

Prevalence of Burnout in Occupational and Environmental Medicine Physicians in the United States

Judith Green-McKenzie, MD, MPH, Parvathi Somasundaram, MD, MPH, Timothy Lawler, DO, MPH, Edward O'Hara, MD, MBA, and Frances S. Shofer, PhD

Objective: To determine prevalence and key drivers of burnout in Occupational and Environmental Medicine physicians in the United States. **Methods:** A nationwide survey of Occupational Medicine physicians was conducted using the Qualtrics® platform. Burnout, measured by the Maslach Burnout Inventory®, Social Support, and Job Satisfaction were assessed. **Results:** The response rate was 46%, the overall burnout prevalence 38%, and most respondents were men (69%). The mean age and mean years in practice were 56 years and 20 years respectively. Physicians working in government/military (48%) and private medical center group settings (46%) were significantly more likely to report burnout, with consultants (15%) reporting the lowest rate. **Conclusions:** Although the overall burnout prevalence is lower in Occupational Medicine physicians compared with most specialties, the rate varies significantly by practice setting (15% to 48%) affirming the impact of organizational factors.

Keywords: burnout, depersonalization, employee health, emotional exhaustion, invisible occupational hazard, Karasek-Johnson, Maslach Burnout Inventory, occupational hazard, occupational medicine physician, occupational health and safety, preventive medicine, reduced personal accomplishment, social support

Preventive Medicine specialists, of which Occupational and Environmental Medicine is a subspecialty, reportedly have the lowest rates of burnout—ranging from 28%¹ to 38%.² Much higher rates exist within other specialties with the highest rate reported in Emergency Medicine physicians at 70%.² Although this lower rate may seem admirable, one in three physicians is a significant number considering this occupational hazard is potentially preventable. Indeed, the 2019 National Academy of Medicine

Learning Objectives

- Discuss previous findings on rates of burnout among occupational and environmental medicine (OEM) physicians, relative to other specialties.
- Summarize the findings of the new survey of burnout among OEM physicians.
- Identify the impact of practice setting/organizational factors found to affect the prevalence of burnout among OEM specialists.

Committee, convened to address burnout and well-being, presented several strategies emphasizing “a systems approach to burnout”³ towards reducing or eliminating this invisible workplace hazard.

Burnout has been defined as a psychological syndrome in response to chronic interpersonal stressors,⁴ occurring after exposure to relentless stress at work, and as such, is considered an end-stage consequence of such factors.^{5,6} An occupational hazard for healthcare workers, it is characterized as having three dimensions: high emotional exhaustion (EE), high depersonalization (DP), and low personal accomplishment (PA). Emotional exhaustion is defined as a state of being emotionally overextended and exhausted by one's work and being depleted of one's emotional resources. Depersonalization refers to an impersonal response toward recipients of one's service, care treatment, or instruction—a negative, cynical, and detached approach to people under one's care. Personal accomplishment refers to feelings of competence and successful achievement in one's work, while reduced personal accomplishment refers to a sense of low self-efficacy and negative feelings towards one's self.⁵⁻⁷

The rate of burnout has been noted to be higher in physicians than in the general population (45.5% vs 28.4% respectively) in 2011 and noted to increase (54.4% vs 28.6%) in 2014, with the general population prevalence similar in both years.^{1,8,9} Although the burnout rate reportedly decreased between 2011 and 2017, it remains a significant public health problem nonetheless.^{10,11} Contributors to burnout have been found to range from excessive workload, increased use of electronic medical records, administrative burdens, loss of autonomy and flexibility, fear of making errors, to the decline in personal meaning in relationships with patients, and difficulty integrating personal and professional lives.^{6,9,10} Being younger, unmarried, and having longer working hours have also been found to be significantly associated with higher rates of burnout in the physician worker population.^{2,1-4,12-14}

In the professional realm, physician burnout has been found to be independently associated with an increase in medical errors, decreased morale, and increased physician turnover.^{15,16} This is impactful to health care organizations, not only because patient care can be affected; but because with increased physician turnover, comes increased costs to the health system. The cost to recruit and train a new physician lies at around \$500,000 to \$1 million.⁸ Indeed, addressing burnout is not only morally and ethically important but also fiscally sound.⁸

In general, studies on burnout have either grouped Occupational and Environmental Medicine (OEM) with General Preventive

From the Division of Occupational Medicine (Dr Green-McKenzie, Dr Somasundaram, Dr Lawler, Dr O'Hara); Bayhealth Occupational Medicine, Dover, Delaware (Dr Somasundaram); Sharp Rees-Stealy Medical Group, San Diego (Dr Lawler); EMR CPR, Fremont (Dr O'Hara), California; Epidemiology & Biostatistics (Dr Shofer), Department of Emergency Medicine, University of Pennsylvania Perelman School of Medicine, Philadelphia, Pennsylvania. Clinical significance: Burnout, an invisible occupational hazard, can impact physicians' personal and professional lives, patient care, and financial health of health care institutions. This nationwide survey revealed that although Occupational Medicine physicians report the lowest overall burnout prevalence, burnout varied by practice setting (15% to 48%) supporting the benefit of prevention through organizational change.

This article is based on a poster presentation at the 2019 American Occupational Health Conference in Anaheim, California.

Green-McKenzie, Somasundaram, Lawler, O'Hara, and Shofer have no relationships/conditions/circumstances that present potential conflict of interest.

The JOEM editorial board and planners have no financial interest related to this research.

Conflicts of Interest: This research was supported in part by two training grants, on which JGM was the PI, from the National Institute of Occupational Safety and Health - grant number: 5-TO1-OH008628 and the Health Resources and Services Administration - grant number: D33HP25770-01-00. The opinions expressed in this article are the authors own and do not necessarily reflect the view of the granting agencies.

Address correspondence to: Judith Green-McKenzie, MD, MPH, Division of Occupational Medicine, Department of Emergency Medicine, 3400 Spruce Street, University of Pennsylvania Perelman School of Medicine, Philadelphia, PA 19104 (Judith.mckenzie@pennmedicine.edu).

Copyright © 2020 American College of Occupational and Environmental Medicine

DOI: 10.1097/JOM.0000000000001913

Medicine or have not mentioned the specialty. The aim of this research is to explore burnout in this unique group of physicians, whose mandate is to protect the occupational health and safety of workers. To do this we will assess the magnitude of the problem. Factors that may increase or reduce burnout will also be assessed in order to identify potential preventive measures.

The objectives of this study are to determine the prevalence of burnout in OEM physicians in the United States and to assess the role of demographics, organizational work factors, job satisfaction, and social support.^{17–20}

METHODS

Design

This prevalence, cross-sectional study was approved by The Institutional Review Board of the University of Pennsylvania Perelman School of Medicine.

Survey Tool

The Maslach Burnout Inventory–Human Services Survey for Medical Personnel ((MBI-HSS [MP])) was the main survey tool.^{21,22} Created specifically for health care workers, it is considered the gold standard for evaluating burnout in healthcare professionals.^{23–25} It focuses on the three dimensions of burnout—Emotional Exhaustion (EE), Depersonalization (DP), and low personal accomplishment (PA). Consistent with prior research⁶ high levels of EE or DP was considered diagnostic of burnout. Burnout was defined as high EE and/or high DP. The criteria for burnout used in this research is based on the definition in the MBI manual 3rd edition, with the cutoff for high EE at more than or equal to 27 and the cutoff for high DP at more than or equal to 10. The cutoff for low PA was less than or equal to 38.^{13,21,22,26,27}

In order to further determine factors associated with burnout the validated Job Satisfaction Survey²⁸ was also used as were selected questions from the validated Social Support Questionnaire.²⁹ Additionally, other questions asked assessed demographics, geographical practice location, board certification, and practice characteristics—such as in-hospital practice, outpatient clinic, or private practice. Some free text, open-ended questions assessing respondents' opinions on the causes of burnout were also employed. The questions were administered as an online survey using the Qualtrics survey platform. The survey was voluntary and anonymous.

Study Period

The study period, during which the questionnaire administration was conducted, was limited to the month of December 2018.

Study Population

The inclusion criteria were as follows: active membership in American College of Occupational and Environmental (ACOEM), the largest professional organization of OEM physicians in the United States. Additionally, participants must hold an MD or DO degree and practice medicine within the continental United States, Alaska, Hawaii, or Puerto Rico. The survey was e-mailed to each of the 2398 unique e-mail addresses identified from the ACOEM databases as belonging to the active ACOEM members. In order to increase the response rate, two separate e-mail reminders were sent. Consent was requested before the survey could be opened so consent was assumed once the survey was opened.

Statistical Analysis

Descriptive summary statistics were used to characterize the study population, using mean $\pm$ standard deviation or median and interquartile range for continuous variables, such as age or years of practice, and frequencies and percentages for categorical variables such as type of practice, sex, geographic region. To determine

TABLE 1. Demographics

Demographic	N	%
Gender		
Female	140	29.1
Male	333	69.2
Prefer not to respond/other	8	1.7
Age, yrs		
Mean $\pm$ SD		56.2 $\pm$ 10.4
<50	122	25.9
50–58	119	25.3
59–64	123	26.1
>64	107	22.7
Practice type		
Hospital/Medical Center Group	122	25.5
Employed Occupational Medicine	88	18.4
Corporate Medicine	53	11.1
Government/Military	52	10.9
Self-employed practice	46	9.6
Consultant	41	8.6
Academic (non-resident)	25	5.2
Private Medical Center Group	24	5.0
Other	28	5.9
Type physician		
Allopathic MD	419	87.1
Osteopathic DO	62	12.9
Board Certification*		
OEM	337	70.1
General Preventive Medicine	107	22.2
Internal Medicine	83	17.3
Family Medicine	82	17.1
Aerospace Medicine	18	3.7
Emergency Medicine	12	2.5
Other specialty†	38	7.9
Marital status		
Married	399	84.2
Single	34	7.2
Divorced/Separated	34	7.2
Widowed	7	1.5
Years practiced OEM (mean $\pm$ SD)		20.4 $\pm$ 11.0
Hours work/wk (mean $\pm$ SD)		43.4 $\pm$ 12.5
Patient care h/wk (mean $\pm$ SD)		22.5 $\pm$ 15.8
0–8	135	28.1
9–25	115	23.9
26–36	121	25.2
>36	110	22.9

*Respondents can be boarded in more than one specialty.

†Includes Addiction Medicine, Allergy & Immunology, Anesthesiology, General Surgery, Geriatrics, Hematology, Hyperbarics, Infectious Disease, Orthopedics, Palliative Care, Pediatrics, Physical Medicine & Rehabilitation, Pulmonology, Toxicology.

differences in burnout within the three dimensions (EE, DP, and low PA) by these physician demographics, several techniques were employed. Initial statistics included, chi-square tests for categorical variables, and either *t* tests or Analysis of Variance (more than two categories) for demographics that were normally distributed, or Wilcoxon rank sum and Kruskal-Wallis tests, respectively, for non-normally distributed data. Logistic regression was used to determine physician characteristics associated with burnout, as well as the impact of social support/job satisfaction, in any of the three constructs. All analyses were performed using SAS statistical software (version 9.4, SAS Institute, Cary, NC).

RESULTS

Of 2398 e-mails sent, 1305 ACOEM members opened at least one invitation e-mail and as such were identified as having received

TABLE 2. Burnout by Domain and Overall Burnout Prevalence

Range	Emotional Exhaustion (EE)			Depersonalization (DP)			Personal Accomplishment (PA)			Burnout		
	Scale	N	%	Scale	N	%	Scale	N	%	Scale	N	%
Low	≤18	243	51.9%	≤5	274	58.7%	≤33	89	19.3%	EE < 27 and DP < 10	283	61.8%
Moderate	19–26	85	18.2%	6–9	82	17.4%	34–39	96	20.9%			
High	≥27	140	29.9%	≥10	115	24.4%	≥40	277	60.0%	EE ≥ 27 or DP ≥ 10	181	*38.2%

*Burnout is defined as high DP and/or high EE.

the survey. Of those, 46% (569) opened the link to start the survey, and 37% (481) completed it and form the basis of this analysis. Of the completed surveys, the respondents were 69% men, the mean age was 56 years, the mean number of years spent practicing OEM was 20 years, and the average number of hours spent in patient care was 22.5 h/wk, with 48% working more than 25 hours (Table 1). Of various board certifications, 70% of the respondents reported being diplomates of the American Board of Preventive Medicine—Occupational Medicine, followed by General Preventive Medicine (22%), Internal Medicine (17%), Family Medicine (17%), and Aerospace Medicine (4%). Overall, 97% reported active board certification. All participants primarily practiced occupational medicine and 186 (39%) were boarded in more than one specialty.

Respondents were found to have a diverse range of practice environments, where 26% worked in a hospital/medical center group, 18% in an Employed Occupational Medicine practice, which is defined as a working within a private nationwide network of clinics, 11% each for Corporate and Government/Military settings, followed by self-employed (10%), then consulting (9%). Respondents noted that their duties ranged from 100% clinical care to 100% non-clinical work.

Respondents represented 48 states, including Hawaii, and every region of the United States—Northeast (28%), Midwest (26%), Southeast (16%), West (23%), Southwest (16%). Thirty percent practiced in multiple states. The overall prevalence of burnout in this group of OEM physicians was 38% (Table 2). Although 24.4% reported high DP and 29.9% reported high EE, 8.4% reported DP only and 13.9% reported EE only—16% reported both. Low PA was reported by 19.3%.

Compared with respondents without burnout, those with burnout were more likely to be younger (54 vs 57 years, $P = 0.007$), work longer patient care h/wk (more than 36 hours; 29% vs 19.5%, $P = 0.002$), and have been in practice for shorter periods of time (less than 20 years: 55% vs 45%, $P = 0.01$, Table 3).

Logistic regression models revealed that women, age, and clinical patient hours were all independently associated with increased odds of burnout (Fig. 1). As seen in Fig. 2, burnout by practice type was found to be highest in Government (48%), Private Medical Center Groups (46%), Employed Occupational Medicine (45%) and Hospital/Medical Center Group (42%), and lowest in consulting (15%).

Burnout was also associated with social support factors in that physicians with burnout were significantly less likely to report that their relationships are filled with love, that they have someone to help them with chores if they were sick, or have someone with whom to share private worries and fears (Table 4, $P < 0.0001$). They were also significantly less likely to ascribe to the sentiment that goals and values are important in their lives (Table 4, $P < 0.004$). Additionally, physicians with burnout were significantly more likely to report dissatisfaction with relationships with family/children, unhappiness with financial resources, and unimportance of goals and values (Table 4, $P < 0.0001$).

After adjusting for physician demographics, the odds of burnout increased with the following factors: younger age, not having someone with whom to share private worries and fears, the inability to relax and have fun outside work, dissatisfaction with financial resources, and the feeling relationships in life were not filled with love (Fig. 3). Common themes emerged from the open-

TABLE 3. Burnout and Relationship to Physician Demographics

Characteristic	Burnout		No Burnout		P-Value
	N	%	N	%	
Age, yrs		54 ± 10.2		57.4 ± 10.4	0.0007
32–49	51	28.8%	71	24.7%	0.02*
50–58	55	31.1%	62	21.6%	
59–64	46	26.0%	75	26.1%	
>64	25	14.1%	79	27.5%	
Patient hrs/wk		25.6 ± 15.5		21 ± 15.5	0.002
0–8 hrs	39	21.6%	90	30.7%	0.002
9–25 hrs	38	21.0%	76	25.9%	
26–36 hrs	51	28.2%	70	23.9%	
>36	53	29.3%	576	19.5%	
Years practicing OEM		18.6 ± 10.2		21.2 ± 11.3	0.01
0–10	54	29.8%	64	21.8%	
11–20	46	25.4%	69	23.6%	
21–30	59	32.6%	111	37.9%	
>30	22	12.2%	49	16.7%	
Children < 18 years at home	63	34.8%	88	30.2%	0.31
Married	149	84.2%	243	83.8%	>0.9999

*Chi-square test for trend.

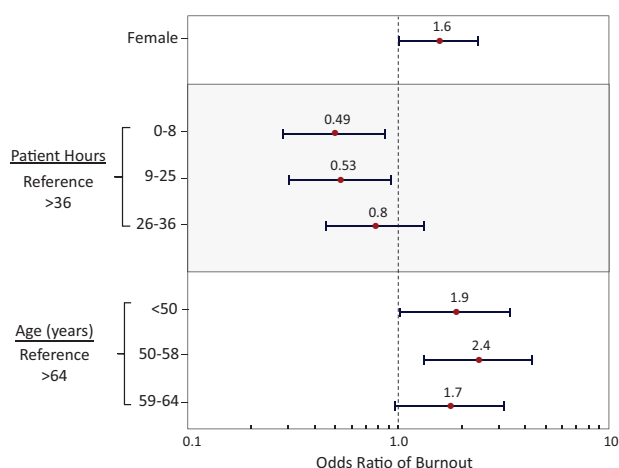


FIGURE 1. Odds ratios of burnout adjusted for sex, age, and patient care hours.

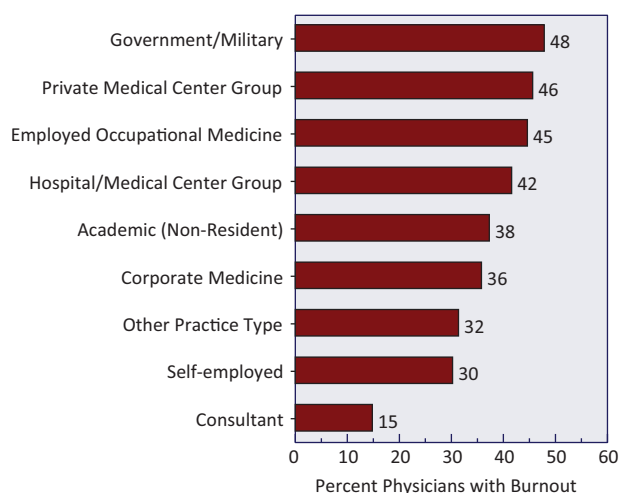


FIGURE 2. Burnout by physician practice type.

ended question as sources of burnout. They were stress experienced related to personal health, having to care for elderly parents, and having to keep up with maintenance of certification credits towards maintaining board certification.

DISCUSSION

Over the past several years, there have been nationwide efforts directed at reducing the burden of burnout in physicians.^{1,10,11,30} This research is consistent with prior work and also adds to the current literature on burnout in physicians. Younger age has been found to be significantly associated with higher rates of burnout as reported previously.^{2,16,17}

Longer clinical hours were also found to be associated with a significantly increased prevalence of burnout also supported by other research.^{2,16,17} Physicians who work longer clinical hours may have less control over when their day ends. Indeed, factors such as patient volume, illness complexity, and injury severity may be unpredictable and add to the amount of time needed to deliver care. The pressure to meet industry standard relative value units (RVUs) may also contribute as there may be increased pressure for the physician to see as many patients as possible.³¹ The result is high demand combined with a low locus of control, which has been associated with increased job stress.²¹ Physicians employed in private and hospital based groups reported longer hours.

Consultants, on the other hand, who are more likely to work in a setting with a high locus of control, whether their self-selected work demands are high or low, reported the lowest rate of burnout at 15%. This is half the rate of OEM physicians overall, less than one-third the rate of those in government/military service, and about one-third the rate for those employed in private medical center groups, general occupational medicine, and hospital medical center groups. A reason for this finding could be that, in general, consultants have the highest levels of autonomy. They operate in a high demand and high control setting, which has been shown to result in lower work related stress than individuals who work in jobs that require high demand and low control.¹³ Physicians in military service may have less control over their work environment given the more hierarchical structure.³²

Indeed, the relatively low prevalence of burnout, compared with other specialties, may be falsely reassuring given the wide range of OEM practice settings, each varying in OEM physician burnout prevalence. The large difference in burnout by practice type (15% vs 48%), subscribes to the importance of organizational factors^{3,13} and warrants further study. A better understanding of the operational differences among each practice type and how these differences contribute to burnout may be an important factor to explore further.

Social support has been described by Karasek and Johnson as a moderating factor in mitigating workplace stress.^{18–20} Questions exploring this concept were posed, such as having help if one is sick, having a friend with whom to go to the movies, or having someone with whom to talk if a problem arises. Physicians who reported positively were significantly less likely to report burnout. In general, physicians with burnout were significantly more likely to report lower levels of social support.

TABLE 4. Burnout by Social Support Characteristic

Social Support Characteristic	Burnout		No Burnout		P-Value
	N	%	N	%	
No one to share private worries and fears	65	36.1	44	15.1	<0.0001
Able to relax and have fun outside of work	110	60.8	258	88.1	<0.0001
Happy with financial resources	123	68.0	256	87.4	<0.0001
Someone to help with chores if sick	130	72.6	256	87.4	<0.0001
Draw satisfaction from friends	131	72.8	271	92.8	<0.0001
Feel relationships in my life are filled with love	134	74.0	272	92.8	<0.0001
Satisfied with relationship with family/children	139	76.8	265	91.1	<0.0001
Someone to help with suggestions with a personal problem	141	78.3	271	92.5	<0.0001
Find someone to go to a movie with	119	66.1	234	79.9	0.0011
Goals and values important in my life	167	92.3	287	98.0	0.004

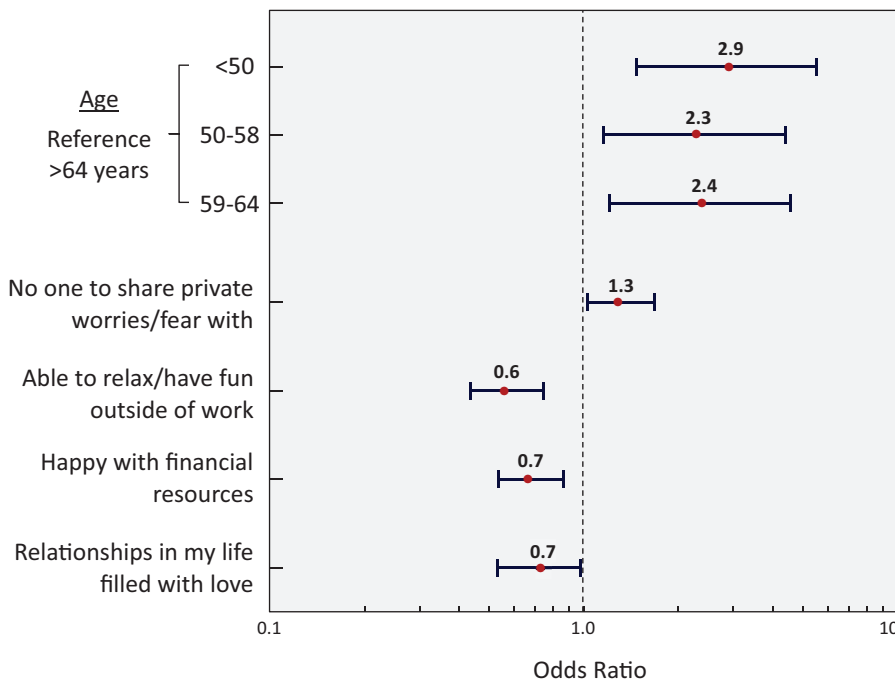


FIGURE 3. Odds ratio for burnout adjusted for social support factors and physician demographics.

Purpose and meaning have been found to be important to one's well-being.³³ Physicians with burnout were significantly less likely to ascribe to the sentiment that goals and values are important in their lives. Strategies to help increase the meaning a physician finds in his or her daily life and work, through resiliency training,^{6,34} for example, may help towards burnout mitigation or prevention. These can be instituted on the personal or organizational level.^{3,18,35–37}

This research fills a gap in that the prevalence and associated factors affecting burnout in OEM physicians has not been previously studied. That OEM physicians have the lowest overall burnout rate is aligned with their mission—dedication to promoting the health and productivity of workers, their families, and communities. Worker health, safety and well-being are integral to the training of OEM physicians.^{38,39}

Limitations

Limitations to this study include the modest response rate of 46% with 37% of respondents completing the survey. This lends itself to response bias. The survey was self-report which may mitigate respondents' reporting what they perceive to be more socially acceptable answers. ACOEM does not represent all OEM physicians in the United States. As such, the reach of the survey may have been limited. However, ACOEM is the largest national professional society for OEM physicians and as such, represents the practicing OEM physicians in the United States. The ACOEM membership sex demographic also reflects that of the respondents—68%⁴⁰ versus 69% men, respectively. Themes that arose from free text open ended questions that could potentially affect burnout such as stress related to personal health, caring for elderly parents, and keeping up to date on maintenance of certification credits were not explored in detail but may be used to inform future research.

CONCLUSION

Burnout has been found to be least prevalent in occupational and environmental physicians compared with other specialties. However, this research suggests that the rate of burnout varies within this occupational group depending on organizational factors and on the presence of social support and purpose and meaning. Indeed, as many as half of OEM physicians who work in some OEM

practice settings reported burnout. This research sheds light on drivers specific to this physician population. The National Academy of Medicine recommends a systems approach to burnout, emphasizing the importance of organizational support of targeted initiatives, as well as a better understanding of specific drivers towards directed interventions.³ Burnout is preventable, yet it persists as a significant occupational hazard. Despite current efforts, some physicians pay the ultimate price.^{2,15,41} Further research to better elucidate the organizational, social and personal factors associated with burnout will continue to inform targeted interventions towards eliminating burnout, the invisible occupational hazard.

ACKNOWLEDGMENTS

The authors would like to thank the American College of Occupational and Environmental Medicine (ACOEM) for allowing us to distribute this survey to its membership and for their help and support in this research project and Ms Jamie Curran for her assistance with the logistics.

REFERENCES

- Shanafelt TD, Hasan O, Dyrbye LN, et al. Changes in burnout and satisfaction with work-life balance in physicians and the general US working population between 2011 and 2014. *Mayo Clin Proc.* 2015;90:1600–1613.
- Medscape. Medscape National Physician Burnout, Depression & Suicide Report 2019; 2019. Available at: <https://www.medscape.com/slideshow/2019-lifestyle-burnout-depression-6011056#1>.
- Taking Action Against Clinician Burnout.* Washington, D.C: National Academies Press; 2019, doi:10.17226/25521.
- Maslach C, Leiter MP. Understanding the burnout experience: recent research and its implications for psychiatry. *World Psychiatry.* 2016;15:103–111.
- Paolini HO, Bertram B, Hamilton T. Antidotes to burnout: fostering physician resiliency, well-being, and holistic development. *Medscape Psychiatry.* 2013. <https://www.medscape.com/viewarticle/782514>.
- Deckard G, Meterko M, Field D. Physician burnout: an examination of personal, professional, and organizational relationships. *Med Care.* 1994;32:745–754.
- Benzer DG. Stress impairment in physicians. *WJ.* 2001;100:20–23.
- Shanafelt T, Goh J, Sinsky C. The business case for investing in physician well-being. *JAMA Intern Med.* 2017;177:1826–1832.
- Shanafelt TD, Boone S, Tan L, et al. Burnout and satisfaction with work-life balance among US physicians relative to the general US population. *Arch Intern Med.* 2012;172:1377–1385.

10. Jha A, Iliff A, Chaoui A, Bonbaugh MMY. A Crisis in Health Care: A Call to Action on Physician Burnout; 2019. Available at: <http://www.massmed.org/News-and-Publications/MMS-News-Releases/Physician-Burnout-Report-2018/>.
11. Shanafelt TD, West CP, Sinsky C, et al. Changes in burnout and satisfaction with work-life integration in physicians and the general US Working Population between 2011 and 2017. *Mayo Clin Proc.* 2019;94:1681–1694.
12. North CS, Ryall JE. Psychiatric illness in female physicians. Are high rates of depression an occupational hazard? *Postgrad Med.* 1997;101:233–236.
13. Patel RS, Bachu R, Adikey A, et al. Factors related to physician burnout and its consequences: a review. *Behav Sci (Basel).* 2018;8:E98.
14. McKenzie B, Walker T, Chin C. Prevalence of burnout in Bahamian Health Care Personnel. *J Occup Environ Med.* 2018;60:e434–e435.
15. Leiter MP, Durup J. The discriminant validity of burnout and depression: a confirmatory factor analytic study. *Anxiety Stress Coping.* 1994;7:357–373.
16. Tawfik DS, Profit J, Morgenthaler TI, et al. Physician burnout, well-being, and work unit safety grades in relationship to reported medical errors. *Mayo Clin Proc.* 2018;93:1571–1580.
17. West CP, Dyrbye LN, Erwin PJ, et al. Interventions to prevent and reduce physician burnout: a systematic review and meta-analysis. *Lancet.* 2016;388:2272–2281.
18. Karasek RA. Job demands, job decision latitude, and mental strain: implications for job redesign. *Adm Sci Q.* 1979;24:285.
19. Johnson JV, Hall EM. Job strain, work place social support, and cardiovascular disease: a cross-sectional study of a random sample of the Swedish working population. *Am J Public Health.* 1988;78:1336–1342.
20. Blom V, Bodin L, Bergström G, et al. Applying the demand-control-support model on burnout in managers and non-managers. *Int J Work Heal Manag.* 2016;9:110–122.
21. Maslach C, Jackson SE, Leiter MP. *Maslach Burnout Inventory. Manual.* 3rd ed. Palo Alto, CA: Consulting Psychologists Press; 1996.
22. Maslach C, Jackson S, Leiter MP. *Maslach Burnout Inventory Manual*, 4th ed.; 2017.
23. Hyman SA, Shotwell MS, Michaels DR, et al. A survey evaluating burnout, health status, depression, reported alcohol and substance use, and social support of anesthesiologists. *Anesth Analg.* 2017;125:2009–2018.
24. Doulougeri K, Georganta K, Montgomery A. Diagnosing burnout among healthcare professionals: can we find consensus? *Cogent Med.* 2016;3:1237605. doi:10.1080/2331205X.2016.1237605.
25. Rafferty JP, Lemkau JP, Purdy RR, et al. Validity of the Maslach Burnout Inventory for family practice physicians. *J Clin Psychol.* 1986;42:488–492.
26. Lee RT, Ashforth BE. A meta-analytic examination of the correlates of the three dimensions of job burnout. *J Appl Psychol.* 1996;81:123–133.
27. Leiter CMSEJMP. *Maslach Burnout Inventory manual*; 1996.
28. Spector PE. Measurement of human service staff satisfaction: development of the Job Satisfaction Survey. *Am J Community Psychol.* 1985;13:693–713.
29. Sarason IG, Levine HM, Basham RB, Sarason BR. Assessing social support: the Social Support Questionnaire. *J Pers Soc Psychol.* 1983;44:127–139.
30. Darves B. Targeting physician burnout. *NEJM Career Cent.* 2017. Available at: <https://www.nejmcareercenter.org/article/targeting-physician-burnout/>.
31. Turner TB, Dilley SE, Smith HJ, et al. The impact of physician burnout on clinical and academic productivity of gynecologic oncologists: a decision analysis. *Gynecol Oncol.* 2017;146:642–646.
32. Walters T, Matthews J, Dailey I. Burnout in Army health care providers. *Mil Med.* 2014;179:1006–1012.
33. Loehr J. *The Only Way to Win: How Building Character Drives Higher Achievement and Greater Fulfillment in Business and Life.* Hachette Books; 2012.
34. Oliver D. David Oliver: when “resilience” becomes a dirty word. *BMJ.* 2017;358:j3604.
35. Shanafelt TD, Noseworthy JH. Executive leadership and physician well-being: nine organizational strategies to promote engagement and reduce burnout. *Mayo Clin Proc.* 2017;92:129–146.
36. Shanafelt TD, Dyrbye LN, West CP. Addressing physician burnout: the way forward. *JAMA.* 2017;317:901–902.
37. American College of Occupational and Environmental Medicine. Vision and Mission Statements; 2018. Available at: <https://acoem.org/About-ACOEM/Vision-and-Mission-Statements>.
38. Green-McKenzie J, Emmett EA. Characteristics and outcomes of an innovative train-in-place residency program. *J Grad Med Educ.* 2017;9:634–639.
39. ACGME. ACGME Program Requirements for Graduate Medical Education in Preventive Medicine; 2019. Available at: https://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/380-Preventive_Medicine_2019.pdf?ver=2018-08-21-130637-697.
40. Personal communication with the American College of Preventive Medicine Membership Office on April 4, 2020.
41. Gold KJ, Sen A, Schwenk TL. Details on suicide among US physicians: data from the National Violent Death Reporting System. *Gen Hosp Psychiatry.* 2012;35:45–49.