Role Models' Influence on Specialty Choice for Residency Training: A National Longitudinal Study

John D. Yoon, MD
Sandra A. Ham, MS
Shalini T. Reddy, MD
Farr A. Curlin, MD

ABSTRACT

Background Role models in medical school may influence students' residency specialty choice.

Objective We examined whether medical students who reported clinical exposure to a role model during medical school would have an increased likelihood of selecting the role model's specialty for their residencies.

Methods We conducted a 5-year prospective, national longitudinal study (2011–2016) of medical students from 24 US allopathic medical schools, starting from the middle of their third year. The primary outcome measure was type of residency specialty choice 4 years after graduation. Main predictors were the clinical specialty of a student's most admired physician and the relative importance of 7 potentially influential factors for specialty choice in the fourth year of medical school.

Results From 919 eligible participants, 564 (61%) responded to the first survey; 474 of the respondents (84%) completed the follow-up survey. We excluded 29 participants who were not in their fourth year by the time of the follow-up survey. Of the follow-up respondents, 427 (96%) had specialty data 4 years after graduation. In our multivariate models, exposure to an admired generalist physician prior to medical school (odds ratio [OR] = 2.21, 95% confidence interval [CI] 1.03–4.73) and during medical school (OR = 2.62, 95% CI 1.69–4.05) had the strongest odds with respect to training in a generalist residency 4 years after graduation. Role model exposure also predicted specialty choice among those training in surgical and radiology, ophthalmology, anesthesiology, and dermatology (ROAD) specialties.

Conclusions Personal exposure to role models in medical school is an important predictor of residency training in that role model's specialty.

Introduction

There is a growing recognition that formative experiences during medical training play an influential role in career decisions,[1] professional identity formation,[2] and overall well-being of physicians in training.[3–5] These experiences can include interactions with positive role models who, through their personal enthusiasm, professional satisfaction, and strong sense of calling for their work, attract trainees toward their specialty.[6] Conversely, formative experiences also can have adverse effects on the professional trajectory of trainees, such as mistreatment from negative role models that puts trainees at risk for burnout.[7] Researchers have started to examine whether, and to what extent, personal exposure to role models influences the specialty choices of medical students, particularly as medical students move through the formative years of their training.[8,9]

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Editor's Note: The online version of this article contains participants' demographic characteristics, potentially influential factors in specialty choice and personal exposure to role models, and classification of American Medical Association medical specialties into specialty types.

In contrast with formal mentorship, the concept of role modeling focuses on "teaching by example."[10] Otherwise known as the "informal curriculum" of medical education, physician role models "demonstrate clinical skills, model and articulate expert thought processes, and manifest positive professional characteristics . . . [so that] student knowledge, skills, and attitudes can be changed profoundly."[10] More specifically, medical schools and residency programs have an institutional culture expressed in the informal curriculum: day-to-day habitual clinical encounters with positive or negative role models that can significantly influence trainees' experiences.[8] Such sustained encounters may be ultimately shaping trainees' career choices, their long-term resilience from burnout, and the formation of their professional identity as physicians.

As an initial exploration into the influence of role models in medical education, we conducted a 5-year, nationally representative, prospective study of US third-year medical students from 2011 to 2016—following them from the middle of their third year of medical school into their final years of residency training. The aim of this study was to assess the importance students ascribed to physician role models relative to other factors commonly associated with specialty choice,

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including debt, income, lifestyle considerations, concerns of burnout, and other factors. We examined whether personal exposure to a role model prior to or during medical school predicted students' eventual practice in the role model's specialty.

What was known and gap
Role models are thought to influence specialty choice, although few studies have analyzed this relationship.

What is new
A longitudinal study tracked students at 24 US medical schools from their third year to 4 years after graduation to assess the influence of an admired physician and 7 other factors.

Limitations
Analysis was at 2 points in time, and "generalist" residents may complete further subspecialty training; associations cannot establish causal relationships.

Bottom line
Personal exposure to positive role models is a predictor of medical students' choice of the role model's specialty.

Methods

Design

This study was part of the Project on the Good Physician at the University of Chicago.[11] After a relevant review of the literature on specialty choice and role models, survey questions underwent expert review by colleagues as well as pretesting by a group of third-year medical students at the University of Chicago Pritzker School of Medicine. To ensure a nationally representative sample of both medical schools and students, we selected 960 third-year students from 24 allopathic medical schools in the United States (provided as online supplemental material). Participants received an initial survey in January 2011 by mail and e-mail and a follow-up survey 6 to 9 months later, when the third-year students became fourth-year students. Case weights were constructed to reflect the probability of selection from the national sample and sources of variance associated with the sample design, and to adjust for potential nonresponse bias, as described in detail elsewhere.[11,12]

Instrument

In the follow-up survey, students were given the following instruction: "Among the physicians you have known personally, think about the one you most admire as a physician." They were then to report that physician's clinical specialty as an open-ended response (provided as online supplemental material). Clinical specialty data were coded by matching textual descriptions of the specialties with the categories used by the American Medical Association (AMA) to identify residents' subsequent specialty choice. The AMA categories were further classified into 3 types as dichotomous variables: generalist specialties/other, surgical specialties/other, and radiology, ophthalmology, anesthesiology, and dermatology (ROAD) specialties/other (provided as online supplemental material).

Respondents were asked, "How much do you think each of the following considerations will influence your specialty choice?" with a list of 7 items (provided as online supplemental material). For each item, responses were dichotomized into *not influential* ("little to no influence" and "some influence") or *influential* ("a lot of influence" and "the most possible influence").

Data for specialty during residency in May 2016 were obtained from the AMA Physician Masterfile. Using the same criteria as described prior for the role model data (provided as online supplemental material), specialties were classified as generalist, surgical, and ROAD specialties. Student specialties were operationalized as 3 dichotomous variables and as a single nominal variable with 3 categories that excluded all other specialties.

This study was approved by the University of Chicago Social Sciences Institutional Review Board.

Statistical Analysis

All statistical analyses were conducted using SAS version 9.4 (SAS Institute Inc, Cary, NC). We described demographic characteristics with chi-square tests for differences by sex, and we described the frequencies of the top 10 most common residency specialties among residents and their role models. Chi-square tests were used to compare the weighted prevalence of each of 8 potentially influential factors by specialty type during residency. Logistic regressions (SURVEYLOGISTIC procedures within SAS) were used to examine which factors reported in the fourth year of medical school were significantly associated with specialty choice during residency training while adjusting for potential confounders (sex, being an underrepresented minority, levels of student debt, and having grown up in a medically underserved area). Statistical analyses were weighted and adjusted to account for sample design and nonresponse. We used 2-sided tests, with P values $< .05$ considered statistically significant.

Results

Of the 919 eligible third-year students, 564 (61%) completed the initial survey; 474 of the respondents (84%) completed the follow-up survey. We excluded

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TABLE 1
Demographics of Respondent Sample for the Project on the Good Physician (2011)

Characteristics	Men, n (%)	Women, n (%)	Total, n (%)	*P* Value
Total	235 (100)	192 (100)	427 (100)	
Underrepresented minority	21 (9)	29 (15)	50 (12)	.031
Grew up in a medically underserved area	52 (22)	48 (25)	100 (23)	.30
Total student debt				.31
No debt	27 (11)	19 (10)	46 (11)	
$\leq$ $50,000	19 (8)	14 (7)	33 (8)	
$50,000–$100,000	31 (13)	20 (10)	51 (12)	
$100,001–$150,000	49 (21)	30 (16)	79 (19)	
$150,001–$200,000	43 (18)	51 (27)	94 (22)	
$>$ $200,000	65 (28)	57 (30)	122 (29)	

29 participants who were not in their fourth year by the time of the follow-up survey. Data for specialty during residency in May 2016 were obtained from the AMA Physician Masterfile for 427 participants (96%). Demographics of our respondent sample are shown in TABLE 1. Internal medicine was the most common clinical specialty chosen (14%, 59 of 427; TABLE 2). A minority of respondents reported physician role models prior to medical school (25%, 106 of 427), and a majority reported exposure to physician role models during medical school (87%, 370 of 427). This included 361 students who reported attending physicians or preceptors and 22 students who reported residents or interns as influential role models.

The estimated prevalence of potentially influential factors varied by specialty type (TABLE 3). The prevalence estimates were adjusted for the survey sample design and weighted to the national population of medical students. For example, the adjusted estimate of 43% (based on survey sample 69 of 161) of trainees in generalist residencies reported that concern about perceived burnout in different specialties strongly influenced their specialty choice, compared with 58% (52 of 89) of those in ROAD residencies and 29% (13 of 45) in surgical residencies ($P = .017$). Generalist physicians were least likely to have reported that prospective income was important to their specialty choice (14% [22 of 161] versus 31% [14 of 45] surgical and 28% [25 of 89] ROAD, $P = .031$), and they were most likely to have reported a generalist role model (70% [113 of 161] versus 31% [42 of 134] all other nongeneralist specialties $P < .0001$).

TABLE 2
Top 10 Specialties for Residencies and Frequencies of Role Models in the Top Specialties and Specialty Types[a]

Specialties	Residencies, n (%)	Role Models, n (%)
Top 10 specialties		
1. Internal medicine	59 (14)	112 (26)
2. Pediatrics	41 (10)	38 (9)
3. Anesthesiology	40 (9)	9 (2)
4. Family medicine	39 (9)	63 (15)
5. Emergency medicine	30 (7)	16 (4)
6. Diagnostic radiology	24 (6)	6 (1)
7. Obstetrics and gynecology	22 (5)	14 (3)
8. Orthopedic surgery	16 (4)	10 (2)
9. General surgery	15 (4)	25 (6)
10. Ophthalmology	14 (3)	3 (1)
Specialty types		
Generalist specialties	161 (38)	225 (53)
Surgical specialties	45 (11)	54 (13)
ROAD specialties[b]	89 (21)	22 (5)

[a] N = 427.
[b] ROAD specialties refers to those specialties (radiology, ophthalmology, anesthesiology, and dermatology) perceived by medical students as being more "lifestyle friendly" and more highly compensated.

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TABLE 3
Differences in Importance of Potentially Influential Factors in Specialty Choice Reported in 2011 by Type of Actual Resident Specialty in 2016 (N = 295)[a]

Potentially Influential Factor	Generalist Specialties (n = 161), n (%)	Surgical Specialties (n = 45), n (%)	ROAD Specialties (n = 89), n (%)	*P* Value
Your financial debt at graduation[b]	18 (11)	9 (20)	27 (30)	.0002
Desire for a manageable lifestyle[b]	116 (72)	12 (27)	70 (79)	< .0001
Family considerations and/or expectations[b]	95 (59)	7 (16)	49 (55)	< .0001
Expected income for different specialties[b]	22 (14)	14 (31)	25 (28)	.031
Desire to follow in the footsteps of a physician you admire[b]	40 (25)	19 (42)	13 (15)	.003
A deep sense of calling to a particular specialty[b]	115 (71)	37 (82)	48 (54)	.0008
The extent to which physicians in different specialties seem to be burned out by their work[b]	69 (43)	13 (29)	52 (58)	.017
Role model in the same specialty type[c]	113 (70)	21 (45)	21 (24)	< .0001

Abbreviation: ROAD, radiology, ophthalmology, anesthesiology, and dermatology.
[a] TABLE 3 reports survey design–adjusted national estimates for the proportion of resident physicians who reported each of the 8 potentially influential factors related to their choice of specialty, by 3 different specialty categories (generalist specialties, surgical specialties, and ROAD specialties).
[b] "A lot of influence" or "the most possible influence."
[c] Based on recoding and classification of open-ended responses to "Among the physicians you have known personally, think about the one you most admire as a physician. What is that physician's clinical specialty?"

Those in surgical specialties were least likely to have prioritized desire for a manageable lifestyle (27% [12 of 45] versus 72% [116 of 161] generalist and 79% [70 of 89] ROAD, $P < .0001$) and were even less likely to have prioritized family considerations and/or expectations (16% [7 of 45] versus 59% [95 of 161] generalist and 55% [49 of 89] ROAD, $P < .0001$). Surgical residents were most likely to give high importance to following in the footsteps of an admired physician (42% [19 of 45] versus 25% [40 of 161] generalist and 15% [13 of 89] ROAD, $P = .003$). Both generalist (71%, 115 of 161) and surgical (82%, 37 of 45) residents gave higher importance to a deep sense of calling to a particular specialty compared with ROAD residents (54% [48 of 89], $P = .0008$). Those in ROAD specialties were most likely to prioritize concern about financial debt at graduation and desire for a manageable lifestyle, but following an admired physician and calling had the least importance among the specialty types (TABLE 3). Only 24% [21 of 89] of ROAD residents had a ROAD role model. Surgical and ROAD role models were much more commonly reported by those in ROAD and surgical residencies.

Exposure to an admired generalist physician prior to medical school (odds ratio [OR] = 2.21, 95% confidence interval [CI] 1.03–4.73) and during medical school (OR = 2.62, 95% CI 1.69–4.05) resulted in the strongest odds for training in a generalist residency training program (FIGURE). When reporting a role model was not included in the fully adjusted regression, family considerations significantly mediated desire for a manageable lifestyle (OR = 1.75; 95% CI 1.06–2.88; FIGURE). In a separate regression, we found that residents in generalist training programs had 3 times the odds (OR = 2.99, 95% CI 2.15–4.15) of having reported a generalist role model (not shown). For trainees in surgical residencies, having a surgical role model was a highly significant predictor of later choosing a surgical residency (OR = 8.76, 95% CI 3.69–20.8). Exposure to a ROAD role model was also a significant predictor for choosing a ROAD residency (FIGURE).

Discussion

This national longitudinal study of US medical students provides preliminary evidence that personal exposure to role models significantly predicted choosing that role model's specialty 4 years after graduating medical school. However, residents in different specialties reported different sets of concerns when they were fourth-year medical students, particularly with respect to lifestyle, family, and financial considerations.

Our findings highlight the formative influence of role models in shaping the professional identity of physicians, particularly at the level of specialty decision making.[13] Gerber[14] previously described

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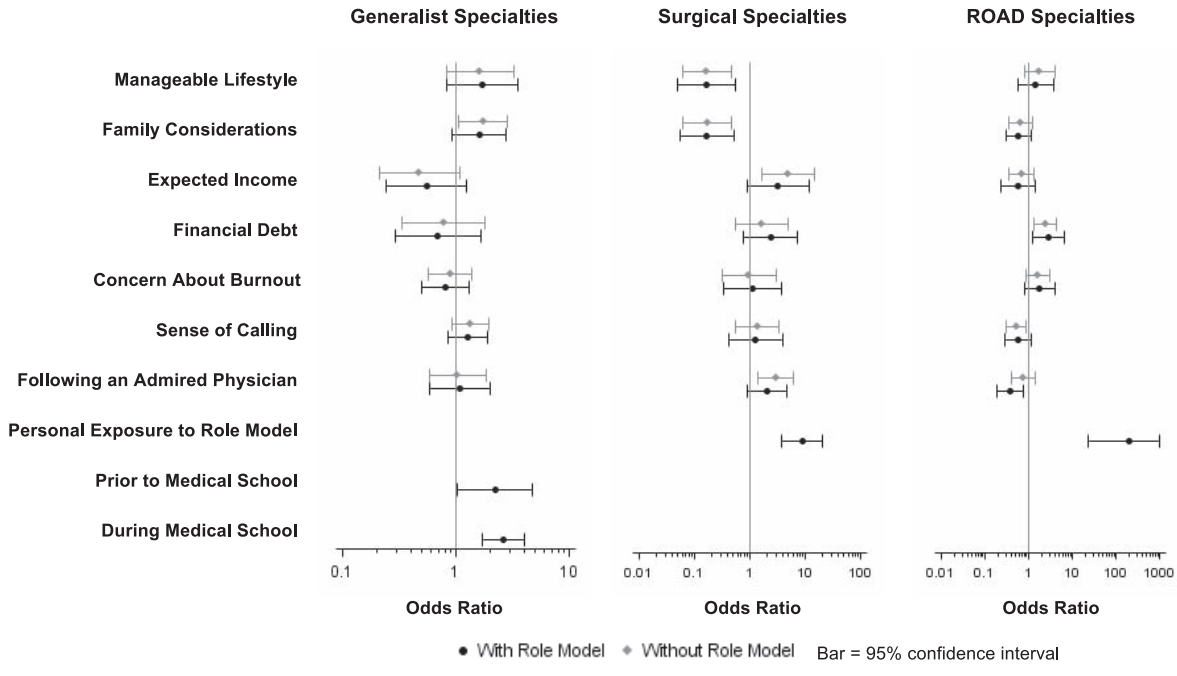

FIGURE

Logistic Regression Models Examining Factors in the Fourth Year of Medical School Associated With Choice of Type of Residency 5 Years Later (N = 427)

Note: Regression models were adjusted for sex, minority status, having grown up in a medically underserved area, and expected student debt.

the "interpersonal coping mechanism of modeling," in which trainees identify a trusted clinical attending physician role model who can help them cope with conditions of high stress. Students choosing surgical residencies may already anticipate concerns related to resident well-being and consciously seek out role models as part of their interpersonal coping and specialty decision making.

Research in positive psychology and moral philosophy suggest that "moral elevation"—the experience of positive moral emotions after witnessing exceptional conduct from a role model—may be undergirding the influence of role models on specialty choice.[15] Formative experiences of moral elevation may explain the subtle, and at least somewhat subconscious, impact that influential role models appear to have on students' decision making.[2] In our study, the majority of students identified their attending physicians or supervisors as role models.

Clinical exposure to admired physicians may lead some students to choose specialties they had not previously considered.[8,16] It is also possible that students exposed to positive role models are interacting with physicians who exhibit a positive sense of well-being in their own professional careers.

Collectively, these findings suggest that program directors who seek to train the next generation of resident physicians should intentionally facilitate trainees' exposure to clinical role models.[2] Sustained interactions with those role models may facilitate the experience of moral elevation during residency training and may even nurture resilience and reduce burnout in ways that positively shape the long-term trajectory of residents' professional identities as physicians. Indeed, our study findings may lend preliminary empirical support to the Accreditation Council for Graduate Medical Education's recently proposed revisions to the Common Program Requirements.[17] These proposed revisions highlight the importance of role modeling among faculty, particularly among residency program directors.[17] Enhancing meaningful interactions between role model faculty and trainees may provide rich opportunities for "interpersonal coping mechanism of modeling"[14] and moral elevation,[15] thus offering a potential intervention to improve resident well-being.[18] However, little evidence is available to inform interventions to support faculty as consistent role models for students and junior trainees who may be sharing the same institutional pressures and stressors as their faculty. Further research is needed to explore the link between physician well-being and the capacity to inspire as a role model educator.

This study had limitations. Our definition of "generalist" specialties relied on AMA specialty categories in which no secondary subspecialty was reported in our data. A portion of these "generalist" residents may end up transitioning into further subspecialties.

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Additionally, our approach could not establish causality in our reported associations. Role model exposure could conceivably influence specialty choice, or students' specialty choice could lead students to seek out personal exposure to role models. Lastly, unmeasured characteristics may have systematically affected students' willingness to respond to this survey.

Next steps would be to explore the opinions of resident physicians on whether increased attention to their own well-being is facilitating their professional development as resident role models and whether exposure to clinical role models during residency training is influencing their ultimate career decisions upon completion of their postgraduate training.

Conclusion

This national longitudinal study of US third-year medical students found that personal exposure to role models significantly predicted training in that role model's specialty 4 years after graduation. Institutions tasked with training the next generation of physicians should pay particular attention to an educational model of professional identity formation that intentionally leverages the influence of role models.

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John D. Yoon, MD, is Assistant Professor of Medicine, Department of Medicine, University of Chicago, and Core Faculty, Internal Medicine Residency Program, Mercy Hospital and Medical Center; **Sandra A. Ham, MS,** is Senior Statistician, Center for Health and the Social Sciences, University of Chicago; **Shalini T. Reddy, MD,** is Professor of Medicine, Department of Medicine, University of Chicago, and Associate Program Director, Internal Medicine Residency Program, Mercy Hospital and Medical Center; and **Farr A. Curlin, MD,** is Josiah C. Trent Professor of Medical Humanities, Trent Center for Bioethics, Humanities, and History of Medicine, Duke University.

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Corresponding author: John D. Yoon, MD, University of Chicago Medicine, 5841 S Maryland Avenue, Chicago, IL 60637, 773.702.5197, fax 773.702.7398, jdyoon@uchicago.edu

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