

Special Article

ATTRIBUTES OF EXCELLENT ATTENDING-PHYSICIAN ROLE MODELS

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ABSTRACT

Background Although effective role models are important in medical education, little is known about the characteristics of physicians who serve as excellent clinical role models. We therefore conducted a case-control study to identify attributes that distinguish such physicians from their colleagues.

Methods We asked members of the internal-medicine house staff at four teaching hospitals to name physicians whom they considered to be excellent role models. A total of 165 physicians named by one or more house-staff members were classified as excellent role models (these served as the case physicians in our study). A questionnaire was sent to them as well as to 246 physicians who had residency-level teaching responsibilities but who were not named (controls). Of these 411 physicians, 341 (83 percent) completed questionnaires while unaware of their case-control status.

Results Of the 341 attending physicians who responded, 144 (42 percent) had been identified as excellent role models. Having greater assigned teaching responsibilities was strongly associated with being identified as an excellent role model. In the multivariate analysis, five attributes were independently associated with being named as an excellent role model: spending more than 25 percent of one's time teaching (odds ratio, 5.12; 95 percent confidence interval, 1.81 to 14.47), spending 25 or more hours per week teaching and conducting rounds when serving as an attending physician (odds ratio, 2.48; 95 percent confidence interval, 1.15 to 5.37), stressing the importance of the doctor-patient relationship in one's teaching (odds ratio, 2.58; 95 percent confidence interval, 1.03 to 6.43), teaching the psychosocial aspects of medicine (odds ratio, 2.31; 95 percent confidence interval, 1.23 to 4.35), and having served as a chief resident (odds ratio, 2.07; 95 percent confidence interval, 1.07 to 3.98).

Conclusions These data suggest that many of the attributes associated with being an excellent role model are related to skills that can be acquired and to modifiable behavior. (N Engl J Med 1998;339:1986-93.)

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A CENTURY ago, William Osler helped create a new approach to medical education based largely on teaching by example. Osler himself is venerated as a paragon of clinical and pedagogic excellence, serving as an example for academic physicians to emulate. Today, role modeling is thought to be an integral component of medical education¹⁻⁸ and an important factor in shaping the values, attitudes, behavior, and ethics of medical trainees.⁷⁻¹⁰ Role models have a strong influence on the career choices of medical students.^{1,3-6,10-23} Since 1966, 25 articles have reported on various aspects of role modeling in medical education.¹⁻²⁵ Only two of these studies, however, have examined the actual attributes of excellent role models, one from the perspective of residents,¹ and the other from the perspective of medical students.⁵ We designed this multicenter case-control study of attending physicians in order to identify attributes that distinguish attending physicians who are excellent role models from their colleagues.

METHODS**Setting**

The study was conducted at four teaching hospitals, two in Montreal (Montreal General Hospital and Royal Victoria Hospital) and two in Baltimore (Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center) from November 1995 to June 1996.

Identification of Physicians as Role Models

All 188 house-staff members in internal medicine at the four hospitals were asked to complete a written, anonymous survey identifying attending physicians in their own departments of medicine whom they considered excellent role models. A role model was defined as "a person considered as a standard of excellence to be imitated."²⁶ House-staff members were allowed to name as many excellent role models as they desired. Overall, 151 (80 percent) of the house staff completed the survey, and the response rates in all four hospitals exceeded 75 percent. An attending physician who was named by at least one house officer was

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classified as an excellent role model. On the basis of this classification, we identified 165 excellent role models (who served as case physicians in our study). We also performed a subsidiary analysis in which the 46 physicians who were named as excellent role models five or more times were compared with the controls.

Selection of Controls

From the departments of medicine at the four hospitals, we acquired the names of all attending physicians who had had residency-level teaching responsibilities during the previous 12 months (1994–1995), including those who served as attending physicians on the wards, in the medical intensive care unit, in the coronary care unit, or on a consultation service, or who acted as preceptors for house officers in an outpatient setting. Both full-time and part-time faculty members were included, but research faculty members who had had no contact with house officers in the past 12 months were excluded. A total of 411 physicians at the four hospitals had taught house officers in the past year; 246 of this group, who were not named as excellent role models by any house officer, were classified as controls.

Design of the Questionnaire

A 55-item questionnaire was developed for the study. In addition to collecting demographic information and data about assigned teaching responsibilities from each physician, the questionnaire covered the following six areas: additional time spent with the house staff beyond that which was assigned; previous training in teaching; teaching style and methods; attitudes toward teaching; activities aimed at building relationships with house officers; and career-related characteristics and achievements. We distinguished between the extent of assigned teaching responsibilities, which reflects choices made by department and division chiefs, and additional time spent with the house staff, which reflects choices made by individual attending physicians both within and beyond their assigned teaching responsibilities. Responses were in the form of answers to yes-or-no questions, seven-point Likert scales, rank orders, and percentages of effort.

Administration of the Questionnaire

Of the total sample of 411 attending physicians with residency-level teaching responsibilities, 341 (83 percent) completed the questionnaire; all were unaware of their case-control status. As compared with the nonrespondents, the respondents were more likely to be women ($P=0.04$) and somewhat more likely to have been named as excellent role models ($P=0.07$). Otherwise, they were similar in terms of age, academic rank, full-time versus part-time status, and specialty. There were no significant differences in either the response rate or the ratio of case physicians to controls among the four participating teaching hospitals.

Statistical Analysis

Attributes of case and control physicians were compared with use of chi-square tests and t-tests. Odds ratios, with 95 percent confidence intervals, were determined. Responses to questionnaire items with seven-point Likert scales (e.g., “stresses importance of the doctor-patient relationship”) were initially analyzed after division into three categories — low, medium, and high. In almost every instance, the greatest contrast between case and control physicians was apparent in the comparison between the group that rated the importance of an item as “high” and the other two groups. Therefore, we combined the low and medium categories into a single comparison group throughout.

Subsequent analyses were based on logistic-regression models in which case-control status was the dependent variable. In each analysis, odds ratios with 95 percent confidence intervals were used to characterize the association of individual attributes with the likelihood of being identified as an excellent role model (i.e., case vs. control status). First, we determined the association of various assigned teaching responsibilities with case-control sta-

tus, without adjustment for other variables. Second, because we hypothesized that attending physicians who were assigned greater teaching responsibilities were more likely to be named as excellent role models, we determined the association of each individual attribute with case-control status after adjustment for the variable representing assigned teaching responsibilities; this variable was represented by two covariates entered in tandem: the sum of the number of months during which a respondent served as attending physician on the wards or in the intensive care or coronary care unit and the number of half-days the physician spent as a preceptor in an outpatient clinic each week. Analyses with adjustment for the variable representing the percentage of total effort spent in teaching yielded practically identical results.

Third, we conducted a two-stage analysis to identify the attributes with the strongest independent associations with case-control status after multivariate adjustment. In the first stage, we constructed six area-specific multivariate models corresponding to the six areas of potentially modifiable behavior or attitudes in the questionnaire. These models consisted only of variables that were significantly associated with case-control status after we controlled for assigned teaching responsibilities ($P<0.05$ by Wald test). In the second stage, we entered variables that were significantly associated with case-control status in the first-stage area-specific models (typically, one to three variables per area) into a studywide multivariate model. To assess the goodness of fit of this final model, the Hosmer-Lemeshow method based on deciles of risk was applied.²⁷ The SAS statistical package (SAS Institute, Cary, N.C.) was used for all analyses. All tests of statistical significance were two-tailed.

Because demographic characteristics were thought not to be modifiable and because the potential implications of findings involving these factors would be limited, they were treated differently from modifiable factors in our analyses. Findings regarding personal attributes such as age and sex are presented without adjustment for assigned teaching responsibilities.

RESULTS

Identification of Excellent Role Models

Sixty-seven (41 percent) of the 165 attending physicians who were identified as excellent role models were named only once or twice (Fig. 1). On average, each house officer named three attending physicians. Every house officer was able to identify at least one excellent role model.

Demographic and Career-Related Characteristics of the Respondents

Among the 341 respondents, there were no statistically significant differences between the 144 physicians identified as excellent role models and the 197 controls with respect to age, sex, additional advanced degrees (master's or Ph.D.), academic rank, or full-time versus part-time status (Table 1). Generalists were, however, more likely to be named as excellent role models than subspecialists ($P=0.004$); this was true even after we adjusted for assigned teaching responsibilities (adjusted odds ratio for the likelihood that a generalist, as compared with a subspecialist, would be named as an excellent role model, 3.37; 95 percent confidence interval, 1.79 to 6.35). The fact that teaching awards were far more common among the case physicians than the controls ($P=0.001$) validates the study's method of identifying excellent role models (construct validity).

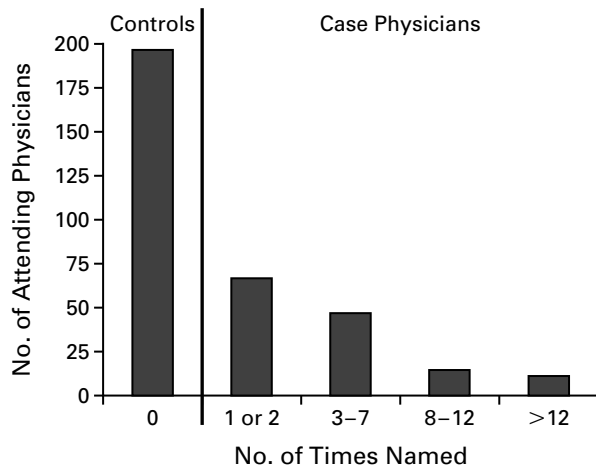


Figure 1. Frequency with Which the 341 Attending Physicians Who Participated in the Study Were Named as Excellent Role Models by the 151 House Officers in Internal Medicine at Four Teaching Hospitals.

Assigned Teaching Responsibilities

As expected, attending physicians with greater assigned teaching responsibilities were more likely to be named excellent role models (Table 2). Physicians who served as attending physicians on medical wards or in the intensive care or coronary care unit for more months per year and those who served as preceptors in outpatient clinics for a half-day or more per week were more likely to be identified as excellent role models than those who had less extensive assigned teaching responsibilities. In contrast, physicians who spent more time on a consulting service were no more likely to be named as excellent role models than those who spent less time.

Additional Time Spent with House Staff

Attending physicians who reported spending additional time with house staff beyond their assigned teaching responsibilities were more likely to be named as excellent role models (Table 3). Specifically, physicians who spent more time with the house staff when they were not acting as attending physicians, such as at morning reports or teaching conferences for house staff, were about twice as likely to be named as excellent role models as those who spent less time in such activities. Similarly, physicians who spent 25 or more hours per week teaching and conducting rounds with their teams when they were serving as attending physicians were also approximately twice as likely to be named as those who spent less than 10 hours per week.

Training in Teaching

Attending physicians who had served as chief residents or had participated in any formal training in

TABLE 1. SELECTED DEMOGRAPHIC AND CAREER-RELATED CHARACTERISTICS OF 341 ATTENDING PHYSICIANS, ACCORDING TO CASE-CONTROL STATUS.*

CHARACTERISTIC	PHYSICIANS NAMED AS EXCELLENT ROLE MODELS (N=144)	CONTROL PHYSICIANS (N=197)	P VALUE
Age — yr	45.3±7.8	46.2±9.7	0.38
Male sex — no. (%)	119 (82.6)	158 (80.2)	0.40
Advanced degree — no. (%)†	34 (23.6)	40 (20.3)	0.51
Academic rank — no. (%)			0.60
Instructor or assistant professor	54 (37.5)	84 (42.9)	
Associate professor	61 (42.4)	73 (37.2)	
Professor	29 (20.1)	39 (19.9)	
Full-time appointment — no. (%)	124 (86.1)	160 (81.2)	0.29
Teaching awards — no. (%)	64 (44.4)	29 (14.7)	0.001
Specialty — no. (%)			0.004
General internal medicine	34 (23.6)	23 (11.7)	
Medical subspecialties	110 (76.4)	174 (88.3)	

*Plus-minus values are means ±SD. All percentages have been calculated on the basis of the number of physicians with valid data available.

†Advanced degrees were defined as master's or Ph.D. degrees.

teaching (including faculty-development programs or teaching workshops) were more likely than those who had not done so to be named as excellent role models (Table 3). In contrast, excellent role models were no more likely to have received feedback from colleagues regarding their teaching performance than were controls.

Teaching Style and Methods

Attending physicians identified as being excellent role models reported stressing the importance of the doctor-patient relationship more in their teaching, placing more emphasis on the psychosocial aspects of patient care, and giving more in-depth, specific feedback to learners than did controls (Table 3). Neither the amount of time spent preparing for teaching sessions nor gearing teaching to the needs and goals of learners differed significantly between the excellent role models and the controls.

Attitudes toward Teaching

Excellent role models enjoyed teaching both medical students and house officers more than did controls (Table 3). In addition, excellent role models rated themselves higher as positive role models for the house staff than did controls. There was no significant difference between the case physicians and the controls in their beliefs about the importance of role modeling in the process of medical education, their perceptions of the influence that role models have on career choice, or the reported influence of role models in their own career development.

TABLE 2. ASSOCIATION OF ASSIGNED TEACHING RESPONSIBILITIES WITH IDENTIFICATION AS AN EXCELLENT ROLE MODEL.*

ASSIGNED TEACHING RESPONSIBILITY	PHYSICIANS NAMED AS EXCELLENT ROLE MODELS (N=144)	CONTROL PHYSICIANS (N=197)	CRUDE ODDS RATIO (95% CI)
	no. (%)		
Attending physician on ward			
<4 wk/yr	35 (24.3)	93 (47.2)	1.00
4–8 wk/yr	54 (37.5)	65 (33.0)	2.21 (1.30–3.75)
>8 wk/yr	55 (38.2)	39 (19.8)	3.75 (2.13–6.60)
Attending physician in CCU or ICU			
<4 wk/yr	115 (79.9)	175 (88.8)	1.00
4–8 wk/yr	11 (7.6)	12 (6.1)	1.39 (0.60–3.27)
>8 wk/yr	18 (12.5)	10 (5.1)	2.74 (1.22–6.15)
Preceptor in outpatient department			
Not done	34 (24.1)	88 (46.6)	1.00
1 half-day/wk	72 (51.1)	62 (32.8)	3.01 (1.78–5.06)
>1 half-day/wk	35 (24.8)	39 (20.6)	2.32 (1.27–4.25)
Attending physician on consulting service			
<4 wk/yr	48 (33.3)	51 (25.9)	1.00
4–8 wk/yr	28 (19.4)	49 (24.9)	0.61 (0.33–1.12)
>8 wk/yr	68 (47.2)	97 (49.2)	0.75 (0.45–1.23)

*CI denotes confidence interval, CCU coronary care unit, and ICU intensive care unit. All percentages have been calculated on the basis of the number of physicians with valid data available.

Building Relationships with House Officers

Engaging in more activities that build relationships with house officers was associated with an increased likelihood of being recognized as an excellent role model (Table 3). Attending physicians who were identified as excellent role models were more likely than controls to organize a dinner at the end of their month as attending physician, share professional experiences, talk about their personal lives, and try to learn about the lives of the house staff than were controls. In contrast, bringing doughnuts to rounds was not associated with identification as an excellent role model.

Career-Related Characteristics and Achievements

Attending physicians who were identified as excellent role models committed a greater percentage of their efforts to teaching, administration, and curriculum development than did controls (Table 3). In contrast, a greater proportion of time spent on research or clinical work was not associated with being identified as an excellent role model. Physicians named as excellent role models perceived more support (defined broadly to include both financial and emotional support) for their work than did the controls, and they also reported being more satisfied with medicine as a career. In crude analyses, career

achievements related to research — including total publications and time spent on research — were inversely associated with identification as an excellent role model (data not shown). However, these inverse associations were no longer significant after adjustment for assigned teaching responsibilities (Table 3).

Multivariate Analyses

After simultaneous adjustment for assigned teaching responsibilities and all variables in the model, the five independent predictors of identification as an excellent role model were having served as a chief resident, stressing the importance of the doctor–patient relationship in one’s teaching, teaching the psychosocial aspects of medicine, spending more than 25 percent of one’s time teaching, and spending 25 or more hours per week teaching and conducting rounds when attending on the wards (Table 4). The P value for the model was <0.001 by the chi-square test, and according to the Hosmer–Lemeshow goodness-of-fit method,²⁷ based on deciles of risk, the model fit the data well (P=0.69).

Subsidiary Analysis

Analyses comparing the physicians who were named most frequently (five or more times) as excellent role models with the controls had results similar to those of analyses comparing the physicians named at least once (this study’s definition of a case physician) with the controls. Three attributes that were significantly associated with identification as an excellent role model only in this reanalysis were directing one’s teaching to the learners’ needs, perceiving role modeling as important to the process of medical education, and satisfaction with one’s current position. In addition, the adjusted odds ratios of two attributes — enjoying teaching house staff and committing a higher percent of effort to teaching — were substantially higher in this reanalysis.

DISCUSSION

Our study suggests that attending physicians who are considered excellent role models differ from their colleagues in a variety of ways. All six areas explored in the study — training in teaching, teaching style and methods, attitudes toward teaching, building relationships with house officers, additional time spent with house staff, and career-related characteristics and achievements — included attributes associated with excellence as a role model. Many of the attributes represent skills that can be acquired or modifiable behavior that is under the control of individual faculty members. Some, such as the extent of assigned teaching responsibilities and faculty development, can be influenced by departmental or institutional actions.

The strengths of our study include the multicenter sample, the use of a control group, the blind-

TABLE 3. ASSOCIATION OF SELECTED CHARACTERISTICS OF ATTENDING PHYSICIANS WITH IDENTIFICATION AS AN EXCELLENT ROLE MODEL, AFTER ADJUSTMENT FOR ASSIGNED TEACHING RESPONSIBILITIES.*

CHARACTERISTIC	PHYSICIANS NAMED AS EXCELLENT ROLE MODELS (N=144)	CONTROL PHYSICIANS (N=197)	ADJUSTED ODDS RATIO (95% CI)†
	no. (%)		
Additional time spent with house staff			
Time spent with house staff when not attending			
≤2 hr/wk	37 (26.4)	94 (49.7)	1.00
3–5 hr/wk	58 (41.4)	64 (33.9)	2.02 (1.18–3.46)
≥6 hr/wk	45 (32.1)	31 (16.4)	3.13 (1.67–5.84)
Time spent with team when attending			
<10 hr/wk	29 (20.6)	67 (35.4)	1.00
11–24 hr/wk	57 (40.4)	72 (38.1)	1.79 (1.00–3.20)
≥25 hr/wk	55 (39.0)	50 (26.5)	2.49 (1.35–4.56)
Training in teaching			
Attended teaching workshops	53 (38.1)	43 (22.1)	2.06 (1.25–3.39)
Served as chief resident	52 (36.4)	42 (21.6)	2.00 (1.20–3.30)
Had any formal training in teaching	67 (48.2)	63 (32.3)	1.89 (1.18–3.01)
Attended faculty-development programs	43 (30.9)	38 (19.5)	1.75 (1.03–2.98)
Received feedback on teaching from colleagues‡	51 (35.7)	60 (30.5)	1.14 (0.71–1.84)
Teaching style and methods			
Stresses importance of the doctor-patient relationship‡	29 (20.6)	17 (8.9)	2.68 (1.40–5.20)
Teaches psychosocial aspects of medicine‡	85 (59.0)	82 (42.5)	2.00 (1.30–3.00)
Gives in-depth feedback‡	51 (35.4)	45 (23.9)	1.74 (1.08–2.81)
Prepares for teaching sessions‡	54 (38.0)	57 (30.2)	1.35 (0.84–2.17)
Directs teaching according to needs of learners‡	55 (38.2)	62 (33.0)	1.29 (0.81–2.06)
Attitudes toward teaching			
Enjoys teaching house staff‡	121 (84.0)	128 (66.3)	2.70 (1.60–4.60)
Rates self highly as a role model for house staff‡	68 (48.2)	59 (31.1)	2.12 (1.32–3.39)
Enjoys teaching medical students‡	47 (32.6)	46 (23.8)	1.80 (1.09–2.98)
Perceives role models to be important in medical education‡	44 (31.0)	47 (24.4)	1.54 (0.93–2.54)
Believes role models influence trainee's career‡	37 (25.7)	46 (23.4)	1.27 (0.75–2.14)
Notes strong influence of role models on own career‡	63 (44.4)	79 (41.6)	1.26 (0.80–1.99)
Building relationships with house officers			
Organizes end-of-month dinner	121 (84.6)	143 (76.1)	1.90 (1.10–3.50)
Shares professional experiences with house staff‡	58 (40.3)	54 (27.5)	1.73 (1.07–2.78)
Shares personal life with house staff‡	68 (47.3)	67 (34.0)	1.70 (1.10–2.70)
Learns about the lives of house staff‡	71 (49.3)	71 (36.0)	1.69 (1.07–2.67)
Brings doughnuts to house-staff team	92 (64.3)	112 (59.9)	0.76 (0.47–1.21)

ing of the attending physicians to their independently assessed case-control status, the inclusion of a sufficient number of subjects to permit adjustment for the extent of assigned teaching responsibilities and the use of multivariate analysis, and the high response rates. Previous studies identified attributes that residents¹ and medical students⁵ felt were important in selecting role models. Our study adds to knowledge about role models in medical education by examining factors such as assigned teaching responsibilities, time devoted to teaching, training in teaching, and attitudes of teachers toward teaching, which could not be assessed by surveys of learners.

Several limitations of our study should be considered in interpreting the results. First, we relied exclusively on self-reporting to characterize the attending physicians. Second, some potentially important

attributes of role models — such as clinical proficiency and teaching ability — could not be assessed with the methods used in this study. Third, although the study involved attending physicians and house staff from four different institutions, all the institutions were university-affiliated teaching hospitals in eastern North America, and the findings may therefore not be generalizable to other types of institutions or other locations. Finally, as is the case with observational studies, the associations found in our study suggest, but cannot prove, causal relations. In any observational study, other factors, such as temporal sequence, dose-response gradients, logical plausibility, and corroborating evidence from other studies, need to be considered in deciding whether or not the associations between variables are likely to be causal.²⁸

For the most part, previous studies of role model-

TABLE 3. CONTINUED.

CHARACTERISTIC	PHYSICIANS NAMED AS EXCELLENT ROLE MODELS (N=144)	CONTROL PHYSICIANS (N=197)	ADJUSTED ODDS RATIO (95% CI) †
	no. (%)		
Career-related characteristics and achievements			
Time spent in teaching			
≤10%	69 (48.9)	133 (70.0)	1.00
11–24%	46 (32.6)	47 (24.7)	1.68 (1.01–2.81)
≥25%	26 (18.4)	10 (5.3)	4.00 (1.80–9.03)
Time spent in administrative work			
≤4%	12 (8.5)	38 (19.9)	1.00
5–15%	75 (53.2)	102 (53.4)	2.01 (0.97–4.17)
>15%	54 (38.3)	51 (26.7)	3.10 (1.46–6.80)
Time spent in curriculum development			
0%	62 (45.9)	117 (61.6)	1.00
1–5%	42 (31.1)	42 (22.1)	1.62 (0.95–2.79)
>5%	31 (23.0)	31 (16.3)	2.02 (1.13–3.61)
Time spent in research			
≤10%	72 (51.1)	84 (44.0)	1.00
11–35%	33 (23.4)	39 (20.4)	1.00 (0.56–1.78)
>35%	36 (25.5)	68 (35.6)	0.81 (0.47–1.41)
Time spent in clinical work			
≤25%	45 (31.9)	57 (29.8)	1.00
26–60%	69 (48.9)	84 (44.0)	0.70 (0.41–1.22)
>60%	27 (19.1)	50 (26.2)	0.46 (0.23–0.89)
High degree of perceived total support ‡	55 (39.3)	48 (25.1)	1.90 (1.20–3.10)
High degree of satisfaction with medicine as chosen career ‡	53 (36.8)	52 (26.5)	1.65 (1.02–2.68)
High degree of satisfaction with current position ‡	29 (20.3)	30 (15.2)	1.59 (0.87–2.89)
Total no. of publications (>20 vs. ≤20)	70 (49.0)	103 (52.8)	0.89 (0.56–1.39)

*Adjustment for assigned teaching responsibilities included both months spent as an inpatient attending physician (on the wards, in the coronary care unit, or in the intensive care unit) and number of sessions per week as a preceptor in an outpatient clinic. Because of rounding, percentages do not always total 100. All percentages have been calculated on the basis of the number of physicians with valid data available. For each variable, physicians with missing data were omitted from the calculation of odds ratios.

†For characteristics related to the amount of time spent in teaching, odds ratios are expressed in relation to a reference category (odds ratio, 1.00). For other characteristics, odds ratios show the likelihood of identification as an excellent role model among physicians with the characteristic as compared with those without it, unless otherwise specified. CI denotes confidence interval.

‡For this variable, the “high” group is compared with the combined “low” and “medium” groups (see the Methods section).

ing in medical education have consisted of focus-group discussions and surveys of students, house officers, and practicing physicians.^{1,3,5,6,11,14,16,19-22,24} They provide evidence that role models are an important influence on the career choices of medical trainees.^{1,3-6,10-23} Role modeling is also felt to be an important method for helping trainees acquire the values, attitudes, and behavior associated with professionalism, humanism, and ethical practice.⁷⁻¹⁰ This study, in combination with our two previous studies,^{1,5} provides a detailed description of the physicians who have been identified as excellent role models by medical students and house officers. The characteristics of attending-physician role models highlighted in the previous studies^{1,5} included personal qualities (such as compassion, a sense of humor, and integrity), clinical skills (such as proficiency as a diagnostician and effective interaction with patients and their families), and teaching skills (such as the ability to explain difficult subjects and a nonthreatening style).

An important, although not unexpected, finding of this study is the strong, graded association between the extent of assigned teaching responsibilities and the likelihood of being identified as an excellent role model. It is difficult to know whether physicians who are excellent role models are encouraged to spend more time teaching or whether attending physicians who spend more time with house officers are more likely to be named as excellent role models. In general, however, differences in assigned teaching responsibilities did not appear to confound the relations between other attributes and identification as an excellent role model. An interesting exception was that assigned teaching responsibilities seemed to explain the inverse relation between research activities (as measured by number of publications and amount of time spent on research) and the probability of being identified as an excellent role model; this relation ceased to be significant after adjustment for assigned teaching responsibilities. This

TABLE 4. INDEPENDENT ASSOCIATIONS OF SELECTED CHARACTERISTICS OF ATTENDING PHYSICIANS WITH IDENTIFICATION AS AN EXCELLENT ROLE MODEL.

CHARACTERISTIC	ADJUSTED ODDS RATIO (95% CI)*
Additional time spent with house staff	
Spending ≥ 25 hr/wk with team when attending	2.48 (1.15–5.37)
Spending ≥ 6 hr/wk with house staff when not attending	1.82 (0.81–4.08)
Training in teaching	
Served as chief resident	2.07 (1.07–3.98)
Had any formal training in teaching	1.60 (0.87–2.92)
Teaching style and methods	
Stresses importance of the doctor–patient relationship†	2.58 (1.03–6.43)
Teaches psychosocial aspects of medicine†	2.31 (1.23–4.35)
Attitudes toward teaching	
Enjoys teaching house staff†	1.58 (0.79–3.13)
Building relationships with house officers	
Learns about the lives of the house staff†	1.22 (0.64–2.31)
Career-related characteristics and achievements	
Spends $\geq 25\%$ of time on teaching	5.12 (1.81–14.47)
Spends $>15\%$ of time on administrative work	2.52 (0.97–6.52)
High degree of perceived total support†	1.53 (0.82–2.86)

*Odds ratios have been adjusted for all other variables contained in the model, as well as for assigned teaching responsibilities (including both months spent as an attending physician on the wards, in the coronary care unit, or in the intensive care unit and number of sessions per week as a preceptor in an outpatient clinic). CI denotes confidence interval. $P < 0.001$ for the model, by the chi-square test. Because of missing data, only 304 physicians were included in this analysis.

†For this variable, the “high” group is compared with the combined “low” and “medium” groups.

finding suggests that the most important factor preventing attending physicians who concentrate on research from being identified as excellent role models may be their lack of contact with the house staff and that such exposure is a prerequisite to becoming an effective role model.

Age, sex, academic rank, and full-time versus part-time status were not associated in crude analyses with identification as an excellent role model, suggesting that all subgroups defined by these factors are equally capable in this respect. The fact that generalists were more likely than subspecialists to be named as excellent role models may be related to the different skills and interests of these two groups of academic internists.

The five attributes with the strongest independent association with being named as an excellent role model were spending more than 25 percent of one's time teaching, spending 25 or more hours per week teaching and conducting rounds when attending on the wards, having served as a chief resident, stressing the importance of the doctor–patient relationship in one's teaching, and teaching the psychosocial aspects

of medicine. Other attributes (e.g., having formal training in teaching) were associated with identification as an excellent role model in preliminary analyses after adjustment for assigned teaching responsibilities, but they did not have an independent association with being named as an excellent role model in the multivariate analysis. One possible interpretation is that such attributes do not contribute to excellence as a role model. Another possibility, however, is that these attributes do, in fact, contribute but are highly correlated with other factors.

It is difficult to elaborate on the implications of this study's results with respect to faculty responsibilities and rewards at a time when faculty members are under increasing pressure to generate more revenue. How can excellent role models be supported so that they are free to spend adequate amounts of time with learners? How can the costs of faculty development — in time and money — be supported so as to help physicians acquire skills required for excellent role modeling? There are many such questions, with few answers at present. With respect to rewards for the excellent role models, mentoring and role modeling have been found to be the third most important factor in decisions about the promotion of clinician-educators (after teaching skills and clinical skills).²⁹

In conclusion, our findings suggest that attending physicians who spend substantial amounts of time with trainees, those who have had training in teaching, and those who build positive relationships with patients and demonstrate to trainees the importance of a comprehensive approach to patient care are most likely to be recognized as excellent role models. Because most attending physicians identified as excellent role models were named by only a few house officers, numerous role models will be required if most house-staff members are to benefit from such a relationship. Since many of the attributes associated with excellence in role modeling represent behavior that can be modified and skills that can be acquired, our data suggest that, with the right advice, training, and environment, more attending physicians could become excellent role models.

Dr. Wright's work was supported by the Frank McGill Travel Fellowship and the Montreal General Hospital Research Institute.

We are indebted to the house staff and faculty members in the departments of medicine at Montreal General Hospital, Royal Victoria Hospital, Johns Hopkins Hospital, and Johns Hopkins Bayview Medical Center for their participation; and to Dr. Tim Meagher, Dr. David Goltzman, Dr. Edward Benz, Jr., and Dr. Phil Zieve for their support.

REFERENCES

1. Wright S. Examining what residents look for in their role models. *Acad Med* 1996;71:290-2.
2. Linzer M, Slavin T, Mutha S, et al. Admission, recruitment, and reten-

- tion: finding and keeping the generalist-oriented student. *J Gen Intern Med* 1994;9:Suppl 1:S14-S23.
3. Ficklin FL, Browne VL, Powell RC, Carter JE. Faculty and house staff members as role models. *J Med Educ* 1988;63:392-6.
 4. Shuval JT, Adler I. The role of models in professional socialization. *Soc Sci Med* 1980;14A:5-14.
 5. Wright S, Wong A, Newill C. The impact of role models on medical students. *J Gen Intern Med* 1997;12:53-6.
 6. Neumayer L, Konishi G, L'Archeveque D, et al. Female surgeons in the 1990s: academic role models. *Arch Surg* 1993;128:669-72.
 7. Baroness J. The GPEP report. III. Faculty involvement. *Ann Intern Med* 1985;103:454-5.
 8. Branch W, Kroenke K, Levinson W. The clinician-educator — present and future roles. *J Gen Intern Med* 1997;12:Suppl 2:S1-S4.
 9. Guide to evaluation of residents in internal medicine. 2nd ed. Philadelphia: American Board of Internal Medicine, 1992:4-5.
 10. Mufson MA. Professionalism in medicine: the department chair's perspective on medical students and residents. *Am J Med* 1997;103:253-5.
 11. Mutha S, Takayama JJ, O'Neil EH. Insights into medical students' career choices based on third- and fourth-year students' focus-group discussions. *Acad Med* 1997;72:635-40.
 12. McMurray JE, Schwartz MD, Genero NP, Linzer M. The attractiveness of internal medicine: a qualitative analysis of the experiences of female and male medical students. *Ann Intern Med* 1993;119:812-8.
 13. Lieu TA, Schroeder SA, Altman DE. Specialty choices at one medical school: recent trends and analysis of predictive factors. *Acad Med* 1989;64:622-9.
 14. Babbott D, Levey GS, Weaver SO, Killian CD. Medical student attitudes about internal medicine: a study of U.S. medical school seniors in 1988. *Ann Intern Med* 1991;114:16-22.
 15. Hunt DK, Badgett RG, Woodling AE, Pugh JA. Medical student career choice: do physical diagnosis preceptors influence decisions? *Am J Med Sci* 1995;310:19-23.
 16. Rubbeck RE, Donnelly MB, Jarecky RM, Murphy-Spencer AE, Harrell PL, Schwartz RW. Demographic, educational, and psychosocial factors influencing the choices of primary care and academic medical careers. *Acad Med* 1995;70:318-20.
 17. Rakatansky H. The role of the role model. *R I Med* 1994;77:339-40.
 18. Reuler JB, Nardone DA. Role modeling in medical education. *West J Med* 1994;160:335-7.
 19. Lublin JR. Role modelling: a case study in general practice. *Med Educ* 1992;26:116-22.
 20. Vance RP, Prichard RW, Smith RD. Recruitment of pathology trainees: recent trends from the 1989 Association of Pathology Chairmen's survey of first-year pathology residents. *Arch Pathol Lab Med* 1991;115:1097-106.
 21. Levinson W, Kaufman K, Clark B, Tolle SW. Mentors and role models for women in academic medicine. *West J Med* 1991;154:423-6.
 22. Siegler M, Reaven N, Lipinski R, Stocking C. Effect of role-model clinicians on students' attitudes in a second-year course on introduction to the patient. *J Med Educ* 1987;62:935-7.
 23. Ambrozy DM, Irby DM, Bowen JL, Burack JH, Carline JD, Stritter FT. Role models' perceptions of themselves and their influence on students' specialty choices. *Acad Med* 1997;72:1119-21.
 24. Roeske NA, Lake K. Role models for women medical students. *J Med Educ* 1977;52:459-66.
 25. Quill TE. Medical resident education: a cross-sectional study of the influence of the ambulatory preceptor as a role model. *Arch Intern Med* 1987;147:971-3.
 26. Webster's new world dictionary of the American language. College ed. Cleveland: World Publishing, 1958.
 27. Hosmer DW Jr, Lemeshow S. Applied logistic regression. New York: John Wiley, 1989.
 28. Sackett DL, Haynes RB, Guyatt GH, Tugwell P. Clinical epidemiology: a basic science for clinical medicine. 2nd ed. Boston: Little, Brown, 1991:285.
 29. Beasley BW, Wright SM, Cofrancesco J Jr, Babbott SE, Thomas PA, Bass EB. Promotion criteria for clinician-educators in the United States and Canada: a survey of promotion committee chairpersons. *JAMA* 1997;278:723-8.

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