Outcomes of a Survey-Based Approach to Determine Factors Contributing to the Shortage of Occupational Medicine Physicians in the United States

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ABSTRACT

Context: There is a long-standing shortage of formally trained Occupational & Environmental Medicine (OEM) physicians despite OEM practitioners experiencing high satisfaction and low burnout.

Objective: To explore the root causes of this shortage and suggest potential remedies.

Methods: Cross-sectional surveys were administered to medical students queried regarding OEM training, practicing OEM physicians queried regarding timing of specialty choice, and OEM Train-in-Place (TIP) program graduates queried regarding satisfaction with training.

Results: Of 247 medical student respondents, 70% had heard of OEM, 60% through one lecture. Of the 160 OEM physicians, 17% first became aware of OEM as medical students, and most would have chosen a different path had they heard sooner. Most TIP program trainees reported that they would not have undertaken specialty training without a TIP program (89%).

Conclusions: Strategies to introduce OEM earlier in medical education and TIP programs for mid-career physicians may help overcome persistent shortages of OEM specialists.

KEY WORDS: burnout, mid-career physician, occupational medicine, preventive medicine, Train-in-Place Program

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There is a long-standing shortage of formally trained Occupational & Environmental Medicine (OEM) physicians in the United States[1,2] and other countries such as the United Kingdom.[3,4] Many physicians active in OEM are residency-trained in other fields and began actively practicing OEM mid-career rather than immediately following residency.[5] Some physicians abruptly shifted to OEM on taking a job in an OEM clinic and others gradually transitioned as their practice took on OEM clients. Some maintain a hybrid practice including OEM.

The shortage of residency-trained OEM physicians is thought to be multifactorial. One suggested factor is

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a lack of awareness of OEM among medical students when choosing specialty training.[6,7] The National Academies of Sciences, Engineering, and Medicine (NASEM)[2] recommended teaching OEM to medical students. Indeed, competency in taking an OEM history is considered important for timely recognition of workplace illnesses, injuries, and exposures. In 2015, nonfatal workplace injuries and illnesses in private industry occurred at a rate of 3.0 cases per 100 equivalent full-time workers.[8]

Because many enter the field of OEM mid-career,[8,9] the NASEM recommended new routes to certification and accreditation in OEM.[9] Among options that could increase the number of OEM physicians are external track programs,[10] especially for those individuals who seek to transition to OEM from another field.[11]

Since 1997, an innovative "Train-in-Place" (TIP) OEM program that allows mid-career physicians to train where they live and work, without incurring the costs of relocation, has been available.[11] Supervised training in a community setting combined with intensive training at an academic institution allows for a higher output of graduating residents per training dollar and facilitates continuing employment of the trainee at their sites.[9]

The overall purpose of this research is to further explore causes for the shortage of OEM physicians and suggest potential remedies. Specific aims are to determine the extent to which medical students are exposed to OEM, when and why practitioners choose the field, and reasons for enrolling in a TIP program and its impact on career paths.

Methods

Surveys

Cross-sectional, anonymous, surveys were administered to 3 groups of respondents at 3 points in time. For each survey, demographic information such as age and sex was assessed. Response options included continuous Likert scale, nominal multiple choice, and binary responses, depending on the question.

Medical students

Students from 3 medical schools were queried via Survey Monkey on whether they had heard of OEM, whether they took a work history on patients, and whether they had experienced lectures on OEM. To allow geographic diversity, schools were selected from the East Coast, Midwest, and the South.

Practicing OEM physicians

The study population was a convenience sample of plenary session attendees at the 2014 American Occupational Health Conference (AOHC) in San Antonio, Texas. This session was chosen as there were no competing concurrent sessions. Study personnel stationed at each auditorium doorway handed a questionnaire to each session attendee and collected it after the session. Questions included duration of practice in medicine, board certification status, OEM practice setting, when and why entered OEM, OEM exposure in medical school, and, if none, the perceived effect on their career.

TIP program OEM graduates

These physicians were queried using a 22-item questionnaire via SurveyMonkey. Questions included year of medical school graduation, TIP residency graduation, and American Board of Preventive Medicine-Occupational Medicine (ABPM-OM) certification; other board certifications; pre- and post-TIP job titles; length of OEM practice prior to TIP; reasons for pursuing TIP; and likelihood of OEM training in absence of TIP. Outcomes included pre- and post-TIP job satisfaction, changes to practice type, and whether TIP helped achieve career goals, resulted in increased compensation, and was necessary for current job eligibility.

Statistical analysis

Summary descriptive statistics were calculated from survey data including frequency distributions for categorical data and means with ranges for continuous data. The study was approved by the University of Pennsylvania Institutional Review Board.

Results

Of the medical student group, there was a 21% (212/1009) response rate. Responding students included 85 (41%) males and 90 (42%) third-year students with the remainder fourth-year students. One hundred sixty-six (79%) students had heard of OEM in medical school: 5(3%) through an elective, 103 (61%) through a lecture, and 16 (9%) through a preceptor. One hundred eighteen (56%) reported having had a lecture on occupational medicine, 173 (82%) noted that they had a lecture on environmental health, and 15 (8%) considered going into OEM. Twenty-one (10%) always took a work history from patients.

Of 1086 physicians who attended the AOHC that year, 176 (16%) attended the plenary session, of

whom 162 (92%) completed the survey. The median age was 55 years (range: 32-80 years), 112 (69%) were male, 155 (96%) were actively engaged in OEM practice, and 69% had 20 or more years of OEM experience (Table 1). The most common practice settings were hospital-based clinic (22%) and private practice (15%). One hundred three (46%) respondents were board certified in OEM, 49 (48%) of whom were only OEM certified, and the others possessed dual board certification, most commonly internal medicine (22%) and family medicine (16%).

The most frequently cited reasons for entering OEM practice were interest in preventive medicine (57%), improved work schedule (56%), diversity in clinical care (43%), opportunity for leadership roles (21%), and research opportunities (10%). Only 21% of respondents became aware of OEM during medical school, while 95 (63%) were already practicing in another medical field. Sixty-two (38%) respondents believed that their career would have progressed differently had they learned about OEM earlier and that they would have trained initially in OEM or transitioned to OEM sooner.

Eighty-eight TIP program OEM graduates from the years 1997-2011 were invited to participate. There were 65 respondents (75% response rate), 43 (67%) were male, 37 (58%) had 5 or more years of OEM work experience prior to TIP, and the mean period between medical school graduation and TIP graduation was 16 years (Table 2). Forty-seven (77%) graduates reported that they would not have undertaken OEM training without a TIP program, 34 (53%) would not be eligible for their current job without OEM training, 73% indicated that their compensation increased

TABLE 1
Practicing Occupational & Environmental Medicine Physicians Attending American Occupational Health Conference Characteristics

Characteristic	N[a]	%
Gender		
Male	112	72.3
Age, mean (range), y	55 (32-80)	
Practice setting		
Hospital-based clinic	42	22.1
Private practice	29	15.3
Government: state/federal	26	13.7
Corporate-private	23	12.1
Academic institution	22	11.6
Occupational provider group	22	11.6
Corporate-public	4	2.1
Government: local/county	2	1.1
Years in practice		
<10 y	17	10.6
10-20	33	20.6
20-30	54	33.8
30-40	48	30
>40 y	8	5
Currently Working in OEM	155	97.5
Board certification		
Occupational medicine	103	45.7
Family medicine	34	15.0
Emergency medicine	35	15.4
Surgery	10	4.4
Internal medicine	3	1.3
Other	42	18.5
Point in career heard about OM		
Medical student	34	21.0
Resident	31	19.4
Practicing in another field	95	63.0
Reasons for choosing career in OM[b]		
Interest in preventive medicine	92	57.5
Improved work schedule	91	56.9
Diversity	69	43.1
Leadership	34	21.3
Research	16	10

Abbreviation: OEM, Occupational and Environmental Medicine.

[a] *May not total to 162 due to missing values.*

[b] *Can choose more than 1 reason, so totals to >100%.*

TABLE 2
Characteristics of Physicians From the TIP Program (N = 65)

Characteristic	N	%
Gender		
Male	43	67.2
Years since medical school[a]	23.5 (10-33)	
Years between medical school and OMR[a]	16.2 (6-27)	
Years worked in OM before TIP		
<1	2	3.2
1-5	24	38.1
6-10	17	27.0
>10	20	31.8
Reason chose TIP		
Only program that allows full-time employment	47	77.1
Reputation/prestige of the program	10	16.4
Alumni/supervisor recommendation	4	6.6
Would not be eligible for job without TIP	32	49.2
Strongly agreed TIP important to help achieve career goals	53	82.8

Abbreviations: OEM, Occupational and Environmental Medicine; OMR, Occupational Medicine Residency; TIP, Train-in-Place.

[a] *Mean and (range).*

after TIP. Fifty-three (83%) strongly agreed that TIP was important in helping them achieve their career goals.

Prior to the TIP training, only 13 (20%) were very satisfied with their job/career and 40 (62%) of residents satisfied, and overall satisfaction was 83%. After TIP training, 51 (80%) became very satisfied with their job/career and 11 (17%) were satisfied—overall satisfaction as 97%. This represents a 14% increase in satisfaction. Train-in-Place trainees scored higher, on average, on both the Core and the Specialty sections of the ABPM-OM examination (than other residency-trained physicians—5% and 12%, respectively.

Discussion

The shortage of physicians trained in OEM[1,2] is curious, given that the specialty offers advantages of lower burnout and higher job satisfaction compared with most others.[10,12] Society benefits from OEM practitioners whose care has been shown to reduce workers' compensation costs without reduction in quality of care.[13] As a preventive medicine as well as a clinical field, OEM specialists are equipped with the epidemiology and population management skills that the nation needs,[14] a need that the Sars-Cov-2 pandemic has highlighted.

Our results suggest that a major cause of the current shortage is lack of early awareness of OEM. Particularly compelling is our finding that only 21% of OEM practitioners recalled hearing of OEM as medical students, when most physicians choose a career specialty. Most became aware of OEM when already practicing in another field. This lack of awareness was not inconsequential: 38% of respondents believed that their career path would have been different had they been aware of OEM earlier, conversely those aware of OEM during medical school were more likely to become OEM board-certified. Occupational & Environmental Medicine board certification has been shown to confer increased practice diversity, skill sets, and greater involvement in management and public health–oriented activities. The majority of surveyed OEM physicians had been actively practicing medicine for 20 years or more and few respondents were younger than 40 years, consistent with mid-career entry to the specialty. Indeed, a 2017 20-year outcomes study of TIP graduates found that 46% were diplomates of another American Board of Medical Specialties, prior to starting the TIP, including family practice, internal medicine, emergency medicine pediatrics, and surgery.[11] Eligibility for an OEM training program (TP) residency requires a minimum 12-month clinical internship. Occupational & Environmental Medicine residents may start the TP at different levels of training where some start after having completed another prior residency such as family practice, internal medicine, emergency medicine pediatrics and surgery, and/or several years of practice.[11] The American Council for Graduate Medical Education (ACGME) requirements for preventive medicine ensure that residents, regardless of entry level prior training, when they enter the OEM TP, are able to acquire the skill set to equip them for varied OEM practice in various settings ranging from academic, clinic, and government to industry and consulting, regardless of prior level of training. Late specialty entry is inherently inefficient with less time to apply newly learned skills in patient care and program administration.

How can the situation be improved? We envisage a 2-pronged approach. The long-term solution is earlier presentation of OEM particularly to medical students; the short-term solution is facilitating the transition of mid-career physicians to OEM. Limited data from third- and fourth-year students at 3 medical schools indicated very little OEM exposure: 70% had no more than 1 lecture and 21% denied hearing of OEM at all. There are options for improving OEM content in medical curricula including OEM core clerkships and recruitment of OEM provider groups as training sites.

A short-term solution is expanding TIP programs to improve the competence and range of skills in physicians making mid-career transitions. This model allows residents to train where they work overcoming major barriers that would deter otherwise motivated physicians from specialist training. They do not have to relocate, terminate employment, or take a leave of absence to initiate training. Residents work full time as OEM physicians at their approved clinical training site supervised by an ABPM-certified physician. As residents tend to practice where they train, graduates can then comprise a more geographically diverse workforce as they do not have to relocate to train. There are 2 interrelated components: the applied component at the clinical training site and a didactic component that consists of monthly 3-day sessions at the academic medical center. Both components work in tandem to allow acquisition of the ACGME milestones and success on the ABPM examination. Our data indicate that for most TIP trainees, the TIP was the only viable option to obtain OEM board certification and had the benefits of increased career opportunities and job satisfaction.

The TIP model allows a higher output of graduating residents per unit of grant dollars spent, compared with traditional TPs, as resident training sites remain a source of employment, reducing or eliminating the

need for added trainee salary support. The bulk of graduate medical education is funded by the Centers for Medicare & Medicaid Services, for which most preventive medicine residencies are not eligible. Preventive medicine funding sources include the Health Resources & Services Administration (HRSA), the National Institute for Occupational Safety and Health (NIOSH), the Veteran's Administration (VA), the National Aeronautics and Space Administration (NASA), corporate donations, and scholarships.[15] In general, PM programs receive little or no funding from their institutions. Largely due to a lack of funding, only approximately half of ACGME-approved positions have been filled over the past decade. The NASEM has noted that regulations and reimbursement policies are barriers to residency training outside the hospital setting and has advocated Medicare reform to encourage innovation delivering improved individual patient care, population-based medicine, and lower cost.[14] The OEM TIP would seem to meet these criteria.

One of the strengths of this study is the diverse, multifaceted approach surveying individuals at 3 different stages—medical student, current OEM practitioner, and TIP program graduate. Another strength is the TIP program survey response rate of 75% suggesting that the responses were representative of the trainees in general. Indeed, annual surveys reveal that TIP residents rate their satisfaction with the program on average at 4.85.5/5.

The cross-sectional design is one of the weaknesses as cause and effect cannot be determined, yet this design is efficient, allowing one to obtain information relatively quickly and inexpensively, which can then lend itself to more rigorous studies. Selection bias may also be in play, given the low student survey response rate and similarly for the plenary session sample consisting of only 16% of AOHC attendees. Yet, the sample was drawn from the largest single gathering of the AOHC conference of whom 92% responded, where responses suggest some of the root causes for the shortage of OEM physicians. These research findings can be used as a springboard for further study. The study population is also taken from the annual meeting of the largest professional body of OEM physicians in the United States—American College of Occupational and Environmental Medicine. Another weakness is that the survey of physicians at the plenary session occurred at one point in time and more robust data could have been generated using a longitudinal design.

This study adds to the literature on increasing the pipeline of OEM physicians. It is unique in that there has been no comprehensive evaluation of the root causes for the shortage of OEM physicians looking at 3 groups of individuals using survey research. The shortage exists and has been documented but data on root causes are scant. Further research to confirm these findings as well as to investigate outcome of interventions to increase the pipeline is in order.

Implications for Policy & Practice

- There is a shortage of formally trained OEM physicians despite high job satisfaction and low burnout in the specialty. The majority of physicians in OEM enter mid-career from another field. Few were aware of the possibility of OEM careers as medical students; 38% perceived that their career was adversely affected by not knowing earlier about OEM.
- A long-term solution to the OEM specialist shortage is greater visibility for the field in medical student education including relevant clinical clerkships in academic, corporate, governmental, and public health settings. Mandated representation of OEM in the medical school curriculum would serve to educate students on its existence and importance earlier in their career, such that those with an interest in public health and population health, merged with clinical medicine, can make the choice sooner in their career. These strategies would require resources to support faculty as well as student travels while they train away from their home institution.
- Increased funding of OEM programs would provide the resources necessary to allow for the filling of ACGME approved positions. This action would almost double the number of residents with the ultimate outcome of helping to reduce the shortage of OEM physicians.
- A short-term solution to the OEM specialist shortage is increasing availability of OEM Train-in-Place specialist training for mid-career physicians making a switch to OEM. Train-in-Place training in OEM is proven to enhance job satisfaction. Train-in-Place training is cost-effective for payees of post-graduate medical education.

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