

# Experiencing the Culture of Academic Medicine: Gender Matters, A National Study

Linda H. Pololi, MD<sup>1</sup>, Janet T. Civian, EdD<sup>1</sup>, Robert T. Brennan, EdD<sup>2</sup>, Andrea L. Dottolo, PhD<sup>1,3</sup>, and Edward Krupat, PhD<sup>4</sup>

<sup>1</sup>Women's Studies Research Center, National Initiative on Gender, Culture and Leadership in Medicine: C - Change, Brandeis University, Waltham, MA, USA; <sup>2</sup>Harvard School of Public Health, Boston, MA, USA; <sup>3</sup>Department of Psychology, University of Massachusetts, Lowell, MA, USA; <sup>4</sup>Harvard Medical School, Boston, MA, USA.

**BACKGROUND:** Energized and productive faculty are critical to academic medicine, yet studies indicate a lack of advancement and senior roles for women.

**OBJECTIVE:** Using measures of key aspects of the culture of academic medicine, this study sought to identify similarity and dissimilarity between perceptions of the culture by male and female faculty.

**DESIGN:** The C - Change Faculty Survey was used to collect data on perceptions of organizational culture.

**PARTICIPANTS:** A stratified random sample of 4,578 full-time faculty at 26 nationally representative US medical colleges (response rate 52 %). 1,271 (53 %) of respondents were female.

**MAIN MEASURES:** Factor analysis assisted in the creation of scales assessing dimensions of the culture, which served as the key outcomes. Regression analysis identified gender differences while controlling for other demographic characteristics.

**KEY RESULTS:** Compared with men, female faculty reported a lower sense of belonging and relationships within the workplace ( $T=-3.30$ ,  $p<0.01$ ). Self-efficacy for career advancement was lower in women ( $T=-4.73$ ,  $p<0.001$ ). Women perceived lower gender equity ( $T=-19.82$ ,  $p<0.001$ ), and were less likely to believe their institutions were making changes to address diversity goals ( $T=-9.70$ ,  $p<0.001$ ). Women were less likely than men to perceive their institution as family-friendly ( $T=-4.06$ ,  $p<0.001$ ), and women reported less congruence between their own values and those of their institutions ( $T=-2.06$ ,  $p<0.05$ ). Women and men did not differ significantly on levels of engagement, leadership aspirations, feelings of ethical/moral distress, perception of institutional commitment to faculty advancement, or perception of institutional change efforts to improve support for faculty.

**CONCLUSIONS:** Faculty men and women are equally engaged in their work and share similar leadership aspirations. However, medical schools have failed to create and sustain an environment where women feel fully accepted and supported to succeed; how can we ensure that medical schools are fully using the talent pool of a third of its faculty?

**KEY WORDS:** culture; academic medicine; female faculty; gender.

J Gen Intern Med 28(2):201-7

DOI: 10.1007/s11606-012-2207-1

© Society of General Internal Medicine 2012

## INTRODUCTION

For 30 years now, women have constituted between 30 % and 50 % of medical students; currently, a third of medical faculty are women; faculty attrition due to dissatisfaction<sup>1</sup> and attrition rates<sup>2</sup> are similar for men and women. Yet, the average medical school has only 43 female full professors compared with 192 male counterparts,<sup>3</sup> resulting in female full professors making up only 4 % of all the faculty.<sup>3</sup> Just 12 % of clinical department chairs are women.<sup>4</sup> National reports show that the career advancement of female faculty in academic health centers (AHC) is much slower than that of their male peers.<sup>5,6</sup> Recognizing these disparities, we sought to better understand how female faculty experience the culture of academic medicine and the extent to which this differs from their male counterparts.

Female faculty's perceptions of gender discrimination and sexual harassment in academic medicine were documented by a 1995 national survey,<sup>7</sup> and women surgeons have reported feeling isolation and that career advancement opportunities were not equally available to them.<sup>8</sup> One study found higher clinical research self-efficacy beliefs in male than in female medical faculty.<sup>9</sup> Studies focused on the lack of advancement of female faculty, mostly conducted in a single institution or a single specialty, have documented substantial gender differences in the rewards and opportunities of academic medicine.<sup>10-12</sup> These studies highlight disparities in outcomes for women, such as salary, recommendation letters, promotion, tenure and leadership opportunities. Several national studies have documented sexism in peer review<sup>13-16</sup> and remuneration<sup>17</sup> of female researchers. Taking a broader approach, the research reported here focuses on the organizational culture and the perceptions of the female and male faculty about dimensions of the culture in their institutions.

Received April 26, 2012

Revised July 18, 2012

Accepted July 23, 2012

Published online August 31, 2012

Prior qualitative research studies of the National Initiative on Gender, Culture and Leadership in Medicine (known as the C - Change project) have documented the professional experiences of male and female faculty and the culture of academic medicine.<sup>18–26</sup> We found that a lack of relationships emerged as a central theme for both sexes across all career categories.<sup>18</sup> Other negative attributes of the culture included competitive individualism, undervaluing of humanistic qualities, deprecation, disrespect and the erosion of trust. Many faculty, both men and women, also described behaviors that led them to conclude that their institutions were not focused enough on their espoused social and educational missions.<sup>20,23</sup> A dominant theme expressed by female faculty in their interviews was the experience of feeling marginalized and invisible.<sup>19</sup>

The main aim of this paper is to delineate the comparative experiences of women and men, and to gain a quantitative assessment of their relative perspectives on institutional culture. To do so, we surveyed faculty members in 26 representative U.S. medical schools, to our knowledge the first large-scale national study of male and female faculty perceptions of the culture across multiple medical schools and disciplines. Our hypothesis was that female faculty would hold more negative perceptions of the culture than their male counterparts. Our goal was to determine the strength of association between gender and the perceptual/attitudinal variables concerning the culture of academic medicine, while controlling for the role of other relevant variables, such as ethnicity and seniority.

## METHODS

### Instrument Development

The domains and items of the C - Change survey were derived in large part from themes identified in the C - Change qualitative study,<sup>18–22,25</sup> in conjunction with an extensive search of the literature and reviews of relevant instruments.<sup>27–32</sup> Faculty responded to a survey<sup>1</sup> containing 74 items related to advancement, engagement, relationships, feelings about workplace, diversity and equity, leadership, institutional values and practices, and work-life integration. Items used 5-point Likert response scales (range: 1 = strongly disagree to 5 = strongly agree).

Human subject institutional approvals were obtained at Brandeis and Boston Universities, and the Association of American Medical Colleges (AAMC).

### Sampling Procedures

**Selecting Schools.** Schools were selected in a multi-stage process. First, we included the five schools that were part of the C - Change consortium associated with the project from which this study derived. These schools had been selected to

vary by region and public-private status. Then, from the AAMC list of all US medical schools, we created a stratified random sample of an additional 21 medical schools to ensure that the 26 schools together 1) spanned all important types (purposefully including in the 21 one small and one historically Black school), and 2) achieved a distribution similar to the overall proportion of AAMC schools by geographic region and public/private sector. The dean at each school was approached to participate. Three schools declined, citing recent survey efforts; in each case a school from the same stratum was randomly selected as replacement. Because the first five schools had not been selected at random, the data from these five were systematically compared to the other 21. We found no significant differences in respondents' perceptions on all but one of the scales measuring attributes of the work environment, and no differences in demographic characteristics between the original five and the additional 21 schools, suggesting that the combined 26 school sample was representative of the larger population of US medical schools.

**Sampling Faculty Within Schools.** The AAMC provided names and demographic characteristics of full-time faculty at each school (PhD, EdD and MD), and deans provided e-mail addresses. For sampling, each faculty member was categorized by sex, chronological age (under 39 years of age, 39–47 years, and 48 years and older), under-represented minority in medicine (URMM) status (yes or no), and surgical specialty (yes or no). At each school, 25 faculty members were selected from each of six sex-by-age categories for a base sample of 150 per school. To ensure adequate numbers of URMM and female surgical faculty, we added faculty at each school to the 150 members sampled by sex and age. We followed NIH definitions in coding the following as URMM: American Indian or Alaska Native, Black or African American, Hispanic/Latino, Native Hawaiian or other Pacific Islander. At each school, we added URMM faculty to each age group, up to a maximum of 20 URMM faculty per group. Female surgeons were a group of interest because of the particularly low representation of women in this large specialty. To ensure their representation, additional female surgeons were selected until the pool was exhausted. Sample weights were employed in the analyses to adjust for oversampling.

### Survey Administration

The selection process resulted in a list of 4,578 sampled faculty. The survey was administered electronically, with reminders at 2–3 week intervals and eventual follow-up with phone contact and a hard copy mailing, as needed. The survey was distributed as schools were recruited in waves from 2007 through early 2009.

## Analytic Overview

We constructed weights based on sex, age, and URMM characteristics of the 2008 AAMC all-school faculty population, to be able to generalize our findings to the national population of academic faculty. To address missing values, ten multiply imputed data sets were estimated using IVEware 2002 (Survey Research Center, Institute for Social Research, University of Michigan).<sup>33</sup> Under certain assumptions, multiple imputation yields unbiased point estimates and confidence intervals.<sup>34</sup> IVEware uses chained equations in combination with a Markov chain Monte Carlo method.

To determine the conceptual structure underlying faculty responses, we subjected 46 items related to institutional culture to a factor analysis using SAS/STAT Version 8.2 for Windows, 2004 (SAS Institute, Cary, NC). First, we examined unrotated principal component loadings showing the linear consistency among all items, retaining items with unrotated loadings  $\geq 0.40$ . Then we used an equamax rotation to identify distinct factors, or sub-dimensions of institutional culture.<sup>35</sup> The research team used these in conjunction with semantic review of the items to guide final scale development; an additional five scales were content-derived (indicated in Table 1). Negatively stated individual questions were reverse-coded, responses summed, and scores divided by the number of items in each scale to allow for a consistent interpretation in the metric of the original Likert 5-point scale across scales, regardless of the number of items. Cronbach's  $\alpha$  reliability coefficients were estimated to assess the internal consistency of each scale (see Table 1 for a list of the scales, their properties and descriptive statistics).

Exploratory data analysis included comparison of group means by gender on 11 scales representing dimensions of the culture (see Table 1), as well as a comparison of differences by other demographic characteristics including age, rank, URMM status and primary role (clinician, researcher, administrator or educator). Because these demographic characteristics are not independent of one another, we used a multivariate approach to understand the unique contribution of gender as a predictor of each dimension of the culture, while controlling for other demographic characteristics. Regressions were estimated using IVEware to accommodate the ten imputed data sets, including "school" as the cluster variable to accommodate the nesting of the data. For each dimension of the culture, we first estimated a model with gender, URMM status, age, rank, and primary role. We next tested for interaction effects with gender when other demographic predictors were found to be statistically significant. Multiple regression permits the elimination of factors whose influence on a certain outcome merely reflects their dependence on other variables.

## RESULTS

Of the 4,578 faculty invited to participate, 2,381 responded for a response rate (RR) of 52 %. The median school RR was 54 %; one school had an RR of 28 %, while the others ranged from 40 % to 62 %. Faculty reporting their rank as instructor, lecturer<sup>2</sup> or "other" were omitted from this analysis, because of the very small numbers and role ambiguity, for a final study sample of 2,218. Unweighted and weighted descriptive statistics for the sample are presented in Table 2. The 1,172 women represented 53 % of the sample, and 512 (23 %) of respondents were from URMM groups.

### Effect of Gender

The estimated regression models demonstrated that gender was a significant predictor of perceptions in six dimensions of the culture. Holding constant the other demographic predictors in the model (i.e., URMM status, age, faculty rank and primary role), female faculty had more negative perceptions than male faculty on the following six dimensions: self-efficacy for career advancement ( $T = -4.73$ ,  $p < 0.001$ ) relatedness/inclusion (feelings of trust, inclusion and connection) ( $T = -3.30$ ,  $p < 0.01$ ), values alignment (alignment of personal values and observed institutional values) ( $T = -2.06$ ,  $p < 0.05$ ), perceptions of equity for female faculty ( $T = -19.82$ ,  $p < 0.001$ ), work-life integration (institutional support for managing work and personal responsibilities) ( $T = -4.06$ ,  $p < 0.001$ ), and perception of institutional change efforts for diversity ( $T = -9.70$ ,  $p < 0.001$ ) (see Table 3). There were no significant gender differences for five of the dimensions of the culture scales. Men and women responded similarly about engagement, institutional support, ethical/moral distress, leadership aspirations and perceptions of institutional change efforts related to faculty support.

### Effect of Other Variables in the Models

Other demographic descriptors, such as belonging to an URMM group, age, faculty rank and primary role (research, education, clinical care), were inconsistently predictive. URMM was a factor in only one of these outcomes (relatedness/inclusion), and age and faculty rank were associated with the outcomes in two measures (self-efficacy for career advancement and relatedness/inclusion). Administrators reported higher self-efficacy, relatedness/inclusion and values alignment than clinical faculty. Researchers were more likely to perceive gender inequity than clinical faculty. Researchers and educators were more positive than clinical faculty about effectively integrating career and family or personal demands. Self-efficacy increased with rank; however, increasing age mitigated this effect in both males and females. Underrepresented minority faculty reported lower relatedness/inclusion than non-minority faculty.

**Table 1. Definitions and Estimated Statistical Characteristics (Unadjusted) of Dimensions of the Culture Scales for Study Sample Overall and by Sex (n=2,218)**

	# of items	Cronbach's $\alpha$	Grand mean (SE)	Mean for women (SE)	Mean for men (SE)
Engagement: being energized by work*	5	0.84	3.91 (0.018)	3.87 (0.029)	3.94 (0.025)
Self-efficacy: confidence in ability to advance in career*	4	0.82	3.65 (0.021)	3.47 (0.039)	3.75 (0.032)
Institutional support: perception of institutional commitment to faculty advancement	7	0.90	3.26 (0.028)	3.22 (0.037)	3.28 (0.037)
Relatedness/inclusion: faculty feelings of trust, inclusion and connection	6	0.84	3.57 (0.019)	3.45 (0.037)	3.63 (0.029)
Values alignment: alignment of faculty personal values and observed institutional values	9	0.85	3.24 (0.025)	3.20 (0.033)	3.26 (0.029)
Ethical/moral distress: feeling ethical or moral distress and being adversely changed by the culture*	8	0.78	2.35 (0.019)	2.39 (0.029)	2.33 (0.024)
Leadership aspirations: aspiring to be a leader in academic medicine	2	0.66	3.99 (0.026)	3.96 (0.031)	4.01 (0.037)
Gender equity: perceptions of equity for female faculty	4	0.83	3.58 (0.036)	2.99 (0.047)	3.89 (0.037)
Work-life integration: institutional support for managing work and personal responsibilities	4	0.76	3.30 (0.036)	3.19 (0.053)	3.36 (0.033)
Institutional change efforts for diversity: good faith effort by institution to advance women and URMM faculty	3	0.86	3.64 (0.044)	3.41 (0.044)	3.76 (0.051)
Institutional change efforts for faculty support: good faith effort by institution to improve support for faculty	6	0.87	3.00 (0.030)	2.96 (0.033)	3.02 (0.037)

SE standard error; URMM under-represented minority in medicine

Weighted means and standard errors estimated on the analysis sample (n = 2,218) based on ten multiply imputed data sets. The imputation procedure does not estimate standard deviations

\*Indicates factors identified by equamax rotation and semantic review

## DISCUSSION

The central finding of this study is that male and female faculty have equal feelings of being engaged and enthusiastic about their work and have equal leadership aspirations, yet women faculty do not feel as confident about career advancement as men, do not feel equally included in the environment of academia, and their personal values are more likely to be at odds with institutional values. Whereas gender is a predictor of six important dimensions of the culture, other key demographic variables that might have been expected to make a difference, such as race/ethnicity, rank, and role, were less consistent in their predictive ability.

In the management literature, where women's lack of advancement has been well studied, Ely and Meyerson

examined the ways in which the culture of organizational life and work centers primarily on men's needs and expectations, and showed endemic gender bias in both the implicit and explicit practices of the workplace contributing to marginalization.<sup>36</sup> Our findings point to similar patterns of gender inequity in academic medicine, in that women feel less included—or as “outsiders,” are more aware than men of gender inequity, and are less likely than men to believe that their institutions are making a good faith effort to facilitate diversity among faculty. The study finding of female faculty's perceived bias against women in the presence of leadership aspirations reveals ideal conditions for women to be subject to stereotype threat. Stereotype threat could itself promote reduction in self confidence and self-efficacy.<sup>37</sup> We

**Table 2. Unweighted and Weighted Demographic Characteristics of Study Sample Overall and by Sex (n=2,218)**

	Overall sample		Women		Men	
	No. and (U %)(W %)*	U/W mean†	No. and (U %)(W %)*	U/W mean†	No. and (U %)(W %)*	U/W mean†
Female	1,172 (53)(35)		—		—	
Minority status	512 (23)(10)		242 (21)(11)		270 (26)(9)	
Age		49/49		48/47		49/50
Rank						
Assistant Prof.	912 (41)(39)		525 (45)(48)		387 (37)(34)	
Associate Prof.	680 (31)(31)		352 (30)(29)		328 (31)(32)	
Full Prof.	626 (28)(30)		295 (25)(23)		331 (32)(34)	
Role						
Clinician	1,083 (49)(50)		553 (47)(49)		530 (51)(51)	
Researcher	696 (31)(31)		376 (32)(33)		320 (31)(30)	
Administrator	220 (10)(9)		121 (10)(9)		99 (9)(9)	
Educator	219 (10)(9)		122 (10)(10)		97 (9)(9)	

\* (U %) refers to the unweighted percent in the study sample and (W %) refers to the weighted percent

† U refers to the unweighted mean in the study sample and W refers to the weighted mean

Table 3. Demographic Predictors of Six Dimensions of the Culture Scales Using Multiple Regression Analysis ( $n=2,218$ )

	Outcome					
	Self-efficacy	Relatedness & inclusion	Values alignment	Gender equity	Work-life integration	Change efforts for diversity
	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Intercept	3.650*** (0.022)	3.566*** (0.020)	3.242*** (0.026)	3.582*** (0.035)	3.299*** (0.036)	3.640*** (0.046)
Female	-0.265*** (0.056)	-0.175** (0.053)	-0.070* (0.034)	-0.922*** (0.047)	-0.169*** (0.042)	-0.334*** (0.034)
URMM	0.076 (0.063)	-0.141* (0.059)	0.077 (0.085)	-0.015 (0.107)	-0.003 (0.068)	-0.159 (0.148)
Age	-0.021*** (0.004)	-0.011** (0.004)	-0.003 (0.003)	-0.006 (0.003)	-0.003 (0.004)	0.004 (0.003)
Rank: Full Prof. (ref.)						
Assistant Prof.	-0.610*** (0.063)	-0.221** (0.077)	-0.056 (0.074)	0.053 (0.069)	-0.106 (0.072)	-0.090 (0.077)
Associate Prof.	-0.444*** (0.064)	-0.118 (0.079)	-0.124 (0.062)	-0.026 (0.063)	-0.123 (0.077)	-0.129 (0.075)
Role: Clinician (ref.)						
Researcher	0.094 (0.053)	-0.016 (0.054)	0.021 (0.039)	-0.132** (0.043)	0.126* (0.055)	-0.075 (0.064)
Administrator	0.209** (0.075)	0.257** (0.083)	0.255** (0.083)	-0.022 (0.095)	0.181 (0.103)	0.172 (0.092)
Educator	0.138 (0.082)	0.124 (0.094)	0.078 (0.072)	0.000 (0.103)	0.281*** (0.078)	0.050 (0.109)

SE standard error

$p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

note that researchers are less likely to report gender equity and also that, traditionally in medical schools, leaders are expected to have demonstrated research productivity. The additive effect of gender and research role may further explain the lack of women in leadership positions. Women also feel less support from their institution to combine their work and personal life. All of these factors, combined with lower self-efficacy, unconscious bias, and lack of sponsorship, likely contribute to the slow pace of professional advancement for female faculty in academic medicine. Our finding of equal leadership aspirations among men and women further generalizes a similar finding from a study conducted in a single medical school.<sup>11</sup>

It is of concern that highly accomplished women, successful by many measures, would exhibit lower self-efficacy about their careers than similarly successful men. In social science research, self-efficacy is a predictor of career interest, perceived career options, and persistence in scientific fields,<sup>38,39</sup> and self-efficacy in career advancement can be linked to the idea of “possible selves,” a term coined by Markus and Nurius.<sup>40</sup> For example, a girl who sees only male airline pilots, priests, or corporation presidents will not easily construct possible selves that encompass these occupations.<sup>41</sup> Similarly, female faculty in academic medicine who rarely observe other women in the highest positions of the medical academy will likely have less self-confidence in career advancement.

Lower self-efficacy may also be explained by documented negative response to women in positions of authority or leadership roles, especially in male-associated fields.<sup>42-44</sup> Another manifestation, consistent with the notion of non-

conscious bias, is that self-promotion in women invokes a more negative response from men and women than self-promotion in men.<sup>45</sup> Consequently, women are behaviorally conditioned from an early age to prevent or minimize these negative responses to their person.

Prior research, as well as this study, shows that incongruence of personal and institutional values is an important issue for all faculty, but even more so for women.<sup>1,20,46</sup> Further research on what faculty perceive as incongruent in their values is warranted, and it would be interesting to explore the interrelationship of self-efficacy, stereotype threat, values alignment, and realizing women’s potential and full contributions, to shaping academic medicine’s responsibilities.

## Study Strengths and Limitations

The strengths of the study include: its national, multi-institutional nature, a large cross-disciplinary representative sample size, the very reasonable response rate for a medical faculty survey, and the theoretical grounding of the methods and survey development. Many studies of the impact of gender in academic medicine have been at a single institution. Survey items were based upon a hypothesis-generating qualitative analysis of prior faculty interviews; our survey included numerous non-customary questions and domains relating to relationships, values, ethical and moral climate, on being changed by the culture, diversity, equity and support/advancement. The faculty sample included members from both clinical practice and basic sciences, and also identified major roles of the faculty respondents and

detailed demographic data. The rigorous analysis allows specific factors to be identified while controlling for other factors—in this case, we have been able to isolate gender as a factor while controlling for seniority, rank and primary role.

Within schools, faculty were randomly selected, although the AAMC roster used for sampling was not fully up-to-date regarding recent attrition, nor were the e-mail lists of their faculty provided by schools. The RR could have been higher had we been able to exhaustively determine all sampled faculty who were ineligible for inclusion. Especially given this, a 52 % RR compares well with other reported surveys of medical faculty;<sup>2,27,47–49</sup> even so, there is the possibility of non-response bias. Those who have studied physician response rates and their impact on the representativeness of the data have concluded that response rates among physicians are approximately 10 % below those of non-physicians, and that response bias (e.g., non-representativeness of responses) is not as large a concern as had been previously thought.<sup>50,51</sup>

Our findings concur with social science research showing that people whose identities and values are not traditionally those of the institutional culture, or who feel different or are perceived as different, experience exclusion, marginalization, and alienation.<sup>52–55</sup> Those faculty whose identities are most similar to the majority in their AHC are more likely to feel valued, experience a sense of belonging, and successfully navigate its formal and informal structures.<sup>46</sup> Those whose identities, attitudes, and beliefs do not “fit” with the culture of academic medicine are more likely to struggle, both personally and professionally.<sup>52</sup> As expected, women, as compared with men, were more aware of inequities. Feminist scholars have described this as “situated knowledge,” or a different way of knowing, that is derived from occupying a position of less power than the dominant group. Groups with less power perceive inequality differently as a result of being discriminated against.<sup>56</sup>

Our studies show that female faculty have a different experience of the culture of academic medicine, and suggest that their experience of the culture may contribute to the lack of women’s advancement. These findings add to the medical faculty professional development and workforce literature by demonstrating that female faculty, when compared with male faculty, feel a lack of inclusion and relationships within the workplace, and to some extent perceive less congruence between their own values and those of their institutions. They report gender inequality and that their institutions are failing to adequately make change to address diversity goals. Despite these challenges, female faculty continue to be highly engaged in the demanding work of academic medicine and have leadership aspirations similar to male faculty.

Women in medicine hold expanded and varied perspectives, and will be essential as participants in helping to bring about positive change in health care delivery and medical research. Realizing the full potential of female physicians and scientists will more fully use the nation’s

human capital and resources devoted to medical training. Academic medicine needs its highly skilled and deeply dedicated female physicians and biomedical scientists to implement their own vision of leadership and health priorities for the nation.

---



---

#### Acknowledgements:

**Contributors:** The authors wish to thank all the members of the C - Change research team who participated in developing items for the survey, data collection and supporting the process of C - Change work. The authors thank the AAMC for assisting in the initial phase of the project. The authors are indebted to the medical faculty who generously shared their perspectives in the survey.

**Funders:** The authors gratefully acknowledge the critical funding support of the Josiah Macy, Jr. Foundation and Brandeis University Women’s Studies Research Center. Funding supported the design and conduct of the study; and collection, management, analysis and interpretation of the data. Supplemental funds to support data analysis were provided by the U.S. Health and Human Services Office of Public Health and Science, Office on Women’s Health, and Office of Minority Health; National Institutes of Health, Office of Research on Women’s Health; the Agency for Healthcare Research and Quality; the Centers for Disease Control and Prevention and the Health Resources and Services Administration.

**Prior Presentations:** None

**Other Disclosures:** The C - Change Faculty Survey and its items, described in this report, are copyrighted by C - Change, Brandeis University. Please contact [cchange@brandeis.edu](mailto:cchange@brandeis.edu) to use this survey.

**Conflict of Interest:** The authors declare that they do not have a conflict of interest.

**Corresponding Author:** Linda H. Pololi, MD; Women’s Studies Research Center, National Initiative on Gender, Culture and Leadership in Medicine, C - Change, Brandeis University, Mailstop 079, South Street, Waltham, MA 02454-9110, USA (e-mail: [lpololi@brandeis.edu](mailto:lpololi@brandeis.edu)).

## REFERENCES

1. Pololi L, Krupat E, Civian JT, Ash AS, Brennan RT. Why are a quarter of faculty considering leaving academic medicine? A study of their perceptions of institutional culture and intention to leave in 26 representative medical schools. *Acad Med.* 2012;87:859–869.
2. Corrice AM, Fox S, Bunton SA. Retention of full-time clinical M.D. faculty at US medical schools. Analysis in Brief. Washington DC: AAMC. 2011;11(2):1–2.
3. Association of American Medical Colleges (AAMC). [https://www.aamc.org/download/170264/data/2009\\_table05.pdf](https://www.aamc.org/download/170264/data/2009_table05.pdf) Accessed August 5, 2012.
4. Association of American Medical Colleges (AAMC). [https://www.aamc.org/download/170274/data/2009\\_table09a.pdf](https://www.aamc.org/download/170274/data/2009_table09a.pdf). Accessed August 5, 2012.
5. Association of American Medical Colleges (AAMC). 2011 AAMC data book: Medical schools and teaching hospitals by the numbers. <https://www.aamc.org/data/databook>. Accessed August 5, 2012.
6. Bickel J, Wara D, Atkinson BF, Cohen LS, Dunn M, Hostler S, Johnson TRB, Morahan P, Rubenstein AH, Sheldon GF, Stokes E. Increasing women’s leadership in academic medicine: report of the AAMC Project Implementation Committee. *Acad Med.* 2002;17:1043–1061.
7. Carr PL, Ash AS, Friedman RH, et al. Faculty perceptions of gender discrimination and sexual harassment in academic medicine. *Ann Intern Med.* 2000;132:889–896.
8. Schroen AT, Brownstein MR, Sheldon GF. Women in academic general surgery. *Acad Med.* 2004;79:310–318.

9. **Bakken L, Sheridan J, Carnes M.** Gender differences among physician-scientists in self-assessed abilities to perform clinical research. *Acad Med.* 2003;78:1281-1286.
10. **Foster SW, McMurray JE, Linzer M, Leavitt JW, Rosenberg M, Carnes M.** Results of a gender-climate and work-environment survey at a Midwestern academic health center. *Acad Med.* 2000;75(6):653.
11. **Wright AL, Schwindt LA, Bassford TL, Reyna VF, Shisslak CM, St. Germain PA, Reed KL.** Gender differences in academic medicine: patterns, causes, and potential solutions in one U.S. college of medicine. *Acad Med.* 2003;78:500-508.
12. **Kaplan SH, Sullivan LM, Dukes KA, Phillips CF, Kelch RP, Schaller JG.** Sex differences in academic advancement. *N Engl J Med.* 1996;335:1282-1289.
13. National Academy of Sciences; National Academies of Engineering; Institute of Medicine Committee on Maximizing the Potential of Women in Academic Science and Engineering. *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering.* Washington DC: National Academies Press; 2006.
14. **Trix F, Psenka C.** Exploring the color of glass: letters of recommendations for female and male medical faculty. *Discourse Soc.* 2003;14:191-220.
15. **Wenneras C, Wold A.** Nepotism and sexism in peer-review. *Nature.* 1997;387:341-343.
16. **Steinpreis RE, Anders KA, Ritzke D.** The impact of gender on the review of the curricula vitae of job applicants and tenure candidates: a national empirical study. *Sex Roles.* 1999;41:509-528.
17. **Jagsi R, Griffith KA, Stewart A, Sambuco D, DeCastro R, Ubel PA.** Gender differences in the salaries of physician researchers. *JAMA.* 2012;307:2410-2417.
18. **Pololi L, Conrad P, Knight S, Carr P.** A study of the relational aspects of the culture of academic medicine. *Acad Med.* 2009;84:106-114.
19. **Pololi LH, Jones SJ.** Women faculty: an analysis of their experiences in academic medicine and their coping strategies. *Gen Med.* 2010;7:438-450.
20. **Pololi L, Kern DE, Carr P, Conrad P, Knight S.** The culture of academic medicine: faculty perceptions of the lack of alignment between individual and institutional values. *J Gen Intern Med.* 2009;24(12):1289-1295.
21. **Carr P, Pololi L, Knight S, Conrad P.** Collaboration in academic medicine: reflections on gender and advancement. *Acad Med.* 2009;84(10):1447-1453.
22. **Conrad P, Carr P, Knight S, Renfrew MR, Dunn M, Pololi L.** Hierarchy as a barrier to advancement for women in academic medicine. *J Women's Health.* 2010;19(4):799-805.
23. **Pololi L, Kern DE, Carr P, Conrad P.** Authors' reply: faculty values. *J Gen Intern Med.* 2010;25(7):647.
24. **Pololi LH.** A prescription for diversifying medical faculties. *Chron High Educ.* September 24, 2010. B32-34.
25. **Pololi L, Cooper LA, Carr P.** Race, disadvantage and faculty experiences in U.S. academic medicine. *J Gen Intern Med.* 2010;25:1363-1369.
26. **Pololi LH.** *Changing the Culture of Academic Medicine. Perspectives of Women Faculty.* Hanover: Dartmouth College Press; 2010.
27. **Schindler BA, Novack DH, Cohen DG, et al.** The impact of the changing health care environment on the health and well-being of faculty at four medical schools. *Acad Med.* 2006;81:27-33.
28. **Butler JK.** Toward understanding and measuring conditions of trust: evolution of a conditions of trust inventory. *J Manag.* 1991;17:643-663.
29. **Pololi L, Price J.** Validation and use of an instrument to measure the learning environment as perceived by medical students. *Teach Learn Med.* 2000;12(4):201-207.
30. **Pololi LH, Dennis K, Winn GM, Mitchell J.** A needs assessment of medical school faculty: caring for the caretakers. *J Contin Educ Health Prof.* 2003;23:21-29.
31. Women in Science and Engineering Leadership Institute. <http://wiseli.engr.wisc.edu/pubtype.php> Accessed 8/5/12.
32. University of Michigan ADVANCE program. <http://www.advance.rackham.umich.edu/climatesurvey1.pdf>. Accessed 8/5/12.
33. **Raghunathan TE, Lepkowski JM, Van Hoewyk J, Solenberger PW.** A multivariate technique for multiply imputing missing values using a sequence of regression models. *Surv Methodol.* 2001;27:85-95.
34. **Rubin DB.** *Multiple Imputation for Nonresponse in Surveys.* New York: John Wiley and Sons, Inc.; 1987.
35. **Hatcher L.** *A Step-by step Approach to Using the SAS System for Factor Analysis and Structural Equation Modeling.* Cary: SAS Institute; 1994.
36. **Ely RJ, Meyerson DE.** Theories of gender in organizations. A new approach to organizational analysis and change. *Res Organ Behav.* 2000;22:103-151.
37. **Burgess DJ, Joseph A, van Ryan M, Carnes M.** Does stereotype threat affect women in academic medicine? *Acad Med.* 2012;87:506-512.
38. **Lent R, Brown S, Larkin K.** Self-efficacy in the prediction of academic performance and perceived career options. *J Couns Psychol [serial online].* 1986;33(3):265-269. Available from: PsycINFO, Ipswich, MA. Accessed July 9, 2012.
39. **Lent R, Brown S, Larkin K.** Comparison of three theoretically derived variables in predicting career and academic behavior: self-efficacy, interest congruence, and consequence thinking. *J Couns Psychol [serial online].* 1987;34(3):293-298. Available from: PsycINFO, Ipswich, MA. Accessed July 9, 2012.
40. **Markus H, Nurius P.** Possible selves. *Am Psychol.* 1986;14:954-969.
41. **Lips HM.** *A New Psychology of Women: Gender, Culture and Ethnicity.* 3rd ed. Boston: McGraw Hill; 2006:123.
42. **Eagly AH, Karau SJ.** Role congruity theory of prejudice toward female leaders. *Psychol Rev.* 2002;109:573-598.
43. **Heilman ME, Wallen AS, Fuchs D, Tamkins MM.** Penalties for success: reactions to women who succeed at male gender-typed tasks. *J Appl Psychol.* 2004;89:416-427.
44. **Heilman ME.** Description and prescription: how gender stereotypes prevent women's ascent up the organizational ladder. *J Soc Issues.* 2001;57:657674.
45. **Rudman LA.** Self-promotion as a risk factor for women: the costs and benefits of counter stereotypical impression management. *J Pers Soc Psychol.* 1998;74(3):629-645.
46. **Levine RB, Lin F, Kern DE, Wright SM, Carrese J.** Stories from early-career women physicians who have left academic medicine. *Acad Med.* 2011;86(6):752-758.
47. **Cropey KL, Masho SW, Shiang R, Sikka V, Kornstein SG, Hampton CL.** Committee on the Status of Women and Minorities. Why do faculty leave? Reasons for attrition of women and minority faculty from a medical school: four-year results. *J Women's Health.* 2008;17:1111-1118.
48. **Lowenstein SR, Fernandez G, Crane LA.** Medical school faculty discontent: prevalence and predictors of intent to leave academic careers. *BMC Med Educ.* 2007;7(37):1-8.
49. **Linn LS, Yager J, Cope D, Leake B.** Health status, job satisfaction, job stress, and life satisfaction among academic and clinical faculty. *JAMA.* 1985;254:2775-2782.
50. **Asch DA, Jedrzejewski MK, Christakis NA.** Response rates to mail surveys published in medical journals. *J Clin Epidemiol.* 1997;50:1129-1136.
51. **Groves RM, Peytcheva E.** The impact of nonresponse rates on nonresponse bias—a meta-analysis. *Public Opin Q.* 2008;72(2):167-189.
52. **Stewart AJ, Dottolo AL.** Socialization to the academy: coping with competing social identities. In: Downey G, Dweck C, Eccles J, Chatman C, eds. *Navigating the Future: social Identity, Coping and Life Tasks.* New York: Russell Sage; 2005:167-187.
53. **Turner CSV, Myers SL Jr, Creswell JW.** Exploring underrepresentation: the case of faculty of color in the Midwest. *J High Educ.* 1999;70:27-59.
54. **Tierney WG, Rhoads RA.** Faculty socialization as a cultural process: a mirror of institutional commitment. *ASHE-ERIC Higher Educ Rep.* 1994;93:29.
55. **Weidman JC, Twale DJ, Stein EL.** Socialization of graduate and professional students in higher education: a perilous passage? *ASHE-ERIC Higher Educ Rep.* 2001; 28.
56. **Haraway D.** Situated knowledges: the science question in feminism and the privilege of partial perspective. *Fem Stud.* 1988;14:575-599.