Occupational Medicine Training Program Surveys

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Although the quantity of Occupational Medicine (OM) residents in training programs has risen in the past 15 years, there remains a significant shortage of OM physicians in the United States. A survey of OM residency program directors and residents and fellows (trainees) was accomplished to answer questions relevant to recruiting and supplying OM trained physicians. Twenty-six of 29 program directors (89.7%) replied. One hundred forty-three of 174 (82.2%) trainees responded. Fifty percent of responding program directors were satisfied with the current quantity of program applicants. Medical students were provided a median of 3 hours (range, 0 to 20 hours; mean, 5.35 hours) of formal OM teaching by the responding programs. Almost half of trainees, 68 (48.6%), did not receive formal OM instruction in medical school. An average of 5.4 ± 13.3 hours of OM was taught to OM trainees in medical school. Disproportionate numbers of trainees were taught OM as fourth-year medical students and in other residencies. Reasons for pursuing OM training were diverse and often related to postgraduate clinical experience with OM. Only a total of 84 primary care residents (0.32%) rotate through the OM residency programs in an average year. We conclude that an insufficient quantity of qualified applicants, combined with limited exposure to OM in medical schools and low levels of contact with residents in primary care programs, will continue to hinder efforts to reduce the shortage of OM residents and physicians. Further training specifically targeting the fourth year of medical school and the primary care residencies may have the most impact on recruitment.

Worker health, safety, and health care costs are receiving increasing attention. Clinical Occupational Medicine (OM) problems are evolving with time, such as a marked rise in cumulative trauma diagnoses now in progress. An adequate supply of OM physicians to evaluate and prevent these workplace problems is of likely importance. The shortage of OM physicians in the United States has been estimated at 3280.[1] A second estimate placed the shortage of Occupational and Environmental Medicine (OEM) physicians in the United States at between 3100 and 5500.[2] It has also been estimated that only 70 residents and fellows (hereafter referred to as trainees) complete training in OM each year[3] to add to the nation's supply of approximately 1200 practicing board-certified OM physicians.[2] It is therefore anticipated that the shortage of OM physicians will not diminish soon. When so few training positions are available, it becomes important to ensure that all available positions are filled. Actual numbers of trainees have consistently fallen below program capacities.[4-17] Although this may be due in large part to unfunded positions, limited numbers of qualified candidates may also be a significant factor.

A survey of occupational medicine training program directors and trainees was undertaken to characterize: 1) criteria for admission to each program, 2) levels of satisfaction with the current quantity and quality of applicants, 3) difficulties with funding training positions, 4) program interactions with medical students, 5) the extent of opportunities to teach OM to primary care residents, 6) demographics of trainees, 7) time trainees spent studying OM in medical school, 8) the main experience that led train-

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ees to pursue formal OM training, 9) residency training other than OM, and 10) American Board of Medical Specialties certifications and eligibilities (BC/BE) of trainees.

Methods

A survey was mailed in August 1991 to the 29 Program Directors of the 30 Occupational Medicine Programs (one of the directors heads two of the programs) listed in the 1991–1992 Directory of Graduate Medical Education Programs[18] after approval by the University of Utah Institutional Review Board. Twelve questions were asked. Two questions dealt with the program's minimum qualifications required of applicants and three concerned the current quantity and quality of program applicants. Information on numbers of positions available and the number filled was also sought. Two questions involved information on funding for residents' and fellows' salaries, and two additional questions requested information on the amount of teaching time allotted for the teaching of OM to medical students and residents in primary care residencies. A separate question asked for the number of non-OM residents rotating through an OM elective in an average year. The final inquiry was open-ended and requested opinions regarding the main problem(s) in supplying adequate numbers of OM physicians. A second survey was mailed to the nonresponding directors. All nonresponding programs were contacted by telephone to determine the number of current trainees.

A separate survey was mailed to 174 trainees from August to October 1991. These participants were identified as current trainees either by mail, from the responding program directors, or by telephone for the nonresponding directors. Fifteen questions were asked. Demographic questions included age, sex, and race. A question was asked to quantify the number of hours of OM instruction in medical school. Another dealt with the timing of instruction in medical training, including postgraduate training. The medical school and year of graduation were requested. The institution(s) for internship (PGY-1) and residency (PGY-2 or greater) were also requested. Medical specialties and number of years of training were specified. Lastly, a question was asked to ascertain the main experience/exposure to OM that caused the trainee to embark on OM training. Nonresponding trainees were sent a second questionnaire. When replies consisted of a range of numbers, the mean of that range was used for calculations. Results reported in this paper incorporate responses to both the first and second questionnaires.

Results

Of the 29 OM Program Directors representing the 30 programs, 26 (89.7%) responded, and their responses are included in the analysis. The 26 directors instructed 153 (87.9%) trainees of the 174 total trainees that were identified in OM programs in August 1991. Subsequent calculations involve the programs and the 153 trainees identified by these responding directors. Fifteen of the responding programs, representing 88 (57.5%) of the trainees, require only 1 year of prior family practice, internal medicine, or transitional training as a minimum to be admitted to the residency (see Table 1). Six trainees were documented in programs that accept medical school graduates who have not accomplished prior postgraduate year one (PGY-1) training. These programs provide a PGY-1 year in addition to OM residency training. Twelve (46.2%) of the program directors consider the quantity of current applicants unsatisfactory, and 13 (50.0%) consider the quality of current applicants insufficient. Dissatisfaction was present in programs filled to capacity as well as programs of varying size. There was a slight trend toward being filled to capacity and being dissatisfied with the quality or quantity of applicants.

Funding of training positions was diverse (see Table 2). The largest source was the National Institute for Occupational Safety and Health, but it only provided 31.4% of trainees' salaries. Other governmental funding, clinic revenues, and private sources,

TABLE 1

Minimum Requirements of OM Applicants to Be Admitted to a Program

Requirement	No. Programs (%)	No. Trainees (%)
No minimum (PGY-1* provided)	2 (7.7)	6 (3.9)
One year	15 (57.7)	88 (57.5)
One year + experience	2 (7.7)	13 (8.5)
Two years	2 (7.7)	15 (9.8)
Completed residency†	5 (19.2)	31 (20.3)
Total	26 (100.0)	153 (100.0)

* Postgraduate year-1.

† Usually 3 years of internal medicine or family practice.

TABLE 2

Funding for Trainee Salaries

Source	No. Programs (%*)	No. Positions (%)
NIOSH†	20 (76.9)	48.25 (31.4)
Other private sources	12 (46.2)	38.25 (24.9)
Other US government	9 (34.6)	25 (16.2)
State funding	3 (11.5)	11 (7.1)
OPSF†	8 (30.8)	10 (6.5)
OM clinic revenues	6 (23.1)	3.2 (2.1)
Other, unspecified	8 (30.8)	18.2 (11.8)
Total	26 (100.0)	153.9‡ (100.0)

* Percent of 26 responding programs.

† NIOSH, National Institute for Occupational Safety and Health; OPSF, Occupational Physicians Scholarship Fund.

‡ Total greater than 153 because of summing.

including the Occupational Physicians Scholarship Fund, provided the remainder of resident support. Each program averaged 2.5 sources to fund its trainees. A total of 35 unfunded positions was reported.

Hours allotted by the medical schools to the OM training programs for formal instruction of their medical students were highly variable (see Table 3). A median of 3 hours (range, 0 to 20 hours; mean, 5.35 ± 5.7 hours) of instruction time over 4 years of medical school was given to medical students by the responding programs. At eight (30.8%) of the programs, no time was allotted. A median of 9 hours (mean, 16.1 ± 22.6; range, 0 to 108 hours) was devoted to teaching all levels of medical school and graduate medical education by these programs each year.

There were only six programs (23.1% of programs) that had any time allotted to teach physicians in the first postgraduate year (PGY-1). Time allotted averaged 5.5 hours (range, 1 to 12 hours). Sixteen of the programs (61.5%) were allotted time to teach primary care residents (PGY-2 and PGY-3). Time allotted averaged 15.4 ± 24.9 hours (range, 1 to 100 hours) of instruction. One program reported 100 hours of time to teach primary care residents. Without this program, the average was 9.8 ± 11.0 hours in the other programs with instruction time.

Only a total of 84 primary care residents (range, 0 to 40 per program) were estimated to rotate through an OM elective at these programs in an average year. This is only 0.32% of the 25,959 primary care residents[17] (those residents in family practice, internal medicine, and combined programs in internal medicine/pediatrics and internal medicine/emergency medicine) and only 0.10% of the 82,902 total residents in the United States.[17]

Replies to the open-ended question regarding the problems with supplying an adequate number of OM physicians are summarized in Table 4. Difficulties with funding, including resident salaries and occupational research support, were noted by 13 (50.0%) directors. Insufficient curricula time in medical schools, a lack of role models, (including community physicians actively assisting with teaching), and an insufficient number of qualified candidates for training positions were also frequently mentioned.

Residents and Fellows

Of the total of 174 trainees identified, 143 (82.2%) responded to the trainees' questionnaire and are included in the analysis. The mean age was 34.9 ± 5.1 years. Men accounted for 69.2% of trainees and white men accounted for 57.3% of all trainees.

The largest group, 70 (49.0%), were in their second year of OM residency. Seven (4.9%) were in a third year of training in OM, as a research year and/or fellowship. Nine (6.3%) were in a 4-year combined OM/Internal Medicine residency program.

An average of 5.69 ± 15.1 hours

TABLE 3
Formal Time Allotted to Programs to Teach Occupational Medicine

Training Status	No. Programs (%)	Mean Hours/Program (Range)
First year medical school	10 (38.5)	1.27 (0–6)
Second year medical school	15 (57.7)	2.58 (0–8)
Third year medical school	6 (23.1)	1.31 (0–12)
Fourth year medical school	2 (7.7)	0.19 (0–3)
PGY-1	6 (23.1)	1.27 (0–12)
PGY-2 or PGY-3*	16 (61.5)	9.50 (0–100)
Total	26 (100)	16.1 (0–108)

* Internal Medicine and Family Practice.

TABLE 4
Program Directors' Views of Problems with Supplying Occupational Medicine Trained Physicians

Problem	No. Responses* (%)†
Inadequate funding support	13 (50.0)
Lack of contact with medical students/too much other curricula	8 (30.8)
Lack of role models (faculty and community)	7 (26.9)
Low specialty visibility	6 (23.1)
Insufficient qualified applicants	6 (23.1)
Bias of medical community, 3rd party payors, and students toward acute care, not prevention	3 (11.5)
Low specialty prestige/pay compared with procedural specialities	3 (11.5)
Lack of faculty time	1 (3.8)
Lack of departments in medical schools	1 (3.8)
Difficult field to master	1 (3.8)
Difficulties specific to an armed service	1 (3.8)

* Numbers added to more than 26 responses because of multiple replies.
† Percent of 26 responding program directors.

TABLE 5
Timing of Trainees' Occupational Medicine Instruction

Timing of Instruction	No. Respondents* (%)
First year medical school	13 (9.1)
Second year medical school	24 (16.8)
Third year medical school	10 (7.0)
Fourth year medical school	30 (21.0)
PGY-1†	9 (6.3)
Residency	28 (19.6)
Never	69 (48.3)

* Multiple replies; n = 142 trainees responding.
† Includes rotating internship.

(median, 1.0; range, 0 to 100) of OM instruction time in their medical school years was reported by the trainees. Sixty-eight (48.6%) reported no hours of OM instruction time. Forty-five (32.1%) recalled 0.5 to 5 hours of time. Eleven (7.9%) reported more than 15 hours of OM instruction time. The distribution of these hours of instruction is in Table 5. Thirty-seven (25.9%) reported instruction in the first 2 years of medical school and 40 (28.0%) reported receiving OM teaching in the final 2 years of medical school. This table also contains information about receiving OM instruction in other residencies, including the PGY-1 year. Only nine (6.3%) reported any OM instruction in the PGY-1 year, whereas 28 (19.6%) received OM teaching in other years of residency.

The trainees completed medical school at one of 90 medical schools and seven osteopathic schools. Seventy-one (78.9%) of these were US medical schools and this is approximately 56.3% of all US medical schools. There were also 16 (11.4% of trainees) International Medical Graduates (IMGs). No school appeared to be a disproportionate source for OM trainees.

The postgraduate training completed prior to OM is in Table 6. A completed residency in Internal Medicine was the most common residency (n = 43; 30.5%). One year of any type of postgraduate training was very common (n = 62; 43.9%). Including Internal Medicine and Family Practice, there were 11 specialties reported other than OM.

Data of the American Board of Medical Specialties eligibilities/certifications of the trainees were also collected. Ten specialties were reported. The most common was again Internal Medicine (n = 42; 29.4%). Eighty-seven (60.8%) had no current board eligibility or certification. Board certification/eligibility specialties reported include internal medicine (42), family practice (14), general preventive medicine (4), obstetrics and gynecology (4), occupational medicine (4), pulmonary (3), orthopedics (1), anesthesiology (1), geriatrics (1), and aerospace medicine (1).

One hundred four (72.7%) reported some prior experience with OM (see Table 7). The most common (n = 22; 15.4%) was a military experience including general medical officers, flight surgeons, or undersea medical officers. OM clinic work or other private clinical work preceding formal OM training was noted by 18 (12.6%). Fifteen (10.5%) had nonmedical industrial work experiences. Many of the responses were unique.

The main experience(s) or exposure(s) that led the student to pursue formal OM training were even more variable (see Table 8). Only two (1.4%) decided primarily on the basis of a medical school course in the first 2 years. Thirty-four (23.8%) based a decision on an OM medical school rotation (years 3 to 4), or training in internship and residencies. A friend, mentor, or word of mouth were cited by 12 (8.6%). Contact with OM patients in a primary care practice, or one specific OM case of poisoning or occupational illness led to the decision to pursue OM for 30 (21.4%).

TABLE 6
Postgraduate Training of Trainees Preceding Occupational Medicine

Training	No.* (%)
Transitional	26 (18.4)
Family practice, 1 y	10 (7.1)
Family practice, 2 y	0 (0.0)
Family practice, 3 y	14 (9.9)
Internal medicine, 1 y	26 (18.4)
Internal medicine, 2 y	6 (4.3)
Internal medicine, 3 y	43 (30.5)
Other†	16 (11.3)

* Some multiple replies; n = 129 trainees responding.
† Includes nine other specialties.

Discussion

Occupational Medicine has remained a relatively small specialty of approximately 1200 to 1500 active, board-certified, or board-eligible specialists.[2] The shortage of OM physicians is not likely to change soon because of the magnitude of the shortfall and the small number of residency positions available relative to the size of the shortfall. Despite this large shortfall, there is some hope for making progress.

The number of OM training programs has been rising gradually. There were 25 OM programs in 1980 and 30 in 1990 (20% increase).[7,17] The trend in the numbers of trainees was particularly encouraging (see Fig. 1). There was a 129.6% increase in OM trainees from 1980 to 1990.[7,17] It should be noted that the number of training positions is projected and reported by the program directors one year in advance of the time these positions are filled. Therefore, the number of positions realized and filled with residents reported the following year may not be equivalent to the previous years' projections. Also, the response rate of all residency program directors has averaged >92% over the past ten years.[7-17] Whether this marked growth rate in OM trainees can be sustained is questionable. This

TABLE 7
Work Experiences Preceding Occupational Medicine Training of Trainees

Work Experience	No. Respondents* (%)
None	39 (27.3)
Emergency/urgent care	12 (8.4)
Corporate physician	7 (4.9)
Military	22 (15.4)
OM clinic	18 (12.6)
Nonmedical industrial work†	15 (10.5)
Private patients‡	17 (11.9)
Others§	11 (7.7)
Not defined	8 (5.6)

* Multiple replies; n = 143 trainees responding.
† Factory line work, industrial hygiene, industrial chemist, engineer, labor negotiator.
‡ Pulmonary, orthopedics, internal medicine, family practice, anesthesiology.
§ Environmental Protection Agency, Centers for Disease Control—Environmental Epidemiology, academic medicine, biostatistics, research scientist, Vista volunteer.

10-year growth rate surpassed that of all other specialties reported[7,17] (see Table 9). The lack of contact with medical students likely hinders recruitment and knowledge of the specialty. The median of 3 hours of teaching time for medical students among these programs is actually less than that noted in the survey by Levy.[19] He found that, of those medical schools that taught occupational health in 1977 to 1978, the median time spent was 4 hours. The study by Levy included all medical schools, the majority of which were without graduate OM training programs.

The findings of this study with respect to medical school teaching were particularly surprising. It was anticipated that the OM programs in 1991 to 1992 would be far more involved in the teaching of OM to medical students than would medical schools with or without an accredited residency in 1977 to 1978. This unexpected result may reflect the problem, acknowledged in this survey and noted in the Institutes of Medicine report,[3] of too much other curricula to be taught in medical schools to allow for OM. Still, one would have expected the average OM program director to have been able to make some progress in the incorporation of OM into medical schools' curricula. If 3 hours of OM training is the median for medical schools with OM programs, it may follow that there is even less OM taught at medical schools without OM programs. The findings of this study suggest a complete lack of progress in incorporating OM into curricula of medical schools in the United States over the past 14 years.

In this study, the trend during the medical school years was for fewer hours of OM to be taught in the clinical, final 2 years. It may be especially significant that OM training for third- and fourth-year medical students is poor. This is a time perceived to be important for specialty selection.[20-23] At the very least, it is the time when students select an initial residency. Only two programs reported any required time to teach fourth-year medical students and the most generous of the medical schools allotted 3 hours. This problem may also represent the bias against preventive medicine pervasive throughout the medical training and medical care system noted by a few of the directors in Table 4.

Paltry numbers of primary care residents with rotations in OM (n = 84; 0.32%) or with formal teaching of OM likely hinder recruitment of graduates of primary care residencies to OM programs. Several OM program directors spontaneously cited planned future requirements for more primary care training before admission to their programs. This was perceived as necessary to accomplish the extensive clinical responsibilities of OM physicians. The goal of filling these programs' positions may be progressively difficult to achieve. This is due to the lack of contact with the residents who would make up this prospective, more qualified, but smaller applicant pool. The lack of OM knowledge, due to inadequate experience of primary care

TABLE 8
Main Trainee Experience Leading to OM Training

Experience/exposure	No.* (%)
Medical school course	2 (1.4)
Medical school OM rotation	16 (11.4)
OM rotation during another residency/fellowship	18 (12.9)
Other courses/mini-residencies/thesis work	11 (7.9)
Contact with patients with OM diseases	30 (21.4)
Military experiences	14 (10.0)
Industrial hygiene	3 (2.1)
Corporate physician	6 (4.3)
Nonmedical factory work	3 (2.1)
Advised by friend/mentor	12 (8.6)
Union work/Workers' Compensation	3 (2.1)
Other	17 (12.1)
Not specified	5 (3.6)

* A few multiple replies: n = 143 trainees responding.

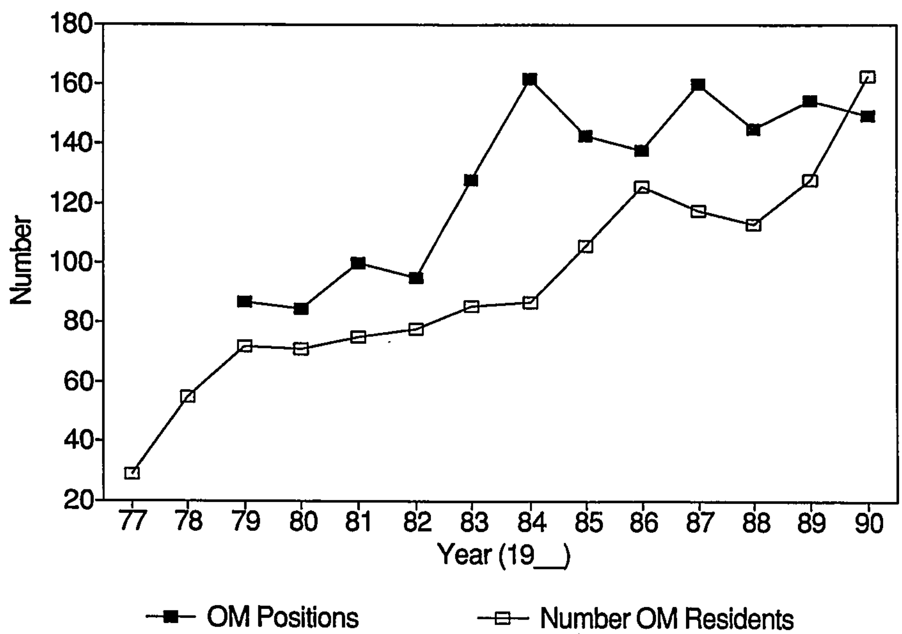

Fig. 1. Reported OM training positions and number of residents.

TABLE 9
Residency Program 10-Year Growth Rates of Residents

Residency Program	1980 Residents (n)	1990 Residents (n)	Growth Rate* (%)
Occupational Medicine	71	163	129.6
Anesthesiology	2490	4889	96.3
Aerospace Medicine	25	48	92.0
Physical Medicine	492	893	81.5
Allergy	192	322	67.7
Radiology, Oncology	288	443	53.8
Child Psychiatry	426	642	50.7
Colorectal Surgery	37	54	45.9
Neurosurgery	511	720	40.9
Blood Banking	23	32	39.1
Diagnostic Radiology	2766	3775	36.5
Pediatric Cardiology	130	176	35.4
Pediatric Surgery	29	37	27.6
Forensic Pathology	22	28	27.3
Psychiatry	3911	4673	19.5
Thoracic Surgery	256	305	19.1
Pediatrics	5171	6115	18.3
Internal Medicine	15,964	18,734	17.4
Dermatology	755	824	9.1
Orthopedic Surgery	2418	2630	8.8
Neurology	1114	1211	8.7
Otolaryngology	923	1002	8.6
Pathology	2186	2364	8.1
Plastic Surgery	367	391	6.5
Family Practice	6344	6680	5.3
Urology	917	963	5.0
Obstetrics/Gynecology	4221	4315	2.2
Surgery	7794	7644	−1.9
Ophthalmology	1480	1446	−2.3
General Preventive Medicine†	157	146	−7.0
Nuclear Medicine	176	156	−11.4
Dermatopathology	30	25	−16.7
Neuropathology	52	38	−26.9
Radiology, Nuclear	48	32	−33.3
Public Health†	31	19	−38.7

* Ten-year growth rate.
† There were 56 combined general preventive medicine/public health positions reported in 1990. Had these three programs been combined, there would have been a 22.8% growth rate in general preventive medicine or public health in the decade.

physicians during the residency training, could also hinder appropriate care, use of preventive medicine techniques, and referrals to OM specialists by these primary care physicians.

Funding was the most widely cited problem among responding program directors. This view is supported by the multiple and wide variety of sources used to fund all positions in the United States. Considering the severe shortage of OM specialists in the United States, the 35 unfunded positions reported among the responding programs is a tragic shortcoming. The funding of these positions would have resulted in a potential increase in the number of trainees by approximately 20%.

A lack of role models, both community physicians and medical school faculty, was cited as a problem by approximately 16% of the responders. This could be perceived as the respondents' desire for more involvement in medical school curricula by OM physicians in private practice. It also is a probable indicator of the shortage of faculty to fill available teaching positions at OM training programs and thus provide academic role models.

Certificates of Added Qualifications

The shortage of OM physicians is so great that one solution recently suggested is for the American Board of Internal Medicine and the American Board of Family Practice to offer Certificates of Added Qualifications (CAQs) to specialists of these fields with advanced OM training.[3] These concepts have not been without controversy.[24] From the information gained from this survey, CAQs would not address important aspects of the underlying problems in OM noted by the program directors in Table 4. These include lack of role models, inadequate time to teach medical students, insufficient numbers of primary care residents rotating through OM electives, low specialty visibility, and biases against preventive care. Further, funding for research and training in OM could be diluted between standard OM residencies and programs with CAQs. Because there has been very significant progress in the last 14 years in forming OM training programs and producing OM specialists, and there are additional OM programs being started, it may be appropriate to address the shortage through increased support of currently available programs, rather than CAQs. The Occupational Physicians Scholarship Fund is an example of an initiative that can significantly increase the number of OM residents.

Trainees

Our survey indicates that the number of residents completing OM residency training each year is greater than the 70 previously reported.[3] There are a disproportionate number of trainees who are in their second year. If the number of second-year trainees among questionnaire responders is extrapolated to all trainees identified, 85 trainees should have completed OM training in June 1992. An estimated three OM/Internal Medicine combined residents will complete training for a total of 88 trainees completing OM residency in June 1992. Every year may have a slightly greater number of second-year trainees because of the inclusion of those who fulfilled prior academic year requirements elsewhere and were admitted for a single year of training.

Different interpretations of the responders' medical school experiences with OM are possible. It is mildly encouraging that nearly half of the trainees had no OM instruction in medical school, but still proceeded to obtain formal residency training. It is also worrisome that this broad cross-section of US medical school graduates is so poorly exposed to OM. It is disconcerting that these trainees' fellow classmates may know nothing about OM, or perhaps, not know even that it exists.

The timing of OM instruction received by trainees is particularly interesting. Although relatively few had OM instruction in the first 3 years of medical school, 21% had instruction in the fourth year of medical school. Only two (7.7%) OM program directors out of 27 programs reported time allotted to teach OM in the fourth year of medical school. Although these two surveys cannot be compared directly statistically, they suggest that more OM teaching in the fourth year of medical school may augment the number of applicants to OM programs. This is especially likely to be true when this information is combined with previous studies demonstrating the importance of the last year of medical school in specialty selection.[20-23] More aggressive marketing of elective fourth year rotations may also help recruitment. That 19.6% of the respondents were taught some OM in other residencies was unexpected. It was thought that the amount of training in other residencies nationally was very small. OM training during other residencies may be another time when OM instruction may yield better recruitment to OM programs.

There is a large diversity in the types of other residency training that current OM trainees have had, although the largest portion involved internal medicine and family practice. We suspect this great diversity is probably unique among medical specialties, and could be due, in part, to the multiple paths available to gain entrance to the OM programs. The diversity in this group of trainees is further underscored by the large variety of prior work experiences and the main experience(s) that led to the decision to begin OM training. Commonly, either premedical school work experiences or postgraduate clinical experiences led to the decision.

Conclusion

This study documents a number of factors that likely contribute to the shortage of OM specialists. There is insufficient teaching of OM to medical students and even less teaching of OM to primary care residents in the United States. In addition, limited residency funding, lack of role models, multiple and varying requirements for admission to training programs, and biases against preventive medicine probably adversely affect the quality and quantity of OM training program applicants. The lack of teaching of OM to medical students and residents may also contribute to a continuing lack of knowledge of OM in the population of primary care physicians who may be performing OM services. Interestingly, the number of OM trainees continues to expand rapidly, despite an apparent lack of progress in incorporating OM into medical schools' curricula.

Although the severe shortage of OM specialists is unlikely to diminish in the near future, the continued growth in the numbers of OM programs and trainees is a hopeful trend. The number of OM residents has been rising briskly (129.6% over the last decade), and we estimate that 88 trainees completed their OM training in June 1992. Current trainees have received very little OM instruction before their current OM programs. There appears to be a significant potential to augment interest in OM and numbers of future applicants by specifically targeting the fourth year of medical school and primary care residencies for formal instruction time. We speculate that the rapid growth rate in OM trainees may be due to strong marketplace demand for OM physicians. If the unfunded positions reported were funded, there is the potential for at least 106 trainees completed OM per year. Medical school and primary care residency curricula changes, appropriate funding, and support of existing and additional programs can play a vital role in alleviation of the shortage of OM specialists. The severe constraints on medical school and residency instruction time will provide a formidable barrier to realizing some of these changes.

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Uranus

. . . Professional musician, amateur astronomer, William Herschel turned a telescope he had crafted himself toward the heavens on the night of March 13, 1781 [in Bath, England], intending to continue with a "review of the heavens"—a careful cataloguing and count of the star fields he . . . examined each night. But this night would be unlike any other. . . . Uranus, seventh planet from the sun, last of the naked-eye planets, revealed itself that night to Herschel, though it would take some time for astronomers and even Herschel himself to recognize that he had spied a previously unrecognized planet. Herschel went on to discover two, perhaps three moons, and determine that this strange new world spun about an axis tipped on its side.

. . . When Herschel first spied Uranus, he imagined that he had captured a new comet in his telescope. . . . The task of determining what Herschel had stumbled upon fell to the mathematicians of the time. Figuring the orbit would reveal its true nature, and Finnish mathematician Ander Lexall apparently calculated the first circular orbit for Herschel's "comet." His calculations showed the object to orbit the sun with a period of 82 years, 10 months at a distance of 2.84 billion kilometers—not far from the 84-year period, 2.87 billion kilometer distant orbit calculated in later years.

With the evidence at hand that the object Herschel saw was indeed a planet, there arose the question of what to name the newest member of the solar system. Herschel himself suggested "Novumsidus Georgianum" in honor of King George III (who, shortly after the discovery, appointed Herschel to be Astronomer to George III), later modified to "Georgium Sidus." . . . That name never quite caught on. . . . Johann Elbert Bode—author of Bode's Law—suggested the name . . . Uranus, Saturn's father in Roman mythology.

Surprisingly, according to authors Garry Hunt and Patrick Moore in . . . "Atlas of Uranus," Uranus had been sighted at least 22 times prior to Herschel's discovery. The first Astronomer Royal, the Reverend John Flamsteed, mistook Uranus for a star on the night of December 23, 1690. That was just the first time. He subsequently recorded, but did not recognize, the planet on five later occasions.

From Herschel's world, by R. Wagner in *Adastra.* 1993; 5:3, p 41.