to yet another study, 55% of women, compared with 42% of men, practiced in the 3 lowest-paying specialties in medicine—pediatrics, general practice, and internal medicine.²⁷ On the contrary, only 14% of women physicians worked in the 4 highest-paying fields—radiology, general surgery, anesthesiology, and subspecialty surgery—compared with 27% of men.²⁷

Another key position of influence and academic growth within medicine is to serve as a principal investigator of a larger center grant. The percentage of female principal investigator for National Institute of Health (NIH) grants has only increased slightly between 1994 and 2004 (20.2% to 24.6%). In addition, female investigators on average receive smaller grants. The Clinical and Translational Science Award program is one of the largest center grants in research history. Although 25% of all R01 applicants to NIH are female and 23% of all funded grants go to women investigators, only 3 (12.5%) of the first 25 Clinical and Translational Science Awards went to women.²⁸ In fact, the NIH itself is vulnerable to perpetuating the glass ceiling given the gender makeup of its leadership. In 2006, only 20% of NIH Institutes were headed by women, and those units with women leaders received smaller budget increases, on average, than male-headed units.²⁹ These studies combined seem to reaffirm the perception that academic medicine is not gender-blind and that that the road to academic success in the medical fields is more challenging for women than for men.

The unequal numbers of female and male representation is most pervasive in the field of surgery across all levels. These disproportionate statistics are not lost to the keen intellect of our brightest medical students. Lillemoe et al³⁰ performed a survey of 105 medical students and found that 96% of women saw surgery as “unfavorable” to their gender, whereas no male students claimed that surgery was unfavorable to his gender. Among the reasons female students had for rejecting surgery were negative attitudes of surgeons, lack of female mentors, male bias, competition, and life-style incompatibility.^{3,31} Therefore, women begin medical school being less interested in a surgical discipline than men, tend to lose interest during the course of medical more than men, and are less likely to develop new interest in surgery during medical school than men.^{32,33} Over time, the field of surgery and its subspecialties are failing to capture a significant

pool of talent because of these negative perceptions. In 2006, only 15% of general surgery attending physicians and only 28% of general surgery residents were women.⁶ These numbers are lowest among all major specialties, and surgical subspecialties such as urology, neurosurgery, and orthopedic surgery have even fewer female residents.^{6,33} The perception of disparity gets significantly magnified, as young female medical students evaluate the stark odds of successful rise to leadership roles within surgery. Today, only Dr Nancy Ascher at the University of California, San Francisco, Dr Julie Freischlag at the Johns Hopkins University, and Dr Barbara Lee Bass at the Methodist Hospital in Houston, Texas, are chairpersons of university surgical departments in our nation's 125 allopathic medical schools.³

POSSIBLE EXPLANATIONS THAT DISMISS THE GLASS-CEILING EFFECT

Several potential explanations other than the glass-ceiling effect have traditionally been used to explain women's slow progression up the academic ladder. One argument is the pipeline effect, which refers to the insufficient number of women that have been in academia long enough to have reached the rank of full professor.²² However, analyses of gender differences in rank have not supported this hypothesis.^{5,16} For example, even in fields such as obstetrics/gynecology, pediatrics, and psychiatry where women have captured at least 50% of the positions for the past 25 years, they have been underrepresented in leadership positions (only 20% of full professors and 10% of department chairs) for over a decade.³⁴ Another commonly used explanation for the absence of female physicians in academic leadership is women's lack of requisite innate leadership skills. This hypothesis has been poorly substantiated, as formal studies on the subject suggest that women may in fact be more effective leaders than men.^{35,36} A third potential explanation is that women may be less serious about their careers than men and are therefore less productive.³⁷⁻³⁹ Objective measures of one's productivity include the publication of original research in prominent journals and invitations by editors to provide scientific opinions on the published research of others.⁷ Studies have shown that when stratified by rank and track, there are no gender differences in peer-reviewed publications.²² The proportion of women as first authors and senior authors both have increased in recent years, although interestingly, when examining some specific journals, this increase is most sharp for *Obstetrics & Gynecology* and *Journal of Pediatrics* but remained low in *Annals of Surgery*.⁷ In addition to an increase in the number of publications by female researchers, there is evidence to suggest that the quality of work produced by women is as good, if not superior to those of men, as reflected by the frequency with which female authors are cited.⁴⁰ Housri et al attempted to examine the quality of publications by female authors by comparing abstracts presented at annual meetings of the Association of Academic Surgery and the Society of University Surgeons. By doing so, they compare men and women with similar career paths.⁴⁰ They found that of the Association of Academic Surgery abstracts, the publication rate for male authors was significantly lower than that of women (52.4% vs 68.5%). The average citations between the two genders were not significantly different.⁴⁰ On the contrary, the Society of University Surgeons abstracts with female authors were published in journals with higher impact factors.⁴⁰ Therefore, it seems that across all major medical fields, women are publishing more papers, as medical students, residents, and faculty. In addition, these papers authored by women exhibit high scientific merit when judged by objective measures of peer citations and journal impact factor. However, despite this increase in academic productivity, women remain underrepresented on editorial boards of major medical journals.⁴¹

PERSISTENT BARRIERS THAT CONTRIBUTE TO THE GLASS-CEILING EFFECT

The stalled advancement of female physicians to leadership positions despite the increasing pool from which to choose these leaders and their growing productivity and desire to lead can be explained by several persistent obstacles. Yedidia and Bickel conducted a study interviewing clinical department chairs with extensive leadership experience to delve into the reasons for these barriers. The chairpersons identified 3 major constraints that contribute to the glass ceiling: traditional gender roles, manifestations of sexism in the medical environment, and lack of effective mentors.²³

GENDER ROLES

Social psychological research has found that apart from explicit discrimination (discussed later), there are unconscious assumption about traits and behaviors of men and women. These biases form prescriptive gender norms and are applied in decision-making.³⁶ These norms emanate from the social roles historically occupied by men and women and have little to do with the actual knowledge and abilities of an individual.¹ Women are viewed as having more communal traits, which include being dependent, nurturing, and submissive, whereas men are viewed as having more agentic traits, which include being strong, action-oriented, and independent.⁴² Fields in which women predominate and where communal behaviors are valued (childcare, social work, and nursing) have lower salaries and less prestige than fields in which men predominate (engineering and surgery).¹ Therefore, socialization patterns for women are less likely to encourage them to engage in behaviors that are conducive to moving up the professional ladder.

Traditional gender roles impose on women the major share of family duties that may constrain the progression of female surgeons in many ways. Women bear primary responsibility for childcare and housework, and dealing with competing time pressures of professional productivity and family care negatively affect women.¹ Because of family attachments, many women have limited geographic mobility which is often necessary for advancement.²² Women's roles in the family may preclude them from devoting essential time and energies to achieving milestones that are essential for promotion.⁴³⁻⁴⁵ In fact, most men have acknowledged the extent to which their own career advancement depended upon sacrifices on the part of their wives.²³ Although it is encouraging that some recent studies have suggested that balancing work and other pursuits are just as important to men, at least among younger physicians,^{46,47} many strides still need to be taken to improve the gender disparity that is pervasive in academic medicine.

Difficulties in reconciling and balancing work and family responsibilities are also more pronounced in surgical specialties, as they require a greater time commitments during and after training. The most stressful time for a woman surgeon is during the years of residency training, which presents a clash, as this is the optimal childbearing age for most women,⁴⁸ and only 16% of US programs make concessions for their new family needs.³ Longo et al surveyed 100 women surgeons and found that 53 held full-time university positions on surgical teaching services for a portion of their career. When faced with the prospect of juggling a career and parenting children, these highly skilled women are delaying motherhood or skipping it.⁴⁹ In fact, more than one fourth of the 40-year-old college-educated women in the study have not yet had a child, and those that have had children average 1.6 children each, which is lower than the typical 2.1 children per American household.³ Women who are married with children relate that their family has slowed the progression of their careers. In addition, women without children averaged 95% of men's wages, whereas women with children averaged only 75% of men's

wages.³ Female were twice as likely as men to leave academia due to family responsibilities.³⁹ Most of the respondents of the study have remained single and have stated that they had abandoned any hope of having a conventional family life.³ Some female surgeons, in hopes to find time for child-rearing and family activities, have changed the focus of their practice to surgical subspecialties that have limited emergencies and night-time duties.³ In fact, women are more dissatisfied with their time commitment to their careers than their male counterparts, and more often consider part-time and other academic flexibilities beneficial.⁵⁰

SEXUAL AND GENDER DISCRIMINATION

Although most female and male surgeons do not openly acknowledge it, gender-based sexual harassment is highly prevalent in the surgical field.^{51–54} Sexism has many forms, ranging from inappropriate sexual bantering to flirtation and sexual advances to pressuring women to participate in sexual relationships. Gender discrimination is a subtle but equally harmful version of sexism. It can have detrimental effects on career advancement and satisfaction, as females who experience discrimination have lower levels of career satisfaction.^{22,55} Some studies show that far more women reported being discriminated against than did men.²² Many women ranked discrimination number 1 on a list of factors that hindered their academic career.⁵⁵ In addition, significantly more female faculty mentioned instances of sexual harassment in comparison to male faculty.⁴⁴ One study found that as much as 30% of women faculty in one academic medical center perceived that they had been denigrated and 25% observed other women denigrated by male faculty on the basis of gender.⁵⁶ Another study found that 63% of women surgeons reported that they were demeaned, 29% felt they were the object of inappropriate sexist remarks or advances, and 42% related the presence of sexual bias and discrimination against women by the male power structure in surgery and even by some nursing personnel.³ Even those women who were able to rise in academic medicine endured sex-related stress. The resignation of Dr Frances Conley from Stanford Medical School, the only female neurosurgeon in her department, brought to public notice what she referred to as “demeaning actions and words for 25 years.”⁵⁷ One explanation for why the medical field is infiltrated with sexist attitudes is the rigid educational hierarchy combined with the traditional inequality between doctors and nurses, which sets the tone for other power-imbalanced working relationships.⁵⁷

Unfortunately, gender discrimination is not limited to women faculty. Nora et al⁵⁸ found that both male and female students had experienced gender discrimination and sexual harassment, with the problem being most severe in general surgery. Lillemoet et al⁵⁰ found that more than half of female students (54%) reported some form of sexual harassment during their surgery rotation.

Other than outright gender discrimination and sexual harassment, there exists a slightly more veiled manifestation of sexism characterized by the omission of women in routing interactions among faculty. For example, important information related to job opportunities, negotiations, and organizational politics exchanged in settings into which women are seldom invited, such as golf courses, locker rooms, and exclusive clubs.²³ Many female surgeons reflected that the men seemed to have a “glue” that goes beyond work, and this, combined with the fact that being leader in a department requires having such a network of connections, puts the woman at a marked disadvantage. One recent study shows that male surgeons more commonly perceived academic surgery to be unfavorable for women than did female surgeons.⁵⁹ Also, an inclination exists to question a woman’s dedication to her career, for example, the decision to have a child may imply to some leaders less commitment to the academic community. Sexism also hinders women once they are on the job,

as men are often reluctant to be supervised by women and women are offered less support from ancillary staff.²³ Women surgeons in non–university settings often note the reluctance of male physicians to refer patients requiring a surgical consultation to them.³

Trix and Psenka⁵⁷ examined more than 300 recommendation letters for medical faculty at a large US medical school in the mid-1990s to identify subtle biases that women experience in the academic world. They found that letters written for female applicants were significantly shorter than those written for male applicants. Also, letters for female applicants often lacked basic features such as commitment and relationship of recommender to applicant and evaluation or comparison of traits and accomplishments by the applicant ($P = 0.021$).⁵⁷ In addition, letters for women applicants had a higher percentage of doubt raisers, such as negative language, and were significantly less frequent in the mentioning of status terms ($P = 0.01$).⁵⁷ Finally, and perhaps most subtly but importantly, the most common semantically grouped possessive phrases for women were “her teaching,” and “her application (for the position),” whereas those for male applicants were “his research,” “his skills and abilities,” and “his career,” reinforcing gender schema that tend to portray women as teachers and students, and men as researchers and professionals.⁵⁷

SCARCE MENTORSHIP

Effective mentors have many roles in the advancement of their mentees: they can act as role models, are a source of professional advice and training guidance, provide an existing network of contacts, and can facilitate career advancement opportunities.^{14,23,60} Mentors can validate the difficulties women face in their academic careers, offer specific strategies for balancing family and career commitments, and protect women from pressures of accepting less rewarding roles in academia.

There is a lack of same-sex mentors and role models for women in both academic surgery and medicine.^{14,38,61} For example, one study found that male medical students were significantly more likely to find a mentor of their same gender in the field of surgery.³³ This may be in part due to the fact that some women lack initiative in finding a mentor, whereas mentors believe that it is the mentee’s responsibility to take the first step. In fact, one study showed that women were less willing to ask for advice than men, especially when it comes to issues that concern only women.⁶² Although most women have had male surgical mentors, it is important to recognize that female surgical mentors will have an improved understanding of unique matters to the female gender in comparison to their male counterparts. This situation is unfortunate, as successful women are often affected by their mentors in a positive manner and are likely to select surgery as a career if there was increased exposure to female surgical faculty.⁶³ Conversely, the scarcity of women in senior positions inevitably means that their individual and collective opinions are less likely to be voiced in policy and decision-making processes, and subsequently younger women will not be encouraged or motivated to achieve top careers in medicine.

STRATEGIES FOR CONTINUED IMPROVEMENT

At each evaluation point, women experience systemic disadvantages.^{1,43,44,64} However, opportunities abound to address these obstacles at both the individual and the institutional levels (Table 2).

Constraints of traditional gender roles can be addressed by a multitude of tactics. Family construction can be altered to allow women more successful compliance with the existing demands of academic medicine, such as having children earlier in their careers, getting more help at home, and renegotiating division of family responsibilities among parents. It is important to counsel women on options for structuring home life to accommodate professional

TABLE 2. Interventions to Address the Glass Ceiling*

Barrier	Intervention
Constraints of traditional gender roles	Individual
	Young women may try to have children early in their careers
	Obtain help at home and renegotiate division of family responsibilities
	Advise women on avoiding inequitable share of assignments that are not rewarded in the tenure process
	Institution
	Schedule meetings at more workable times
Sexism and gender discrimination	Minimize nighttime calls for parents with young children
	Create part-time tenure-track positions
	Individual
	Leaders should serve as role models and set examples
	Publicly acknowledge one's blind spots to promote openness
	Speak up when confronted with offensive behavior
	Personally counsel colleagues who display unacceptable behavior
	Appoint committees who can be relied upon to take female candidates seriously
	Initiate proceedings to terminate employment for inappropriate behavior
	Institution
Assure that important department issues are not conducted in settings in which women are generally absent	
Establish workshops to sensitize colleagues to gender issues and set standards for acceptable and unacceptable behavior	
Educate students early on	
Set up formal and informal mechanisms for identifying and responding to inappropriate behavior	
Scarcity of mentors	Individual
	Appoint more women to leadership and senior positions
	Use visiting professorships to increase female role models
	Encourage men to rise to the occasion
	Encourage women to rely on multiple mentors to address distinct issues
	Institution
	Establish association of female faculty to use existing mentor resources efficiently
	Recruit mentors from nonmedical departments
Participate in regional and national networks to link mentors with junior faculty	

*Adapted from table in Yedidia JM and Bickel J.²³

activities, seek role models that demonstrate possibility of successfully balancing family and career, and avoiding inequitable share of assignments that are not rewarded in the tenure and promotion process.²³ At the institutional level, adjustments should be made to create a more hospitable environment for those heavily engaged in familial responsibilities. Whenever possible, meetings should be scheduled when everyone can attend, on-call schedules should minimize nighttime demands for parents of young children, and greater flexibility allowed for tenure-track positions, such as extending the probationary period before tenure decisions and creating a part-time tenure-track position.^{22,23}

Sexism also requires continuing individual and institutional interventions. Early education and spreading of positive attitudes should occur in medical schools and incoming medical students should be made aware of gender-related issues and expectations of how to deal with negative behavior. Individuals must serve as proper role models, setting expectations for colleagues and students, publicly acknowledge one's blind spots to promote openness to discuss them, speak up when confronted with offensive behavior, personally counsel colleagues who display unacceptable behaviors, and appoint committees that aggrieved parties can turn to without fear of retribution.^{3,23} From

the institutional point of view, it is important to conduct business in settings where women are generally present, establish workshops and programs designed to sensitize colleagues and students to gender-related issues, set standards of acceptable and unacceptable behaviors, and set up formal and informal mechanisms for identifying and responding to unacceptable behaviors.²³ Episodes of sexist behavior should be identified and explicitly labeled as inappropriate.

Mentorship must also be improved, because advancement in academic medicine is significantly enhanced by effective mentorships, as they play key roles in addressing barriers to advancement.²³ Mentors could deter young female faculty from the liabilities of taking on tasks that are associated more with staff than with leadership positions. Visiting professorships are effective in increasing the presence of female role models at various universities, and participation in regional and national networks designed to link mentors with junior faculty in a given field is also critical.²³ Finally, an updated view of leadership development is critical, including individuals with untraditional career trajectories.¹¹ A peer mentorship pilot program has been established at the Mayo Clinic, Scottsdale, where experienced female physicians acted as facilitators to a group of junior women who served as their own peer mentors.⁶⁵ The program was able to

increase academic activity in terms of publications and promotions in all participants.⁶⁵ Further studies and larger group of participants are necessary before final recommendations can be made. On a national scale, the association of Women Surgeons and American College of Surgeons have joined together and developed a mentoring program for women surgeons in the United States to help early career assistant professors achieve promotion and tenure. Each mentee submits a written statement identifying her professional goals and the information is used to match and facilitate introduction to senior female surgeons.

Changing gender-biased patterns and behaviors will require persistence, communication, and continuous monitoring of progress.²² Chairs accustomed to regular monitoring of salaries, track assignments, start-up packages, and promotions will become more accountable for positive outcomes.⁶⁶ Dean's offices might consider how to recognize and reward progress in the recruitment, promotion, retention, and advancement of female faculty members, for example, with start-up research funds.²² It is important for professional societies to provide women with an opportunity to acquire and develop leadership qualities and skills. The NIH also has supplemental programs to promote reentry of women into biomedical and behavioral research careers, as these may promote women's more equal participation in academic medicine.

CONCLUSION

Many generational changes have taken place in surgery over the past few decades, from the obvious work-hour limitations that are part of residency training today, to the gentler value sets of both male and female surgeons today compared to more traditional norms. In addition, women have recently been appointed as President of the American College of Surgeons, Chair of the American Board of Surgery, and member of the Board of Regents of the President of the American College of Surgeons. Although these value changes and anecdotal advancements of certain women academic surgeons are encouraging and exciting, the overall advancement of women in academic medicine as a group must also persevere, particularly in general surgery and its subspecialties. Women now account for almost 30% of board-certified practitioners and clearly have the potential and ability to thrive as surgeons and make a positive contribution to our field, and such negative influences such as institutional gender-biased politics, disparities in salary, lack of administrative and institutional support, conflicting family pressures, and lack of role models must be minimized.¹⁴ Therefore, although progress has been made, many other changes still need to be undertaken for surgery to capitalize on the growing female talent that populates our medical schools. The literature on these subjects is rich and indicates multiple actions that individuals and institutions can take to address what may be the most important "talent management" opportunity surgery has ever faced.

Simultaneously, female surgeons must continue to do their best, including earning participation on programmatic endeavors, generating fertile collaborations, seeking mentors, and understanding inherent subconscious biases within oneself and others rooted on traditional cultural norms that dictate unrealistic gender roles and hinder academic advancement. Women must think creatively about their options, transitioning to another institution when necessary, and being willing to ignore false humility and fully appreciate their own talent and potential. Despite the natural tendency for women to be reserved in the work environment, women must recognize the importance of maintaining a noticeable profile and participating in decision-making processes. A buffer against surgery-specific biases for women academic surgeons is to undertake collaborative projects with other colleagues and departments. Formal training may be required to learn

effective strategies for prioritizing and delegating, leading to successful management of work and family and successful career advancement.

A problem not acknowledged is a problem destined to remain unsolved. Surgery as a field must recognize the disparity that is abundantly chronicled in the literature and current statistics. All available data indicate that there is still a glass ceiling for women in academic medicine and that the glass may be thickest for women in academic surgery. There are strategies at the level of the individuals (both women and men) and the level of the institutions that can address and correct the problem. But to shatter this glass ceiling, all stakeholders must acknowledge its existence and recognize that allowing it to remain in place erodes our nation's competitive edge in the field of surgery, wastes human capital, and prevents improvement of health care for all.

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