

Impact of a formal mentoring program on academic promotion of Department of Medicine faculty: A comparative study

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Abstract

Purpose: To evaluate the impact of a formal mentoring program on time to academic promotion and differences in gender-based outcomes.

Methods: Comparisons of time to promotion (i) before and after implementation of a formal mentoring program and (ii) between mentored and non-mentored faculty matched for covariates. Using paired-samples *t*-testing and mixed repeated measures ANCOVA, we explored the effect of mentor assignment and influence of gender on time to promotion.

Results: Promotional data from 1988 to 2010 for 382 faculty members appointed before 2003 were compared with 229 faculty members appointed in 2003 or later. Faculty appointed in 2003 or later were promoted 1.2 years (mean) sooner versus those appointed before 2003 (3.7 [SD = 1.7] vs. 2.5 [SD = 2], $p < 0.0001$). Regardless of year of appointment, mentor assignment appears to be significantly associated with a reduction in time to promotion versus non-mentored (3.4 [SD = 2.4] vs. 4.4 [SD = 2.6], $p = 0.011$). Gender effects were statistically insignificant. Post hoc analyses of time to promotion suggested that observed differences are not attributable to temporal effects, but rather assignment to a mentor.

Conclusions: Mentoring was a powerful predictor of promotion, regardless of the year of appointment and likely benefited both genders equally. University resource allocation in support of mentoring appears to accelerate faculty advancement.

Introduction

There is a widely held belief that effective mentors can enhance the productivity, career advancement and career satisfaction of junior faculty members (Applegate & Williams 1990; Levinson et al. 1991; Fried et al. 1996; Palepu et al. 1998; Jackson et al. 2003; Lukish & Cruess 2005; Straus et al. 2006; Taherian & Shekarchian 2008). Many North American academic medical centres and departments have developed formal mentoring programs designed to advance and support successful mentoring relationships (Fried et al. 1996; Morzinski et al. 1996; Pololi et al. 2002; Wingard et al. 2004). Ultimately, such programs are expected to further the success of individual faculty members and institutions that seek to encourage and retain strong academic faculty (Morzinski et al. 1994; Farrell et al. 2004; McGuire et al. 2004). Notwithstanding the resources invested in formal mentoring programs and the widespread perception that they are beneficial, there is little evidence of their actual impact.

In 2010, a systematic review of qualitative papers identified and reviewed nine papers which highlighted perceptions that mentoring is complex and when based on mutual interests provides support for both academic and personal growth across genders. Mentoring requires institutional support as

Practice points

- Mentorship accelerates time to faculty promotion.
- A formal program of mentorship accelerates time to faculty promotion by more than a year.
- Both female and male faculty members directly benefit significantly from mentorship.

well as active participation by both the mentee and the mentor (Sambunjak et al. 2010). Junior faculty members who were mentored self-reported increased publications and research productivity (Levinson et al. 1991), better research skills and preparation (Palepu et al. 1998), improved skills of academic leadership (Gray & Armstrong 2003), increased understanding of academic values (Morzinski et al. 1996), and an increased likelihood to seek an academic appointment (Straus et al. 2006). Respondents from all faculty reported increased academic retention, access to faculty development, pay equity, promotion (Wise et al. 2004), and career satisfaction (Levinson et al. 1991). They also noted that with mentoring there was decreased gender bias (Fried et al. 1996; McGuire et al. 2004) and time to promotion (Fried et al. 1996;

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Wise et al. 2004). Most importantly, mentoring was perceived to yield personal and professional benefits to the mentor (Taherian & Shekarchian 2008), mentee (Applegate & Williams 1990; Pololi et al. 2002; Taherian & Shekarchian 2008) and institution (Taherian & Shekarchian 2008). Objective studies across mentored versus non-mentored faculty consisted of compensation comparisons (with minimal effect size) (Allen et al. 2004) and improved retention rates (Wingard et al. 2004). In 2004, Allen et al. (2004) were prompted to conduct a systematic review of the qualitative data citing that the development of the theoretical construct of mentoring and its nomological net has been hampered by the lack of a collective interpretation of the data. They concluded that there was a need for quantitative and longitudinal data. Given the significant commitment of resources to create and sustain a mentoring program, objective studies are needed to demonstrate metrics of success.

We sought to evaluate the impact of a formal program of faculty mentorship based on time to academic promotion. To our knowledge, this is the first study to quantitatively evaluate the effect of a mentoring program on this metric. We hypothesized that implementing a formal mentoring program would translate into faster academic promotion after adjustment for gender, age at appointment, specialty division, academic rank and job description.

Methods

Setting and population

At the time of the study, the Department of Medicine at the University of Toronto (U of T) had 611 full-time faculty members at the level of Lecturer or above. Faculty members were appointed within a division depending on their specialty or subspecialty. Academic rank was assigned at the time of appointment to assistant, associate or full professor based on academic merit; however, some junior faculty were appointed as a lecturer if they were completing either a graduate degree or subspecialty training and had insufficient scholarship to merit an appointment of assistant professor. Moreover, faculty members were assigned to one of the five academic job descriptions based on the amount of time spent in clinical care, teaching, educational leadership and scholarship, administration, and research. The job descriptions include Clinician Teacher, Clinician Educator, Clinician Investigator, Clinician Scientist, and Clinician Administrator. PhD scientists in the Department were appointed as "Research Scientists."

Mentored cohort

Starting in 2003, a program of formal mentorship was initiated as a part of the Department of Medicine's strategic priority to support the career development of new faculty members. Each new recruit was encouraged to identify several potential mentors and, through interviews and discussion, choose a formal career mentor. If the new recruit was familiar with the University faculty, the mentor was chosen at the time of faculty appointment and the best fit was the guiding principle regardless of division, department, or institution. If the new faculty member was recruited from an external institution, he

or she was given up to 6 months following their appointment to establish a best fit mentor relationship with a formal mentor. Mentors and mentees completed an Academic Planning Document template (Appendix 1, available as supplemental material online at <http://informahealthcare.com/mte>) which was a requirement for faculty appointment. The Academic Planning Document enabled the mentee to plan their distribution of time across the various academic job requirements, including clinical care, teaching, research, and administration, compatible with their academic job description. Moreover, it allowed the mentee to list goals and enablers important to their success in the upcoming year. Mentees were also encouraged to meet with their mentor at least once a year to complete an Annual Activity Report (Appendix 2 available as supplemental material online at <http://informahealthcare.com/mte>) and re-evaluate career planning. Although this document was not a requirement of the program, many mentors asked for guidance on what to discuss in their meetings and the Annual Activity Report provided a framework to facilitate discussions pertaining to reasons for current levels of success and ways of enabling future successes.

In order to optimize the quality of the mentoring process, a number of interventions occurred. Senior faculty were engaged and acknowledged through peer reviewed nominations and awards at the department and institutional level. Tracking and reporting mentoring was included in the annual performance reviews and valued contributions were considered when applying for promotion. Mentoring workshops were offered to facilitate skill acquisition or renewal for formal mentors in the Department of Medicine. The workshop focused on the basics of mentoring including how to form a relationship, how often to meet, what to discuss, how to maintain boundaries, and how to terminate a relationship if it was not working for either party. The mentoring program description is posted on the Department's website with facilitation tools and mentoring resources (University of Toronto 2014).

Outcome measures

The individual faculty members appointed prior to 2003 formed the primary comparison cohort. The primary outcome measure was the number of years to promotion from one faculty level to another aggregated by, and matched on, academic job descriptions, gender, age at appointment, medical specialty, and rank. These measures were compared between the faculty appointed prior to 2003 and those appointed in 2003 or after. A secondary a priori comparison included the mean number of years to promotion from one faculty level to another between faculty members with a mentor and those without a mentor, regardless of year of appointment.

Data management

All Department of Medicine faculty demographics and promotion history at the University of Toronto are stored on an administrative data set. This data set is checked against a local data set to ensure data entry accuracy. The longitudinal data

set used in this analysis pertained to current faculty appointed from 1988 onwards and currently appointed on August 2010.

Data analysis

The dependent variable was time to promotion from one faculty level to another, in years, aggregated by and matched on academic job descriptions, gender, age at appointment, medical specialty and rank, to control for potential confounders of successful mentorship. Times to promotion between appointees before and after 2003 and non-mentored versus mentored faculty, irrespective of appointment years, were compared using paired sample *t*-tests. Although the process of promotion and the lack of departmental influence on promotion have remained unchanged before and after 2003, to further control for potential temporal effects and to assess the influence of gender on time to promotion, a mixed repeated measures ANCOVA was employed with two levels for the independent variable (no mentor assigned vs. mentor assigned), adjusting for mean differences in appointment years as a post hoc analysis. Gender was the between subject factor, further examined by promotion type. All data are reported as mean years (SD).

Results

At the time of the study, there were 611 full-time faculty members appointed to the Department of Medicine. Table 1 presents faculty demographics based on the year of appointment, pre-2003 or 2003 or after. Of the 611 full-time staff, 382 (62%) were appointed before 2003 (pre-2003) and 229 (38%) were appointed in 2003 or after (2003 or after). Overall, 46% of all faculty members (279/611) were promoted to assistant professor or higher since their initial appointment and 223 (85%) of these promotions occurred in faculty appointed before 2003.

A comparison of time to promotion for faculty demonstrated that, on an average, there was a significant overall decrease in the time to promotion of faculty appointed in 2003 or after. Faculty appointed in 2003 or after were promoted, on an average, 1.2 years sooner than their counterparts appointed

before 2003 (mean [SD] for 2003 or after 2.5[2.0] versus pre-2003 3.7[1.7], $p < 0.001$). This trend was observed with promotions from lecturer to assistant professor (2003 or after 1.9[1] vs. pre-2003 3.3[1.2], $p < 0.001$) (Figure 1). Time to promotion to associate professor was not significantly shorter for faculty appointed after 2003 (2003 or after 7.0 [2.2] vs. pre-2003 7.2[1.2], $p = 0.89$).

A comparison of time to promotion for mentored (M) versus non-mentored (NM) faculty, regardless of the year of appointment, demonstrated the same significant finding favouring a faster time to promotion for faculty who were mentored, $M = 3.4$ (2.4) versus NM 4.4 (2.6), $p = 0.011$ (Figure 2). The mean (SD) number of years of mentoring in faculty appointed in 2003 or after was 3.8 (0.3). No gender effect on time to promotion was apparent for either Lecturer-to-Assistant or Assistant-to-Associate promotions ($p > 0.05$).

A post hoc comparison of time to promotion for mentored versus non-mentored faculty in each cohort to minimize temporal differences and influences on the faculty in each cohort was significant, $F(1,29) = 7.90$, $p = 0.009$, $\eta^2 = 0.21$. The strength of the relationship between mentor assignment and time to promotion was moderate as assessed by partial η^2 , with a mentor assignment accounting for about 21% of the variance in the time to promotion, adjusting for mean differences in appointment years. Overall, the gender was insignificant, $F(1,29) = 0.66$, $p = 0.42$, and also within particular promotion types such as Lecturer to Assistant, $F(1,20) = 1.59$, $p = 0.22$, and Assistant to Associate, $F(1,6) = 3.30$, $p = 0.12$. No significant interaction between the gender and the effects of mentor assignment was observed, $F(1, 29) = 0.77$, $p = 0.39$.

Discussion

We found that time to promotion was significantly faster for faculty appointed after the introduction of a formal mentoring program. More importantly, mentored faculty were promoted faster than faculty without mentors, regardless of the year of appointment, suggesting that mentorship was a powerful predictor of academic success. Studies have demonstrated the effect of mentoring on faculty development and productivity but this is the first study to actually demonstrate an impact on

Table 1. Demographic data for the comparative cohorts of full-time faculty at the University of Toronto, Department of Medicine.

	Full-time faculty, $n = 611$	FT faculty appointed before 2003, $n = 382$ (62%)	FT faculty appointed in 2003 or after, $n = 229$ (38%)	<i>p</i> Value
Mean(SD) age in years at appointment	35.4 (5.4)	34.2 (4.2)	37.3 (6.4)	<0.01
Male	398 (65%)	253 (66%)	145 (63%)	NS
Clinician educators	58 (10%)	45 (12%)	13 (6%)	
Clinician administrators	30 (5%)	25 (6%)	5 (2%)	
Clinician scientists	154 (25%)	99 (26%)	55 (24%)	
Clinician teachers	211 (34%)	115 (30%)	96 (42%)	
Clinician investigators	135 (22%)	82 (22%)	53 (23%)	
Research scientists	23 (4%)	16 (4%)	7 (3%)	
Appointed at lecturer	199 (33%)	188 (35%)	84 (28%)	
Appointed at assistant professor	297 (49%)	176 (46%)	121 (53%)	
Appointed at associate professor	24 (4%)	12 (3%)	12 (5%)	
Appointed at professor	18 (3%)	6 (2%)	12 (5%)	
Mentored	257 (42%)	53 (14%)	204 (89%)	<0.01
Promoted at least once (above lecturer) since appointment	279 (46%)	223 (58%)	56 (24%)	<0.01

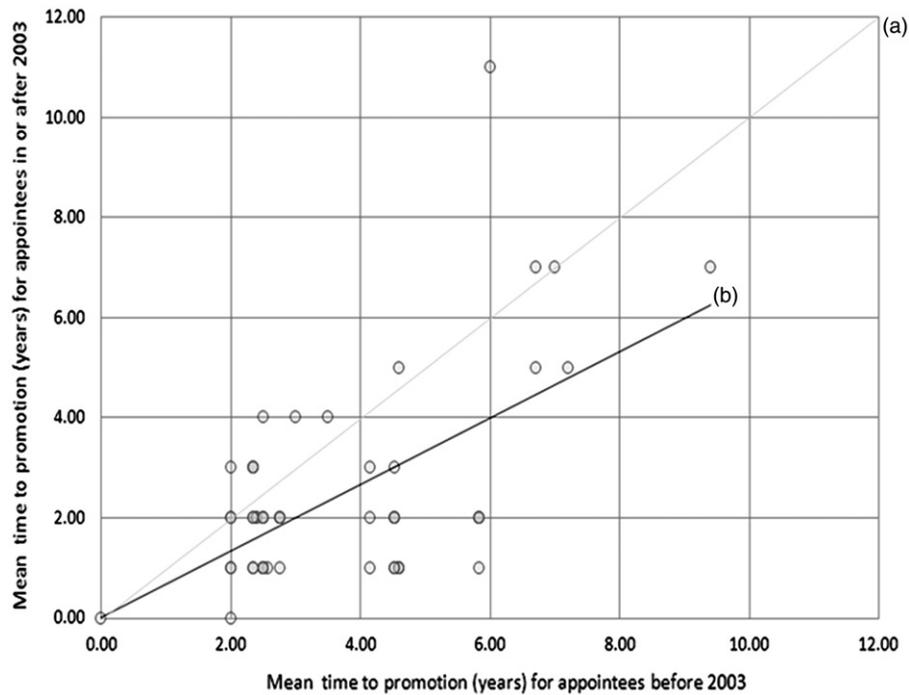


Figure 1. Comparison of time to promotion intervals for faculty appointed before versus after the introduction of a formal mentoring program in 2003. (a) Line of no change. (b) Best fit from origin. *Matched on job description, gender, age at appointment, and promotion transitions from lecturer and higher.

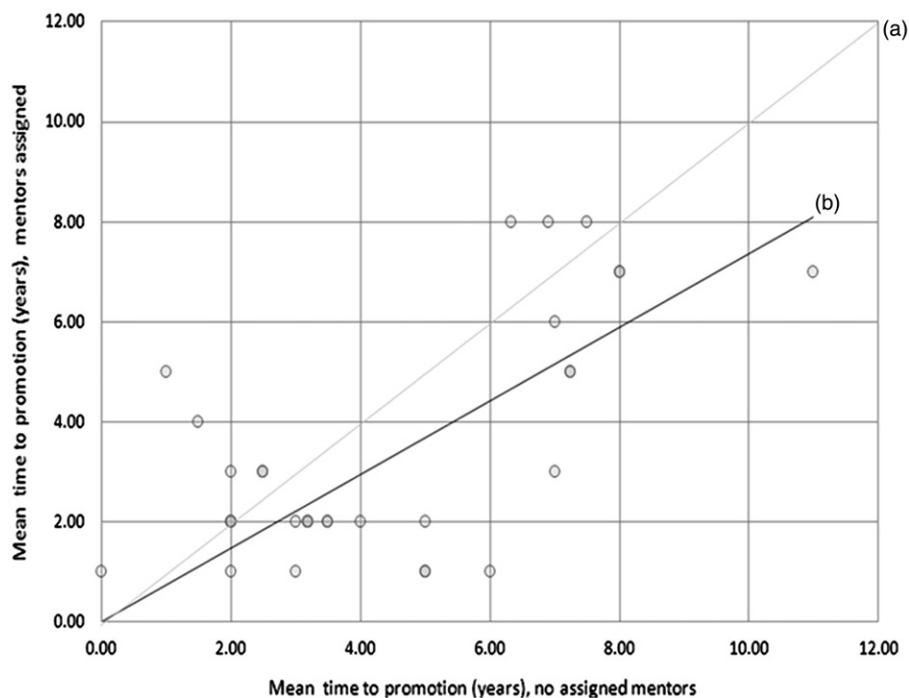


Figure 2. Comparison of time to promotion intervals for faculty with mentors versus non-mentored faculty. (a) Line of no change. (b) Best fit from origin. *Matched on job description, gender, age at appointment, and promotion transitions from lecturer and higher.

promotion rates (Morzinski et al. 1996; Allen et al. 2004; Rabatin et al. 2004; Wise et al. 2004).

There was a substantial rise in the number of mentored faculty from 14% to 89% once a formal program was put in

place. This suggests that senior faculty members were willing to serve as mentors despite the competing demands of clinical care and expected productivity in education and research (Paice et al. 2002; Gray & Armstrong 2003; DeAngelis 2004).

Prior implementation studies of mentoring programs have reported problems attributed to conflict or confusion between mentoring versus supervisory roles, confidentiality breaches, mentor bias, or lack of “active listening” (Taherian & Shekarchian 2008; Sambunjak et al 2010). There are several design features of our mentorship program which likely contributed to our favourable outcomes. To begin, we encouraged mentees to follow careful consideration for best fit (Jackson et al. 2003) and to reflect on personal needs along with how well the mentor matched their needs (Farrell et al. 2004). Mentees were also encouraged to meet all potential mentors prior to making a final decision. In addition, we stressed that these relationships could change over time; for example, a change in mentors through the termination of one mentor and the addition of another or the relationship evolving to include personal mentoring in addition to professional mentoring. Moreover, the mentoring program emphasized the importance of informal mentors and multiple mentors to help each faculty member adequately address the complexity of their academic career through diversity in mentorship.

Mentees were able to choose mentors who not only were a good personal fit, but had the skills necessary to facilitate and ensure success (Levinson et al. 1991; Jackson et al. 2003). Mentees were free to choose formal mentors from a variety of career pathways, specialties, and disciplines, including outside of medicine if the best fit was found elsewhere. This model freed mentees from artificial barriers that may otherwise have been a hindrance had they been mandated to select mentors from within their own specialties, particularly for those in emerging or small sub-specialties. The program also stressed that same sex was not as important as best fit (Jackson et al. 2003).

Mentorship is time consuming when done well and traditionally it has been considered a requirement of faculty; however, mentorship has not been reported and acknowledged in the same way as education scholarship or research productivity. Many surveys have identified the importance of institutional support and infrastructure as well as academic merit in successful mentoring programs (Morzinski et al. 1996; Pololi et al. 2002; DeAngelis 2004; McGuire et al. 2004; Taherian & Shekarchian 2008; Sambunjak et al. 2010). To address this need for infrastructure and academic merit, we implemented a number of strategies. First, formal mentor assignment was tied to the initial faculty appointment ensuring that the faculty and the leadership put in place a process to assist the new recruit in finding a mentor. This mandatory requirement reinforced the importance of a mentor to the leadership and the faculty-at-large. In addition, the Department of Medicine created awards for excellence in mentorship at the University level and at each affiliated hospital, to celebrate a number of outstanding mentors each year. The value of mentorship was also weighed during annual performance reviews as documented in the Annual Activity Reports (Appendix 2, available as supplemental material online at <http://informahealthcare.com/mte>). Mentorship activities (student, resident, fellow or peer mentoring) were documented in the promotion portfolio and served as an

additional service to the university in a faculty member's promotion file.

Adler had suggested that, in the past, the lack of senior female role models in academic positions may have deterred young women from pursuing an academic career, and the literature from the 1990s had suggested that gender bias existed in promotion and could be addressed through mentorship, increased numbers of senior female role models, and a change in institutional culture (Adler 1991; Fried et al. 1996). For women who choose an academic career in medicine, our study results are reassuring since, in the absence of any significant interaction between the gender and the apparent positive effects of mentor assignment, both females and males should equally benefit from such supportive programs.

Our study has some limitations. A potential confounding influence may have been the participants themselves. Faculty members who see the value of mentorship may also represent those who are motivated to pursue academic goals and promotion; however, a randomized trial that isolates the influence of mentoring is unlikely to be feasible given the perceived benefit of mentoring. Additionally, the data were limited to a single department within a large Faculty of Medicine in Toronto, Canada, and thus the results may not be generalizable to other departments within the University or to other faculties of medicine nationally or internationally. Furthermore, our study employed the use of institutional administrative human resources data at the target institution. While the university administrative data base was cross checked against the department dataset to ensure accuracy, the data were not collected in a prospective manner and this may have affected the accuracy of the findings.

The quality of the mentoring experience is unknown. Important parameters such as the duration of mentoring, frequency of meeting, number of informal mentors, and clustering if one faculty mentor mentored more than one faculty member were unmeasured and not included in the model. Despite the evidence of an overall mentoring program effect, we cannot adequately evaluate which design elements of the program contributed to its success.

The mentoring program is just one prong of the Department's strategic priority to support the career development of new faculty members. Although our analysis incorporated an adjustment for mean differences in appointment years as a covariate to correct for temporal effects, we cannot completely ignore the possibility that the elements of this strategic priority have generated a broader culture of career achievement that may influence time to promotion. The academic requirements and the process of applying for promotion remained unchanged throughout the duration of both cohorts. The decisions of promotion rest at the decanal level where the Department of Medicine has only a single vote so it is unlikely that these changes in culture affected the primary outcome measure. It was reassuring that a post hoc analysis controlling for temporal trends in promotion compared mentored versus non-mentored in each cohort and demonstrated a significant impact of mentorship.

Conclusion

In conclusion, our study demonstrates that a formal program of mentoring reduces time to promotion by more than a year. Perhaps more importantly mentored faculty, regardless of year of appointment or exposure to the formal mentoring program, were promoted one year faster than non-mentored faculty. It is likely that both female and male faculty members realize equally a time to promotion benefit with mentorship. University resource allocation in support of mentoring would appear to accelerate faculty advancement. Future research should address if mentorship can influence measures of institutional loyalty such as vacant post and departure rates and age of retirement in addition to academic productivity and job satisfaction.

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