

Collaboration in Academic Medicine: Reflections on Gender and Advancement

Phyllis L. Carr, MD, Linda Pololi, MBBS, Sharon Knight, PhD, and Peter Conrad, PhD

Abstract

Purpose

Collaboration in academic medicine is encouraged, yet no one has studied the environment in which faculty collaborate. The authors investigated how faculty experienced collaboration and the institutional atmosphere for collaboration.

Method

In 2007, as part of a qualitative study of faculty in five disparate U.S. medical schools, the authors interviewed 96 medical faculty at different career stages and in diverse specialties, with an oversampling of women, minorities, and generalists, regarding their perceptions and experiences of collaboration in academic medicine. Data analysis was

inductive and driven by the grounded theory tradition.

Results

Female faculty expressed enthusiasm about the potential and process of collaboration; male faculty were more likely to focus on outcomes. Senior faculty experienced a more collaborative environment than early career faculty, who faced numerous barriers to collaboration: the hierarchy of medical academe, advancement criteria, and the lack of infrastructure supportive of collaboration. Research faculty appreciated shared ideas, knowledge, resources, and the increased productivity that could result from collaboration, but they were acutely aware that advancement requires an independent

body of work, which was a major deterrent to collaboration among early career faculty.

Conclusions

Academic medicine faculty have differing views on the impact and benefits of collaboration. Early career faculty face concerning obstacles to collaboration. Female faculty seemed more appreciative of the process of collaboration, which may be of importance for transitioning to a more collaborative academic environment. A reevaluation of effective benchmarks for promotion of faculty is warranted to address the often exclusive reliance on individualistic achievement.

Acad Med. 2009; 84:1447–1453.

Over the past several years, there has been a greater emphasis on faculty collaboration in academic medicine, particularly in research. The National Institutes of Health (NIH) Roadmap initiative has provided incentives for such collaboration,¹ and Darrell Kirch,² in his President's Address at the Association of American Medical Colleges (AAMC) annual meeting in November 2007, noted the need for the culture of academic medicine to change from one of individualistic achievement to one that

values and rewards collaboration and teamwork. Collaboration, as defined by Chrislip and Larson,³ is "a mutually beneficial relationship between two or more parties who work together toward common goals by sharing knowledge, learning, responsibility, authority and accountability for achieving results." In the fields of business and education, collaboration is widely and effectively utilized. Collaborative teamwork garners greater resources, recognition, and rewards when facing competition for finite resources.⁴

Few have studied collaboration in academic medicine, where faculty collaboration is usually an intellectual endeavor that is creative in nature. Successful academic collaboration in medicine, as opposed to more task-oriented instrumental collaboration, entails participants learning from and with one another. Although the collaborative process seems appropriate in academic medical research, an inherent contradiction exists: the promotion and advancement of faculty in academe traditionally requires an individual body of work.² We sought to understand how faculty in medical academe define and view collaboration and how they describe

the atmosphere for collaboration in academic medicine. We were especially interested in the influences of gender and career stage on perceptions about collaboration.

Method

In 2007, as part of a larger qualitative study on faculty at diverse U.S. medical schools, we selected five schools to represent the diverse organizational characteristics (i.e., public/private, NIH research intensive, primary care orientation/community orientation) of the then 126 medical schools in the United States. The sample included representation from each of the designated AAMC regions, with two schools from the Northeastern region where the bulk of medical schools are concentrated. Faculty from two public and three private schools, two research-oriented schools as determined by NIH funding, one school with a primary care orientation, and three with a community orientation participated in the study. The demographics regarding female and underrepresented minority faculty in these five schools were almost identical to

Dr. Carr is professor of medicine and associate dean for student affairs, Boston University School of Medicine, Boston, Massachusetts.

Dr. Pololi is senior scientist and resident scholar, Brandeis University, Waltham, Massachusetts.

Dr. Knight is associate dean and director of graduate studies and professor, Department of Health Education and Promotion, East Carolina University, Greenville, North Carolina.

Dr. Conrad is Harry Coplan Professor of Social Sciences at Brandeis University, Waltham, Massachusetts.

Correspondence should be addressed to Dr. Carr, Office of Student Affairs, Boston University School of Medicine, A213, 72 East Concord Street, Boston, MA 02118; telephone: (617) 638-4166; fax: (617) 638-4491; e-mail: (PLCARR@BU.EDU).

statistics regarding women and minorities at medical schools nationally.

Participant criteria

We used both stratified purposeful and chain referral sampling strategies (i.e., interviewed faculty suggested other faculty who fit particular descriptions) to identify medical faculty from the five C–Change (The National Initiative on Gender, Culture and Leadership in Medicine) medical schools⁵ on the basis of their medical school affiliation, gender, race/ethnicity, department/discipline, and career stage. Participants were research scientists, medical and surgical subspecialists, and generalist medical faculty holding doctoral degrees (84% MD/DO, 16% PhD). We interviewed 96 faculty members who were in one of four possible career stages that we felt would provide a thoughtful spectrum of medical faculty experience: (1) early career, those who were in their initial faculty appointment for two to five years, (2) “plateaued,” those faculty who had not advanced as expected in rank and responsibility and who had been faculty members for 10 or more years, (3) faculty in leadership roles such as deans, department chairs, and center directors (identified below as “senior” faculty), and (4) former faculty who had left academic medicine.

Data collection and analysis

We four authors personally conducted in-depth, open-ended interviews—15% in person and the remainder by telephone. Interviews, typically one hour in length, were audio-recorded and transcribed verbatim. We used an interview guide that we developed through a pilot series of interviews. The guide included questions such as

- What is it about your work that energizes you?
- What do you see as valued in your institution?
- How does your institution encourage interdisciplinary collaboration?
- When have you felt most successful in your work?

The data were coded and all names and identifying information were removed. We analyzed the data in aggregate by repeatedly reading the interview transcripts to develop understanding and

interpret meaning. The transcribed narrative data were stored, coded, and sorted using Atlas.ti software. Analysis involved reducing or condensing data to identify patterns and themes as they emerged from the coded data. The analysis process was inductive and driven by the Grounded Theory tradition.^{6,7} We drew and verified our conclusions by continually reviewing the transcripts and challenging one another’s findings until we developed consensus. The institutional review board at each of the investigators’ institutions (Brandeis University, Boston University School of Medicine, and East Carolina Brody School of Medicine) approved this study.

Results

Participant demographics

We invited 170 faculty to participate. Eight individuals refused, primarily because of time constraints, and 54 did not respond; we were unable to schedule interviews with 12 potential participants. We identified plateaued and early career faculty in advance through key informant interviews. Identifying male plateaued faculty was more difficult than locating female faculty at a similar stage. Overall, those in leadership were more likely to agree to participate, and we found securing interviews with early career faculty the most difficult (Table 1). However, the smaller number of early career faculty in the study was due to the fact that we reached saturation and were no longer obtaining new data from this

group. Female and underrepresented minority faculty were purposefully oversampled, as were generalists, a group comprising general internal medicine, family medicine, and general pediatrics. Fifty-five percent of the participants were women; 17% were African American/black, 4% were Hispanic/Latino, 79% were Caucasian/white, and 20% were generalists. Interviewees were similarly represented in the plateaued group (n = 23) and among those who had left academic medicine (n = 24). The largest number of participants fell into the senior leadership group (n = 28). Fewer were in the early career group (n = 21), because, as discussed above, we stopped interviewing such faculty when we no longer obtained new data. We interviewed similar numbers of faculty from each school.

Over 4,000 pages of data were recorded. In this manuscript, participants’ quotations are identified by gender, degree, and the faculty group (defined above) to which the participant belonged, as well as the area in which the collaboration occurred (research, administrative, clinical, or educational).

The results below are grouped by the seven emergent themes extracted from the data and presented in the following order: (1) the gendered meaning, value, and experience of collaboration, (2) career stage perspectives on collaboration, (3) barriers to collaboration, (4) collaboration in research—barriers and disadvantages, (5) collaboration in medical education, and (6) outcomes of collaboration.

Gendered meaning, value, and experience of collaboration

Faculty reflected on the meanings and experiences of collaboration in several ways. For some faculty, collaboration was a reason for choosing a career in academe. Several female faculty members described it as a way of working together and learning and growing in their work. Female faculty tended to value the concept and process of collaboration at all career stages:

It’s fascinating and exciting to me to see how it’s done elsewhere and get ideas . . . it’s really a shared knowledge . . . collaboration to learn, impart knowledge and look at things in a new way . . . broader than just what we each do as individuals and you can actually reach more people.

Table 1
Faculty Participants (N = 96) by Career Stage and Gender in a 2007 Qualitative Study of Collaboration in Academia

Career stage*	Female faculty	Male faculty
Early	14	7
Plateau	13	10
Senior	16	12
Left	13	11
Total	53	43

* Early faculty are those who have been faculty for two to five years; plateaued faculty are those who have not advanced as expected in rank and responsibility and who have been faculty members for 10 or more years; senior faculty are those who are in leadership roles such as deans, department chairs, and division and center directors; faculty who have left are no longer working in academia.

—Plateaued female physician
(educational collaboration)

Academic medicine offered a wide variety of opportunities . . . it offered the opportunity to teach and to work with colleagues . . . I also liked talking about ideas and thinking about ideas and collaborating on projects with colleagues.

—Female physician who left academic medicine (educational collaboration)

It was the greatest thing, I mean having that collaboration . . . I think, more and more, we think less about the departmental structure and more about collaboration than ever before.

—Senior female physician
(administrative collaboration)

Compared with male faculty, more female faculty commented on the interpersonal relationships associated with collaboration. The relationships that could result from collaboration were important to faculty. Whether the collaboration resulted in the positive bonds or whether these bonds helped to bring about collaboration was unclear, but relationships were clearly an important aspect of the collaboration process, especially for female faculty in our study:

I actually get energized by the relationships that I develop with both medical students and residents . . . as well as relationships with other faculty. I do a lot of community work and outreach, and so I think that's what draws me to it [collaboration] more than anything. It's the contacts that I develop with people and feel a bond with.

—Plateaued female physician (clinical and educational collaboration)

Female faculty viewed collaboration as a sharing of ideas and knowledge and as a way of looking at things from a new perspective. Male faculty often recounted more pragmatic reasons for collaboration such as the provision of research opportunities:

I actually have been ask[ed] to join that group several times and have had other collaborative things done because of it . . . and again . . . it came about because of my work ethic and the way I do things clinically, and for being a team player because it's very political.

—Early career male physician (clinical and research collaboration)

Male faculty recognized that chances for collaboration could be political and thus

intentionally positioned themselves to acquire these opportunities. Male faculty focused on outcomes, such as research opportunities, from their collaborative work, whereas female faculty typically focused on the process of collaboration, the generation of ideas, and the enjoyment of actual participation.

Faculty expressed the notion that a collegial, collaborative atmosphere would be the ideal environment in which to work in academic medicine. Collaboration was also seen as a means of having faculty interaction as part of the process of decision making.

It's a much better environment if there's collaboration, cooperation and support . . . I really try to make a collaborative environment where everybody feels that they're part of the decision making . . . it's a much better environment if there's collaboration and support.

—Senior female physician
(administrative collaboration)

Career stage perspectives

The career stage of faculty influenced their perspectives on collaboration. Senior faculty in leadership positions, regardless of gender, viewed collaboration as an opportunity for brainstorming, collective decision making, problem solving, and accessing other points of view. They expressed a consistently positive view of these opportunities:

The chairs get together as a group to address common problems . . . and to try to evolve collegial, collaborative ways of overcoming and addressing these problems.

—Senior male PhD faculty
(administrative collaboration)

Certainly at a high administrative level, we have a small core of administrative staff . . . we have two or three hours of . . . brainstorming meetings every week where we really . . . wrestle with issues and try to make decisions in a collaborative way.

—Senior male physician
(administrative collaboration)

Senior male faculty sometimes viewed the relationships stemming from collaboration as networking, a more formal relationship to other colleagues, both at their institution and in the larger community of academic medicine.

Part of it [collaboration] is a network of colleagues—I mentioned locally, but also nationally . . . we get together sporadically . . . they tend to be in leadership roles in other institutions and we support each other in trying to affect these big complex institutions.

—Senior male physician (administrative collaboration)

These faculty clearly enjoyed the process of collaboration and gained from the input of other senior leaders in solving administrative problems in the workings of academic institutions. Administrative collaboration tended to be more pragmatic than collaboration in research, which more formally evaluates and studies a scientific question by obtaining data.

I really loved faculty development and building programs and working with my colleagues, fellow chairs, on just trying to build the institution . . . I enjoyed it so much because I do like the interaction with the faculty and other leaders in the institution.

—Senior female physician (administrative collaboration)

For many senior faculty, a form of instrumental collaboration provided opportunities to interact with other faculty and to build interpersonal bonds or networks through collaboration.

Unlike senior faculty leaders who endorsed and embraced collaboration in their own work, early career faculty faced important impediments to collaboration. One of the major impediments was criteria for career advancement.

Barriers to collaboration

Faculty tended to work in academic environments that did not pervasively value collaboration regardless of career stage. Early career faculty, for example, tended to describe an environment that was one of competitive self-interest rather than collaboration and clearly recognized the lack of support for collaboration:

It's like playing high school football again, you know? Really it's the same sort of mentality. You watch out for the other person, I'll help you, what can I do to help you get out [of work] sooner, rather than everybody for themselves . . . in academic medicine, unfortunately, I see more of that attitude than the former, meaning that it's everybody for

themselves . . . I think more selfish than competitive.

—Early career male physician (research collaboration)

I mean that would be a positive in my life if I felt we were all sort of on this team working towards this common goal, but I don't have that.

—Early career male physician (clinical collaboration)

The hierarchical nature of academic medicine served to inhibit opportunities and collegial environments for effective collaboration. In fact, for some faculty the traditional hierarchy was the antithesis of collaboration:

What kind of structure would that (function- or purpose-driven organization) foster . . . it would look a whole lot different I would think . . . a lot less hierarchical, a whole lot more collaborative.

—Female physician who left academic medicine (research and educational collaboration)

Hierarchy creates a structure that makes communication up the line more difficult for junior faculty who would benefit from more interaction with senior and leadership faculty. Junior faculty saw senior faculty as contributing to the hierarchical structure. A senior male physician stated, "I'm the boss, don't hesitate to talk to somebody who's keeping me from ever having to talk to you." These junior faculty were concerned that departments mirrored some of their more senior faculty who could be averse to change, making it hard for new ideas to take hold. An early career stage female physician put it this way: "I think that the upper administration does not appear to be aware of the problems we have, which I think is very strange, because at one point they had to be where we are now." And a senior male physician said, "It's very hierarchical [so] those at lower levels have minimum input. . . . Certainly not into major strategic decisions at a departmental level. It's all held at a very high level."

The lack of cooperation between departments in academic medicine also works against effective collaboration as stated by this former faculty member:

I would like to see people . . . be more curious and more respectful of each

other, so not be as guarded and defensive as specialties sometimes become.

—Male physician who left academic medicine (research collaboration)

Collaboration in research

Barriers. There were barriers to research collaboration as well, including the difficulty faculty encountered learning about the work of other researchers in their institution with similar interests.

It's [collaboration] great when it happens. I mean, but when it happens, it's because you are sitting with somebody at lunch . . . it's because you are sitting there and talking about your work and you think, "Oh, I work on that. Let's do something together" . . . that's how it happens.

—Senior female PhD (research collaboration)

These informal pathways to research collaboration are common, and many faculty saw the potential of having more formal ways to encourage collaboration, such as through institutional research databases, rather than to have it occur through chance. Early career faculty involved in clinical research also expressed low expectations of other faculty contributing and collaborating with them on their research:

It's not that they don't want to be involved, it's just that they are really busy and to expect other people to care about what I'm doing, for the most part is—I don't. So I don't expect it, so I'm not very disappointed by it . . . I think isolated . . . the only time isolated bothers me is when I am trying to enroll patients in studies that I need my partners' patients. . . . I never get resistance, but I never get the level of support that would make this all better.

—Early career male physician (research collaboration)

In addition to the concerns by some male faculty about the lack of cooperation from other faculty in furthering their research studies, clinical faculty had other concerns. They identified the heavy clinical load expected by hospitals from their physician staff as a barrier to collaboration and wanted to ensure that somehow research collaboration would not be stifled for clinical faculty:

Cultivating that environment for collaborative work between that handful of researchers who are struggling to get time off from their clinical expectations.

—Early career woman PhD (research collaboration)

A major barrier for research collaboration is faculty advancement. The system of promotion usually requires an individual body of work that is clearly that of the faculty member who is under consideration for promotion. Although faculty might wish to collaborate and realize that they could gain greater productivity through collaboration, they also realize that they would be promoted or promoted earlier if their work were completely their own and separate from their mentor's line of research. Collaboration in academic medical research is the most difficult to achieve because of this constraint. As one plateaued female physician (research collaboration) stated,

My model for research is more a group model and I still work very closely with my scientific mentor, which is, you know, great, in terms of being able to use his resources, where I haven't had them, but it also hurts you in that it keeps you from looking independent, which is part of advancement.

Faculty were also aware of the contradictions between, on one side, this policy of independence and the reality of academic life and, on the other, collaboration and the need for academic medicine to change.

The goal, this whole goal of becoming an independent researcher which truthfully I think is kind of bunk at the end of the day. I think, to me, and I think the new Institute Roadmap is acknowledging that we do get a lot more done when we work together, in group mission, greater productivity. . . . You always felt like you were working together, helping one another. I have not seen that. . . . I think they [large labs that collaborate] are few and far between.

—Early career male physician (research collaboration)

Collaboration was valued and noted to provide a means of greater research productivity, but at the end of the day, faculty were very aware of the need to have accomplished goals independently.

Disadvantages. One faculty member observed that the pace of the work that was accomplished could be negatively impacted by collaboration. Investigators needed to rely on other people to complete their work in a timely way. Faculty sensed a loss of control:

[When] you need to rely on other people . . . other factors come into play, like how hard others work.

—Early career female PhD (research collaboration)

Working with others, therefore, had its limitations as well as advantages.

Collaboration in medical education

Many faculty enjoyed medical education because of the many possible avenues for collaboration. They valued the excellence of work that resulted from effective collaboration, as well as having a pragmatic outcome such as a grant or curricula.

I wrote a bunch of curricula while I was there and changed some courses fairly dramatically, and I also liked talking about ideas and thinking about ideas and collaborating on projects with other colleagues.

—Female physician who left academic medicine (educational collaboration)

Faculty also noted that collaboration as part of the leadership structure of a residency program was effective, valuable, and common to many programs.

So when I was offered the position of training director, there was no associate training director and I advocated aggressively to name an associate training director . . . I had a lot of resistance about that from my chair. Eventually she agreed and the program has been so much better.

—Early career male physician (educational collaboration)

It's a lot of work, but when you see it [new curriculum] come together, or even if it falls apart, it's such a learning process for me, and I think for them, and hopefully that we are able to—as a group—to impart some knowledge or at least a new way of looking at something to groups of students, residents, or our colleagues.

—Plateaued female physician (educational collaboration)

Outcomes

Many faculty, researchers, clinicians, and educators, particularly male faculty, expressed the need for tangible outcomes from collaboration. They felt that if they engaged in collaboration, there needed to be something in it for them, whether it was a publication, a grant, or curricula. Female faculty again imparted a sense of enjoying the process as much as the

outcome (see above quotation), and of having the ability to choose faculty for their committee as a way of increasing the probability of having more thoughtful and effective members:

What I liked about it was working with people from different backgrounds and coming together to work on a common problem and the other people there made me think of things in a way that I hadn't before. And they were people I was able to handpick . . . for being very thoughtful people . . . That was a project that involved a lot of intellectual energy, that had an outcome, you know that had a grant, a product that was really a challenge to produce.

—Plateaued female physician (educational collaboration)

This female faculty member has not advanced as expected, yet she is supportive of the idea of collaboration and finds the process in and of itself valuable, regardless of the outcome.

Some faculty, often female, were generous with the outcomes that they produced collaboratively, as illustrated in the following statement:

So we set major goals, we worked together and one of the things that happened . . . I was very generous with authorship. If you did something for the [research] project, you could be an author. And so that way everybody felt a part of it.

—Senior female physician (research collaboration)

It's several different individuals collaborating to work together to achieve a goal and publish. Just recently we recognized that there was a problem with stress, depression, and burnout . . . we had an intervention that we studied as a research project.

—Senior female physician (research collaboration)

Female faculty design opportunities that allow others to share in the outcome of their work; they value the process of collaboration, which they use as team building with colleagues. Male faculty, particularly those still in the early stages of their careers, did not express the idea of providing such a shared outcome but, rather, a more competitive approach that would result in greater research opportunities for taking on additional work (see “Barriers to Research,” the first quote: “It's everybody for themselves . . . I think more selfish than competitive”).

There were no male faculty at any stage of their careers in this study who expressed value in the process of collaboration regardless of an outcome.

Discussion

Leaders have promulgated effective collaboration as facilitating excellence in research in academic medicine, but often neither the atmosphere nor the advancement criteria in medical institutions are conducive to such collaboration. The need to transform the individualistic and competitive environment to one that is collaborative and cooperative has been voiced by senior leadership in medicine.^{1,2} There is almost no literature about collaboration in academic medicine, despite the importance of this concept. The lone, autonomous investigator who competes for research grants and advancement has long been the model for success in academic medicine. Many of the early career male faculty in our study expressed a competitiveness in the academic environment that female faculty did not experience, recognize, or create. Rather, female faculty revealed an enthusiasm about the process of collaboration, which was at odds with early career male faculty, who seemed outcome-oriented in their vision of collaboration. The concepts that female faculty associated with collaboration, such as learning and growing, sharing ideas, and gaining new perspectives—similar to those expressed by Chrislip and Larson³—are at the heart of an effective process of collaboration.

Our respondents described ways of collaborating that fit two of three descriptions of collaboration detailed by Schneider⁸: (1) brainstorming or collaboration by interest, in which collaborators spontaneously discuss a common problem at hand—this is described by senior faculty who approach institutional problems through this approach—and (2) collaboration by the leader, in which the collaborators are chosen by the committee chair and thus often have compatible values and come from similar working environments—this type of collaboration is referred to in our study by a plateaued female physician who found it essential to have thoughtful faculty whom she had selected in her committee (first quote in the outcome

section). Schneider's third way of collaboration (not specifically mentioned by our participants) is collaboration by acuity, in which the collaborators are selected to create a balanced skill set among the members. In addition to these types of collaboration, we also noted a form of instrumental collaboration through which faculty worked on large projects with multiple-author papers, essentially completing work together but not necessarily learning and growing together. Collaboration by acuity is particularly important in academic medicine because of the highly specialized nature and increasing complexity of medical knowledge. The lone, autonomous investigator is at a disadvantage as collaboration is even more vital now than in times past.

Both the lack of formal pathways in many institutions to facilitate collaboration among faculty and the barriers between departments hinder effective collaboration. One of our key findings is that faculty readily concurred that the best environment in academe is one in which cooperation, support, and collaboration exist, yet few of our faculty participants, and particularly early career faculty, described such an environment at their current institution.

Paul T.P. Wong⁹ describes five types of "toxic" cultures that inhibit collaboration: authoritarian—hierarchical, competing—conflicting, laissez faire, dishonest—corrupt, and rigid—traditional. Several aspects of academic medicine contain features of these "toxic" cultures: the hierarchical and competitive aspects of the culture, which faculty participants repeatedly noted as barriers to collaboration; chairs who are not accessible to talk with faculty; and the competitive environment for individualistic advancement sensed by early career male faculty. In business, leaders have understood the importance of a healthy corporate culture that includes trust building, transparency, accountability, and empowerment of the workforce. A hierarchical culture does not permit the equal sharing of ideas so that all participants can contribute, learn, and grow. Instead, in medical academe there is often the unilateral control of the chair or chief, resulting in lost opportunity for mutual learning, equal input, and high-quality decisions.⁹

Whereas the hierarchy and competitiveness of academe are prominent to junior faculty, senior faculty have reached another stage in their careers at which they tend to view collaboration as brainstorming; consequently, developing ideas and solving problems are forms of collaboration. Initial brainstorming often sets the tone for further work, which involves agreeing on similar group values. Senior leaders in academic medicine are likely to share a common set of academic and institutional priorities, which aid in making such sessions collaborative.⁴ Senior leaders are at the top of the hierarchy and can follow a mutual learning model in which there is transparency, sharing of information, decision making by building a consensus, and a greater commitment to implementing such decisions.¹⁰ For effective collaboration to occur, the ideas of every person need to be respected and the value of each person's contribution appreciated. From this mutual respect and appreciation, a shared field of meaning can emerge,¹¹ and differences can be seen as opportunities for learning.¹⁰ These qualities of effective collaboration seem to thrive in the brainstorming of senior faculty. Leaders seem to accept collaboration as an effective means to an end for themselves in the roles that they play, but perhaps not necessarily for junior faculty. The role of the leader suggests that advancement has occurred to some degree before a role change. Views on collaboration may change once someone meets at least initial advancement criteria and moves into an academic leadership role, such as chair or dean.

These senior faculty almost uniformly described a connection to colleagues, a readiness to collaborate with other senior faculty for problem solving, and an enhanced satisfaction from this process. Junior faculty expressed concerns both about the atmosphere in academic medicine being adverse to sharing work and about their lack of connection to other faculty. This lack of connection, despite the greater ease of communication through e-mail, faxing, and teleconferencing, suggests that relationship formation cannot be adequately achieved without direct interpersonal meetings and exchanges. Likewise, in a culture in which rank or job title is important, it can be difficult

for a lower-ranking faculty member to access more senior faculty for the purpose of collaboration. The disconnect between junior and senior faculty in our study was vivid and problematic. Particularly concerning is that early career faculty were very aware of the barriers to collaboration and pessimistic that effective, productive collaboration was possible. They were highly aware of the hierarchy, as they were close to the bottom of it. Greater efforts are necessary to support junior faculty and to create a more collaborative culture at all levels of academe.

Female faculty remained enthusiastic and positive about collaboration, whereas male faculty, particularly early career male faculty, seemed much more pragmatic about collaboration, valuing it for its outcomes. Nonetheless, these early career male faculty still perceived the individualistic and competitive atmosphere in academe. Female faculty in this study expressed greater interest in collaboration than did their male colleagues, with less concern for the outcome than the processes and the learning involved with the work. Notably, though, many of these female faculty had either plateaued or left medical academe. It is also disconcerting that it was easier to find plateaued female faculty compared with male faculty. If effective collaboration is more valued, women may find it easier to advance in their academic careers and thus be less likely to plateau.

Our study has a number of limitations. The in-depth and time-consuming nature of the interviews necessitated a small sample size, so whether our findings are generalizable is not clear. Another investigator examining our data may not extract the same themes, but we found the themes consistent and congruent. Our study also has significant strengths. This work is the first on collaboration in academic medicine and provides national information from five medical schools which are quite representative of medical schools nationally by geography, in public—private status, and demographically. The qualitative methods reveal the experience of faculty in their own rich language and according to their own understanding.

Conclusions

The descriptions of the academic environment provided by the faculty we interviewed, especially junior faculty, are concerning. Creating a supportive, collegial, and collaborative atmosphere in medical academe needs to be a high priority. Female faculty could be a particularly valuable asset in this transition because they seem to value collaboration, both the process and the outcomes. Reciprocally, building a more collaborative atmosphere could improve the position of female faculty in academic medicine. Better benchmarks to judge the accomplishments of faculty are needed so that the desire for and actual steps toward advancement are not at odds with the increasingly complex and interdisciplinary process of academic work. The criteria for promotion need to change to reflect the value of effective collaboration.

Acknowledgments

The authors gratefully acknowledge the critical funding support of the Josiah Macy Jr. Foundation and supplemental funding provided

by Office of Public Health and Science, Office of Women's Health, and Office of Minority Health; National Institutes of Health, Office of Research on Women's Health; Agency for Healthcare Research and Quality; Centers for Disease Control and Prevention; and Health Resources and Service Administration. The authors also thank Marianne McPherson and Meg Lovejoy for assistance with data coding. The authors are indebted to the medical faculty who willingly shared their thoughts with them.

References

- 1 Zerhouni E. Medicine: The NIH roadmap. *Science*. 2003;302:63–72.
- 2 Kirch DG. President's address: Culture and the courage to change. Available at: (<http://www.aamc.org/meetings/annual/2007/highlights/president.htm>). Accessed June 17, 2009.
- 3 Chrislip DD, Larson CE. Collaborative leadership: How citizens and civic leadership can make a difference. In: Schuman S, ed. *Creating a Culture of Collaboration*. San Francisco, Calif: Jossey-Bass; 1994.
- 4 Wagner CS, Loet L. Globalisation in the network of science in 2005: The diffusion of international collaboration and the formation of a core group. Available at: (<http://203.199.213.48/1271/1/globalisation.pdf>). Accessed June 17, 2009.
- 5 Biernacki P, Waldorf D. Snowball sampling: Problems and techniques of chain referral sampling. *Sociol Methods Res*. 1981;10:141–163.
- 6 Glaser B, Strauss AL. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago, Ill: Aldine; 1967.
- 7 Charmaz K. *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. Thousand Oaks, Calif: Sage Publications; 2006.
- 8 Schneider F. Collaboration: Some thoughts of new ways of working and learning together. Available at: (<http://Summit.Kein.org/node/190>). Accessed August 18, 2009.
- 9 Wong PTP. Is your organization an obstacle course or a relay team? A meaning centered approach to a collaborative culture. In: Schuman S. *Creating a Culture of Collaboration: The International Association of Facilitators Handbook*. San Francisco, Calif: Jossey-Bass; 2006.
- 10 Schwartz R. Using the facilitative leader approach to create an organizational culture of collaboration. In: Schuman S. *Creating a Culture of Collaboration: The International Association of Facilitators Handbook*. San Francisco, Calif: Jossey-Bass; 2006.
- 11 Zubizarreta R. Practical dialogue: Emergent approaches for effective collaboration In: Schuman S. *Creating a Culture of Collaboration: The International Association of Facilitators Handbook*. San Francisco, Calif: Jossey-Bass; 2006.