

ONLINE FIRST

Burnout and Satisfaction With Work-Life Balance Among US Physicians Relative to the General US Population

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Background: Despite extensive data about physician burnout, to our knowledge, no national study has evaluated rates of burnout among US physicians, explored differences by specialty, or compared physicians with US workers in other fields.

Methods: We conducted a national study of burnout in a large sample of US physicians from all specialty disciplines using the American Medical Association Physician Masterfile and surveyed a probability-based sample of the general US population for comparison. Burnout was measured using validated instruments. Satisfaction with work-life balance was explored.

Results: Of 27 276 physicians who received an invitation to participate, 7288 (26.7%) completed surveys. When assessed using the Maslach Burnout Inventory, 45.8% of physicians reported at least 1 symptom of burnout. Substantial differences in burnout were observed by specialty, with the highest rates among physicians at the front line of care access (family medicine, general internal medicine, and emergency medicine). Compared with a probability-based sample of 3442 working US adults,

physicians were more likely to have symptoms of burnout (37.9% vs 27.8%) and to be dissatisfied with work-life balance (40.2% vs 23.2%) ($P < .001$ for both). Highest level of education completed also related to burnout in a pooled multivariate analysis adjusted for age, sex, relationship status, and hours worked per week. Compared with high school graduates, individuals with an MD or DO degree were at increased risk for burnout (odds ratio [OR], 1.36; $P < .001$), whereas individuals with a bachelor's degree (OR, 0.80; $P = .048$), master's degree (OR, 0.71; $P = .01$), or professional or doctoral degree other than an MD or DO degree (OR, 0.64; $P = .04$) were at lower risk for burnout.

Conclusions: Burnout is more common among physicians than among other US workers. Physicians in specialties at the front line of care access seem to be at greatest risk.

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ALTHOUGH THE PRACTICE OF medicine can be incredibly meaningful and personally fulfilling, it is also demanding and stressful.

Results of studies¹⁻³ suggest that many physicians experience professional burnout, a syndrome characterized by a loss of enthusiasm for work (emotional exhaustion), feelings of cynicism (depersonalization), and a low sense of personal accomplishment. Although difficult to fully measure and quantify, findings of recent studies⁴⁻⁸ suggest that burnout may erode professionalism, influence quality of care, increase the risk for medical errors, and promote early retirement. Burnout also seems to have adverse personal consequences for physicians, including contributions to bro-

ken relationships, problematic alcohol use, and suicidal ideation.⁹⁻¹¹

Despite the extensive data on physician burnout, to our knowledge, no national study has evaluated rates of burnout among US physicians. Although there has been much conjecture about which medical or surgical specialty areas are high risk, this speculation has primarily been based on comparisons across studies of physicians from individual disciplines, for which differences in sample selection, study size and setting, participation rates, and year of survey administration confound interpretation. The literature on physician burnout is also hampered by a lack of data about how rates of burnout for US physicians compare with rates for US workers in other fields.

To address these issues, we conducted a national study of burnout among a large sample of US physicians in June 2011 that included representation across all the specialty disciplines. We also surveyed a probability-based sample of the general US population for comparison with physicians.

METHODS

PARTICIPANTS

Physician Sample

A sample of physicians from all the specialty disciplines was assembled from the American Medical Association Physician Masterfile (PMF). The PMF is an almost complete record of all US physicians, independent of American Medical Association membership, that is primarily used for estimating the size of the physician workforce and for verifying professional credentials. To ensure an adequate sample of physicians from each specialty area, we oversampled physicians in fields other than family medicine, general pediatrics, general internal medicine, and obstetrics/gynecology. Initial canvassing e-mails stating the objective of the study (eg, to better understand the factors that contribute to satisfaction among US physicians), along with an invitation to participate and a link to the survey, were sent to 89 831 physicians in June 2011, with 3 reminder requests sent during the following 4 weeks. The invitation contained no information about specific hypotheses of the study. The 27 276 physicians who opened at least 1 invitation e-mail were considered to have received the invitation to participate in the study.¹² Participation was voluntary, and all the responses were anonymous.

Population Control Sample

In December 2010, we surveyed a probability-based sample of individuals from the general US population aged 22 to 65 years, with modest oversampling of those younger than 34 years. The survey was conducted using a probability-based panel (KnowledgePanel; Knowledge Networks), designed to be representative of the US population. Participants in the panel are initially chosen scientifically by a random selection of telephone numbers and residential addresses. Persons in selected households are then invited by telephone or by mail to participate in the panel. For those who agree to participate but do not already have Internet access, Knowledge Networks provides a laptop computer and Internet service provider connection at no cost. Additional technical information is available at <http://www.knowledgenetworks.com/knpanel/index.html> and <http://www.knowledgenetworks.com/ganp/reviewer-info.html>. Demographic information on population control subjects included age, sex, occupation, relationship status, current employment status, hours worked per week, and highest level of education completed. The Mayo Clinic Institutional Review Board reviewed and approved the study.

STUDY MEASURES

The physician and population control samples provided information on demographics (age, sex, and relationship status) and on burnout, hours worked per week, symptoms of depression, satisfaction with work-life balance, and suicidal ideation in the past 12 months. Physician professional characteristics were ascertained by asking physicians about their practice. Population controls also provided information about their occupation, current employment status, and highest level of education completed.

Burnout

Burnout among physicians was measured using the Maslach Burnout Inventory (MBI), a validated 22-item questionnaire considered the gold standard tool for measuring burnout.^{1,13-15} The MBI has 3 subscales to evaluate each domain of burnout, including emotional exhaustion, depersonalization, and low personal accomplishment. Because other burnout studies¹⁶⁻¹⁸ have focused on the presence of high levels of emotional exhaustion or depersonalization as the foundation of burnout in physicians, we considered physicians with a high score on the depersonalization or emotional exhaustion subscales as having at least 1 manifestation of professional burnout.¹

Although the 22-item MBI is the gold standard for the assessment of burnout,¹ its length and the expense of administration limit feasibility for use in large population samples or in long surveys addressing multiple content areas. Therefore, to allow comparison of burnout between physicians and population controls, we measured burnout in both groups using 2 single-item measures adapted from the full MBI (physicians completed the full MBI and the 2-item instrument; population controls completed just the 2-item instrument). These 2 items correlated strongly with the emotional exhaustion and depersonalization domains of burnout as measured by the full MBI in a sample of more than 10 000 individuals.^{19,20} In previous studies,^{19,20} the areas under the receiver operating characteristic curve for the emotional exhaustion and depersonalization single items relative to those of their respective full MBI domain scores were 0.94 and 0.93, respectively. The positive predictive values of the single-item thresholds for high levels of emotional exhaustion and depersonalization were 88.2% and 89.6%, respectively. This method has been used in prior large-scale national studies of more than 15 000 US physicians.²¹

Symptoms of Depression and Suicidal Ideation

Symptoms of depression were assessed using the 2-Item Primary Care Evaluation of Mental Disorders,²² a standardized and validated assessment for depression screening that performs as well as longer instruments.²³ Recent suicidal ideation was evaluated by asking participants, "During the past 12 months, have you had thoughts of taking your own life?" This item was designed to measure somewhat recent, but not necessarily active, suicidal ideation. These questions, originated from an inventory developed by Meehan et al,²⁴ have been used extensively in other studies²⁵⁻²⁷ and allow ready comparison with the prevalence of suicidal ideation reported in other studies of the US population.

Satisfaction With Work-Life Balance

Satisfaction with work-life balance was assessed by the item, "My work schedule leaves me enough time for my personal/family life." (response options were strongly agree, agree, neutral, disagree, or strongly disagree). Individuals who indicated strongly agree or agree were considered to be satisfied with their work-life balance, whereas those who indicated disagree or strongly disagree were considered to be dissatisfied with their work-life balance.

STATISTICAL ANALYSIS

Standard descriptive summary statistics were used to characterize the physician and population control samples. Associations between variables were evaluated using the Kruskal-Wallis test (for continuous variables) or χ^2 test (for categorical

Table 1. Demographic Characteristics of Responding Physicians Compared With All US Physicians Invited to Participate in the Survey^a

Characteristic	Responders (n = 7288)	All US Physicians (n = 814 022)
Sex, No. (%)		(n = 812 870)
Male	5241 (71.9)	563 408 (69.3)
Female	2046 (28.1)	249 462 (30.7)
Missing	1 (<0.1)	...
Age, y		
Median	55	50
Age group, No. (%)	(n = 7210)	(n = 814 002)
<35	321 (4.5)	48 829 (6.0)
35-44	1299 (18.0)	215 256 (26.4)
45-54	1842 (25.5)	228 156 (28.0)
55-64	2586 (35.9)	207 648 (25.5)
≥65	1162 (16.1)	114 113 (14.0)
Years since graduation from medical school, No. (%)	(n = 6988)	
1-9	865 (12.4)	100 085 (12.3)
10-19	1145 (16.4)	224 060 (27.5)
20-29	1890 (27.0)	227 376 (27.9)
≥30	2940 (41.2)	262 148 (32.2)
Missing	148 (2.1)	353 (0.4)
Primary care physician, No. (%) ^b	(n = 7233)	
Yes	1907 (26.4)	313 328 (38.5)
No	5326 (73.6)	500 694 (61.5)
Specialty, No. (%)		
Anesthesiology	309 (4.2)	...
Dermatology	174 (2.4)	...
Emergency medicine	333 (4.6)	...
Family medicine	752 (10.3)	...
General surgery	276 (3.8)	...
General surgery subspecialty	374 (5.1)	...
General internal medicine	578 (7.9)	...
Internal medicine subspecialty	1019 (14.0)	...
Neurology	252 (3.5)	...
Neurosurgery	82 (1.1)	...
Obstetrics and gynecology	312 (4.3)	...
Ophthalmology	199 (2.7)	...
Orthopedic surgery	269 (3.7)	...
Otolaryngology	193 (2.6)	...
Other	329 (4.5)	...
Pathology	184 (2.5)	...
General pediatrics	286 (3.9)	...
Pediatric subspecialty	239 (3.3)	...
Physical medicine and rehabilitation	97 (1.3)	...
Preventive medicine, occupational medicine, or environmental medicine	76 (1.0)	...
Psychiatry	488 (6.7)	...
Radiation oncology	55 (0.8)	...
Radiology	216 (3.0)	...
Urology	136 (1.9)	...
Missing	60 (0.8)	...
Hours worked per week		
Median (IQR)	50 (40-60)	...
Range, No. (%)		
<40	985 (13.5)	...
40-49	1459 (20.0)	...
50-59	1852 (25.4)	...
60-69	1659 (22.8)	...
70-79	455 (6.2)	...
≥80	497 (6.8)	...
Missing	381 (5.2)	...
No. of nights on call, median (IQR) per week	1 (0-3)	...
Primary practice setting, No. (%)		
Private practice	4087 (56.1)	...
Academic medical center	1494 (20.5)	...
Veterans hospital	184 (2.5)	...
Active military practice	65 (0.9)	...
Not in practice or retired	89 (1.2)	...
Other	1164 (16.0)	...
Missing	205 (2.8)	...

Abbreviation: IQR, interquartile range.

^aData do not sum to 100% due to missing responses for some questions by participants.

^bPhysicians in subspecialty areas were intentionally oversampled to provide an adequate number of responses from physicians for each specialty to allow comparison across specialties. Primary care specialties include general internal medicine, general practice, family medicine, obstetrics and gynecology, and general pediatrics.

variables) as appropriate. All tests were 2-sided, with a type I error level of .05. Multivariate analysis of differences across physician specialties was performed using logistic regression. Similarly, a pooled multivariate logistic regression analysis of physicians and population controls was performed to identify demographic and professional characteristics associated with the dependent outcomes. All the analyses were performed using commercially available statistical software (SAS version 9; SAS Institute, Inc).

RESULTS

DESCRIPTIVE FINDINGS ABOUT US PHYSICIANS

Of 27 276 physicians who received an invitation to participate, 7288 (26.7% cooperation rate) completed surveys. The demographic characteristics of responders relative to all 814 022 US physicians in the PMF were generally similar, although participants were slightly older and further removed from medical school graduation (**Table 1**). Consistent with the sampling method that oversampled specialists (approximately 69% of the sample herein compared with about 61% of physicians in the PMF), participants were less likely to work in primary care disciplines. Analysis of early responders compared with late responders (a standard approach to evaluate for response bias) did not identify any statistically significant differences for age, sex, or specialty (primary care vs not primary care), providing further evidence that the sample was generally representative of US physicians from a demographic perspective.

Characteristics of responding physicians with respect to burnout, symptoms of depression, suicidal ideation in the past 12 months, and satisfaction with work-life balance are summarized in **Table 2**. When assessed using the MBI, 37.9% of US physicians had high emotional exhaustion, 29.4% had high depersonalization, and 12.4% had a low sense of personal accomplishment. In aggregate, 45.8% of physicians were considered to be experiencing at least 1 symptom of burnout based on a high emotional exhaustion score or a high depersonalization score. The validated 2-item burnout measure,^{19,20} used for comparison with population controls (discussed in the "Comparison of Physicians With the General US Population" subsection), showed a strong correlation with the overall MBI (correlation with emotional exhaustion, 0.90; correlation with depersonalization, 0.85) but provided a more conservative estimated overall burnout rate of 35.2% relative to the gold standard MBI. Approximately half (48.2%) of the physicians thought their work schedule left enough time for personal or family life, with 14.4% responding neutral and the remaining 36.9% disagreeing with this assertion (responses to the question were missing from 0.6%).

Substantial differences in burnout were observed by specialty (**Figure 1**). Emergency medicine, general internal medicine, neurology, and family medicine had the highest rates of burnout, whereas pathology, dermatology, general pediatrics, and preventive medicine (including occupational health and environmental medicine) had the lowest rates. After adjusting for age, sex, call sched-

Table 2. Burnout, Career Satisfaction, Depression, and Quality of Life Among 7288 Physicians Who Participated in the Survey Study

Variable	Value (n = 7288)
Burnout Indexes^a	
Emotional exhaustion	
Median score	21.0
Score level, No. (%)	(n = 7208)
Low	3041 (42.2)
Intermediate	1433 (19.9)
High	2734 (37.9)
Depersonalization	
Median score	5.0
Score level, No. (%)	(n = 7193)
Low	3601 (50.1)
Intermediate	1476 (20.5)
High	2116 (29.4)
Personal accomplishment	
Median score	42.0
Score level, No. (%)	(n = 7140)
High	4758 (66.6)
Intermediate	1495 (20.9)
Low	887 (12.4)
Burned out, No. (%) ^b	3310 (45.4)
Depression	
Screen positive for depression, No. (%)	2753 (37.8)
Suicidal Ideation	
Suicidal ideation in the past 12 mo, No. (%)	466 (6.4)
Satisfaction With Work-Life Balance	
Work schedule leaves me enough time for my personal and/or family life, No. (%)	
Strongly agree	1233 (16.9)
Agree	2279 (31.3)
Neutral	1046 (14.4)
Disagree	1775 (24.4)
Strongly disagree	911 (12.5)
Missing	44 (0.6)

^aAs assessed using the full Maslach Burnout Inventory. Per standard scoring of the Maslach Burnout Inventory for health care workers, physicians with scores on the emotional exhaustion subscale exceeding 27, scores on the depersonalization subscale exceeding 10, or scores lower than 33 on the personal accomplishment subscale are considered to have a high degree of burnout in that dimension.

^bHigh score on the emotional exhaustion or depersonalization subscale of the Maslach Burnout Inventory (details are given in the "Methods" section).

ule, relationship status, primary practice setting, hours worked per week, and years since graduation from medical school, physicians practicing emergency medicine (odds ratio [OR], 3.18; $P < .001$), general internal medicine (OR, 1.64; $P < .001$), family medicine (OR, 1.41; $P = .001$), neurology (OR, 1.47; $P = .01$), or radiology (OR, 1.46; $P = .02$) remained at higher risk for burnout, whereas those practicing dermatology were at lower risk (OR, 0.65; $P = .02$).

Differences in satisfaction with work-life balance were also observed by specialty (**Figure 2**). Physicians practicing dermatology, general pediatrics, and preventive medicine (including occupational health and environmental medicine) had the highest rated satisfaction with work-life balance, whereas physicians practicing general surgery, general surgery subspecialties, and obstetrics/gynecology had the lowest rates. Although the 3 special-

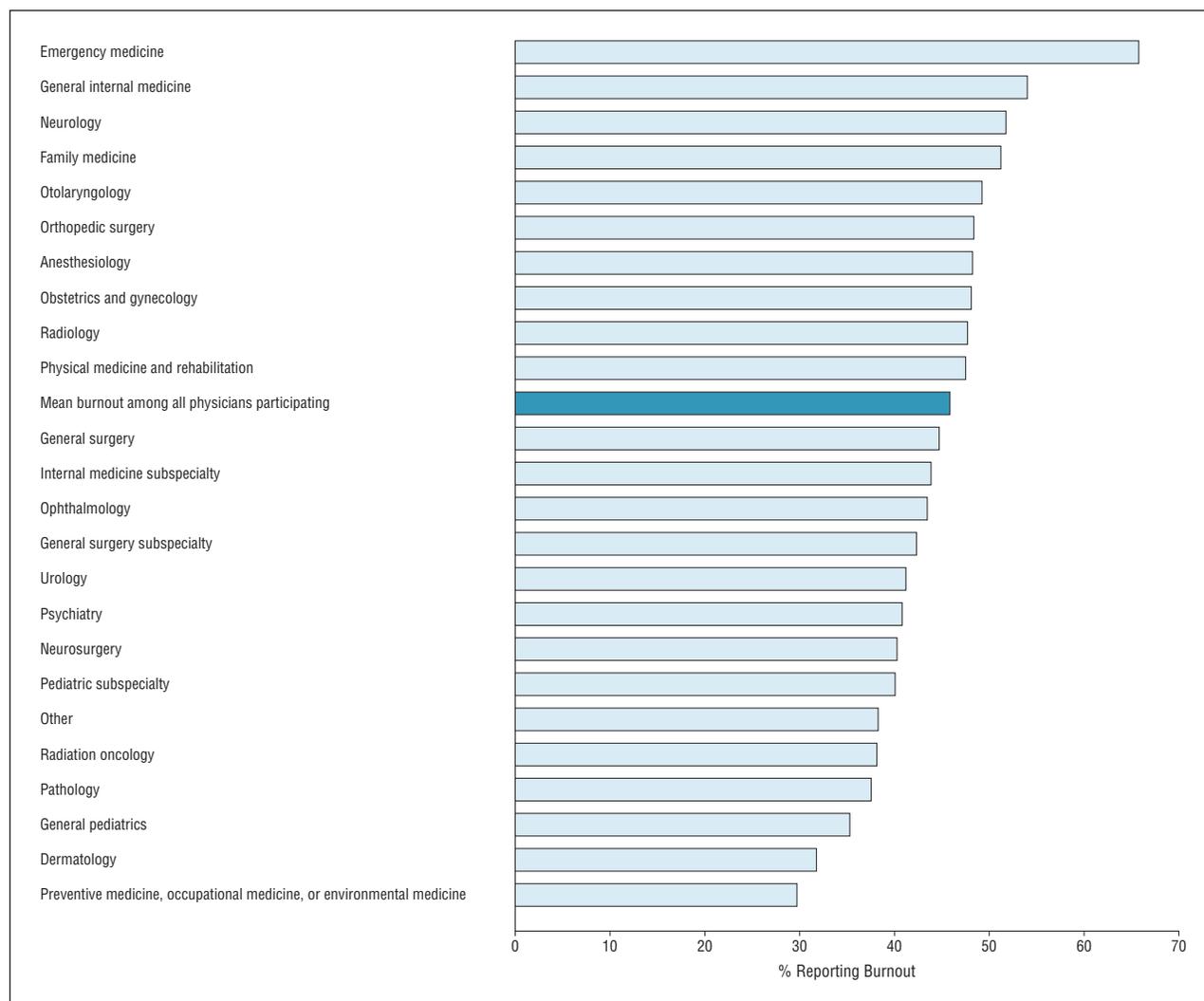


Figure 1. Burnout by specialty.

ties with the lowest rates of burnout also had the highest rated satisfaction with work-life balance, specialties with high burnout rates were not necessarily those least satisfied with work-life balance. For example, only 1 (neurology) of 5 specialties with the highest rates of burnout was among the 5 specialties with the lowest work-life balance, and 3 (general surgery, general surgery subspecialty, and internal medicine subspecialty) of 5 specialties having the lowest rates of satisfaction with work-life balance had below-average burnout rates.

COMPARISON OF PHYSICIANS WITH THE GENERAL US POPULATION

Among the population controls, 4082 (68.8%) were employed. The remaining 1848 were looking for work (498 [8.4%]), had been temporarily laid off (64 [1.1%]), were disabled (484 [8.2%]), had retired (341 [5.8%]), or were not working for another reason (461 [7.8%]).

To compare the professional experience of practicing physicians relative to other working US adults, 6179 nonretired physicians aged 29 to 65 years were compared with 3442 employed, nonphysician, population-

derived control subjects aged 29 to 65 years (**Table 3**). Compared with population controls, physicians were older, were more likely to be male, and were more likely to be married ($P < .001$ for all).

Physicians worked a median of 10 hours more per week than population controls (50 vs 40 hours), with 37.9% of physicians and 10.6% of population controls working 60 hours or more per week ($P < .001$ for both). With respect to satisfaction with work-life balance, 40.1% of physicians did not think their work schedule left enough time for personal or family life compared with 23.1% of controls ($P < .001$). Dissatisfaction with work-life balance was similar for men vs women among the population controls (23.3% vs 23.0%; $P = .88$), whereas female physicians were slightly more likely to be dissatisfied than their male colleagues (43.1% vs 38.9% were dissatisfied, $P = .002$).

On the 2-item burnout measure,^{19,20} physicians were at higher risk for emotional exhaustion (32.1% vs 23.5%), depersonalization (19.4% vs 15.0%), and overall burnout (37.9% vs 27.8%) ($P < .001$ for all) relative to population controls. These differences in burnout between physicians and population controls remained significant and

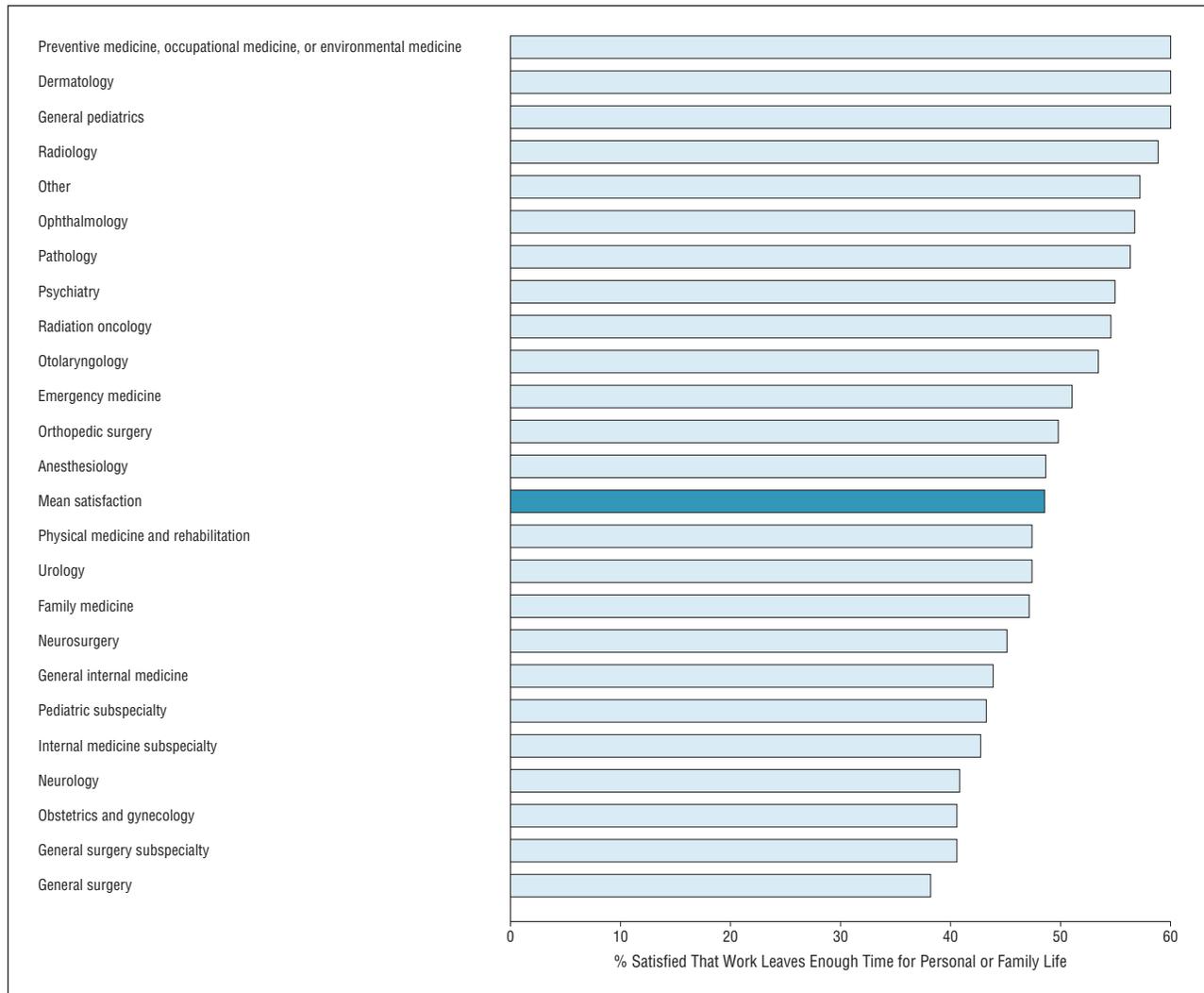


Figure 2. Satisfaction with work-life balance by specialty.

of similar magnitude when women and men were analyzed separately. In contrast to these differences in burnout, no statistically significant differences between physicians and population controls were observed in symptoms of depression or suicidal ideation in the past 12 months, suggesting that the higher distress among physicians was limited to professional burnout.

Finally, we performed a pooled multivariate analysis (among the physician and population control samples) to identify factors independently associated with burnout after adjusting for age, sex, relationship status, hours worked per week, and highest level of education completed. Characteristics associated with a lower overall risk for burnout were being older (OR for each year older, 0.99) and being married (OR vs being single, 0.71) ($P < .001$ for both). Hours worked per week was associated with a higher risk for burnout (OR, 1.02 for each additional hour; $P < .001$). A complex relationship between highest level of education completed and burnout risk was observed. Compared with high school graduates, more education was associated with a lower risk for burnout among nonphysicians (OR for bachelor's degree, 0.80; $P = .048$; OR for master's degree, 0.71; $P = .01$;

and OR for professional or doctoral degree other than an MD or DO degree, 0.64; $P = .04$), whereas physicians (ie, MD or DO degree) remained at higher risk for burnout after adjusting for other factors (OR, 1.36; $P < .001$).

COMMENT

Collectively, the findings of this national study indicate that (1) the prevalence of burnout among US physicians is at an alarming level, (2) physicians in specialties at the front line of care access (emergency medicine, general internal medicine, and family medicine) are at greatest risk, (3) physicians work longer hours and have greater struggles with work-life integration than other US workers, and (4) after adjusting for hours worked per week, higher levels of education and professional degrees seem to reduce the risk for burnout in fields outside of medicine, whereas a degree in medicine (MD or DO) increases the risk. These results suggest that the experience of burnout among physicians does not simply mirror societal trends.

Burnout can have serious personal repercussions for physicians, including problematic alcohol use, broken

Table 3. Comparison of Employed Physicians in the Sample Aged 29 to 65 Years With a Probability-Based Sample of the Employed US Population Aged 29 to 65 Years

Variable	Physicians (n = 6179)	Population Control Subjects (n = 3442)	P Value	
Demographics				
Sex, No. (%)				
Male	4267 (69.1)	1810 (52.6)]. <.001	
Female	1912 (30.9)	1632 (47.4)		
Age, y				
Median	53	41	<.001	
Age group, No. (%)				
29-34	313 (5.1)	857 (24.9)]. <.001	
35-44	1291 (20.9)	982 (28.5)		
45-54	1838 (29.7)	927 (26.9)		
55-65	2737 (44.3)	676 (19.6)		
Missing				
Relationship status, No. (%)				
Single	711 (11.5)	962 (27.9)]. <.001	
Married	5179 (83.8)	2164 (62.9)		
Partnered	233 (3.8)	264 (7.7)		
Widowed or widower	40 (0.6)	52 (1.5)		
Missing	16 (0.3)	0		
Hours worked per week				
Mean (SD)	53.3 (15.5)	42.2 (13.4)	<.001	
Median	50	40	<.001	
Range, No. (%)	(n = 6265)	(n = 3454)		
<40	664 (10.6)	783 (22.7)]. <.001	
40-49	1246 (19.9)	1660 (48.1)		
50-59	1653 (26.4)	581 (16.8)		
60-69	1498 (23.9)	269 (7.8)		
70-79	419 (6.7)	60 (1.7)		
>80	459 (7.3)	38 (1.1)		
Missing	240 (3.8)	51 (1.5)		
Highest level of education completed, No. (%)			...	
<High school graduate	...	135 (3.9)]. <.001	
High school graduate	...	763 (22.2)		
Some college, no degree	...	710 (20.6)		
Associate's degree	...	339 (9.8)		
Bachelor's degree	...	875 (25.4)		
Master's degree	...	486 (14.1)		
Professional or doctoral degree other than MD or DO	...	134 (3.9)		
Occupation, No. (%)				...
Professional ^a	...	1455 (42.3)		
Health care ^b	...	217 (6.3)		
Service ^c	...	234 (6.8)		
Sales ^d	...	234 (6.8)		
Office and administrative support	...	330 (9.6)		
Farming, forestry, or fishing	...	23 (0.7)		
Precision production or craft and repair ^e	...	232 (6.7)		
Transportation and material moving	...	110 (3.2)		
Other	...	586 (17.0)		
Missing	...	21 (0.6)		

(continued)

Table 3. Comparison of Employed Physicians in the Sample Aged 29 to 65 Years With a Probability-Based Sample of the Employed US Population Aged 29 to 65 Years (continued)

Variable	Physicians (n = 6179)	Population Control Subjects (n = 3442)	P Value
Burnout Indexes, No. (%)			
Emotional exhaustion ^f			
Never	785 (12.7)	406 (11.8)]. <.001
A few times a year	1637 (26.5)	1065 (30.9)	
≤Once a month	782 (12.7)	537 (15.6)	
A few times a month	958 (15.5)	610 (17.7)	
Once a week	614 (9.9)	239 (6.9)	
A few times a week	819 (13.3)	372 (10.8)	
Every day	536 (8.7)	193 (5.6)	
Missing	48 (0.8)	20 (0.6)	
High score ^g	1969 (31.9)	804 (23.4)	
Depersonalization ^h			
Never	2020 (32.7)	1357 (39.4)]. <.001
A few times a year	1537 (24.9)	824 (23.9)	
≤Once a month	679 (11.0)	348 (10.1)	
A few times a month	705 (11.4)	374 (10.9)	
Once a week	405 (6.6)	176 (5.1)	
A few times a week	541 (8.8)	202 (5.9)	
Every day	247 (4.0)	133 (3.9)	
Missing	45 (0.7)	28 (0.8)	
High score ^g	1193 (19.3)	511 (14.8)	
Burned out ⁱ	2319 (37.5)	950 (27.6)	
Depression and suicidal ideation			
Screen positive for depression	2494 (40.4)	1426 (41.4)	.31
Suicidal ideation in the past 12 mo	426 (6.9)	227 (6.6)	.59
Satisfaction with work-life balance			
Work schedule leaves me enough time for my personal or family life			
Missing	13 (0.2)	8 (0.2)]. <.001
Strongly agree	879 (14.2)	671 (19.5)	
Agree	1898 (30.7)	1291 (37.5)	
Neutral	909 (14.7)	677 (19.7)	
Disagree	1621 (26.2)	605 (17.6)	
Strongly disagree	859 (13.9)	190 (5.5)	

^aBusiness or financial; management; computer or mathematical; architecture or engineering; lawyer or judge; community or social services; nonuniversity teacher; college or university teacher; life, physical, or social sciences; or other.

^bNurse, pharmacist, paramedic, laboratory technician, nursing aide, orderly, or dental assistant.

^cProtective service, food preparation or service, building cleaning or maintenance, or personal care or service.

^dSales representative, retail sales, or other sales.

^eConstruction and extraction, precision production (machinist, welder, baker, printer, or tailor), or installation, maintenance, or repair.

^fIndividuals indicating symptoms of emotional exhaustion weekly or more often have median emotional exhaustion scores on the full Maslach Burnout Inventory exceeding 30 and have a greater than 75% probability of having a high emotional exhaustion score as defined by the Maslach Burnout Inventory (>27).

^gAs assessed using the single-item measures for emotional exhaustion and depersonalization adapted from the full Maslach Burnout Inventory.

^hIndividuals indicating symptoms of depersonalization weekly or more often have median depersonalization scores on the full Maslach Burnout Inventory exceeding 13 and have a greater than 85% probability of having a high depersonalization score as defined by the Maslach Burnout Inventory (>10).

ⁱHigh score (indicating a frequency of weekly or more often) on the emotional exhaustion or depersonalization subscale.

relationships, and suicidal ideation.^{10,11,28} When considered with the mounting evidence that physician burnout adversely affects quality of care,^{4,6,29-35} these findings suggest a highly prevalent and systemic problem threatening the foundation of the US medical care system. The fact that almost 1 in 2 US physicians has symptoms of burnout implies that the origins of this problem are rooted in the environment and care delivery system rather than in the personal characteristics of a few susceptible individuals. Policy makers and health care organizations must address the problem of physician burnout for the sake of physicians and their patients.^{4,36}

Unfortunately, little evidence exists about how to address this problem. Although extensive literature suggests that contributors include excessive workload, loss of autonomy, inefficiency due to excessive administrative burdens, a decline in the sense of meaning that physicians derive from work, and difficulty integrating personal and professional life,⁹ few interventions have been tested. Most of the available literature focuses on individual interventions centered on stress reduction training³⁷ rather than organizational interventions^{38,39} designed to address the system factors that result in high burnout rates. Efforts to promote self-awareness and meaning seem promising⁴⁰⁻⁴³ but may not appeal to all physicians and have typically required investment of personal time that is already in short supply for physicians. Efforts to date have been further limited by short-term follow-up periods, small sample sizes, or nonrandomized study designs. Limited funding for such studies has severely undermined the quality of research in this area.

Our study is subject to several limitations. First, most physicians who were sent e-mails to inform them of the study did not open these messages and never received the invitation to participate. Although similar to other national survey studies^{3,44,45} of physicians, the response rate of 26.7% among physicians who received an invitation to participate in the study is lower than that of physician surveys in general.⁴⁶ In this regard, we did not use monetary or other incentives to improve participation. Nevertheless, several cross-sectional investigations have failed to identify significant differences between responding and nonresponding physicians.⁴⁷ We found no statistically significant differences for age, sex, or specialty (primary care vs not primary care) among early responders compared with late responders (a standard approach to evaluate for response bias), further supporting that responders were representative of US physicians. In addition, the burnout rate in this study was similar to that reported in previous literature.^{3,48-50} Second, our survey was cross-sectional, and we are unable to determine whether the associations observed are causally related and the potential direction of the effects. Third, compared with the physicians, individuals in the comparison sample of population controls were younger and more likely to be female. Although this was expected because of the demographic characteristics of US physicians and was adjusted for in the multivariate analysis, it is possible that other unmeasured confounders exist.

Our study has several important strengths. The large physician sample was drawn from the PMF, a complete

registry of all US physicians, and included physicians from across the United States in all specialty areas, practice settings, and environments. The participants generally seem similar to US physicians overall and, from a practical perspective, it is unlikely that a more representative study of US physicians will be conducted. We also surveyed a large probability-based sample of workers among the general US population, which (for the first time) provides context for interpreting the data on burnout and satisfaction with work-life balance in physicians.

In conclusion, burnout is highly prevalent among US physicians, more so than among other US workers. Physicians in specialties at the front line of care access seem to be at greatest risk. Given the evidence that burnout may adversely affect quality of care and negatively affect physician health, additional research is needed to identify personal, organizational, and societal interventions to address this problem.

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