Career Development for Women in Academic Medicine

Multiple Interventions in a Department of Medicine

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Objective.—To determine the gender-based career obstacles for women in an academic department of medicine and to report the interventions to correct such obstacles (resulting from the evaluation) and the results of these interventions.

Design.—Intervention study, before-after trial, with assessment of faculty concerns and perceived change through structured, self-administered questionnaires.

Setting.—The Department of Medicine, The Johns Hopkins University School of Medicine, Baltimore, Md.

Participants.—Full-time faculty.

Interventions.—Multifaceted intervention from 1990 through 1995 to correct gender-based career obstacles reported by women faculty, including problem identification, leadership, and education of faculty, and interventions to improve faculty development, mentoring, and rewards and to reduce isolation and structural career impediments.

Main Outcome Measures.—Retention and promotion of deserving women faculty, salary equity, quality of mentoring, decreased isolation from information and colleagues, integration of women faculty into the scientific community, and decreased manifestations of gender bias.

Results.—Junior women were retained and promoted, reversing previous experience, with a 550% increase in the number of women at the associate professor rank over 5 years (from 4 in 1990 to 26 in 1995). Interim 3-year follow-up showed a 183% increase in the proportion of women faculty who expected they would still be in academic medicine in 10 years (from 23% [7/30] in 1990 to 65% [30/46] in 1993). One half to two thirds of women faculty reported improvements in timeliness of promotions, manifestations of gender bias, access to information needed for faculty development, isolation, and salary equity. Men also reported improvements in these areas.

Conclusions.—The outcomes reported here indicate that it is possible to make substantive improvements in the development of women's careers, that an institutional strategy to this end can be successful in retaining women in academic medicine, and that such interventions are likely to benefit all faculty. Long-term interventions appear essential.

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WOMEN ARE less likely to succeed in academic medical careers in the United States than men.[1-7] Compared with men, women are underrepresented in leadership roles,[1,8,9] have slower rates and lower likelihood of promotion,[1,10,11] and are less likely to become professors in their departments.[2] In an 11-year follow-up study of US medical school faculty appointed in 1980, only 5% of women became professors, compared with 23% of men, despite comparable overall rates of leaving academic medicine for women and men over this period.[10] Women also received lower salaries in comparable positions.[3,9,10]

These data suggest that the low proportion of women faculty at senior and leadership levels may not result from a cohort effect alone. Among the more subtle factors that may underlie the lesser likelihood of success for women in academic scientific careers are reduced access to mentoring[12-14] and to rewards, including promotions, salary, and recognition.[14-16] Other key factors are isolation from colleagues and career-related professional information.[14,16,17] It has been shown that women receive fewer resources to accomplish their goals, including necessary personnel, space, and equipment.[10,15] Further, academic institutions are often organized on the assumption of a "social and emotional support structure provided to the male scientist by an unpaid full-time housewife or done without,"[16] leading to structural, institutional impediments to careers for individuals without this support structure. Outright gender discrimination is another obstacle.[6,7,14] While these findings prevail, there has been no comprehensive evaluation of the differences in career development between men and women.[1]

The proportion of women on academic medical faculties increased from 13% in 1967 to 24% in 1994,[1,2] and 42% of entrants to medical schools are now women.[1,18] However, attaining a critical mass may not be sufficient to remove the obstacles that women experience in academic scientific careers.[16] For this reason, the American College of Physicians[19] and the Association of American Medi-

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cal Colleges (AAMC)[19] have urged all medical schools to design and implement institutional strategies that will foster the success of women faculty and their promotion to senior faculty positions.

This article reports the results of such an institution-based strategy, the first major effort of a US department of medicine to define and intervene aggressively to correct the structural and subtle impediments to the careers of women faculty. This article describes, in 3 phases, the identification of gender-related career obstacles (phase 1), the interventions implemented to correct the multiple obstacles identified (phase 2), and the results of the first 5 years of intervention, including improvements in promotion rates, career experiences, and gender-based obstacles for women in the department (phase 3). We also report data indicating that careers of male, as well as female, faculty benefited from these interventions.

PHASE 1: IDENTIFICATION OF GENDER-RELATED OBSTACLES (BASELINE EVALUATION)

Background and Methods

In 1989, the Provost's Committee on the Status of Women at The Johns Hopkins University, Baltimore, Md, issued a report documenting lower salaries for women faculty compared with men and substantially slower rates of promotion, the latter a result of lower rates of nomination.[11] Consequently, in 1990, the chair of the Department of Medicine, The Johns Hopkins University School of Medicine (J.D.S.), appointed the Task Force on Women's Academic Careers in Medicine to evaluate whether there were career obstacles for women faculty in the Department of Medicine and, if so, to characterize them. This task force (L.P.F., chair; C.F., E.M.W., M.M.N.) performed structured interviews of women faculty and trainees (a convenience sample of as many women as this small group had time to interview, approximately half the women at all ranks) over a 6-month period. These interviews identified recurrently described, significant problems that appeared to be generic ones, to be gender-based and that crossed ranks and divisional lines. These observations were developed into the following hypotheses for further evaluation: (1) women faculty, compared with men faculty, were less likely to be nominated for promotion, to have mentors who actively fostered their careers, to be sought for collaborative research efforts, to have equal access to resources and comparable salaries, and to participate in informal institutional networks and decision making; (2) women faculty were more likely than their male counterparts to have a mentor who used the woman faculty member's research activities for the mentor's own career needs, to experience isolation and lack of support from the academic environment, and to experience conflict between the expectations of academic culture and personal responsibilities (eg, regularly scheduled meetings on evenings and weekends conflicting with family responsibilities primarily carried out by women); and (3) obstacles to women's careers resulted both from institutional policy and structure and from the informal culture.

To evaluate these hypotheses, a self-administered anonymous questionnaire[20] was mailed to all full-time faculty in June 1990 by the department chair. The goal of the questionnaire was to determine the career development experiences and future expectations of faculty and their perceptions as to gender-based differences in these areas. Response rates were calculated, and responses to individual questions were analyzed overall, by gender, and by faculty rank. Statistical comparisons by gender and faculty rank were performed using χ^2 or t tests, as appropriate.

Results of Baseline Evaluation

Seventy percent of women (30/43) and 67% of men (97/145) on the full-time, tenure-track faculty completed the baseline questionnaire in 1990 (Table 1). Significantly more women than men perceived a wide variety of career impediments, many gender-based, involving promotions, collaborative interactions, networking, male-female interactions, and general climate, as shown in Table 2. Of note, more than half of the responding women perceived gender-related obstacles in the department. In contrast to the high frequency with which women perceived these relatively subtle obstacles to careers, only 10% of women faculty reported overt sexual harassment on the job (Table 2).

Table 3 describes mentoring experiences. One third of both female and male faculty reported having a mentor. Low but equal proportions of women and men reported that their mentors critiqued their work and fostered their careers. However, in other respects, the perceived quality of the mentoring differed by gender. First, men's mentors were significantly more likely to facilitate their external visibility, such as through chairing conferences or participating in invited manuscripts. Second, one third of women reported that their mentors used the woman faculty member's work for the mentor's own career benefit, rather than to benefit the woman's career; 10% of men reported similar experiences (P=.004).

Table 1.—Response Rates for Full-time Faculty at Baseline Evaluation in 1990

Faculty	Women, % (No.*)	Men, % (No.*)
Instructor	43 (3/7)	38 (3/8)
Assistant professor	68 (19/28)	49 (28/57)
Associate professor	100 (4/4)	84 (38/45)
Professor	100 (4/4)	80 (28/35)
Total	70 (30/43)	67 (97/145)

*Number responding/total number in group.

Four institutional policies that preferentially inhibited women's careers were identified (Table 4). Meetings after 5 PM and on weekends caused problems for two thirds of women and almost one third of men because faculty members with competing personal responsibilities were excluded from this essential information exchange and networking. The presence of rigid limits to time at rank was also cited by women as causing problems; this policy limited the ability of faculty to meet personal responsibilities if they were to be competitive for promotion within the time allotted. The lack of a part-time tenure track and the lack of on-site child care were seen as obstacles by women faculty significantly (P=.001 and .04, respectively) more frequently than by men.

Finally, future expectations varied by gender (Table 5). A lower proportion of women expected to be promoted than did men; this did not differ significantly by rank (P=.66). Notably, only 40% of the women who wanted to be in academic medicine 10 years later expected that they would be, compared with 66% of the men. Conversely, almost two thirds of the women were seriously considering leaving academic medicine, compared with 43% of the men (P=.22 for these comparisons). Among the reasons cited for considering leaving academic medicine, a perception of isolation was the only one that differed significantly by gender (cited as a reason by 80% of women compared with 34% of men, P<.05).

Discussion of Baseline Results

Overall, women faculty reported a high prevalence of gender-based career obstacles in 1990. While some were structural in origin, the majority appeared to be more informal and subtle. The latter were consistent with the definition of gender discrimination as "behaviors, actions, policies, procedures, or interactions that adversely affect a woman's work due to disparate treatment or impact, or the creation of a hostile or intimidating work or learning environment."[21] It appeared that gender-based obstacles occurred in many different aspects of a woman's career, perhaps lead-

Table 2.—Faculty Perceptions of Gender-Based Career Obstacles, 1990

Perception	Agree With Statement, % Women (n=30)	Men (n=97)	P
There are gender-based obstacles in my division to career success and satisfaction of women	52	18	.001
Climate less supportive of women than of men in the department	52	30	.05
Climate less supportive of women than of men in my division	38	15	.005
I feel like a welcomed member of the institution	38	74	.001
Women faculty are put up for promotion later than men of comparable accomplishments and time at rank	66	23	.001
Men are more likely to be sought for collaborative research, given comparable scientific expertise	59	16	.001
Professional, collegial relationships more difficult between faculty of different genders	48	21	.001
Men have difficulty taking careers of women faculty seriously and accepting women as colleagues	75	32	.001
Men faculty are denigrating to women colleagues based on their gender	34	17	.001
Informal networking in division systematically excludes faculty on basis of gender	32	2	.004
I have been harassed sexually on the job	10	2	.05

Table 3.—Mentoring Experience of Full-time Faculty, 1990

Experience	Proportion Responding Yes Women, % (n=30)	Men, % (n=97)	P
Currently have a mentor	31	33	.73
If no mentor currently, had a mentor in the past	62	57	.73
Mentor critiques scientific work	42	43	.94
Mentor actively advises and fosters career	67	73	.26
Mentor promotes participation in external professional activities	48	63	.39
Mentor facilitated (participation in)			
Chairing a conference	6	39	.008
Invited manuscripts	28	75	.001
Mentor used your work to advance his/her own career, rather than your career	32	10	.004
Mentoring relationships more difficult between a faculty member and trainee of different genders than of the same gender	45	19	.001
Division director prospectively advises about criteria for promotion	26	50	.02

Table 4.—Institutional Factors Considered Obstacles to Career Success or Satisfaction in Academic Medicine, 1990

Factor	Agree That Factor Is an Obstacle, % Women (n=30)	Men (n=97)	P
Meetings after 5 PM and on weekends	63	28	.001
Rigid promotion timelines	59	16	.001
No emergency child care	35	21	.10
No part-time tenure track	32	7	.001
No formal parental leave policy	32	17	.06
No on-site child care	27	11	.04

ing to what Bickel has described as the "cumulative disadvantages" that have a summary dampening effect on careers.[14] From our evaluations, it appeared that there were multiple impediments to women's careers and that resolution of any one impediment would not be sufficient in itself to correct the overall career-dampening effects.

Our survey assessed perceptions and experiences of faculty because it appeared from the initial interviews that these factors were important in career decisions. In 1990, few data were available to provide insight into the disparities in career experiences between men and women. It was observed by the task force that women appeared to leave either the institution or academic medicine early in their careers (ie, after holding the assistant professor rank for 4 or more years), and no information was available on the women who had left. Therefore, self-report from current faculty appeared to be a reasonable starting point. Since this questionnaire was administered, many of the perceptions of the women faculty have been substantiated in national data[4-10,12-16] and in reports from other universities.[13,17,22-24] The perceptions of women faculty that they were less likely to be promoted than men and that there were salary discrepancies by gender were also supported by 1989 data compiled by the Provost's Committee of the University.[11]

The finding in this questionnaire that isolation was a serious obstacle (it was the second most important factor for women in considering leaving academic medicine) has also been reported to be a common problem for women faculty at other institutions.[14,16,17,22] National data also indicate that women have less support for their professional activities in some areas of medicine than do men,[22] as measured by less time for research, less access to space, and fewer research assistants or secretaries.[9,10,17] Other studies indicate that although having a mentor is important in career advancement and satisfaction, women are less likely than men to have a mentor.[8,12,13] Thus, in the subset of areas investigated by others, the results of our evaluations have been substantially corroborated and validated.

Based on these findings, it was decided that there was evidence of pervasive gender discrimination and structural career obstacles for women in the Department of Medicine, and that these obstacles were multiple, complex, and often subtle. It was decided that constructive interventions that could shift these experiences and perceptions were reasonable to attempt if they would retain women in academic medicine and enhance performance.

PHASE 2: INTERVENTIONS IMPLEMENTED TO CORRECT MULTIPLE OBSTACLES

Multiple interventions were implemented in the Department of Medicine beginning in October 1990, with the long-term goal of eliminating the gender-based obstacles to women's careers. The department chair and the task force committed to a long-term, 15-year intervention to meet this goal. The short-term, 5-year goals were as follows: to retain excellent women faculty; to establish and maintain salary equity among faculty in the Department of Medicine; and to increase the number of qualified women at the associate professor rank to a proportion equivalent to the percentage of men at that rank.

The department chair and the task force agreed that interventions would originate from the department chair and be targeted to all members of the department. Interventions were initially developed by the task force and/or the department chair, with decisions for implementation made collaboratively. Interventions were designed to improve generic problems identified in the evaluations and to provide the career development and support essential to meeting goals. The major areas of intervention are summarized in Table 6.

Table 5.—Career Expectations and Factors Associated With Considering Leaving Academic Medicine, 1990

Expectations and Factors	Women, % (n=30)	Men, % (n=97)	P
Expect to be promoted	44	59	<.001
Want to be in academic medicine in 10 years	58	71	<.001
Expect to be in academic medicine in 10 years*	23	47	<.001
Seriously considering leaving academic medicine	63	43	<.001
Factors cited by those seriously considering leaving			
Uncertainty of external funding	85	91	.50
Sense of isolation	80	34	.001
Unsupportive atmosphere	74	64	.47
Too stressful	58	33	.06
Conflicting family responsibilities	50	41	.54
Salary	42	57	.28
Inadequate intellectual stimulation	0	15	.08

*Excluding those planning to retire.

Table 6.—Areas to Which Interventions Were Targeted to Improve Outcomes for Women Faculty

Leadership
Education as to nature of gender-based obstacles and motivation for change
Isolation
Faculty development
Mentoring
Rewards
Structural obstacles
Monitoring and evaluation

Leadership was defined as the most critical element of the intervention and had 3 components. The first was strong and visible leadership by the department chair regarding the necessity of eliminating gender-based obstacles. This factor was essential to legitimize the issue, to decrease the vulnerability of women who were on the task force or attended relevant meetings, and to set a model for the department.[6,16] The department chair implemented the interventions targeted to all faculty, leading discussion at active staff meetings and introducing workshops, and personally intervening with faculty and leadership to address specific gender-based problems.

The second leadership component was the Task Force on Women's Academic Careers in Medicine. The members were appointed by the department chair and worked closely with him to identify problems on an ongoing basis, to develop and implement proposals for interventions, and to monitor progress. Many interventions were developed and implemented by the task force, but under the legitimizing auspices of the department chair. The results of this work are reported in the following sections. The task force provided a model for collaborative, reasoned, and constructive solutions and offered the first opportunity for formal leadership by women within the department. After 2 years, the task force was formalized as 1 of only 3 standing committees in the department. It was provided an operating budget that covered the costs of printed materials, mailings, staff support, meetings, speakers, data analysis, and sending 2 to 6 women per year to the AAMC faculty development conferences for junior and senior women.

The third leadership component was a faculty/organization development specialist with skills in organizational assessment and change management. This individual (E.J.S.) worked with the department chair, the task force, division chiefs, and individual faculty and fellows, providing from 25% to 50% of her time. In this role, she worked intensively to evaluate departmental and divisional structure and decision-making methods and helped to institute changes that would be more inclusive and supportive of the careers of all faculty. She also served in ombuds-like roles in the department, helping to analyze problems experienced by women faculty and trainees and, with the department chair, mediate solutions.

Education of Faculty

Interventions were instituted to legitimize concerns and educate faculty as to the nature of gender discrimination and bias in academic medicine, to motivate faculty for change, and to develop the skills to accomplish such change. For all faculty, outside consultants provided lectures, workshops, and focus groups to legitimize and develop understanding in these areas. The consultants used anonymous case histories of experiences of women faculty in the department as the basis of discussion (these were collected from women faculty and trainees by the task force). Results of surveys and recommendations of the task force[25-27] were distributed to all faculty and discussed at town meetings of faculty, in leadership development meetings for division chiefs, at divisional faculty meetings, and at the departmental retreat. For the women faculty, a monthly colloquium was sponsored by the department and organized by the task force to foster consensus about gender-based career obstacles and to perform evaluation of progress and needs. The monthly colloquium also targeted the development of essential career knowledge and skills and discussion of all of these issues with international, national, and institutional leaders. The department chair and the organization development specialist recommended changes at both the departmental and divisional levels and instituted programs to enhance the sensitivity and the skills of the division chiefs to accomplish change in these areas.

Decrease the Isolation of Women Faculty

Interventions were designed to decrease women's isolation from colleagues, leadership, recognition, and quality mentoring and to increase information and skills necessary for faculty development. Standing meetings were moved from weekends and evenings so that faculty with family responsibilities could participate. Medical grand rounds, held on Saturdays for 100 years, was changed to Friday mornings. Attendance by full-time faculty, both women and men, increased substantially. Based on this success and the urging of the department chair, other meetings were rescheduled to weekday working hours. The monthly colloquium for women faculty and fellows provided opportunity for women faculty across divisions to get to know each other, which resulted in a sense of a critical mass at the departmental level (often lacking within divisions) and, thereby, reduced isolation. For the first time, women had a substantial presence as speakers at medical grand rounds and the major annual departmental educational conference, Topics in Internal Medicine. Departmental retreats were instituted for key departmental issues. A concerted effort was made to identify women, as well as men, as leaders in planning subcommittees and as speakers at these retreats, to provide visibility for women's accomplishments and leadership. To foster development of women as institutional leaders, the department sponsored 2 to 3 senior women per year to attend the Faculty Development Program for Senior Women in Academic Medicine of the AAMC. Two or more women were included on every search committee in the department, and the task force nominated women for all departmental searches.

Faculty Development and Mentoring

A review of promotions in the Department of Medicine revealed that, prior to 1990, many women were first evaluated for promotion at the limit of time at rank. It appeared to the Department of Medicine promotions committee that women, more than men, ei-

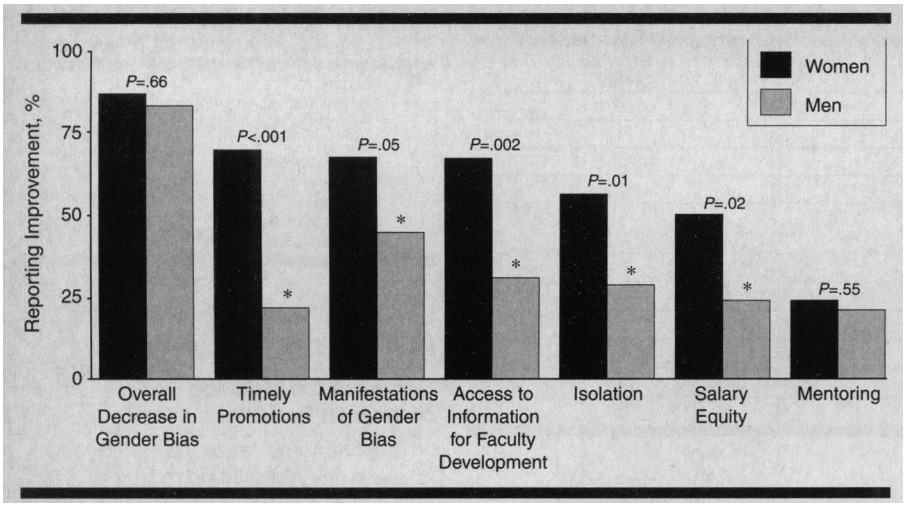

Figure 1.—Faculty report in 1993 of improvements since 1990 in areas targeted for interventions. Data are stratified by gender.

ther were not aware of the types of productivity required for promotion or had job descriptions less likely to facilitate this. Therefore, the Department of Medicine promotions committee was instructed to review the curriculum vitae of each woman faculty member annually. This intervention led to early identification of women whose careers were not progressing adequately, allowing time for effective action by the department chair, working with the division director and the faculty member. This review was found to be so useful that it was expanded to include male faculty.

Second, it appeared that most women were not receiving adequate mentoring, based on questionnaires and interviews. To compensate, a program to provide essential generic information and skills was instituted. The monthly colloquium was used to identify career development needs of women faculty and to provide information on tasks and goals at each level of a faculty career, characteristics of quality mentoring, and conflict management and negotiation. The information found to be most generally useful was subsequently presented to all faculty by the department chair. The essential characteristics of effective mentoring were defined in a monthly colloquium and then made explicit in a document authored by women faculty. It was presented to the department and has been used since to educate faculty and fellows in mentoring and being mentored.[27] The department also sponsored 3 to 5 women assistant professors per year to attend the AAMC Faculty Development Program for Junior Women in Academic Medicine.

To increase the perceived value of mentoring throughout the department, a faculty subcommittee on mentoring and faculty development was convened (W.B.B., chair), and it identified departmental needs. To enhance the mentoring by leaders, the department chair modeled annual review and mentoring sessions by initiating these with the division directors. An instrument for use in a standardized annual review that incorporated all aspects essential to career development and success was developed by the task force and recommended for implementation. Most divisions are now performing such annual reviews, although they have not yet been standardized throughout the department.

Academic Rewards

The department chair instituted salary equity by reviewing salaries within each division and increasing those of women who were below scale. He also annually reviewed the progress of women faculty with each division director. Women ready for promotion were identified through these reviews and also by the departmental promotions committee's annual review of curriculum vitae. The faculty/organization development specialist worked with the department chair and most division directors to evaluate divisional rewards, communication, and decision-making processes and to recommend structural and style changes that would make them more explicit, equitable, and inclusive of women. Additionally, the school of medicine lengthened the time limits at each rank to enhance the possibility of promotion for individuals needing to devote time to personal demands.

Monitoring and Evaluation

The task force annually presented a written evaluation of progress at the departmental and divisional levels to the department chair and recommended goals and additional methods to correct gender-based obstacles to women's careers.[26] In addition, a follow-up evaluation of faculty concerns and progress was performed by questionnaire in late 1993.

PHASE 3: RESULTS OF THE INTERVENTIONS

Methods

In late 1993, the Department of Medicine readministered the 1990 questionnaire[20] to all full-time faculty, with additional questions to assess change. The questionnaire was anonymous, and the mailing and data analysis were carried out as in 1990.

Results of Follow-up Surveys

The 3-year follow-up questionnaire had a response rate of 80% of female (47/59) and 60% of male (126/209) full-time faculty. The faculty reported changes in many of the areas targeted for interventions (Table 6). Overall, 86% of women and 83% of men reported that gender bias had decreased in the department between 1990 and 1993 (Figure 1). From one half to two thirds of women faculty reported improvements (in rank order) in timeliness of promotions, manifestations of gender bias, access to information needed for faculty development, isolation, and salary equity. One quarter of women faculty said that mentoring had improved. Men also reported improvements in each of these areas (Figure 1), with proportions ranging from 21% to 45%.

In 1993, there was a 58% decline in the proportion of women who felt that the climate in the department was less supportive of women (from 53% to 22%), and a 40% increase in the proportion of women who felt welcomed in the institution (from 38% to 53%) (Table 7). Notably, there was a 77% increase in the proportion of women reporting that their division directors advised them about promotion criteria (increased from 26% to 46%), and a 110% increase in the proportion who had mentors (from 31% in 1990 to 65% in 1993). In addition, the quality of mentoring appeared to have improved for women. There was a 74% increase in the proportion reporting that their mentors critiqued their scientific work (from 42% in 1990 to 73% in 1993) and a 27% increase in the proportion of women reporting that their mentors promoted their external visibility (from 48% to 61%), among those with mentors. There was a 39% increase in the proportion of women instructors and assistant professors who said that their mentors actively fostered their careers (increase from 65% in 1990 to 90% in 1993). In addition, there was a decline, although not significant, in the proportion of women who were uncomfortable raising issues concerning gender discrimination with their colleagues (from

Table 7.—Three-Year Change in Experiences Reported by Women Faculty

Experience	Women Responding Yes* 1990	1993	P	Change From 1990 to 1993, %†
Department is less supportive of women than of men	52 (15/29)	22 (10/46)	.008	−57.7
I feel like a welcomed member of the institution	38 (11/29)	53 (24/45)	.10	+39.5
Division director prospectively advises about promotion criteria	26 (7/27)	46 (21/46)	.08	+76.9
Currently have a mentor	31 (9/29)	65 (30/46)	.005	+109.7
Mentor critiques scientific work	42 (3/7)	73 (22/30)	.12	+73.8
Mentor actively advises and fosters career	67 (6/9)	73 (22/30)	.51	+9.0
Mentor facilitates invited manuscripts	28 (2/7)	46 (13/28)	.71	+64.3
Mentor uses your work for his/her career, not yours	32 (3/9)	18 (5/28)	.39	−43.8
Meetings after 5 PM and on weekends are an obstacle	63 (19/30)	28 (13/47)	.003	−55.6

*Data are expressed as % (No. agreeing/No. responding)
†Calculated as ([% yes 1993 − % yes 1990]/% yes 1990).

Table 8.—Three-year Change in Future Expectations Among Women Faculty

Expectation	Women Responding Yes* 1990	1993	Change From 1990 to 1993, %†
Expect to be promoted	44 (13/29)	73‡ (33/45)	+65.9
Seriously considering leaving academic medicine	63 (19/30)	28‡ (13/47)	−55.6
Expect to be in academic medicine in 10 years	23 (7/30)	65‡ (30/46)	+182.6

*Data are expressed as % (No. agreeing/No. responding)
†Calculated as ([% yes 1993 − % yes 1990]/% yes 1990).
‡ $P<.001$ difference from 1990 to 1993.

58% in 1990 to 45% in 1993). In general, men also reported improvements in these measures.

Future expectations also changed during this period. As seen in Table 8, there was a 66% increase in the proportion of women who expected to be promoted (from 44% to 73%), and a similar decline in the proportions of women considering leaving academic medicine (from 63% to 28%). Notably, among those considering leaving in 1993, the importance of isolation as a factor had declined (50% in 1993, compared with 80% in 1990; $P<.001$). While there was little change in the proportion of women who wanted to be in academic medicine in 10 years (Table 5), there was a 183% increase in the proportion who expected that they would still be in academic medicine (from 23% to 65%). With regard to these future goals, men's expectations changed similarly to women's in direction, but at a lesser magnitude. Specifically, there was a 29% increase in the proportion of men who expected to be promoted, a 42% decline in the proportion considering leaving academic medicine, and a 57% increase in the proportion who expected to be in academic medicine in 10 years (data not shown).

There were also perceptions that did not change over this time. For example, there was no change in the opinion that there were gender-specific biases in one's division (49% of women said yes in 1993; data not shown). Also unchanged were responses to questions about male-female professional interactions, collaborations or mentoring relationships, and reported sexual harassment (Tables 2 and 3).

Finally, the department separately monitored promotion rates from 1990 to 1995. The number of women at the rank of associate professor increased from 4 to 26, a 550% increase, with no changes in promotion criteria over this interval. The proportion of associate professors among women faculty increased from 9% (4/45 women) in 1990, to 32% (20/62) in 1993, to 41% (26/64) in 1995 (Figure 2), and the proportion became comparable with the proportion of men at this senior rank after 3 years. During this period, 12 women (including 4 associate professors) and 37 men (including 26 associate professors) left the faculty. The number of women and men on the full-time tenure track increased by 33% during this time.

CONCLUSION

This is the first trial in an academic department of medicine of multifaceted interventions to improve career success and satisfaction of women faculty. The strategy of targeted efforts to decrease gender-based career obstacles led to substantial positive changes in the experiences of women faculty and in their future expectations of success. Men also perceived benefit in association with these interventions.

The gender discrimination and career impediments reported by faculty at The Johns Hopkins University in 1990 are consistent with reports of problem areas in salary, promotions, mentoring, and isolation[1,2,4-17,22-24,28] and similar prevalence rates among women faculty at other institutions. At the same time, there has been the perception of a low incidence of reporting of problems because of fear of reprisals, except in instances where women voice their concerns as a group.[7]

The short-term goals of the interventions described in this study were to retain and promote qualified women faculty and thereby increase the number of women at senior faculty ranks by 50% over 3 years. As 1 measure of success, the number of women at the associate professor rank increased over 550% in 5 years, with no alteration in promotion criteria. The increase in the number of associate professors created a critical mass of women at senior ranks in the department for the first time. These interventions are now being expanded to also address the career needs of women at the associate professor level. It is hoped that, as a result, the next 5 years will show substantial increase in the numbers of women promoted to professor.

Overall, the results indicate improvement for women across a range of important obstacles to career success. Most importantly, there was a substantial decline in the proportion of women anticipating that they would leave academic medicine. At baseline, a much lower proportion of women than men anticipated remaining in academic medicine; this was consistent with the department's observation, up to 1990, of difficulty retaining women and with reports elsewhere of a "leaky pipeline" for women in science.[16,29] We intervened in areas where faculty perceived problems; some of these were substantiated at the university level or reported in studies at other institutions. Follow-up evaluation indicated that faculty saw improvements in many of these targeted areas. The results reported here indicate that the interventions increased the optimism of women faculty about their careers and decreased the substantial disparity between women's high interest in remaining in academic medicine and their low expectations that they would. Gender discrimination has been shown to result in career impediments for women physicians, including lower aspirations, motivation, commitment to medical institutions, and career derailment and changes.[28,30] Our data suggest that changes in experiences and perceptions modify future expectations and career decisions.

The substantial increase in retention and promotion of women was perceived to result primarily from several interventions: promotions committee monitoring of women's career progress, im-

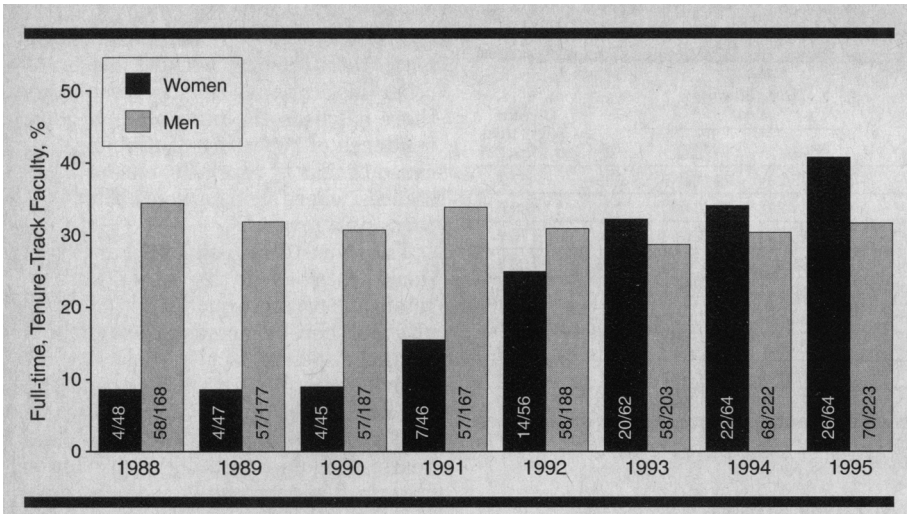

Figure 2.—Proportion of all women and all men on the full-time, tenure-track faculty in the Department of Medicine (at ranks of instructor, assistant professor, associate professor, and professor) who were associate professors from 1988 to 1995. The total number of women and of men, respectively, on the tenure track faculty (denominator) and at the associate professor rank (numerator) in each year is indicated in the appropriate bars. Associate professors are the focus here because the number of women associate professors (4) was constant in the 1980s through 1990. The number and proportion of women at this senior rank has increased steadily since 1991, reaching comparable proportions of female and male faculty at this rank after 3 years.

proved mentoring, and institution of a career development program for women. A major contributor to retention was the increased optimism by women about their careers and specifically about their opportunities at Johns Hopkins. This optimism resulted heavily from the legitimization of the problems they experienced, improved rewards (salary and recognition), and the department chair's demonstrated willingness to intervene, when needed, on behalf of women's careers.

The costs of the intervention were in several areas. Direct expenditures for the interventions totaled $46 000 per year, comprising $15 000 for the faculty/organizational development specialist, $10 000 operating budget for the task force, $15 000 for faculty time, and $6000 for education by consultants. Data analysis cost $10 000 over the course of 5 years. In addition, there were the legally necessary costs of increasing women's salaries to reach equity. Finally, many women faculty contributed substantial amounts of time to this work.

This study has implications for the broader social question of affirmative action. It appears that targeted interventions can improve the inclusion of a marginalized group to the benefit of the entire community without lowering standards. However, there remains a disparity between reports that some specific areas have improved but that male-female interactions have not done so commensurately or sufficiently, suggesting that the overall culture has not yet evolved sufficiently to remove the need for ongoing interventions. As in any successful intervention directed at marginalized groups, differential attention to women will likely be able to be decreased over time.

As in many interventions to assist marginalized groups, there has been backlash by male faculty, as well as fear by women of reprisals if they were identified as participants in these changes. These have been concerns from the outset of these interventions, and much effort was made to make the interventions always constructive and to quickly generalize useful interventions to men as well as women. The department chair has explicitly and consistently expressed the importance of these changes for the long-term good of the department and institution, helping all faculty recognize that, since women constitute half the talent pool, not drawing proportionately from that pool will limit the institution's competitiveness and excellence. The chair has consistently expressed an expectation of behavior by all faculty that is constructive and collegial and does not discriminate on the basis of gender or create an adverse work environment for women. The leadership has worked with individuals and programs to help make the adaptations that were needed. These efforts have helped maintain a general, although not uniform, perception that these changes are necessary and beneficial.

Methodological limitations of this study included the fact that it was specific to 1 department of medicine and was not a controlled trial. It is possible that some of the changes reported here may have occurred without an intervention as a result of secular changes occurring in academic medicine. However, the relatively short time in which the changes occurred, the fact that approximately half of the women promoted were identified as being ready for promotion through the process of promotions committee review, and the much greater improvements for women, to whom most interventions were initially targeted, suggest that the interventions played a significant role in the changes. Another limitation is the possibility of bias introduced into the baseline and follow-up data by having less than complete ascertainment.

Several key components of the intervention strategy deserve emphasis. The first is that active support from the department chair was essential to the success. Many women felt vulnerable and not valued in their academic unit and perceived that identification with gender-based concerns would increase their isolation from colleagues. Consistent, strong leadership from the top legitimized discussion and problem solving related to issues that otherwise might have been perceived by the community as negative and destructive.[6,16]

Second, it was anticipated that all interventions had to be long term because of the complexity of the obstacles and the extent to which they are imbedded in academic and societal culture. Thus, the Department of Medicine envisioned the need for at least a 15-year intervention strategy. The results after 5 years that are presented here constitute an interim report, documenting the substantial improvements for women accomplished in a relatively short time. New 5-year goals have been established for 1996 to 2000, and they target retention and promotion of women to professor and senior leadership positions, as well as maintenance of current changes.

Third, the multifaceted nature of obstacles to women's careers necessitated similarly complex interventions. Among the most difficult and powerful obstacles are the subtle ways in which women's accomplishments and capabilities are devalued; these phenomena required particularly extensive analysis and multiple, ongoing actions. While there were improvements in specific areas and the overall climate, these short-term interventions did not eliminate gender bias. In particular, the area in which the least change was seen over the short term was interactions between men and women. These appear to require more long-term interventions. In addition, some interventions must be implemented at levels of the university other than the department. For example, during this interval, the School of Medicine increased the time limits at each faculty rank. The university is also developing

mechanisms to provide child care.

Fourth, the intervention was progressive and implemented in small steps. Problem identification at baseline was not sufficient for the long term, and annual reevaluation was fruitful. With better understanding, new concerns have been sequentially identified. For example, the 1993 follow-up questionnaire identified a perception that women had less access to resources than men and that allocations were not equitable. Further evaluation and interventions for this and other concerns identified at our institution and in the literature are under development, including sexual harassment[5] and the lack of institutional support for faculty members who are parents.[31-36]

It has been stated that the academic culture must be changed so that it facilitates women's careers and entry of women into academic medicine—or else begin the 21st century without including half of the most qualified pool of academicians.[1,8,16,18,31,32,37] We report here a model for institutional strategies to make such changes. The outcomes reported here suggest that it is possible to make substantive improvements for women in academic medicine and that such interventions are likely to benefit all faculty in both the short term and the long road to academic equality and quality.

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