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Changes in Burnout and Satisfaction With Work-Life Integration in Physicians and the General US Working Population Between 2011 and 2017

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Abstract

Objective: To evaluate the prevalence of burnout and satisfaction with work-life integration among physicians and other US workers in 2017 compared with 2011 and 2014.

Participants and Methods: Between October 12, 2017, and March 15, 2018, we surveyed US physicians and a probability-based sample of the US working population using methods similar to our 2011 and 2014 studies. A secondary survey with intensive follow-up was conducted in a sample of nonresponders to evaluate response bias. Burnout and work-life integration were measured using standard tools.

Results: Of 30,456 physicians who received an invitation to participate, 5197 (17.1%) completed surveys. Among the 476 physicians in the secondary survey of nonresponders, 248 (52.1%) responded. A comparison of responders in the 2 surveys revealed no significant differences in burnout scores ($P=.66$), suggesting that participants were representative of US physicians. When assessed using the Maslach Burnout Inventory, 43.9% (2147 of 4893) of the physicians who completed the MBI reported at least one symptom of burnout in 2017 compared with 54.4% (3680 of 6767) in 2014 ($P<.001$) and 45.5% (3310 of 7227) in 2011 ($P=.04$). Satisfaction with work-life integration was more favorable in 2017 (42.7% [2056 of 4809]) than in 2014 (40.9% [2718 of 6651]; $P<.001$) but less favorable than in 2011 (48.5% [3512 of 7244]; $P<.001$). On multivariate analysis adjusting for age, sex, relationship status, and hours worked per week, physicians were at increased risk for burnout (odds ratio, 1.39; 95% CI, 1.26-1.54; $P<.001$) and were less likely to be satisfied with work-life integration (odds ratio, 0.77; 95% CI, 0.70-0.85; $P<.001$) than other working US adults.

Conclusion: Burnout and satisfaction with work-life integration among US physicians improved between 2014 and 2017, with burnout currently near 2011 levels. Physicians remain at increased risk for burnout relative to workers in other fields.

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The past decade has been a time of tremendous change in the US health care system. Consolidations and mergers have substantively altered practice structure, with a majority of physicians now in employed practice models.[1] Health care regulations and policies, including the Affordable Care Act, Meaningful Use, and the Medicare Access and CHIP Reauthorization Act of 2015 have transformed the day-to-day work of US physicians. Widespread penetration of electronic health records (EHRs) has increased administrative burden and led to decreased physician face time with patients.[2-5] The average physician now spends roughly half of their workday and an additional 28 hours per month on nights and weekends completing EHR tasks.[5] To the dismay of many physicians, measures of administrative efficiency (eg, how quickly in-box messages are answered or

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charts closed for billing purposes), imperfect patient satisfaction measures, and productivity metrics (eg, relative value unit generation) have reshaped how many organizations define what it means to be a "good doctor."

In 2011, we began surveying US physicians and workers in other fields every 3 years to chronicle the changing rates of burnout and satisfaction with work-life integration (WLI) among physicians relative to the general working population. In 2011, 45% of US physicians had at least one manifestation of professional burnout (emotional exhaustion or depersonalization), and problems with burnout and WLI were more common in physicians than in workers in other fields even after adjusting for level of education, hours worked, and other factors.[6,7] These gaps between physicians and workers in other fields widened by 2014 as physician burnout and problems with WLI increased.[8] These and other studies also revealed that distress among physicians may undermine the adequacy of the physician workforce[9] and quality of care.[10-14] The growing literature on the prevalence and consequences of burnout in physicians and nurses[15-17] has generated a critical dialogue about the need to address this problem.[18,19] The American Medical Association (AMA) began working to mitigate physician burnout and promote professional satisfaction in 2012, commissioned a RAND report in 2013, convened numerous meetings of experts, chief executive officers, chief medical officers, and other diverse stakeholders (regulators, payers, EHR vendors), and created online resources and modules.[20] In early 2017, the National Academy of Medicine launched a large-scale, national, multidisciplinary effort engaging payers, regulators, professional societies, health care organizations, EHR vendors, and others to galvanize efforts to address system issues contributing to the problem.[21] Recognizing that system-level factors are the primary driver of burnout, a number of large health care organizations have begun to make changes to improve the work environment. Although encouraging results have stemmed from these interventions,[22-26] organizational efforts remain sporadic and inconsistent. Because many of these efforts are still at a nascent stage, their national impact is unknown. Here, we report the results of the 2017 national survey evaluating changes in burnout and satisfaction with WLI among physicians and other US workers compared with 2011 and 2014.

PARTICIPANTS AND METHODS

The 2017 survey employed methods similar to the 2011 and 2014 studies.[6,8] At all 3 time points, we assessed a range of personal and professional characteristics, as well as several dimensions of well-being.

Study Participants

Physician Sample. A sample of physicians from all specialty disciplines was assembled using the AMA Physician Masterfile. The Masterfile is a nearly complete record of all US physicians independent of AMA membership. Similar to 2011 and 2014, we oversampled physicians in fields other than family medicine, general pediatrics, general internal medicine, and obstetrics/gynecology to ensure an adequate sample of physicians from each specialty. Canvassing e-mails stating the purpose of the study (ie, 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 83,291 physicians on October 12, 2017, with 4 reminder requests sent over the ensuing 6 weeks. A total of 27,071 physicians opened at least 1 invitation e-mail. After completion of the electronic survey, a random sample of 5000 physicians who did not respond to the electronic survey (1426 of whom had opened an e-mail invitation and 3574 had not) were mailed a paper version of the survey on December 6, 2017. Of the 5000 mailed surveys, 269 were returned as undeliverable (80 sent to physicians who had opened an e-mail invitation and 189 who had not). Completed surveys returned by March 15, 2018, were included in the analysis. The 30,456 physicians who opened at least 1 invitation e-mail and/or received a paper mailing of the survey were considered to have received an invitation to participate in the study, while the others were classified as "unable to contact."[27]

Participation was voluntary, and all responses were anonymous.

To estimate response bias, we also conducted a secondary survey with intensive follow-up in a random sample of 500 physicians who did not respond to the electronic survey.[15] These individuals were mailed a paper copy of the survey with a $20 incentive to participate. Individuals in the secondary survey who did not respond to the first mailing were sent a second mailing 3 weeks later (without additional compensation). Twenty-four mailed surveys were returned as undeliverable, yielding a final sample of 476. Those who did not respond to the second mailing within 3 weeks were mailed a brief postcard survey requesting basic demographic characteristics and measures of well-being.

Population Sample. For comparison to physicians, we surveyed a probability-based sample of individuals from the general US population from October 13 through October 21, 2017. Consistent with the approach used in 2014, the 2017 population survey oversampled individuals aged 35 to 65 years to better match the age range of practicing US physicians. The population survey was conducted using the KnowledgePanel, a probability-based panel designed to be representative of the US population (http://www.knowledgenetworks.com/knpanel/index.html and http://www.knowledgenetworks.com/ganp/reviewer-info.html). Based on the intent to compare workers in other fields to physicians, only employed individuals were surveyed. The Stanford University and Mayo Clinic institutional review boards reviewed and approved the study.

Study Measures

Both the physician and population controls provided information on demographic characteristics (age, sex, relationship status), hours worked per week, symptoms of burnout, symptoms of depression, suicidal ideation, and satisfaction with WLI. Physician professional characteristics were ascertained by asking physicians about their practice.

Burnout. Burnout among physicians was measured using the emotional exhaustion and depersonalization scales of the Maslach Burnout Inventory (MBI), a validated questionnaire considered the criterion standard tool for measuring burnout.[28-31] Consistent with convention,[10,32,33] we considered physicians with a high score on the depersonalization and/or emotional exhaustion subscale of the MBI as having at least one manifestation of professional burnout.[28]

Although the MBI is the criterion standard for the assessment of burnout,[28] its length and expense limit feasibility for use in long surveys addressing multiple content areas or in large population samples. Thus, 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. These 2 items correlated strongly with the emotional exhaustion and depersonalization domains of burnout measured by the full MBI in a sample of more than 10,000 individuals,[34,35] with an area under the receiver operating characteristic curve of 0.94 and 0.93 for emotional exhaustion and depersonalization, respectively, for these single items relative to the full MBI.

Symptoms of Depression. Symptoms of depression among physicians were assessed using the 2-item Primary Care Evaluation of Mental Disorders,[36] a standardized and validated assessment tool for depression screening that performs as well as lengthier instruments.[37] This tool has a high sensitivity but lower specificity such that approximately 1 of every 4 individuals screening positive would meet criteria for major depression if they were to undergo full psychiatric assessment.

Satisfaction With WLI. Satisfaction with WLI was assessed by the item, "My work schedule leaves me enough time for my personal/family life" (response options: strongly agree, agree, neutral, disagree, strongly disagree).[6] Individuals who indicated "strongly agree" or "agree" were considered to be satisfied with their WLI, whereas those who indicated

TABLE 1. Demographic Characteristics of Responding Physicians Compared With All US Physicians[a,b]

Characteristic	2017 Responders (N=5445)	All US physicians, 2017 (N=890,083)[c]	2014 Responders (N=6880)	2011 Responders (N=7288)
Sex				
Male	2995 (62.1)	577,339 (64.9)	4497 (67.5)	5241 (71.9)
Female	1818 (37.7)	311,776 (35.1)	2162 (32.5)	2046 (28.1)
Other	13 (0.3)	NA	NA	NA
Missing	619	968	221	1
Age (y)				
Median	53	52	56	55
<35	305 (6.4)	80,780 (9.1)	332 (5.0)	321 (4.5)
35-44	1120 (23.5)	224,341 (25.2)	1223 (18.4)	1299 (18.0)
45-54	1103 (23.1)	227,421 (25.6)	1416 (21.3)	1845 (25.6)
55-64	1371 (28.7)	221,199 (24.9)	2193 (33.0)	2586 (35.9)
≥65	874 (18.3)	135,596 (15.2)	1491 (22.4)	1162 (16.1)
Missing	672	746	225	75
Primary care[d]				
Yes	1281 (23.8)	349,597 (39.3)	1596 (23.3)	1907 (26.4)
No	4103 (76.2)	540,486 (60.7)	5249 (76.7)	5326 (73.6)
Specialty				
Anesthesiology	254 (4.7)	—	236 (3.5)	309 (4.3)
Dermatology	136 (2.5)	—	164 (2.4)	174 (2.4)
Emergency medicine	304 (5.7)	—	355 (5.2)	333 (4.6)
Family medicine	415 (7.7)	—	540 (7.9)	752 (10.4)
General surgery	160 (3.0)	—	259 (3.8)	276 (3.8)
General surgery subspecialty[e]	398 (7.4)	—	381 (5.6)	374 (5.2)
Internal medicine-general	425 (7.9)	—	453 (6.6)	578 (8.0)
Internal medicine subspecialty[e]	652 (12.2)	—	784 (11.5)	1019 (14.1)
Neurology	195 (3.6)	—	246 (3.6)	252 (3.5)
Neurosurgery	66 (1.2)	—	58 (0.9)	82 (1.1)
Obstetrics and gynecology	195 (3.6)	—	246 (3.6)	312 (4.3)
Ophthalmology	146 (2.7)	—	241 (3.5)	199 (2.8)
Orthopedic surgery	276 (5.1)	—	239 (3.5)	269 (3.7)
Otolaryngology	45 (0.8)	—	165 (2.4)	193 (2.7)
Other	162 (3.0)	—	255 (3.7)	329 (4.6)
Pathology	147 (2.7)	—	170 (2.5)	184 (2.5)
Pediatrics-general	264 (4.9)	—	362 (5.3)	286 (4.0)
Pediatric subspecialty[e]	225 (4.2)	—	321 (4.7)	239 (3.3)
Physical medicine and rehabilitation	131 (2.4)	—	170 (2.5)	97 (1.3)
Preventive medicine/ occupational medicine	30 (0.6)	—	112 (1.6)	76 (1.1)
Psychiatry	432 (8.1)	—	566 (8.3)	488 (6.8)
Radiation oncology	42 (0.8)	—	64 (0.9)	55 (0.8)
Radiology	225 (4.2)	—	261 (3.8)	216 (3.0)
Urology	35 (0.7)	—	119 (1.7)	136 (1.9)
Missing	85	—	66	60
Hours worked per week				
Median (IQR)	50 (40-60)	—	50 (40-60)	50 (40-60)
<40	961 (18.9)	—	1172 (17.4)	985 (14.3)
40-49	1053 (20.7)	—	1340 (19.9)	1459 (21.1)
50-59	1245 (24.4)	—	1667 (24.7)	1852 (26.8)
60-69	1084 (21.3)	—	1526 (22.6)	1659 (24.0)
70-79	386 (7.6)	—	535 (7.9)	455 (6.6)
≥80	367 (7.2)	—	509 (7.5)	497 (7.2)
Missing	349	—	131	381

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TABLE 1. Continued

Characteristic	2017 Responders (N=5445)	All US physicians, 2017 (N=890,083)[c]	2014 Responders (N=6880)	2011 Responders (N=7288)
No. of nights on call per week, median (IQR)	1 (0-2)	—	1 (0-3)	1 (0-3)
Primary practice setting				
Private practice	2474 (48.0)	—	3605 (52.6)	4087 (57.7)
Academic medical center	1394 (27.1)	—	1625 (23.7)	1494 (21.1)
Veterans hospital	107 (2.1)	—	104 (1.5)	184 (2.6)
Active military practice	55 (1.1)	—	58 (0.8)	65 (0.9)
Not in practice or retired	169 (3.3)	—	160 (2.3)	89 (1.3)
Other	950 (18.5)	—	1303 (19.0)	1164 (16.4)
Missing	296	—	25	205

[a]IQR = interquartile range; — = not available.

[b]Data are presented as No. (percentage) unless indicated otherwise. Percentages may not total 100 because of rounding.

[c]As of October 18, 2017.

[d]Physicians in subspecialty areas were intentionally oversampled to provide an adequate number of responses from physicians from each specialty to allow comparison across specialties. Primary care specialties include internal medicine-general, general practice, family medicine, obstetrics/gynecology, and pediatrics-general.

[e]For further subspecialty breakdown see Supplementary Material.

"disagree" or "strongly disagree" were considered to be dissatisfied with their WLI.

Statistical Analyses

Standard descriptive summary statistics were used to characterize the physician and comparison samples. Associations between variables were evaluated using the Kruskal-Wallis test (continuous variables) or χ^2 test (categorical variables), as appropriate. All tests were 2-sided with type I error rates of .05. We used multivariate logistic regression to analyze differences in burnout and WLI in 2017. For other multivariate analyses, we pooled physicians who responded in 2011, 2014, and 2017 and evaluated the risk of burnout or symptoms of depression by participation year after adjusting for age, sex, and practice setting. Finally, a pooled multivariate logistic regression analysis of physicians and workers in other fields was performed to identify demographic and professional characteristics associated with the dependent outcomes. For all comparisons with population comparators, physician data were restricted to responders who were between the ages of 29 and 65 years and not retired to match the population sample. We compared demographic and professional characteristics of physicians responding in 2017 to those of physicians who responded in 2011 and 2014 using χ^2 or Kruskal-Wallis tests as appropriate. These data were not paired and were treated as independent samples. Comparisons in the proportions of burnout and satisfaction with WLI between physicians and the general population across 2011, 2014, and 2017 were performed using Breslow-Day tests. All analyses were completed using SAS statistical software, version 9 (SAS Institute).

RESULTS

Well-being of US Physicians

Of the 30,456 physicians who received an invitation to participate either electronically and/or by mail, 5197 (17.1%) completed a survey. To evaluate whether participants were representative of all physicians in the sample, we also conducted a secondary survey with intensive follow-up in a random sample of 476 individuals who did not respond to the electronic survey. With compensation and extensive follow-up, 248 (52.1%) responded. Although the proportion of women participating in the electronic survey was higher than in the secondary survey (39.0% [1583 of 4063] vs 30.4% [75 of 247]; P=.02), we found no statistically significant differences in age (P=.83), years in practice (P=.41), burnout prevalence (full MBI 44.4% [1865 of 4198] vs 42.9% [97 of 226], P=.66), or satisfaction with WLI (41.8% [1694 of 4052] vs 47.4% [117 of 247], P=.09) (Supplemental Table 1, available online at

TABLE 2. Physician Burnout, Depression, Career Satisfaction, and Satisfaction With Work-Life Integration in 2017 Compared With 2014 and 2011[a,b]

Variable	2017 (N=5445)	2014 (N=6880)	2011 (N=7288)	*P* value, 2017 vs 2014	*P* value, 2017 vs 2011
Burnout indices[c]					
Emotional exhaustion					
Median	22.0	25.0	21.0	<.001	.03
Mean (SD)	23.2 (13.2)	25.5 (13.5)	22.7 (13.0)	<.001	.03
Low score	1991 (41.0)	2299 (34.1)	3041 (42.2)	<.001	.40
Intermediate score	989 (20.3)	1283 (19.0)	1433 (19.9)		
High score	1881 (38.7)	3165 (46.9)	2734 (37.9)		
Missing	584	133	80	NA	NA
Depersonalization					
Mean (SD)	6.8 (6.5)	8.1 (6.6)	7.1 (6.1)	<.001	<.001
Low score	2644 (54.2)	2951 (44.0)	3601 (50.1)	<.001	<.001
Intermediate score	907 (18.6)	1434 (21.4)	1476 (20.5)		
High score	1331 (27.3)	2325 (34.6)	2116 (29.4)		
Missing	563	170	95	NA	NA
Burned out[d]	2147/4893 (43.9)	3680/6767 (54.4)	3310/7227 (45.8)	<.001	.04
Depression					
Screening positive for depression	2022/4854 (41.7)	2715/6818 (39.8)	2753/7213 (38.2)	.05	<.001
Career satisfaction					
Would choose to become a physician again	3508/5122 (68.5)	4476/6676 (67.0)	5081/7236 (70.2)	.10	.04
Work-life integration					
Work schedule leaves me enough time for my personal and/or family life					
Strongly agree	602 (12.5)	706 (10.6)	1233 (17.0)	<.001	<.001
Agree	1454 (30.2)	2012 (30.3)	2279 (31.5)		
Neutral	796 (16.6)	973 (14.6)	1046 (14.4)		
Disagree	1272 (26.5)	2004 (30.1)	1775 (24.5)		
Strongly disagree	685 (14.2)	956 (14.4)	911 (12.6)		
Missing	636	229	44	NA	NA

[a]NA = not applicable.

[b]Data are presented as No. (percentage) unless indicated otherwise.

[c]As assessed using the full Maslach Burnout Inventory. Per the traditional scoring for health care workers, physicians with scores ≥27 on the emotional exhaustion subscale, ≥10 on the depersonalization subscale, or <33 on the personal accomplishment subscale are considered to have a high degree of burnout in that dimension.

[d]High score on emotional exhaustion and/or depersonalization subscales of the Maslach Burnout Inventory (see "Participants and Methods").

http://www.mayoclinicproceedings.org). These findings support the absence of response bias in the electronic survey respondents with respect to burnout and satisfaction with WLI, suggesting that participants were generally representative of US physicians in these domains. Given the consistency with respect to the experience of burnout and WLI, all responders were subsequently pooled for further analysis.

The demographic characteristics of participants relative to all 890,083 practicing US physicians were generally similar, although participants were slightly older (Table 1). A greater proportion of participants were in specialties other than primary care, consistent with the sampling approach (see "Physician Sample"). The 2017 participants were similar to the 2011 and 2014 participants except for being slightly younger and more largely represented by women, consistent with the increased proportion of women among US physicians in the Masterfile overall (2011, 30.7%; 2014, 33.2%; 2018, 35.0%).

Mean emotional exhaustion and depersonalization scores were lower in 2017 than in 2014 (Table 2). The mean emotional exhaustion scores in 2017 remained higher than in 2011 (P=.03), whereas the mean depersonalization scores were slightly lower (P<.001). In

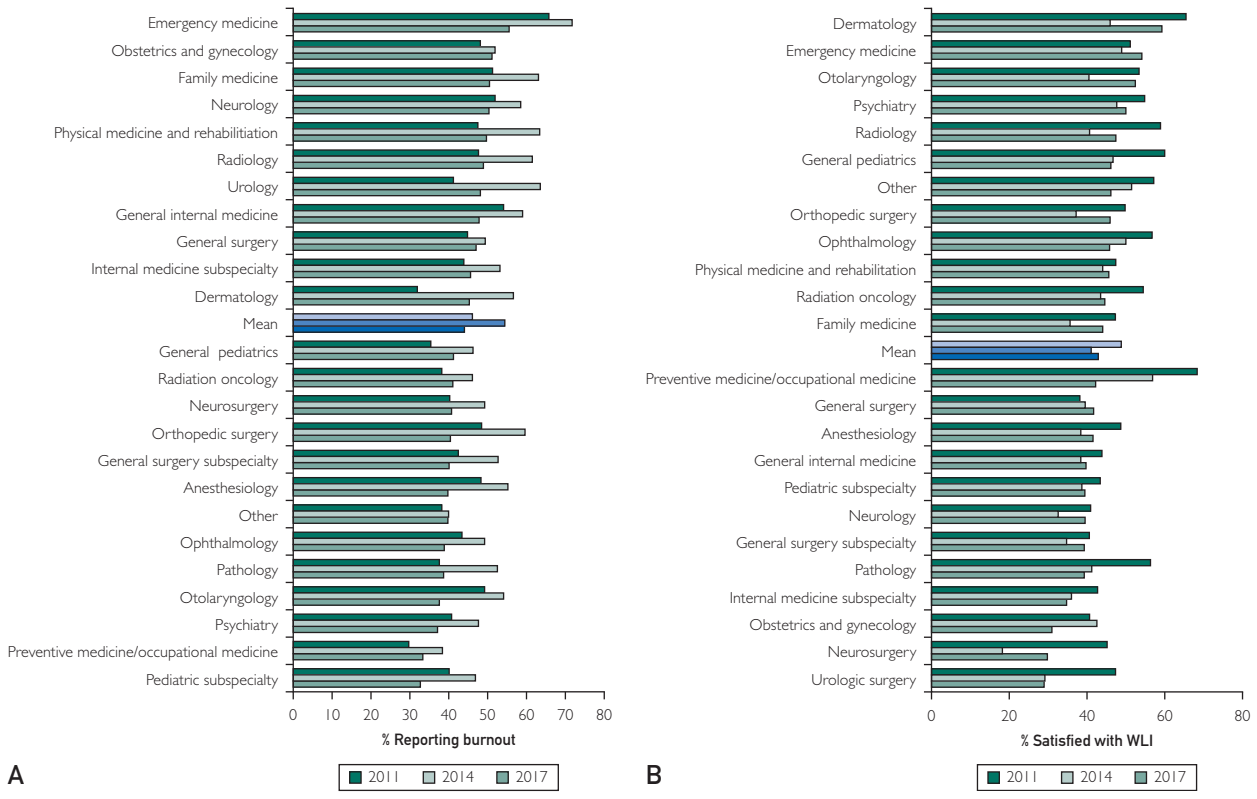

FIGURE 1. Burnout (A) and satisfaction with work-life integration (WLI) (B) by specialty, 2017, 2014, and 2011.

aggregate, 43.9% (2147 of 4893) of physicians had at least one manifestation of burnout in 2017 compared with 54.4% (3680 of 6767) in 2014 ($P<.001$) and 45.5% (3310 of 7227) in 2011 ($P=.04$). On multivariate analysis pooling responders from the 2011, 2014, and 2017 surveys and adjusted for age, sex, specialty, hours worked per week, and practice setting, physicians who responded in 2017 (odds ratio [OR], 0.606; 95% CI, 0.559-0.657) or 2011 (OR, 0.682; 95% CI, 0.634-0.733) were at lower odds of burnout compared with physicians who responded in 2014 (Supplemental Table 2, available online at http://www.mayoclinicproceedings.org).

A more nuanced picture emerged when comparing differences in burnout by specialty at each time point (2011, 2014, 2017), with some specialties experiencing minimal change in the proportion with burnout during the interval (eg, obstetrics and gynecology) and most hitting a peak in burnout in 2014 (Figure 1A). For some specialties, the proportion burned out in 2017 was lower than in 2011 (eg, anesthesiology, emergency medicine, orthopedic surgery) whereas for others the proportion with burnout remained higher in 2017 than in 2011 (eg, dermatology) even though it was lower than in 2014 (Supplemental Table 3, available online at http://www.mayoclinicproceedings.org). Mean emotional exhaustion and depersonalization scores for each specialty by year are shown in Supplemental Table 4 (available online at http://www.mayoclinicproceedings.org).

The proportion of physicians screening positive for depression showed a modest but steady increase between 2011 and 2017 (2011, 38.2% [2753 of 7213]; 2014, 39.8% [2715 of 6818]; 2017, 41.7% [2022 of 4854]; $P<.001$). On multivariate analysis pooling responders from the 2011, 2014, and 2017 surveys and adjusted for age, sex, specialty, hours worked per week, and practice setting, physicians who responded in

2017 (OR, 1.15; 95% CI, 1.061-1.243) or 2014 (OR, 1.090; 95% CI, 1.014-1.171) were at higher odds of screening positive for depression than physicians who responded in 2011.

Satisfaction with WLI was also greater in 2017 than in 2014 but remained lower than 2011 levels (Table 2). Differences in satisfaction with WLI between 2011 and 2017 by specialty are shown in Figure 1B and Supplemental Table 5 (available online at http://www.mayoclinicproceedings.org).

On multivariate analysis of the 2017 data, being a woman and working more hours per week were independently associated with higher rates of burnout and lower degrees of satisfaction with WLI (Table 3). Practicing in certain specialties was also independently associated with higher or lower rates of burnout.

Comparison of Physicians to the General US Working Population

To compare the professional experience of practicing physicians relative to working US adults, 3971 nonretired physicians aged 29 to 65 years were compared with 5198 employed general population respondents aged 29 to 65 years (Table 4). The overall prevalence of burnout on the 2-item burnout measure for the general US working population in 2017 was similar to 2011 and 2014 (2011, 28.6% [1654 of 5791]; 2014, 28.4% [1532 of 5394]; 2017, 28.1% [1452 of 5169]; comparison 2017 to 2011, P=.58; comparison 2017 to 2014, P=.72). Satisfaction with WLI for the general US working population in 2017 was similar to 2014 and remained more favorable than 2011 (2011, 55.1% [3225 of 5858]; 2014, 61.3% [3320 of 5412]; 2017, 61.0% [3159 of 5179]; comparison 2017 to 2011, P<.001; comparison 2017 to 2014:, P=.71).

Demographic differences between the physician and general population samples in 2017 are shown in Table 4. Similar to 2011 and 2014, physicians reported working a mean of 12 hours more per week (52.6 vs 40.3 hours), with 38.9% of physicians (1519 of 3906) and 6.2% of the general population respondents (320 of 5194) working 60 hours or more per week (P<.001 for both). On the 2-item burnout measure, physicians had higher rates of emotional exhaustion (36.4% [1436 of 3944] vs 24.8% [1285 of 5186]; OR, 1.74; P<.001), depersonalization (18.0% [707 of 3938] vs 13.5% [699 of 5165]; OR, 1.33; P<.001), and overall burnout (39.8%

TABLE 3. Multivariate Models Among Practicing Physicians in 2017[a]

Outcome	Predictor	OR (95% CI)	*P* value
Burned out[b]	Age ≥65 y (vs age <35 y)	0.435 (0.320-0.591)	<.001
	Female (vs male)	1.329 (1.156-1.528)	<.001
	Married (vs single)	0.719 (0.593-0.872)	<.001
	Hours worked per week (for each additional hour)	1.021 (1.017-1.026)	<.001
	Specialty (vs internal medicine subspecialty)		
	Emergency medicine	1.875 (1.360-2.584)	<.001
	General surgery subspecialty	0.656 (0.491-0.877)	.004
	Neurosurgery	0.476 (0.255-0.890)	.020
	Pediatric subspecialty	0.539 (0.378-0.770)	<.001
Satisfied with WLI[b]	Age 35-44 y (vs age <35 y)	0.630 (0.475-0.835)	.001
	Age 45-54 y (vs age <35 y)	0.648 (0.488-0.860)	.003
	Age 55-64 y (vs age <35 y)	0.643 (0.486-0.851)	.002
	Female (vs male)	0.512 (0.444-0.592)	<.001
	Hours worked per week (for each additional hour)	0.944 (0.939-0.948)	<.001

[a]OR = odds ratio; WLI = work-life integration.

[b]Both models included the following variables: age (<35 years referent category), sex (male referent), relationship status (single referent), specialty (internal medicine subspecialty referent), hours worked per week, and practice setting (private practice referent category).

TABLE 4. 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 in 2017[a]

Variable	Physicians, No. (%) (N=3971)	Population, No. (%) (N=5198)	*P* value
Sex			<.001
Male	2279 (57.5)	2702 (52.0)	
Female	1674 (42.2)	2496 (48.0)	
Other	11 (0.3)	0 (0.0)	
Missing	7	0	
Age (y)			
Median	50.0	52.0	<.001
29-34	299 (7.5)	500 (9.6)	<.001
35-44	1117 (28.1)	1000 (19.2)	
45-54	1095 (27.6)	1498 (28.8)	
55-65	1460 (36.8)	2200 (42.3)	
Relationship status			<.001
Single	498 (12.7)	1436 (27.6)	
Married	3233 (82.2)	3429 (66.0)	
Partnered	168 (4.3)	229 (4.4)	
Widow/widower	35 (0.9)	104 (2.0)	
Missing	37	0	
Hours worked per week			
Mean (SD)	52.6 (16.1)	40.3 (11.8)	<.001
Median	50.0	40.0	
<40	569 (14.6)	1368 (26.3)	<.001
40-49	801 (20.5)	2813 (54.2)	
50-59	1017 (26.0)	693 (13.3)	
60-69	887 (22.7)	234 (4.5)	
70-79	323 (8.3)	53 (1.0)	
≥80	309 (7.9)	33 (0.6)	
Missing	65	4	
Highest level of education			NA
Less than high school graduate	NA	114 (2.2)	
High school graduate	NA	1156 (22.2)	
Some college, no degree	NA	1025 (19.7)	
Associate degree	NA	606 (11.7)	
Bachelor's degree	NA	1291 (24.8)	
Master's degree	NA	721 (13.9)	
Professional or doctorate degree (other than MD/DO)	3971 (100)	285 (5.5)	
Occupation			NA
Professional[b]	NA	2217 (43.1)	
Health care[c]	NA	386 (7.5)	
Service[d]	NA	386 (7.5)	
Sales[e]	NA	331 (6.4)	
Office and administrative support	NA	469 (9.1)	
Farming, forestry, fishing	NA	22 (0.4)	
Precision production, craft and repair[f]	NA	339 (6.6)	
Transportation and material moving	NA	168 (3.3)	
Armed services	NA	26 (0.5)	
Other	NA	803 (15.6)	
Missing	NA	51	

Continued on next page

TABLE 4. Continued

Variable	Physicians, No. (%) (N=3971)	Population, No. (%) (N=5198)	*P* value
Distress			
Burnout[g]			
Emotional exhaustion[h]			<.001
Never	473 (12.0)	725 (14.0)	
A few times a year	863 (21.9)	1362 (26.3)	
Once a month or less	553 (14.0)	843 (16.3)	
A few times a month	618 (15.7)	971 (18.7)	
Once a week	390 (9.9)	415 (8.0)	
A few times a week	585 (14.8)	559 (10.8)	
Every day	462 (11.7)	311 (6.0)	
Missing	27	12	
High score	1437 (36.4)	1285 (24.8)	<.001
Depersonalization[i]			<.001
Never	1435 (36.4)	2277 (44.1)	
A few times a year	917 (23.3)	1116 (21.6)	
Once a month or less	462 (11.7)	551 (10.7)	
A few times a month	417 (10.6)	522 (10.1)	
Once a week	209 (5.3)	233 (4.5)	
A few times a week	299 (7.6)	246 (4.8)	
Every day	199 (5.1)	220 (4.3)	
Missing	33	33	
High score	707 (18.0)	699 (13.5)	<.001
Burned out[j]	1566/3933 (39.8)	1452/5169 (28.1)	<.001
Work-life Integration			
Work schedule leaves me enough time for my personal/family life			<.001
Strongly agree	422 (10.7)	1205 (23.3)	
Agree	1157 (29.3)	1954 (37.7)	
Neutral	641 (16.2)	953 (18.4)	
Disagree	1103 (27.9)	781 (15.1)	
Strongly disagree	626 (15.9)	286 (5.5)	
Missing	22	19	

[a]NA = not applicable.

[b]Business/financial, management, computer/mathematical, architecture/engineering, lawyer/judge, life/physical/social sciences, community/social services, teacher nonuniversity, teacher college/university, other.

[c]Nurse, pharmacist, paramedic, laboratory technician, nursing aide, orderly, dental assistant.

[d]Protective service, food preparation/service, building cleaning/maintenance, personal care/service.

[e]Sales representative, retails sales, other sales.

[f]Construction and extraction, installation/maintenance/repair, precision production (machinist, welder, backer, printer, tailor).

[g]As assessed using the single-item measures for emotional exhaustion (EE) and depersonalization (DP) adapted from the full Maslach Burnout Inventory (MBI). Area under the receiver operating characteristic curve for the EE and DP single items relative to that of their respective full MBI domain score in previous studies were 0.94 and 0.93, and the positive predictive values of the single-item thresholds for high levels of EE and DP were 88.2% and 89.6%, respectively.[2,34,35]

[h]Individuals indicating symptoms of EE weekly or more often have median full MBI EE scores of >30 and have a >75% probability of having a high EE score as defined by the MBI (≥27).

[i]Individuals indicating symptoms of DP weekly or more often have median full MBI DP scores of >13 and have a >85% probability of having a high DP score as defined by the MBI (≥10).

[j]High score (≥weekly) on EE and/or DP scale.

[1566 of 3933] vs 28.1% [1452 of 5169]; OR, 1.69; *P*<.001) (Figure 2A). After adjusting for age, sex, relationship status, and hours worked per week, physicians remained at increased risk for burnout compared with the general US working population (OR, 1.39; 95% CI, 1.26-1.54; *P*<.001). Physicians had a lower rate of satisfaction with WLI than the

general US working population (40.0% [1579 of 3949] vs 61.0% [3159 of 5179]; OR, 0.43; 95% CI, 0.39-0.46; $P<.001$) (Figure 2B). After adjusting for age, sex, relationship status, and hours worked per week, physicians remained less likely to be satisfied with WLI compared with the general population (OR, 0.77; 95% CI, 0.70-0.85; $P<.001$.

DISCUSSION

The current prevalence of burnout among US physicians appears to be lower than in 2014 and near 2011 levels. This trend is encouraging and suggests improvement is possible despite the numerous contributing factors and complexity of the problem. Although the improvement is good news, symptoms of burnout remain a pervasive problem, and its prevalence among physicians continues to be markedly higher than in the general US working population, even after adjustment for differences in hours worked, age, sex, and relationship status. Notably, the improvement in burnout among physicians has not been realized equally across all specialties, as levels remain higher than in 2011 for many disciplines.

To what can the improvement in the prevalence of physician burnout over the past 3 years be attributed? It is possible that 2014 was a particularly challenging time because of consolidation of hospitals and medical groups, a number of new regulatory factors, increasing EHR penetration, and increased administrative burden.[2-5] The situation may be improving as physicians and organizations adapt to the new practice environment. It is also possible that the prevalence of burnout improved due to burned out physicians leaving the workforce or reducing clinical effort.[9] It should be noted, however, that many large-scale efforts have been initiated at the national level to address this issue.[18,19,38-41] Even though they are still in their early stages, these efforts may have already made a difference: people are talking about the problems, individuals recognize that they are not alone, and the visible leadership by influential national organizations and accrediting bodies (eg, National Academy of Medicine, AMA, Association of American Medical Colleges, Accreditation Council for Graduate Medical Education, the Joint Commission, American College of Physicians, Accreditation Council for Continuing Medical Education) engaging regulators, payers, and other organizations may provide optimism for meaningful change.[19,40-43] Many organizations have also made substantive efforts to improve the efficiency of the practice environment through better team-based care, documentation assistance, and streamlined workflows.[22,25,44-48] These and other efforts to improve physician well-being have proven to be efficacious[23-25,47] and should be

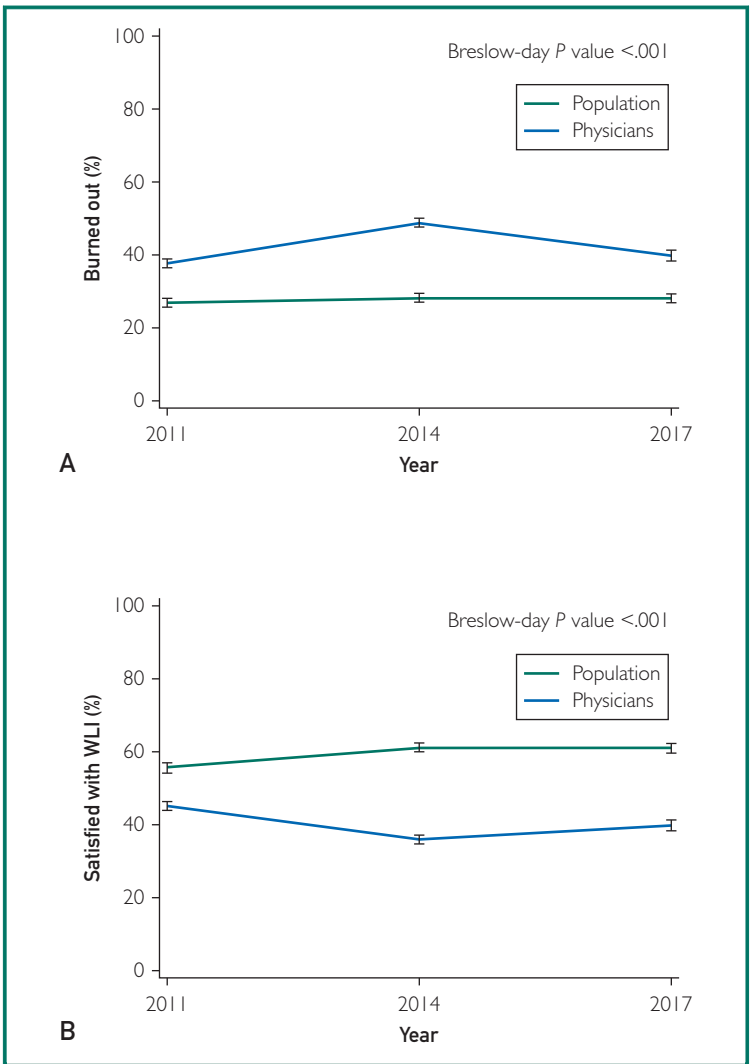

FIGURE 2. Changes in burnout (A) and satisfaction with work-life integration (WLI) (B) in physicians and US working population.

recognized as potential contributors to the favorable trend.

Despite the modest improvement, our results indicate that burnout among US physicians remains a major problem for the health care delivery system. In our view, the effort to improve health care professional well-being is an ongoing journey, analogous to efforts to improve quality and safety.[19,43] A coordinated, systems-based approach at both the national and organizational levels that addresses the underlying drivers is the key to making progress.[22,49] Evidence indicates that both individual- and organization-focused interventions are effective and indeed complementary.[23,24] A formal program to assess, design, coordinate, and lead efforts to reduce the occupational risk for burnout and cultivate professional well-being can help accelerate progress at the organization level.[49]

Although the change in burnout is favorable, symptoms of depression among physicians have continued to worsen. Distress is a multidimensional construct that includes burnout, depression, stress, WLI, professional satisfaction, and fatigue as well as other domains. These dimensions of distress have both shared and distinct drivers and do not always move in the same direction.

Our study is subject to several limitations, the potential for response bias being the most important. The majority of physicians did not open the e-mails informing them of the study and accordingly never received the invitation to participate. The participation rate among those who opened the invitation e-mail was only 17.1%. Although consistent with other national survey studies of physicians,[50-52] this response is lower than typical response rates of physician surveys in general.[53] We did, however, employ a robust double survey approach using incentives to compare participants to nonresponders.[54] The results revealed no statistically significant differences with respect to age (P=.83), years in practice (P=.41), burnout (P=.66), or satisfaction with WLI (P=.09), suggesting that the participants were representative of US physicians. Because our results are based on anonymous responses, we are unable to assess changes in burnout and WLI of individual physicians over time, and the study methodology cannot determine the direction of effect or potential causality between the variables assessed. It is also possible that social desirability bias could alter an individual's response to items about burnout.

CONCLUSION

Burnout and satisfaction with WLI among US physicians improved between 2014 and 2017. This trend is reason for optimism and suggests that progress is both possible and under way. Despite this improvement, symptoms of burnout among physicians continue to be prevalent and markedly higher than seen in the general US working population. Given the evidence that burnout impacts patient satisfaction, access, quality of care, and costs, continued efforts to make progress are needed.

SUPPLEMENTAL ONLINE MATERIAL

Supplemental material can be found online at http://www.mayoclinicproceedings.org. Supplemental material attached to journal articles has not been edited, and the authors take responsibility for the accuracy of all data.

Abbreviations and Acronyms: **AMA** = American Medical Association; **EHR** = electronic health records; **MBI** = Maslach Burnout Inventory; **OR** = odds ratio; **WLI** = work-life integration

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REFERENCES

1. Murphy B. For first time, physician practice owners are not the majority. American Medical Association website. https://wire.ama-assn.org/practice-management/first-time-physician-practice-owners-are-not-majority. Published May 31, 2017. Accessed August 24, 2018.
2. Sinsky C, Colligan L, Li L, et al. Allocation of physician time in ambulatory practice: a time and motion study in 4 specialties. *Ann Intern Med*. 2016;165(11):753-760.
3. Shanafelt TD, Dyrbye LN, Sinsky C, et al. Relationship between clerical burden and characteristics of the electronic environment with physician burnout and professional satisfaction. *Mayo Clin Proc*. 2016;91(7):836-848.
4. Tai-Seale M, Olson CW, Li J, et al. Electronic health record logs indicate that physicians split time evenly between seeing patients and desktop medicine. *Health Aff (Millwood)*. 2017;36(4):655-662.
5. Arndt BG, Beasley JW, Watkinson MD, et al. Tethered to the EHR: primary care physician workload assessment using EHR event log data and time-motion observations. *Ann Fam Med*. 2017;15(5):419-426.
6. 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(18):1377-1385.
7. Shanafelt TD, Mungo M, Schmitgen J, et al. Longitudinal study evaluating the association between physician burnout and changes in professional work effort. *Mayo Clin Proc*. 2016;91(4):422-431.
8. 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 [published correction appears in *Mayo Clin Proc*. 2016;91(2):276]. *Mayo Clin Proc*. 2015;90(12):1600-1613.
9. Sinsky CA, Dyrbye LN, West CP, Satele D, Tutty M, Shanafelt TD. Professional satisfaction and the career plans of US physicians. *Mayo Clin Proc*. 2017;92(11):1625-1635.
10. Shanafelt TD, Bradley KA, Wipf JE, Back AL. Burnout and self-reported patient care in an internal medicine residency program. *Ann Intern Med*. 2002;136(5):358-367.
11. West CP, Huschka MM, Novotny PJ, et al. Association of perceived medical errors with resident distress and empathy: a prospective longitudinal study. *JAMA*. 2006;296(9):1071-1078.
12. Shanafelt TD, Balch CM, Bechamps G, et al. Burnout and medical errors among American surgeons. *Ann Surg*. 2010;251(6):995-1000.
13. Wallace JE, Lemaire JB, Ghali WA. Physician wellness: a missing quality indicator. *Lancet*. 2009;374(9702):1714-1721.
14. Dewa CS, Loong D, Bonato S, Trojanowski L, Rea M. The relationship between resident burnout and safety-related and acceptability-related quality of healthcare: a systematic literature review. *BMC Med Educ*. 2017;17(1):195.
15. Cimiotti JP, Aiken LH, Sloane DM, Wu ES. Nurse staffing, burnout, and health care-associated infection [published correction appears in *Am J Infect Control*. 2012;40(7):680]. *Am J Infect Control*. 2012;40(6):486-490.
16. Aiken LH, Clarke SP, Sloane DM, Sochalski J, Silber JH. Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *JAMA*. 2002;288(16):1987-1993.
17. Welp A, Meier LL, Manser T. Emotional exhaustion and workload predict clinician-rated and objective patient safety. *Front Psychol*. 2015;5:1573.
18. Noseworthy J, Madara J, Cosgrove D, et al. Physician burnout is a public health crisis: a message to our fellow health care CEOs. Health Affairs website. http://healthaffairs.org/blog/2017/03/28/physician-burnout-is-a-public-health-crisis-a-message-to-our-fellow-health-care-ceos/. Published March 28, 2017. Accessed April 28, 2017.
19. Dzau VJ, Kirch DG, Nasca TJ. To Care Is Human - collectively confronting the clinician-burnout crisis. *N Engl J Med*. 2018;378(4):312-314.
20. American Medical Association. Steps Forward. American Medical Association Ed Hub website. www.stepsforward.org. Accessed August 31, 2018.
21. National Academy of Medicine. Action collaborative on clinicial well-being and resilience. National Academy of Medicine website. https://nam.edu/initiatives/clinician-resilience-and-well-being/. Accessed July 11, 2018.
22. Shanafelt TD, Noseworthy JH. Executive leadership and physician well-being: nine organizational strategies to promote engagement and reduce burnout. *Mayo Clin Proc*. 2017;92(1):129-146.
23. West CP, Dyrbye LN, Erwin PJ, Shanafelt TD. Interventions to prevent and reduce physician burnout: a systematic review and meta-analysis. *Lancet*. 2016;388(10057):2272-2281.
24. Panagioti M, Panagopoulou E, Bower P, et al. Controlled interventions to reduce burnout in physicians: a systematic review and meta-analysis. *JAMA Intern Med*. 2017;177(2):195-205.
25. Linzer M, Poplau S, Grossman E, et al. A cluster randomized trial of interventions to improve work conditions and clinician burnout in primary care: results from the Healthy Work Place (HWP) study. *J Gen Intern Med*. 2015;30(8):1105-1111.
26. Shah T, Patel-Teague S, Kroupa L, Meyer AND, Singh H. Impact of a national QI programme on reducing electronic health record notifications to clinicians [published online ahead of print March 5, 2018]. *BMJ Qual Saf*. https://doi.org/10.1136/bmjqs-2017-007447.
27. American Association for Public Opinion Research. Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys. 2016. https://www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf. Published 2016. Accessed January 3, 2018.
28. Maslach C, Jackson SE, Leiter M. *Maslach Burnout Inventory Manual*. 3rd ed. Palo Alto, CA: Consulting Psychologists Press; 1996.
29. Rafferty JP, Lemkau JP, Purdy RR, Rudisill JR. Validity of the Maslach Burnout Inventory for family practice physicians. *J Clin Psychol*. 1986;42(3):488-492.
30. Lee RT, Ashforth BE. A meta-analytic examination of the correlates of the three dimensions of job burnout. *J Appl Psychol*. 1996;81(2):123-133.
31. Leiter MP, Durup J. The discriminant validity of burnout and depression: a confirmatory factor analytic study. *Anxiety Stress Coping*. 1994;7(4):357-373.
32. Thomas NK. Resident burnout. *JAMA*. 2004;292(23):2880-2889.
33. Rosen IM, Gimotty PA, Shea JA, Bellini LM. Evolution of sleep quantity, sleep deprivation, mood disturbances, empathy, and burnout among interns. *Acad Med*. 2006;81(1):82-85.
34. West CP, Dyrbye LN, Sloan JA, Shanafelt TD. Single item measures of emotional exhaustion and depersonalization are useful for assessing burnout in medical professionals. *J Gen Intern Med*. 2009;24(12):1318-1321.
35. West CP, Dyrbye LN, Satele DV, Sloan JA, Shanafelt TD. Concurrent validity of single-item measures of emotional exhaustion and depersonalization in burnout assessment. *J Gen Intern Med*. 2012;27(11):1445-1452.
36. Spitzer RL, Williams JB, Kroenke K, et al. Utility of a new procedure for diagnosing mental disorders in primary care: the PRIME-MD 1000 study. *JAMA*. 1994;272(22):1749-1756.
37. Whooley MA, Avins AL, Miranda J, Browner WS. Case-finding instruments for depression: two questions are as good as many. *J Gen Intern Med*. 1997;12(7):439-445.
38. Shanafelt TD, Dyrbye LN, West CP. Addressing physician burnout: the way forward. *JAMA*. 2017;317(9):901-902.
39. Thomas LR, Ripp JA, West CP. Charter on physician well-being. *JAMA*. 2018;319(15):1541-1542.

40. Erickson SM, Rockwern B, Koltov M, McLean RM; Medical Practice and Quality Committee of the American College of Physicians. Putting patients first by reducing administrative tasks in health care: a position paper of the American College of Physicians. *Ann Intern Med*. 2017;166(9):659-661.
41. McMahon GT. The leadership case for investing in continuing professional development. *Acad Med*. 2017;92(8):1075-1077.
42. Sinsky CA, Privitera MR. Creating a "manageable cockpit" for clinicians: a shared responsibility. *JAMA Intern Med*. 2018;178(6):741-742.
43. Shanafelt T, Goh J, Sinsky C. The business case for investing in physician well-being. *JAMA Intern Med*. 2017;177(12):1826-1832.
44. Swenson S, Kabcenell A, Shanafelt T. Physician-organization collaboration reduces physician burnout and promotes engagement: the Mayo Clinic experience. *J Healthc Manag*. 2016;61(2):105-127.
45. Gidwani R, Nguyen C, Kofoed A, et al. Impact of scribes on physician satisfaction, patient satisfaction, and charting efficiency: a randomized controlled trial. *Ann Fam Med*. 2017;15(5):427-433.
46. Rao SK, Kimball AB, Lehrhoff SR, et al. The impact of administrative burden on academic physicians: results of a hospital-wide physician survey. *Acad Med*. 2017;92(2):237-243.
47. West CP, Dyrbye LN, Rabatin JT, et al. Intervention to promote physician well-being, job satisfaction, and professionalism: a randomized clinical trial. *JAMA Intern Med*. 2014;174(4):527-533.
48. Martel ML, Imdieke BH, Holm KM, et al. Developing a medical scribe program at an academic hospital: the Hennepin County Medical Center experience. *Jt Comm J Qual Patient Saf*. 2018;44(5):238-249.
49. Shanafelt T, Trockel M, Ripp J, Murphy M, Sandborg C, Bohman B. Building a program on well-being: key design considerations to meet the unique needs of each organization [published online ahead of print August 21, 2018]. *Acad Med*. https://doi.org/10.1097/ACM.0000000000002415.
50. Allegra C, Hall R, Yothers G. Prevalence of burnout in the U.S. oncology community: results of a 2003 survey. *J Oncol Pract*. 2005;1(4):140-147.
51. Kuerer HM, Eberlein TJ, Pollock RE, et al. Career satisfaction, practice patterns and burnout among surgical oncologists: report on the quality of life of members of the Society of Surgical Oncology. *Ann Surg Oncol*. 2007;14(11):3043-3053.
52. Shanafelt TD, Balch CM, Bechamps GJ, et al. Burnout and career satisfaction among American surgeons. *Ann Surg*. 2009;250(3):463-471.
53. Asch DA, Jedrziewski MK, Christakis NA. Response rates to mail surveys published in medical journals. *J Clin Epidemiol*. 1997;50(10):1129-1136.
54. Johnson TP, Wislar JS. Response rates and nonresponse errors in surveys. *JAMA*. 2012;307(17):1805-1806.