

Women's Health and Women's Leadership in Academic Medicine: Hitting the Same Glass Ceiling?

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Abstract

The term "glass ceiling" refers to women's lack of advancement into leadership positions despite no visible barriers. The term has been applied to academic medicine for over a decade but has not previously been applied to the advancement of women's health. This paper discusses (1) the historical linking of the advances in women's health with women's leadership in academic medicine, (2) the slow progress of women into leadership in academic medicine, and (3) indicators that the advancement of women's health has stalled. We make the case that deeply embedded unconscious gender-based biases and assumptions underpin the stalled advancement of women on both fronts. We conclude with recommendations to promote progress beyond the apparent glass ceiling that is preventing further advancement of women's health and women leaders. We emphasize the need to move beyond "fixing the women" to a systemic, institutional approach that acknowledges and addresses the impact of unconscious, gender-linked biases that devalue and marginalize women and issues associated with women, such as their health.

Glass Ceiling: The Inability of Organizations to Advance Women into Top Decision-Making Positions

The term "glass ceiling" gained traction as an apt metaphor for the widespread observation that despite entry of women into nearly all fields traditionally occupied primarily by men, women remain virtually nonexistent or present in token numbers in elite leadership positions. Its first use is variably attributed to Marilyn Loden, author of *Implementing Diversity*, in a speech delivered in 1977 to the Women's Action Alliance in describing invisible barriers to women's career advancement; Gay Bryant in an *Adweek* article; Carol Hymowitz and Timothy Schellhardt in the *Wall Street Journal*, or Alice Sargent in an interview about her book, *The Androgenous Manager*.¹

Whatever its origins, the term "glass ceiling" became an established part of the career development lexicon when the Federal Glass Ceiling Commission was created by the Civil Rights Act of 1991 (Public Law 102-166), with a mandate to identify barriers that have prevented the advancement of women and minorities in the labor force.²

The first use of "glass ceiling" in reference to the status of women in academic medicine was by Nickerson et al.³ in a

study demonstrating comparable promotion rates for women and men at Columbia College of Physicians and Surgeons. Leah Dickstein⁴ cites numerous examples of both overt and subtle sexism in her own career advancement and decries the metaphorical ceiling preventing women from entering leadership in academic medicine as being made of Lexan, a material stronger and more difficult to shatter than glass. Tesch and Nattinger⁵ surveyed male and female physicians who began their first faculty appointment at the same time. They proposed "sticky floor" as a supplemental metaphor for women in academic medicine because in addition to finding that fewer women than men had been promoted, they also found that women had been given fewer institutional resources at the start of their career—hence, the sticky floor. As a woman who found herself in a midlevel leadership position in academic medicine, Carnes built on the glass ceiling metaphor in a 1995 editorial noting that as she stood just beneath the glass ceiling and looked through it, she could see no appealing role models in her institution because of the gendered differences in behavioral norms and social roles both inside and outside academic medicine.⁶

To our knowledge, the term "glass ceiling" has not previously been applied to the advancement of women's health.

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In this paper, we discuss (1) the historical linking of the advances in women's health with women's leadership in academic medicine, (2) the slow pace of progress of women into leadership in academic medicine, and (3) indicators that the advancement of women's health has stalled. We posit that it is the deeply embedded unconscious gender-based biases and assumptions that underpin the stalled advancement of women on both fronts. We conclude with recommendations to promote progress beyond the apparent glass ceiling that is preventing further advancement of women's health and women leaders. We emphasize the need to move beyond "fixing the women"⁷ to a systemic, institutional approach that acknowledges and addresses the impact of unconscious, gender-linked biases that devalue and marginalize women and issues associated with women, such as their health. The goal of such an approach is to create institutional environments that are able to use the talents of all faculty and a healthcare system responsive to the needs of all patients—men and women.

Women Leaders in Academic Medicine Linked to Advances in Women's Health

Women in academic medicine and women's health are linked in a number of ways. Perhaps the most striking evidence of the connection between the two is the consistent observation that when a lecture, conference, or seminar in an academic setting has "women's health" in the title, the organizers and attendees are overwhelmingly women. The appeal of participating in research to improve women's health for women physicians and scientists has, in fact, been strategically used to attract them to academic careers.^{8,9}

Throughout U.S. history, many advances in women's health have been led by women. As reviewed by Carol Weisman,¹⁰ past women's health movements initiated and sustained by women include (1) the Popular Health Movement in the early to mid-1800s (which included advocating corsetless clothing), (2) the post-Civil War women's medical movement, in which the first generation of female physicians were prominent participants advocating women's inherent health and vitality in opposition to the prevailing medical view of women as sickly and frail, (3) the Progressive Era in the early 1900s, during which the first birth control clinic was opened in Brooklyn by public health nurse and social activist Margaret Sanger, government-funded maternal and child health services were developed, and the Sheppard-Towner Maternity and Infancy Act of 1921 was passed (emblematic of the new political influence of women who gained the right to vote in 1920), and (4) the women's health movement of the 1960s and 1970s, a grassroots effort in which women's reproductive rights were viewed as essential to full gender equity, the prevailing assumptions and practices of mainstream medicine (controlled almost exclusively by male physicians) were challenged, and women's restricted admission to medical schools was effectively eliminated by enactment of Title IX of the Civil Rights Act in 1972. This set the stage for the most recent women's health movement occurring between approximately 1985 and 2000. (Before women were allowed entry into male-only medical schools, there were 16 women-only medical schools founded and run by women physicians. By 1910, all but 3 of these had closed or merged with traditional schools which led to a reduction in the number of women medical students from 6% in 1900 to 4% in 1930.¹¹)

Once admission restrictions were removed, the number of women enrolled in U.S. allopathic medical schools rose from about 10% in 1970 to approximately 50% today.^{11,12} By the early 1980s, when the proportion of women medical students reached 30%, women physicians—who have consistently entered academic medicine in greater proportion than their male counterparts¹³—began to reach a critical mass in academic medicine. These women, many of whom came of age during the women's health movement of the 1960s and 1970s, realized that medical education, healthcare, and biomedical research excluded women's social and biological experiences, even pathologizing normal female life events, and that this androcentric approach was not only detrimental to the health of women but also socially unjust.¹⁴⁻²⁰

Women leaders in academic medicine established the Society for the Advancement of Women's Health Research (now the Society for Women's Health Research)²¹ in the early 1980s. This organization, through the bipartisan Congressional Caucus on Women's Issues, instigated the General Accounting Office (GAO) inquiry into allocation of research expenditures by the National Institutes of Health (NIH) according to gender. The GAO report, presented at Congressional hearings in 1990, found that only 13.5% of the NIH budget supported research on women's health issues and noted egregious examples of large, publicly funded studies entirely excluding women as subjects. These included the Baltimore Longitudinal Study of Normal Human Aging, which studied only men for 20 years,²² and several large cardiovascular prevention trials.²³⁻²⁵ The ensuing public outrage led to more than 20 separate bills introduced in Congress to improve women's research and healthcare. One direct result of these events was formation of the Office for Research on Women's Health (ORWH) at NIH in 1990, given statutory authority by Congress in the NIH Revitalization Act of 1993. Women physicians and scientists have been the leaders of this Office since its inception.

In its mission statement, ORWH openly acknowledged the inextricable link between the advancement of women's health and the advancement of women in academic medicine. ORWH would not only seek to advance research related to women's health and increased numbers of women participants in clinical research but also, through its programs, support the recruitment, retention, and advancement of women in biomedical research careers.²⁶

In 1995, the Commission on Graduate Medical Education (COGME) in its Fifth Report, *Women and Medicine: Physician Education in Women's Health and Women in the Physician Workforce*,¹¹ stated that issues of equity in the status of women physicians and improvements in the quality of healthcare for women were so tightly bound that they could not be evaluated separately. The report reviewed evidence that women physicians have been agents of change in medical education, research, and practice and drew attention to the paucity of women in academic leadership positions. COGME recommended widespread examination of gender pay equity, efforts to increase women's participation in biomedical research, and "potent mechanisms for eliminating gender bias and sexual harassment" of women physicians.

The interconnectedness of women leaders in academic medicine and improvement in women's health was institutionalized with the establishment of the Department of Health and Human Services (DHHS) Office on Women's Health (OWH) in 1991. OWH issued 18 contracts to acade-

mic health centers between 1996 and 1998 to establish National Centers of Excellence (CoEs) in Women's Health. Each academic health center was required as part of the contract for advancing women's health to submit a plan for concurrently developing women leaders in academic medicine.^{8,19} The relative investment per program was small (\$1 million dollars of total costs spread over six sites in each year of funding), a fraction of the funds allocated for comparable NIH-funded centers of excellence, such as the cancer centers, Pepper centers, and minority health centers, with much the same charge. Nevertheless, the CoEs leveraged the OWH investment in many cases more than 1000-fold.²⁷ This unparalleled return on investment was attributed to the fact that conferring the CoE directors, 15 out of 18 of whom were women, with the title of Center Director, along with salary and administrative staff support, provided an opportunity for their talents to emerge and for them to command a voice in institutional leadership.^{28,29} Many of the CoE Directors of these early programs have gone on to attain top leadership positions within their institutions, and/or in professional societies, and government. These leaders uniformly acknowledge the critical importance of their position as a director of a National Center of Excellence in opening the door for this advancement.

The high-profile activities outlined above brought numerous and wide-ranging responses, including a Congressional request to DHHS in 1993 for medical schools to examine the women's health content in their curricula, rescinding of restrictions by the Food and Drug Administration (FDA) regarding women's participation as subjects in clinical research,³⁰ and the Women's Health Initiative (WHI), an NIH-sponsored clinical study unprecedented in size and scope. WHI, which has transformed the clinical care of postmenopausal women, was launched during the tenure of the first and only woman director of NIH, Dr. Bernadine Healy, creating another example of the link between women academic leaders and women's health. Evidence for the link between women's health and women leaders is also seen in the correlation between the presence of a female dean and curricular offerings in women's health.³¹ By 2000, evidence existed on many fronts that both women's health and women's leadership in academic medicine were priority areas for improving the health and healthcare of all populations of people in the United States.^{10,21,32,33} There was a general sense that this auspicious beginning would lead institutions to address and redress the multiple, complex issues impeding the advancement of women's health in education, research, and clinical practice and also preventing the realization of women physicians full potential for leadership.

The Slow Progress of Women into Leadership Positions in Academic Medicine

There is much to celebrate in women's advancement in medicine. In 2005, 49% of medical school students and 42% of residents were women. Women represent 17% of tenured professors, 16% of full professors, 10% of department chairs, and 11% of medical school deans at U.S. academic medical centers (AMC).³⁴ Although this is clear evidence of progress, the rate of advancement of women into leadership positions in academic medicine is slower than would be predicted by their numbers in medicine for the past 35 years. Although 5 of the top 25 AMCs (ranked by NIH funding) have women

deans, none of these institutions has women chairs of Departments of Internal Medicine. Because internal medicine contains the largest number of women physicians and because service as a chair prior to becoming dean is almost a universal prerequisite, flow in the leadership pipeline is starkly uneven by gender.

Within academic medicine, where research-based faculty tracks alone lead to top leadership, women are more likely to be clinicians and educators^{35,36} and to assume the tasks that have been referred to as "institutional housekeeping."³⁷ Although the issue is complex, women faculty consistently earn less than men with comparable productivity,^{36,38,39} and gender-based and even frank sexual harassment is highly prevalent.^{40,41} In-depth telephone interviews of 18 women faculty⁴² revealed that 40% ranked gender discrimination first out of 11 possible choices for hindering their academic career—above limited time for professional work and lack of mentoring. Thirty percent of women faculty in one AMC perceived that they had been denigrated, and 25% observed other women denigrated by male faculty based on gender.⁴³

Dealing with the competing time pressures of professional productivity and family care giving also disproportionately affects women faculty, who continue to bear primary responsibility for child care and housework. Institutional factors seem to exacerbate this bind. Carr et al.,⁴⁴ in a survey of nearly 2000 faculty from 24 academic medical centers, found that women faculty with children had less secretarial support and fewer institutional research dollars as well as lower career satisfaction than either male faculty or women faculty without children.

To succeed as a researcher, an academic physician must effectively compete for research grants. Although the peer-review process for making such awards is ostensibly objective, with the most meritorious research selected for funding, the case of the NIH Director's Pioneer Award is one prominent example of how subtle cues in the solicitation mechanism or review criteria may bias the review process against women scientists.^{45,46} The first round, in which no women were selected, emphasized that NIH was looking for scientists who were willing to take risks, a behavior that is strongly associated with males.^{47,48} Such semantic priming would favor male scientists in review.⁴⁹ NIH responded to public concern by making a number of changes, including elimination of the word "risk" from both the solicitation and review criteria.⁴⁶ Women scientists have been among the recipients in each subsequent year. We applaud the NIH for making these changes that are in concert with the findings from more than two decades of meticulous, rigorous, experimental social science research.

Another key position of power and influence within academic medicine is the principal investigator (PI) of a large center grant. The Clinical and Translational Science Award (CTSA) program emanating from the NIH Roadmap is one of the largest center grants in research history. Thus, CTSA PIs will wield tremendous power in academic medicine and in setting future research and health policy agendas. Although 25% of all R01 applications to NIH and 23% of all funded grants go to women investigators, only 3 (12.5%) of the first 24 CTSA went to women.^{50,51} Given the link between the advancement of women's health issues and women leaders, the underrepresentation of women physicians among the top leaders in what is touted as a transformative initiative for improving health is disquieting.

The NIH Institutional Mentored Scientist Development Awards (K12), which focus on building the research capacity in women's health,⁵² offer considerably lower salaries than the K12 awards devoted to training future researchers in oncology,⁵³ aging,⁵⁴ drug abuse,⁵⁵ and clinical research.⁵⁶ This strikes a double blow to women because it signals that women's health research is less worthy a pursuit than other areas of research, and as more women will be drawn to research in women's health,⁸ it perpetuates the gender discrepancy in physician salary.^{36,57,58}

The picture remains the same for other areas that exert significant influence over the practice of medicine, national biomedical and behavioral research, and health policy agendas. The NIH itself is vulnerable to charges of perpetuating the glass ceiling, given the gender makeup of and financial support for key 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.⁵⁹ The editorial boards of three prestigious medical journals—the *Journal of the American Medical Association*, the *New England Journal of Medicine* and the *Annals of Internal Medicine*—have few women at 6%, 19%, and 19%, respectively. Even journals representing specialties where women have nearly achieved parity, *Obstetrics & Gynecology* and the *Journal of Pediatrics*, do not have commensurate representation of women on their editorial boards. In addition, there is a gender gap in the authorship of the papers accepted by academic medical journals.⁶⁰

The American Medical Association (AMA) and the Association of American Medical Colleges (AAMC) are two organizations that wield considerable power in the U.S. medical system. The AMA Board of Trustees has 19% female representation with 4 women and 17 men. In its 130-year history, the AAMC has never had a woman president. The American Gynecological and Obstetrical Society, the most prestigious research organization in that field, had its first woman president (Gloria Sarto, M.D., Ph.D.) in 2004, over 20 years since it was established.

Traditional justification for the absence of women physicians in academic leadership has rested on three main premises: (1) women have not been in the field long enough to have reached leadership (pipeline argument), (2) women do not compete for leadership positions for family reasons, and (3) women lack the requisite leadership skills. These explanations are inadequate. Although women have only recently achieved parity in medical student classes, even in such fields as pediatrics and psychiatry where women have comprised at least 50% of the field for the past 25 years, women are underrepresented in leadership positions, hovering at or below 10% of department chairs for over a decade.^{61,62} It may be true that given their social roles beyond the workplace women are more likely than men to "choose" not to pursue leadership positions in academic medicine; however, those who do desire to advance are often not given the opportunity.³⁶ Regarding leadership ability, several studies of effective leaders have found that, if anything, women leaders are more effective than men.^{63,64} There is considerable evidence suggests that the failure of academic medical centers to advance women is in large measure due to the systematic disadvantage women experience daily and at each evaluation point in an academic career.^{42,44,65,66}

Evidence of Progress and Indicators That the Advancement of Women's Health has Stalled

Traditionally, women's health was thought of as maternal health and focused on pregnancy and reproduction. Nonreproductive biomedical research was rooted in the male model, with the belief that results could merely be extrapolated to the female, an approach sustained by the absence of women as participants in clinical research. In the 1980s and 1990s, largely through the efforts noted above, women's health moved beyond reproduction to include health across the life span. In 1985, the U.S. Public Health Service (PHS) first defined women's health as "diseases or conditions that are unique to or more prevalent or serious in women or have different outcomes or interventions."⁶⁷ Although this was a major step forward in establishing that women's health was more than reproductive health, it also implicitly reaffirmed men's health as the norm from which women's health exists only as a comparator. In 1994, the National Academy in Women's Health Medical Education (NAWHME) expanded the PHS definition to include wellness and prevention, the interdisciplinary and holistic nature of women's health, the importance of gender differences, and changes in women's health needs across the life course.⁶⁸ With this expanded definition, women were no longer viewed through the lens of reproductive activities but with recognition of a host of health events across puberty, midlife, and aging. The Institute of Medicine (IOM) has since stressed the importance of research that acknowledges sex differences, describing sex categorization as a "basic human variable" and that sex influences human health not only through biology but through gender-related differences in behaviors, perceptions, environmental exposures, socioeconomic status, and public policy.⁶⁹

This growing emphasis on the biology of sex and gender differences stimulated much laboratory and clinical investigation. Increased dollars were allocated in the 1990s to study women's health across the life span and to include women in clinical trials. The NIH Revitalization Act of 1993 required that NIH-funded clinical trials include women and minorities as subjects in approximately equal numbers of both sexes⁷⁰; other federal agencies adopted similar guidelines. Following this act and policy changes at FDA,³⁰ women of childbearing potential could no longer be routinely excluded from clinical research.

In spite of the public attention that followed the 1990 GAO report indicating that only a small percent of the NIH funding for clinical research was addressing conditions that occur uniquely or predominantly in women,²¹ examples of the invisibility of women in clinical research continue to be published routinely in the highest-impact medical journals. For example, despite the far greater prevalence of depression among women, the only acknowledged gender differences in a *New England Journal of Medicine* review paper on depression were that men are more successful than women in their suicide attempts and that older men are at high risk of suicide.^{71,72} The review made no mention of postpartum depression, which affects approximately 15% of all women who give birth,⁷³ depression following miscarriage, the safety of antidepressants during pregnancy or lactation, or how to counsel women taking antidepressants who wish to become pregnant. Neither was there mention of some of the most potent risk factors for depression in women, including child-

hood sexual abuse,⁷⁴ intimate partner violence,^{75,76} or sexual and gender-based harassment in the workplace.⁷⁷⁻⁷⁹

Additionally, little progress has been made in the inclusion of women in clinical trials, and clear statements of the limits of generalizability of male-only studies are routinely absent, in disregard of the rules of good science.^{80,81} An analysis of findings from randomized, controlled trials published in nine influential medical journals in 2004 showed that women were generally underrepresented, comprising on average 37% of the sample and only 24% of participants in drug trials. Eighty-seven percent of the studies did not report any outcomes by sex or include sex as a covariate in modeling, illustrating inadequate compliance with the NIH guidelines.⁸¹ For example, the results of a randomized clinical trial of coronary artery revascularization before elective vascular surgery in a sample of 98% men are generalized to all patients in the abstract, conclusion, accompanying editorial, and subsequent research summary.⁸²⁻⁸⁴ One has to question whether the identical study on a sample of 98% women would pass editorial review without including an acknowledgment of the study's limitations with the caveat that the results may not be generalizable to the men.

Even when women are included as subjects, the results in male subjects may take precedence in being generalized to the entire population. For example, Wing et al.⁸⁵ published the results of a randomized, controlled trial comparing diuretics with angiotensin-converting enzyme (ACE) inhibitors for treatment of hypertension in older patients. Although ACE inhibitors showed a benefit for men in reducing the combined primary end point of cardiovascular events and all cause mortality, no difference was found for women, the group not only more likely to have hypertension but also the majority of the patient population in the age group studied. The wording of the results hid the absence of benefit of ACE inhibitors for women through misleading language extrapolating the results to "older patients, particularly men" in the abstract. The overreaching lead statement in the paper's discussion notes that "outcomes are better when hypertension in the elderly is treated with an ACE inhibitor. . . ." This continuation of gender bias in scientific reporting is scientifically unsound, potentially detrimental to the health of women, and antithetical to the emphasis on evidence-based practice promulgated in medical education.

Other goals of an expanded view of women's health were to broaden the inclusion of women's health topics in medical school curricula and establish clinical programs that promote comprehensive, interdisciplinary, integrated health services across the life span. OWH addressed this by moving beyond academic health centers, promoting five innovative national model programs at 48 different sites to advance (1) comprehensive, integrated, interdisciplinary, and coordinated women's healthcare, (2) healthcare professional and public education, (3) research on women's health, including sex and gender differences, (4) academic-community partnerships, and (5) leadership development for women.⁸⁶ The five model programs include academic centers, community centers, and demonstration and rural health centers located across the United States. The hope was that the successes of these five models would encourage others to adapt a paradigm of comprehensive, multidisciplinary, integrated women's healthcare. Unfortunately, after 10 years of success and the development of a strong network of 48 sites across

the United States, the CoE model has been defunded, with a number of sites in the middle of their contracts.

The progress of women's health content in medical school curricula was examined by Henrich.⁸⁷ In support of stalled momentum in women's health, she found an increase in educational initiatives at the medical student and graduate training levels from 1995 to 2000 but no subsequent growth. Funding for women's health research has continually declined over the last 6 years. Federal funding from FY2004-2007 for NIH overall showed an increase of 0.5% and a zero dollar increase from 2006 to 2007. Similar trends have been seen for women's health research and other health programs, which either declined or saw a zero percent increase, failing to keep pace with inflation.⁸⁸ When the percentage of NIH dollars given for the study of sex differences is analyzed, the grants awarded represent a very small percentage of the total number of grants allocated. Between 2000 and 2003, with the exception of a very few NIH centers where the percentage remained constant, the other centers and institutes showed a decrease of 1.5%-2% in the proportion of grants awarded that included a sex/gender comparison. The NIH institutes that fund the largest number of grants award a smaller percentage of those grants for the study of sex and gender differences.⁸⁹

Women's health has also taken other unwanted steps backward, often as the result of a political agenda that has promulgated ideology over evidence. In 2005, the FDA decided not to allow emergency contraception (Plan B),⁹⁰ often referred to as the "morning after pill," to be available as an over-the-counter (OTC) product after two independent scientific panels recommended they do so. After 28 months of debate, the FDA indefinitely postponed its ruling on whether women should be allowed to buy emergency contraception without a prescription, opting instead to embark on a new regulation-writing process. After continued pressure from women's health activists and some members of Congress, in August of 2006, the FDA approved Plan B as an OTC option for women aged ≥ 18 .⁹¹⁻⁹³ The approval is a tribute to the efforts of reproductive rights and women's health advocates as well as the scientific community and policymakers who have fought to improve women's access to comprehensive healthcare. The triumph was only a partial victory, however, because young women < 18 years of age still do not have easy access to emergency contraception. For these women, the drug still requires a prescription, a restriction unsupported by medical or scientific evidence. Requiring women < 18 years of age to obtain a prescription delays access to an effective medication and makes intervention less effective.

Women on active duty in the military serve as another example of the setbacks in women's health. The 350,000 women currently serving in the U.S. military have limited to no access to emergency contraception at their military-based pharmacy and no access to elective termination of unwanted pregnancy care at their military health facility. In 2002, the Department of Defense approved Plan B to be stocked at military medical facilities, and Congress was to vote on a bill known as the "The Compassionate Care for Servicewomen Act" that would have added Plan B to the list of medications that must be stocked at every military health facility. The proposal never came to a vote.⁹⁴ It has been acknowledged by all branches of the military and the Department of Veterans Affairs that women on active duty are at high risk of

military sexual trauma. In the event that a woman soldier is raped, however, she is currently not guaranteed access to Plan B.

The attack in recent years on reproductive rights goes beyond access to safe and evidence-based contraception. Variations on bans to elective termination of pregnancy designed as a direct challenge to *Roe v. Wade* were proposed in 12 states in 2006 alone. South Dakota became the first state in 15 years to pass a law making all elective termination of pregnancy illegal (a felony for the physician) unless the woman's life is endangered.⁹⁵ Fortunately, a petition put forth to the South Dakota voters in November 2006 soundly defeated the ban.⁹⁶ Similar laws were adopted in Louisiana and Utah in 1991 but were struck down in federal court. A federal ban on intact dilation and evacuation (the Partial-Birth Abortion Ban Act) was first enacted in 2003 and blocked from taking effect by three separate federal district court rulings, each upheld by a federal appeals court, as being unconstitutional, largely because of the absence of an exception to protect the health of the pregnant woman. In 2007, the U.S. Supreme Court issued a decision to uphold the federal ban. The setback to women's health is heralded by Justice Ginsburg, who wrote that the "decision is alarming. . . . It tolerates, indeed applauds, federal intervention to ban nationwide a procedure found necessary and proper in certain cases by the American College of Obstetricians and Gynecologists (ACOG). It blurs the line, firmly drawn in *Casey*, between previability and postviability abortions. And, for the first time since *Roe*, the Court blesses a prohibition with no exception safeguarding a woman's health."⁹⁷

Many of the setbacks to women's health will impose real economic, physical, and emotional costs on women and their families. Decisions about funding women's health research and access to information, products, and services should not be made on political or ideological grounds but, to the extent possible, on sound medical evidence. To ensure that we have a body of scientific evidence on which to base such decisions, the sex-specific results of clinical research need to be reported and the limitation in generalizability must be acknowledged if research is done only in men.

The Root Cause: Gender-Linked Assumptions That Undervalue and Marginalize Women

Walton et al.⁹⁸ detail how Western biomedical theory has consistently supported the idea of human female inferiority. In ancient Greece, the belief was that the female with internal genitalia is a defect of nature compared to the perfect male form with external genitalia. These ideas moved with little modification into the Renaissance and formed the foundation of early medical textbooks. The 70-kg white man remains the standard for teaching medicine up to the present day, with physiological formulas adjusted for female bodies⁹⁹ and male illustrations outnumbering female illustrations in medical textbooks.²⁰ Institutional confirmation of the lower societal value placed on women compared with men is found in lower Medicare relative value units (RVUs) placed on surgical procedures performed on women in contrast to identical and even technically less difficult procedures performed on men^{15,100,101} With such irrefutable, objective evidence of the lower value placed on women's bodies, is it any wonder that progress in women's health has stalled?

A large body of social psychology research confirms that apart from explicit biases (frank sexism), we all have unconscious biases and assumptions about the traits and behaviors of men and women. These implicit biases form prescriptive gender norms and are easily activated and applied in decision-making settings.^{102,103} These prescriptive norms emanate from the social roles historically occupied by men and women but have little to do with the actual knowledge and abilities of an individual man and woman. Unconscious assumptions about gender as a social category are tenacious and even prevail in the face of objective evidence to the contrary.^{50,65,104} As confirmed repeatedly, 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.^{47,102} All indicators in society affirm that greater value is placed on agentic traits. For example, fields in which women predominate and where communal behaviors are essential (e.g., child care, social work, nursing) have lower salaries and less prestige than fields in which men predominate and where technical prowess is required (e.g., plumbing, engineering, surgery). For centuries, much of the work performed by women has been unpaid labor. Myerson and Fletcher,⁷ who study organizational change, emphasize that the roots of gender inequity lie in the fact that organizations have been created by and for men and are based on traditional male life experiences. The National Science Foundation (NSF) has acknowledged the need for a systems approach to increase the participation and advancement of women in academic science and engineering and has invested in the ADVANCE Institutional Transformation Award program since 2001.¹⁰⁵ Although the NSF program does not focus on academic medicine and few sites include medical schools, the approaches are relevant. Some of the most successful efforts promoting institutional, cultural change involve educating nonsocial scientists and engineers about social science research on biases and assumptions.

So openly acknowledged is the link between the value that society places on a profession and its gender composition that Lyon,¹⁰⁶ in an editorial in *Obstetrics and Gynecology*, cautions against the predicted loss in salary and prestige as women physicians increasingly dominate this field, affirming that "professions created by or predominantly filled by women . . . are uniformly under-respected and under-represented in terms of political clout."¹⁰⁶ Perhaps most telling regarding the relative value placed on the gender composition of a profession is the noticeable absence of the same exuberant concern for the overrepresentation of men among cardiologists or surgeons. In short, the ubiquitous and deeply embedded devaluation of women and the work performed by women is at the root of the subtle and overt gender discrimination repeatedly documented in all aspects of academic medicine. This same devaluation of women allows funding to be siphoned away from programs to promote women's health and enables political ideologues to wrest control of women's bodies from women.

Conclusions and Recommendations

We conclude that as long as women faculty in academic medical centers and issues associated with caring for women are marginalized and devalued, women's health will con-

tinue to reside below a glass ceiling, never reaching the lofty goals envisioned over a decade ago or realizing the full human potential resident in both providers and patients. We put forth the following recommendations for academic medical centers, organizations that support biomedical and behavioral research, and individuals within these institutions to promote progress beyond the apparent glass ceiling that is preventing further advancement of women's health and women leaders. With each recommendation, we include some specific actions.

Recommendation 1: Recognize the impact of socialized gender differences

- Educate members of the academic medicine community about the impact of socialized gender differences on the teaching and practice of medicine.
- Include relevant social science research in the medical school curriculum and familiarize institutional leaders with the National Academies Report on Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering.¹⁰⁷
- Require training of key gatekeepers (e.g., admissions, search, and tenure committee members and those assuming leadership positions) regarding the existence of unconscious gender assumptions and provide evidence-based strategies to mitigate their influence on the evaluation of individuals (e.g., reduce time pressure and divided attention during evaluation; acknowledge the ubiquity of gender bias and instruct evaluators to consciously try to avoid its influence in evaluating individuals)
- Undertake and evaluate organizational interventions to promote gender equity and disseminate the results of successful programs, in keeping with the spirit of type 2 translational research.¹⁰⁸

Recommendation 2: Systemic change needed for advancement of women

- Institutionalize mechanisms to monitor and, if necessary, redress gender pay inequities.
- Implement policies that promote institutional support for programs with diverse representation (e.g., grand rounds speakers, conference programs).
- Examine institutional processes for selecting leaders and recipients of institutional awards and eliminate known activators of bias favoring men (e.g., evaluating "potential" rather than specific performance criteria; using language that emphasizes stereotypical male qualities, such as strength, over gender-neutral or stereotypical female qualities, such as mentoring and collaboration).

Recommendation 3: Make support for professional and personal work/life balance an institutional priority

- Undertake an institutional needs assessment to understand the current status of women faculty, identify barriers to their advancement, and propose systemic solutions.
- Increase the flexibility of tenure track positions to enable scholarship and work/life balance (e.g., part-time positions with prorated tenure clocks; flexible tenure time-

lines; on-site infant, toddler, child care facilities and breastfeeding rooms).

- Create a central administration funding pool to cover hiring supplementary staff (e.g., graduate research or teaching assistants or postdoctoral fellows) for up to 1 year for faculty who have/are experiencing a major care giving-event: childbirth, adoption, elder care, serious personal or partner illness.
- Create a central administration funding pool to cover up to 12 weeks at full salary for both men and women after childbirth or adoption.

Recommendation 4: Reinforce the link between women's health and women's leadership at NIH and other federal agencies

- Capitalize on the link between women's health and women's leadership in academic medicine by incorporating research on sex and gender differences across a wide spectrum of scientific inquiry.
- Establish an extramural program position responsible for reviewing requests for applications (RFA) and program announcements (PA) to determine if sex differences should be the focus of the announcement.
- Issue RFAs and PAs that have hypothesis-driven sex differences and offer grant supplements to investigators to add exploration of sex differences.
- Track publications reporting on sex differences.
- Expand budget of ORWH to increase cooperation and coordination within NIH for sex differences research.
- Provide ORWH with direct grant-making authority with specific direction to Centers for Women's Health Research (including the study of sex and gender differences) at the same level as other comprehensive NIH Centers (e.g., cancer centers, minority health centers).
- Fund organizational and educational research on gender issues in academic medicine, particularly related to institutional transformation and leadership effectiveness (e.g., NIH could fund for academic medical centers a program analogous to the NSF ADVANCE Institutional Transformation Award).
- Mandate that for large center grants or institutional awards, investigators include a description of the process by which the PIs were selected and be explicit about opportunities for women to apply.
- Require applicant organizations to include an accounting of the gender and ethnic/racial composition of its faculty along with a description of institutional programs to develop women and ethnic/racial minority leaders.
- Require that all research mentors who are part of federally supported training grants participate in training regarding gender issues in academic medicine, including social psychology research on evaluation bias.
- Remove any requirement on career development awards that limits access to applicants who are beyond a limited number of years of training to facilitate the reentry of women following childbearing.
- Raise the salary cap on the Building Interdisciplinary Research Careers in Women's Health (BIRCWH) Awards to the level of other K12 awards.
- Continue to monitor and report on the gender composition of NIH grant awardees.

Women's health and women in academic medicine are linked. Despite real gains throughout the 1990s, progress has stalled in both areas. Further advances will require widespread recognition that women have been and continue to be devalued in our society in general and within medicine in particular and acceptance of the necessity of system changes to achieve equity. To break through the glass ceiling, all stakeholders must first acknowledge its existence and agree that allowing it to remain in place erodes our nation's competitive edge in biomedical research, wastes considerable human capital, and prevents realization of optimal health and healthcare for everyone.

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