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Recruitment Challenges for Physician Training in Occupational and Environmental Medicine

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Author contributions: Max Blumberg and Robert Harrison were responsible for the design of the study. Max Blumberg was primarily responsible for statistical analysis and the writing of the manuscript. Both authors read and contributed to the final draft.

Data available upon request from corresponding author.

AI was not used in at any stage of this project.

Ethical considerations: IRB exempt status for our survey was granted through the University of California - San Francisco (UCSF).

Clinical Significance:

The already severe shortage of OEM boarded physicians will worsen as their average age is currently 63 years old. The number of new trainees entering the field is small and shrinking. If this trend continues patients will not be able to access the expertise that the field provides.

Abstract

Objective:

Characterize experiences of current and recent trainees of Occupational and Environmental Medicine (OEM) to inform recruitment.

Methods:

In fall 2023 a survey was sent to 115 current OEM residents and approximately 250 alumni from the previous five years regarding demographics, career motivations, and experience with application/training process.

Results:

The response rate was 54% (62/115) for current residents and approximately 22% (56/~250) for alumni. Only 20% learned about OEM before internship and 41% applied to only one program. The top 3 features of training programs were quality/support of faculty, research opportunities, and family/geographic preference. 84% support a combined/paired internship program.

Conclusions:

The survey highlights challenges in recruitment to OEM, suggesting the need for increased outreach to medical students, opening/reopening programs in new geographic areas, and exploring combined/paired internship programs.

Keywords: Occupational and Environmental Medicine, Occupational Health, Specialty Selection, Residency Training, Residency Match, Medical Student, Resident Survey

Learning Outcomes:

- The overwhelming majority of physicians trained in Occupational and Environmental Medicine (OEM) do not learn about the field until after completing medical school.
- Increased outreach to medical students and creating combined/paired internship programs could allow medical students to more easily enter the field.

Introduction:

Occupational and Environmental Medicine (OEM) is a medical specialty recognized by the American Board of Medical Specialties. OEM training programs are accredited by the American College of Graduate Medical Education (ACGME) and board certification has been granted through the American Board of Preventive Medicine (ABPM) since 1953.[1] OEM practitioners diagnose, treat, and prevent injuries and illnesses caused by exposures in the workplace or environment. Residency training in OEM includes clinical experiences and multidisciplinary non-clinical training, including industrial hygiene, epidemiology, and legal/regulatory frameworks. Those board certified in OEM work in diverse settings, including academia, private practice, government or non-governmental agencies, and corporate consulting.[1–8]

The field of OEM faces several unique challenges. First and foremost, there is a longstanding and severe shortage of residency trained OEM physicians.[9] In the coming years this shortage will worsen as the average age of OEM boarded physicians is currently 63 years old (*unpublished 2024 data provided by the ABPM*). Despite a robust job market, the number of new trainees entering the field is small and declining. When this study was conceived in 2023 there were 23 training programs in the US. This included 21 civilian, one Navy, and one Army program (with Air Force and Navy physicians also sponsored to train at civilian programs). One civilian training program has since closed.

Collectively, there are approximately 200 ACGME accredited residency positions nationwide. However, during each of the last 20 years, more than one third of the slots have been unfilled.[9] In the last 5 years there were an average of 120 residents per year (*data provided by the ACGME).* Moreover, in 2023 there was an unexplained drop in the number of applicants to the

field. The Electronic Residency Application Service (ERAS) has been used by 17 programs to gather application materials. For those 17 programs, the total number of applicants fell from approximately 160 individuals in each of the preceding few years to only 70 individuals in the fall of 2023.[10] Closing the gap between training spots and qualified applicants, even prior to this drop, is a multifaceted problem.

The lack of qualified applicants is partly due to the lack of visibility and partly due to structural barriers. With respect to structural barriers, the pathway to OEM board certification is complex and unusual compared to other fields of medicine. Training can be completed as a primary residency, or as a secondary board similar to a fellowship program. Prior to 2024-2025, there was generally no pathway to enter OEM training directly from medical school. In June 2024, the residency program directors agreed to join the National Residency Match Program (NRMP), *news provided by the Occupational & Environmental Medicine Residency Directors Association*.

The shortage of funding for trainees is also a complex issue. In contrast to other residency training programs, OEM training programs are not funded through federal Medicare dollars. Instead, most of the civilian trainees are funded through competitive training grants from the National Institute of Occupational Safety and Health (NIOSH). A few programs have relatively small amounts of supplemental funds from the Health Resources and Services Administration (HRSA), the Department of Veterans Affairs, and private donations. From 1994 to 2004 there was also the Occupational Physicians Scholarship Fund, which supported about 100 residents over two decades and was funded by several large corporations. Due to changing corporate donation practices the fund closed 20 years ago.[11] In the intervening 2 decades the cost of trainee and faculty salaries has increased, leading many programs to close. In the 1970s there were 40 programs, now only 22.[9]

The objective of this study was to characterize the experiences of current trainees and recent graduates of OEM residency in terms of program selection and educational satisfaction. Our goal was to obtain data that could inform recruitment into the specialty to address structural barriers and the applicant shortage.

Methods:

IRB exempt status for our survey was granted through the University of California - San Francisco (UCSF). We created a draft survey that was pilot tested with one current resident and one recent alumnus of UCSF, who were then excluded from the sample. We distributed the final survey in Fall 2023 through the program directors (PD) of all (then 23) current programs. With a cover email, the PDs distributed the survey to the 115 current OEM residents and an estimated 250 alumni who have graduated from OEM training programs in the US between 2019 and 2023. The numbers of alumni are approximate because the exact number of current residents fluctuates from year to year (between 114 and 124 in 2019-2023) and the total number of graduates each year is not currently collected by any single organization. Each PD sent at least one reminder message to eligible study respondents.

The survey was self-completed online, was anonymous, took about 10 minutes to complete, and included close-ended questions about demographics, pathways to OEM, experience applying to programs, planned/current type of job, and views on various ways to expand the pipeline. The full survey text can be found in the Appendix (http://links.lww.com/JOM/B913).

Data collection and analysis was performed using Qualtrics (Seattle, Washington) and Microsoft Excel (Redmond, Washington). Excluding the demographic questions, only respondents

that completed all the other survey items were analyzed. We used chi-square to test the differences between responses for current residents vs. alumni, and active duty vs. civilian/veteran populations.

Results:

Response rates were 54% (62/115) for residents and approximately 22% for alumni. At least one resident responded from each of the (then) 23 programs (minimum 1, mean 5, maximum 17 respondents per program). Of 115 respondents, 95% were satisfied with their training experience. Responses regarding various demographic features, pathways to the field and applicant experiences are shown in Tables 1 and 2. The top three reasons for choosing the field included work life balance, good hours, & lack of call; diversity of practice settings & job opportunities; and balance of patient care with other work (e.g., research/policy/administrative work). The top 3 features when choosing a training program were quality & support of faculty, research opportunities, and family & geographic preference. Among current trainees and alumni, 80% did not learn about the field until after completing medical school.

Chi square analyses to test for significant differences when comparing current resident vs. alumni or active duty vs. civilian/veteran populations, are shown in Table 3. The only comparisons with significant differences (chi square <0.05) were for gender, race, and number of programs applied to when comparing active duty vs. civilian/veteran populations.

Discussion:

This is the first comprehensive national survey of trainees and recent alumni in OEM, with response from all (then 23) OEM training programs.[12–16] The data collection coincided with, and

generated discussion among PDs, which contributed to the decision to join the NRMP for the first time. This study has a few limitations. First is a relatively small sample size. Second, it is not possible to ascertain if the respondents are representative of the larger pool of OEM residents and recent alumni.

The results elucidate four pathways for today's ACGME trained physicians in the field. The first and most common pathway is individuals who change specialties from another field, either in the middle of another residency or after practicing in another field for years. The second pathway is individuals who complete OEM training like a traditional fellowship, starting directly after completing another residency such as internal or family medicine. Third and rarely, individuals apply to an internship program and then apply to an OEM program one year later. Fourth and very rarely, medical students can apply to one program (Loma Linda University) for a combined internship and OEM program. Aside from Loma Linda University, all other OEM applicants must go through two separate application processes to complete training.

As a result of the structural barriers and lack of visibility of the field among medical students - in addition to the lack of sustained funding - there are about 100 accredited training spots across the country that have been unfilled every year over the last 2 decades.[9] To increase the pipeline of physicians into OEM, we suggest several steps. First, as a field we lack fundamental visibility given that 80% of current and recent trainees did not learn about the field until after medical school. We must do more to introduce the field to medical students, pre-medical students, as well as trainees and practicing physicians in other fields to expand the applicant pool.

Second, opening (or reopening previously closed programs) in new geographic areas may expand the applicant pool. This is particularly supported by the fact that nearly half of survey respondents only applied to a single program and geographic preference was among the top three

reason for choosing a program. The relatively older age of applicants to the field and family considerations may strongly influence choice of programs based on geographic factors.

Third, the fact that OEM programs joined the NRMP in the 2024-2025 match cycle may improve the pipeline. As part of the NRMP, OEM training will be more visible to medical students during their educational pathways and centralized data will also become available. Currently OEM residency programs are omitted from many reports that the NRMP publishes, which are used by medical students to learn about the competitiveness and application practices in other fields. This data can be used to evaluate the impact of enhanced visibility during medical student education. The NRMP may also open the door to a future expansion of the combined/paired internship model. This would enable applicants to apply directly from medical school, removing the structural barrier of two separate application processes.

The survey did not specifically address the funding aspect OEM residency programs, one crucial barrier to enlarging the pool of trainees. Other specialties' training programs are generally funded through federal Medicare dollars, except for pediatrics. The federal Children's Hospital GME (CHGME) program was established in 1999 to continuously fund pediatric training programs.[17] OEM training programs are not eligible for Medicare (or CHGME) dollars. The creation of a CHGME-type program for OEM, or a re-establishment of the corporate scholarship fund mentioned in our introduction could help address NIOSH funding gaps.

We hope that this survey can provide some much-needed data to confirm what many leaders in the field have already been thinking about for many years. The problems facing our small but wide-reaching field are multifaceted and will take interdisciplinary collaboration to solve. We look forward to working together with many stakeholders to expand the pipeline in years to come.

Conclusion:

This is the first comprehensive national survey of trainees and recent alumni in OEM. One key finding is that only 20% of respondents learned about the field before or during medical school. This and other results suggest the need for increased outreach to medical students, opening/reopening programs in new geographic areas, and exploring combined/paired internship programs to increase recruitment to the field.

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Table 1: Demographics of Respondents

Table 2: Path to the field and application experience

Table 3: Chi squares testing the differences between responses for active duty vs. civilian/veteran, and current residents vs. alumni populations.

***Excludes other/decline**

Appendix:

Survey text (attached)

Table 1: Demographics of Respondents

	N	Percent
Training Status	**118**	
Resident	62	53%
Alumni	56	47%
Military Status	**118**	
Active Duty	26	22%
Civilian or Veteran	92	78%
Gender	**118**	
Female	41	35%
Male	65	55%
Other or decline to answer	12	10%
Race	**118**	
White	63	53%
Black or African American	6	5%
Asian	25	21%
American Indian or Alaska Native	2	2%
Decline to answer	22	19%
Ethnicity	**118**	
Hispanic/Latino	6	5%
Not Hispanic/Latino	93	79%
Decline to answer	19	16%
History of occ. Injury/illness	**118**	
Personal	28	24%
Family member	28	24%
Both	11	9%
Neither	51	43%
This injury/illness had a significant impact on leading me to a career in OEM	**65**	
Agree or strongly agree	17	26%
Neutral	24	37%
Disagree or strongly disagree	15	23%

Table 2: Path to the field and application experience

	N	Percent
First learned about the field	**118**	
Before medical school	5	4%
During medical school	19	16%
During internship	15	13%
During PGY2+ residency in another field	49	42%
During attending practice in another field	30	25%
Prior training before OEM	**118**	
Board eligible/certified and 1+ year of attending practice in another field	18	15%
Board eligible/certified in another field, no attending practice	15	13%
PGY2+ of another residency, unfinished	45	38%
Internship only	40	34%
Number of programs applied to	**118**	
1	48	41%
2-5	27	23%
6-10	23	19%
11-15	12	10%
16-23	8	7%
Number of interviews completed	**118**	
1	55	47%
2-5	33	28%
6-10	23	19%
11-15	7	6%
Where did you train?	**118**	
1st choice	102	86%
2nd choice	12	10%
3rd choice	1	1%
4th or lower choice	3	3%
Support a combined/paired internship program	**118**	
Definitely not	1	1%
Probably not	2	2%
Maybe	16	14%
Probably yes	24	20%
Definitely yes	75	64%

Table 3: Chi squares testing the differences between responses for active duty vs. civilian/veteran, and current residents vs. alumni populations.

	Active Duty	**Veteran/ Civilian**	**Total**	**Chi Squares**
Training Status	26	92	118	0.88
Alumni	12	44	56	
Resident	14	48	62	
Gender	24	82	106*	**0.04**
Female	5	36	41	
Male	19	46	65	
Race	20	75	95*	**0.01**
White	18	45	63	
Non-White	2	30	32	
Ethnicity	22	77	99*	0.18
Hispanic/Latino	0	6	6	
Not Hispanic/Latino	22	71	93	
First learned about the field	26	92	118	0.69
Before or During Medical School	6	18	24	
After Medical School	20	74	94	
Programs applied to	26	92	118	**0.01**
1-5	22	53	75	
6-23	4	39	43	
Interviews completed	26	92	118	0.18
1-5	22	66	88	
6-15	4	26	30	
Where did you train	26	92	118	0.88
First or second choice	25	89	114	
Third or lower choice	1	3	4	
Support combined/paired internship program	26	92	118	0.84
No	1	2	3	
Maybe	4	12	16	
Yes	21	78	99	
Top 3 reasons for OEM	57	164	221	0.78
Work/life balance	23	71	94	
Diversity of practice/job opportunities	17	52	69	
Balance of clinical/other work	17	41	58	

Top 3 program features	25	108	133	0.67
(1) Family/Geographic preference	12	57	69	
(2) Faculty	13	51	64	
(3 discordant) Job connections		41		
(3 discordant) Rotation opportunities	16			
	Alumni	**Resident**	**Total**	**Chi Squares**
Military Status	56	62	118	0.88
Active Duty	12	14	26	
Vet or Civilian	44	48	92	
Gender	52	54	106*	0.12
Female	24	17	41	
Male	28	37	65	
Race	48	47	95*	0.17
White	35	28	63	
Non-white	13	19	32	
Ethnicity	49	50	99*	0.98
Hispanic/Latino	3	3	6	
Not Hispanic/Latino	46	47	93	
First Learned about the field	56	62	118	0.52
Before or during medical school	10	14	24	
After medical school	46	48	94	
Programs applied to	56	62	118	0.36
1-5	38	37	75	
6-23	18	25	43	
Interviews completed	56	62	118	0.60
1-5	43	45	88	
6-15	13	17	30	
Total				
Where did you train	56	62	118	0.92
First or second choice	54	60	114	
Third or lower choice	2	2	4	
Support combined/paired internship program	56	62	118	0.77
No	2	1	3	
Maybe	7	9	16	
Yes	47	52	99	
Top 3 reasons for OEM	108	113	221	0.71

Work/life balance	46	48	94	
Diversity of practice/job opportunities	36	33	69	
Balance of clinical/other work	26	32	58	
Top 3 program features	96	103	199	0.95
Family/Geographic preference	34	35	69	
Faculty	36	41	77	
Current residents	26	27	53	

***Excludes other/decline**