

A Cross-sectional Descriptive Study of Mentoring Relationships Formed by Medical Students

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To describe medical students' mentoring relationships and determine characteristics associated with having mentors, 232/302 (77%) of third- and fourth-year medical students at the University of California at San Francisco (UCSF) were surveyed. Twenty-six percent of third-year and 45% of fourth-year students had mentors. Most met their mentors during inpatient clerkships (28%), research (19%), or sought them on the basis of similar interests (23%). On multivariate analysis, students who performed research prior to (odds ratio [OR], 4.8; 95% confidence interval [95% CI], 1.4 to 16.7; $P = .01$) or during medical school (OR, 2.4; 95% CI, 1.1 to 5.6; $P = .03$) and students satisfied with advising from all sources at UCSF (OR, 1.8; 95% CI, 1.4 to 2.4; $P < .001$) were more likely to have mentors.

KEY WORDS: mentors; questionnaires; education; medical; undergraduate.

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Mentoring is a core component in the training of young professionals. Although there is no consistent definition of *mentor*, most emphasize teaching, professional and personal guidance, sponsorship, role modeling, and socialization into a profession.¹⁻³

Much emphasis has been placed on creating and fostering mentoring relationships in medicine.⁴ Although the opportunity for mentorship begins during medical school, little is known about medical students' mentoring relationships or the students who form them. The purpose of this study is to describe the prevalence and characteristics of mentoring relationships among third- and fourth-year medical students at the University of California, San Francisco (UCSF). We sought to understand how these relationships form and whether certain students were more likely to develop successful mentoring relationships.

METHODS

We performed a cross-sectional descriptive and analytic study of all third- and fourth-year medical students

attending UCSF in Spring, 1999. We asked students to complete an anonymous questionnaire during courses in which attendance was required so that all students would be accessible for study entrance. Students not present at class and those who chose not to respond were excluded.

The survey included questions about demographics, perceived class rank, research experience, and career goals. Students were asked if they had developed a mentoring relationship, and if so, to describe it, including the functions performed by the mentor. Students without mentors were asked about perceived barriers to mentoring. We defined *mentor* in the questionnaire as:

A more senior person within the medical training environment, with whom you have a sustained, ongoing relationship. A mentor promotes your professional development by discussing your goals, needs, weaknesses and accomplishments. A mentor should be more than simply a role model or advisor.

The questionnaire was adapted from the study of role models by Wright et al.⁵ Wright drew on the Webster's dictionary definition of role model, "a person considered as a standard of excellence to be imitated." An advisor is "a person who provides a recommendation regarding a decision or a course of conduct." While a mentor may foster a student's career vision by serving as a role model and/or advisor, a mentor should not be a role model or advisor only. Our definition of mentor was drawn from business, educational, and medical literature.^{1-4,6-12} Functions that may be performed by a mentor, and that were elicited on the survey included: personal support (motivation, moral support, personal advice); career advising (assisting with career and residency choice decisions, aiding in career advancement); role modeling for career and family; and collaboration on research/projects. The definition and survey were reviewed by research faculty for thoroughness and piloted with residents and general internal medicine research fellows for clarity and completeness. The UCSF Committee on Human Research approved the study.

At the time of the survey, UCSF had no formal mentoring program. Two programs provided personal support and career advising. Students were assigned to the Medical Family Network, in which groups of approximately 10 to 15 students met with 2 faculty for quarterly group dinners. Students received personal support and general medical school advice from the faculty and senior students. Students also selected a career advisor in their specialty of choice at the end of the third year. These advisors provided information regarding residency application and career planning. Underrepresented minority

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students were also exposed to minority faculty for additional advising.

We analyzed the data using the statistical software package STATA 5.0 (STATA Corp., College Station, Tex). We performed descriptive statistics, χ^2 , Fisher's exact and Mann-Whitney rank sum tests. Using stepwise logistic regression, we assessed independent predictors of forming a mentoring relationship. The model included key demographic variables and all characteristics in bivariate analysis with a P value $\leq .05$ (age, gender, marital status, children, ethnicity, medical school year, perceived class rank, interest in academic career, interest in research, surgical specialty preference, research prior to or during medical school, and overall satisfaction with advising from all sources at UCSF).

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RESULTS

Overall, 232/302 students completed questionnaires (77% response rate). Table 1 contains demographic characteristics of the respondents.

Only 36% (83/232) of all students reported having a current mentor, although 96% (222/232) rated mentors as important or very important. In contrast, 64% (147/232) of students had a role model (63% of third- and 64% fourth-year students) and 68% (158/232) had an advisor (64% of third- and 70% of fourth-year students).

Table 1 demonstrates the medical student characteristics associated with having a mentor on bivariate analysis. On multivariate analysis (Table 2), medical school year, research prior to or during medical school, and overall satisfaction with advising from all sources at UCSF were independently associated with having a mentor. Because the variable "overall satisfaction with advising from all sources at UCSF" may have been strongly influenced by having a mentor, a second model that was identical to the first, but excluding that variable was run. The results were similar except that ethnic minority students (African American and Latin American) were now more likely to have mentors (odds ratio [OR], 3.1; 95% confidence interval [95% CI], 1.3 to 7.6; $P = .01$).

Fourth-year students most commonly met their mentors during the third (29%) and first (21%) years of medical school, followed by fourth year (19%), second year (17%), before medical school (8%), and other (6%). They met their mentors during inpatient clerkships (28%), through research activities (19%), or by seeking a mentor with similar interests (23%). Less commonly, students met their mentors during outpatient clerkships (9%), or through committee/organization participation (4%).

Students reported that 44% of their mentors were women. Sixty-three percent were between 35 and 50 years of age, with 11% less than 35, 23% greater than 50 years old, and 3% of unknown age. The majority of mentors were white (68%) or Asian (13%), with fewer being African

American (5%), Latin American (5%) or other (9%). Twenty-four percent of minority students had minority mentors. Among African-American students, 33% of their mentors were also African American, while 18% of Latin-American students had Latin-American mentors. The majority of mentors were in the fields of internal medicine (12% subspecialty medicine and 20% primary care medicine) or surgery (15% subspecialty and 6% general), with a significant minority in pediatrics (12%), neurology (6%), family medicine (4%), psychiatry (4%), and obstetrics-gynecology (4%). Mentors in our study tended to be younger and were more likely to be female, but were otherwise similar to the general faculty population at the University of California as a whole.¹³ Specific data on the demographic characteristics of the faculty at UCSF are not available.

Mentors most commonly provided personal support, role modeling, and career advising. Personal-support functions included motivation (98%), moral support (91%), and personal advice (60%). Career-advising functions included assisting with specialty (98%) and residency choice (78%) decisions and providing opportunities that aided in career advancement (83%). Eighty-nine percent of mentors served as role models for career and 80% served as role models for achieving balance between personal and professional life. Less commonly, mentors provided research opportunities (60%), collaboration on research/projects (58%), resources such as funding, office space or administrative assistance (39%), or non-research project opportunities (33%). Students met with their mentors weekly or more often (24%), monthly (29%), or less than monthly (47%). Frequency of meetings did not correlate with overall satisfaction with advising.

Among students without mentors, 23% (34/145) had approached potential mentors and 12% (17/146) had been offered mentorship. Students cited several factors in their inability to find a mentor. These factors were considered to be important barriers if they were rated as 3 or higher on a 5-point Likert scale where 1 = not at all important and 5 = very important. These barriers included discomfort asking (67%), and failing to meet someone with similar career (59%) or personal (66%) interests. Forty students wrote in additional responses, including faculty seeming too busy ($n = 13$; 33%) and their own career indecision ($n = 10$; 25%).

DISCUSSION

About 1/3 of our respondents reported finding mentors during medical school. Performing research either before or during medical school was highly correlated on both bivariate and multivariate analysis with having a mentor. Several studies examining the impact of a research mentor on career choice and academic success have found that mentors are associated with decisions to pursue a research career.¹⁴ In our bivariate analysis, students with mentors tended to be interested in both research and

Table 1. Demographic Characteristics of 232 Third- and Fourth-year Medical Students and Bivariate Analysis of Medical Student Characteristics Associated With Having a Mentor, UCSF, 1999

Characteristic	n (%)	Number Mentored (%)	P Value
Men	103 (44)	41 (40)	.2
Women	129 (56)	42 (33)	
Age, y*	28 ± 3*	27.5 ± 2.7 vs 28.8 ± 9.0 [†]	.5
Ethnicity			.12 [‡]
Asian/Pacific Islander	67 (29)	17 (25)	
African American	12 (5)	6 (50)	
White	93 (40)	39 (42)	
Latin American	22 (9)	11 (50)	
Multiethnic	21 (9)	6 (29)	
Other	16 (8)	4 (25)	
Third-year student	117 (50)	31 (26)	.003
Fourth-year student	115 (50)	52 (45)	
Self-identified class rank			.004
Top 1/3	95 (41)	44 (46)	
Middle 1/3	109 (47)	32 (29)	
Bottom 1/3	17 (7)	3 (18)	
Undisclosed	11 (5)	4 (36)	
Married	46 (20)	16 (34)	1.0
Unmarried	183 (80)	64 (35)	
Children	17 (7)	5 (29)	.6
No children	213 (93)	76 (36)	
Participant in MFN	135 (59)	49 (36)	.7
Not participant in MFN	95 (41)	32 (34)	
Committee/organization work	185 (80)	68 (37)	.5
No committee/organization work	45 (20)	14 (31)	
Continuity clinic experience	58 (25)	21 (36)	.9
No continuity clinic experience	173 (75)	61 (35)	
Medical school research	158 (69)	70 (44)	<.001
No medical school research	72 (31)	11 (15)	
Research before medical school	195 (85)	75 (38)	.02
No research before medical school	35 (15)	6 (17)	
Strong interest in research [§]	70 (30)	35 (50)	.003
No strong interest in research	160 (70)	47 (29)	
Strong interest in academic medicine [§]	136 (59)	59 (43)	.004
No strong interest in academic medicine	96 (41)	24 (25)	
Primary care specialty preference	127 (55)	40 (31)	.2
Non-primary care specialty preference	104 (45)	42 (40)	
Surgical specialty preference [¶]	23 (10)	13 (57)	.03
Non-surgical specialty preference [¶]	208 (90)	69 (33)	
Satisfaction with medical school experience [#]	3.7 ± 1.1	3.8 ± 1.2	.11
Satisfaction with advising from all sources at UCSF [#]	2.5 ± 1.1	3.0 ± 1.3	<.001

* Mean ± SD.

[†] Represents mean ± SD of mentored versus nonmentored students.

[‡] Compares minority (African American, Latin American and Native American/Pacific Islander) versus other.

[§] Strong interest indicates rating of 4 or 5 on 5-point Likert scale.

^{||} Primary care specialty preference indicates interest in career in primary care internal medicine, general pediatrics, or family medicine.

[¶] Surgical specialty preference indicates interest in career in surgery or the surgical subspecialties; non-surgical specialty preference indicates interest in any career other than surgery or the surgical subspecialties.

[#] Mean response on 5-point Likert scale, 1 = not at all satisfied, 5 = very satisfied.

UCSF, University of California–San Francisco; MFN, Medical Family Network.

academic careers. Students may also pursue research with the goal of developing a mentoring relationship.¹⁵ The fragmented medical school schedule, with frequent changes of courses and clerkships, does not promote sustained faculty–student relationships⁴ in the way that research collaborations do.

Contrary to prior literature, we did not find that female students were less likely to have mentors.¹⁶ Students

reported that 44% of their mentors were female, whereas women comprised only 24% of the university faculty at the time. This finding may be reflective of the relatively large number of female faculty at UCSF in clinician-educator and administrative positions with significant exposure to medical students. Women faculty may also make a stronger effort to provide mentorship in the face of perceived barriers to success as a female physician. Alternatively, women

Table 2. Multivariate Analysis of Medical Student Characteristics Predictive of Having a Mentor, UCSF, 1999*

Characteristic	OR	95% CI	P Value
Fourth-year student	2.2	1.1 to 4.2	.02
Minority student [†]	2.1	0.8 to 5.4	.1
Medical school research	2.4	1.1 to 5.6	.03
Research before medical school	4.8	1.4 to 16.7	.01
Surgical specialty preference	2.7	0.9 to 7.9	.07
Satisfaction with advising from all sources at UCSF [‡]	1.8	1.4 to 2.4	<.001

* Items not presented but included in the multivariate analysis (age, gender, marital status, children, perceived class rank, interest in academic career, and interest in research) were non-significant with $P > .2$.

[†] Minority, African American, Latino and Native American/Pacific Islander.

[‡] Satisfaction with advising indicated by rating of 4 or 5 on a 5-point Likert scale, 1 = not at all satisfied, 5 = very satisfied.

UCSF, University of California-San Francisco; OR, odds ratio; CI, confidence interval.

students, who comprise half of our medical school class, may actively seek women mentors.

Unlike prior studies,¹⁶ minority students at UCSF were at least as likely to find mentors as nonminorities. Including or excluding the variable "overall satisfaction with advising from all sources at UCSF" in the multivariate model had a significant impact on the degree to which student ethnicity was found to be statistically significant. Perhaps minority medical students are more likely to have a mentor because of unmeasured factors (such as the minority advising program at UCSF), and then are also more likely to be satisfied with the advising received during medical school. Once we controlled for overall satisfaction with advising, minority status became nonsignificant.

Our study has several limitations. We collected data from a single institution during 1 academic year. The cross-sectional design prevents determination of causality. Results are dependent on student report alone. We designed a new survey instrument that has not been previously validated. However, we did build on questions used by Wright et al. in their study of role models,⁵ and we piloted the instrument thoroughly. Because of the absence of a universally accepted definition of *mentor*, our definition was derived from various definitions in the literature to indicate a relationship greater than that of an advisor or role model.¹⁻³ Our 23% nonresponse rate introduces the possibility of bias, although our response rate is high compared to other survey studies involving medical students. We do not have information on whether the nonresponders were mentored or not, although the demographics of our respondents correspond closely with those of the class as a whole. Finally, we may have failed to measure some factors that are important to forming student-mentor relationships.

Ours is the first study we know of that profiles the medical students who form successful mentoring relationships and describes the characteristics of mentoring specifically for students. Our study emphasizes the importance that students place on mentors and the difficulties inherent in forming these relationships during medical school.

Our study suggests several ways to improve the quality of mentoring for medical students. On bivariate analysis, students with unformed career aspirations and those with interests outside of academic medicine were unlikely to find mentors. Early and frequent career advising may help students with unformed career aspirations make career decisions and solidify their goals, eliminating this barrier to finding a mentor. These advisors should then refer students on to potential mentors in the student's field of interest. Research or project time may also promote mentoring, although it is unclear if requiring such activities of students without interests in these areas would be successful. Exposure to faculty outside of academic medicine would assist students with nonacademic career goals.

Further studies are needed to clarify the effectiveness of early career advising programs, the components of successful programs (e.g., required research/project time, the assignment of students to faculty with similar career interests, including clinical practice as well as research), and the components of effective mentoring relationships (e.g., helping students to discover and define their interests versus influencing them in the direction of the mentors). In addition, more research is needed on the barriers that medical students face in finding mentors.

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