

Burnout Among Health Care Professionals

A Call to Explore and Address This Underrecognized Threat to Safe, High-Quality Care

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The US health care system is rapidly changing in an effort to deliver better care, improve health, and lower costs while providing care for an aging population with high rates of chronic disease and co-morbidities. Among the changes affecting clinical practice are new payment and delivery approaches, electronic health records, patient portals, and publicly reported quality metrics—all of which change the landscape of how care is provided, documented, and reimbursed. Navigating these changes are health care professionals (HCPs), whose daily work is critical to the success of health care improvement. Unfortunately, as a result of these changes and resulting added pressures, many HCPs are burned out, a syndrome characterized by a high degree of emotional exhaustion and high depersonalization (i.e., cynicism), and a low sense of personal accomplishment from work [1,2].

What Is the Extent of Burnout Among Health Care Professionals?

Physicians

More than half of US physicians are experiencing substantial symptoms of burnout. Physicians working in the specialties at the front lines of care (e.g., emergency medicine, family medicine, general internal medicine, neurology) are among the highest risk of burnout. Burnout is nearly twice as prevalent among physicians as US workers in other fields after controlling for work hours and other factors [1,2]. Between 2011 and 2014, the prevalence of burnout increased by 9 percent among physicians while remaining stable in other US workers. Several studies have also found

a high prevalence of burnout and depression among medical students and residents, with rates higher than those of age-similar individuals pursuing other careers [3-9].

Nurses and Other Health Care Professionals

Studies of nurses report a similarly high prevalence of burnout and depression. In a 1999 study of more than 10,000 registered inpatient nurses, 43 percent had high degree of emotional exhaustion [10]. A subsequent study of approximately 68,000 registered nurses in 2007 reported that 35 percent, 37 percent, and 22 percent of hospital nurses, nursing home nurses, and nurses working in other settings had high degree of emotional exhaustion [11]. The prevalence

of depression may also be higher among nurses than other US workers. In a study of 1,171 registered inpatient nurses, 18 percent had depression versus a national prevalence of approximately 9 percent [12]. Less is known about other members of the health care team, although existing data suggest a similar prevalence of burnout among nurse practitioners and physician assistants [13].

Why Should We Be Concerned About Burnout Among Health Care Professionals?

Quality and Safety

There are cross-sectional studies of physicians that suggest a significant effect on quality and risk of medical malpractice suits. In cross-sectional studies of more than 7,100 US surgeons, burnout was an independent predictor of reporting a recent major **medical error** [14] and being involved in a **medical malpractice suit** [15] on multivariate analysis that is controlled for other personal and professional factors. The relationship between burnout and medical error is likely bidirectional. In a longitudinal study of internal medicine residents, higher levels of burnout were associated with increased odds of reporting an error in the subsequent 3 months. Self-perceived medical errors were also associated with worsening burnout, depressive symptoms, and decrease in quality of life, suggesting a cyclical relationship between medical errors and distress [16,17]. Mean stress levels of hospital employees have also been shown to correlate with the number of hospital malpractice suits [18], and mean burnout levels among hospital nurses are an independent predictor of **health care-associated infection** [19]. Other studies have found that as mean emotional exhaustion levels of physicians and nurses working in intensive care units rose, so did standardized **patient mortality ratios** [20], while perceived quality of **interpersonal teamwork** deteriorated [21].

Patient Satisfaction

Cross-sectional studies with modest sample sizes have reported significant correlations between a physician's degree of depersonalization and **patient satisfaction** with their hospital care [22] and between a physician's job satisfaction and patient satisfaction with their health care [23] and patient-reported adherence to medical advice [24]. Additional studies have reported an inverse relationship between nurse job satisfaction

and emotional exhaustion and patient satisfaction ratings across a variety of domains [11,25,26].

Turnover and Reduction of Work Effort

Cross-sectional studies of physicians have found burnout to be independently associated with **job dissatisfaction** [27] and more than 200 percent increased odds of **intent to leave** [28,29] the current practice for reasons other than retirement. Similarly, in studies of nurses, burnout and job dissatisfaction were associated with plans to leave the current job or nursing field [30-32]. This dissatisfaction and intent often translates into action. A longitudinal study of physicians reported that each 1-point increase in emotional exhaustion or 1-point decrease in job satisfaction between 2011 and 2013 was associated with a 28 percent and 67 percent greater likelihood, respectively, of **reduction in professional effort** (i.e., reduction in work hours according to payroll records) over the following year [33], resulting in a **loss of productivity** at the national level estimated to equate to eliminating the graduating classes of seven medical schools [34]. Other studies support this relationship between burnout and leaving the clinical practice [27,35,36]. Although leaving one's current job or reducing work hours may provide individual relief [34], these tactics further strain a health care system already struggling to meet access needs [37].

Health Care Costs

HCP turnover has financial implications for health care organizations. The cost of **turnover** among RNs is estimated at 1.2 to 1.3 times their salary (estimated total costs of \$82,000–\$88,000 per RN in 2007) [38,39]. Costs to replace one physician depend on specialty, location, and length of vacancy, with estimated costs ranging from hundreds of thousands to more than \$1 million [40,41]. Several small studies point to the possibility of physicians experiencing burnout or high workloads making **more referrals** and **ordering more tests** [42,43]. Burnout may also increase health care expenditures indirectly via higher rates of medical errors [14,16,17] and malpractice claims [14,15], absenteeism, and lower job productivity [12,44-47].

Personal Consequences

HCP burnout represents real suffering among people dedicated to preventing and relieving the suffering

of others. Cross-sectional studies of physicians have found burnout to be independently associated with 25 percent increased odds of **alcohol abuse/dependence** and 200 percent increased odds of **suicidal ideation** among physicians [48,49]. In a longitudinal study of medical students, burnout predicted development of suicidal thoughts over the ensuing year, independent of symptoms of depression [7]. Physicians are at increased risk of suicide compared with the US general population [50], with the suicide rate among male physicians 40 percent higher than that of other males in the population and the suicide rate among female physicians 130 percent higher than that of other females in the population [50].

What Is Driving Burnout Among Health Care Professionals?

Work-Related Factors

A large number of studies suggest that work-related stress fuels burnout [51] and job dissatisfaction among HCPs [52,53]. Work process inefficiencies (e.g., computerized order entry and documentation), excessive workloads (e.g., work hours, overnight call frequency, nurse-patient ratios), work-home conflicts, organizational climate factors (e.g., management culture; lack of physician-nurse collaboration, value congruence, opportunities for advancement, and social support), and deterioration in control, autonomy, and meaning at work have been associated with burnout among physicians and nurses [1,10,11,27,30,31,45,54-65]. For example, multivariate analyses of data from cross-sectional studies of physicians have reported independent relationships between burnout and **work hours** (3 percent increased odds for each additional hour/week), **night or weekend call** (3–9 percent increased odds for each additional night or weekend on call), time spent at **home on work-related tasks** (2 percent increased odds for each additional hour/week), and **work-home conflict** (200–250 percent increased odds). In a study of inpatient nurses, each increase of one **patient per nursing staff ratio** (self-reported staffing levels) increased odds of high degree of emotional exhaustion by 23 percent and job dissatisfaction by 15 percent [10]. **Moral distress**, stemming from factors such as perceived powerlessness, unnecessary/futile care, inadequate informed consent, and false hope [66], is also a significant predictor of burnout among nurses [65]. Registered nurses who

worked in nursing homes may also be at higher risk for burnout and lower job satisfaction than nurses who work in other settings [11].

Cross-sectional studies have consistently found physician **specialty** to be an independent predictor of burnout, with some specialties associated with 40 percent lower odds of burnout (e.g., dermatology) and others associated with up to 300 percent increased odds of burnout (e.g., emergency medicine, general internal medicine, neurology) in comparison with other specialties [1,2,27,35,55,57,58,67], suggesting there is something unique to the work lives in these specialties that contributes to increased risk. There may also be distinct work-related drivers for physicians in **private practice**, as several studies have found them at approximately 20 percent higher odds for burnout independent of specialty, work hours, incentive pay, and a variety of other factors [2,35,55,58]. Multivariate analyses of data from cross-sectional studies of physicians have reported independent relationships between burnout and **incentive pay** (130 percent increased odds versus other salary models), **career stage** (25 percent more likely among **midcareer** physicians than early or late career), **career fit** (275 percent more likely among physicians who spend less than 20 percent of their work effort on the activity they find most personally meaningful), and use of **computerized physician order entry** (29 percent more likely among physicians who enter orders into a computer) [35,57,58]. Other aspects within the work environment that drive **clerical burden** likely also contribute [58,68,69]. Additionally, **leadership behaviors** matter [70]. How well leaders seek input from, inform, mentor, and recognize individuals for their contributions relates to burnout and the career satisfaction of the physicians they lead [70]. Large national studies of physicians also suggest that organizations that provide physicians with **control** over workplace issues are more likely to employ physicians with higher career satisfaction and lower reported stress [36,52].

Demographic Profiles of Those at Higher Risk

Cross-sectional studies of physicians have found independent relationships between burnout and physician sex, age, relationship status, age of children, and spousal/partner occupation [2,27,57,71]. Although gender is not consistently an independent predictor of burnout after adjusting for age and other factors, some

studies have found **female physicians** to have 30–60 percent increased odds of burnout [2,58,67]. Female physicians are more likely to experience depressive symptoms than male physicians; however, depression is not more common among female physicians than other females in the general population [50]. **Younger physicians** are also at increased odds of burnout, with those who are less than 55 years old at 200 percent increased risk compared with those older than 55. Having a **child younger than 21 years old** increases the odds of burnout by 54 percent, and having a **spouse/partner who works as a nonphysician HCP** increases the odds by 23 percent. We are unaware of any studies that have explored ethnic or racial differences in the prevalence of burnout among practicing physicians, although some work has been done in medical students [72]. Among other helping professionals, the prevalence of burnout among African Americans has been shown to be lower than among Caucasians [51,73]. Individual characteristics, such as personality and interpersonal skills, and experiences may influence how HCPs deal with stress and adjust to rapidly changing work environments [74-77]. Research, however, suggests that individuals who choose to become physicians are not inherently more vulnerable to stress and burnout [78].

What Research Is Needed?

Despite decades of publications documenting the problem and some of its causes and potential

consequences, many questions remain, and information on effective interventions remains limited [2,79-81]. A major limitation of the existing research is that the vast majority of studies have been cross-sectional, hampering our ability to understand causality. Many studies lack the multivariate analyses needed to elucidate the extent to which hypothesized variables are independent predictors or interacting or confounding correlates. Only a limited number of the complex array of factors (e.g., workplace conditions and personal characteristics) that may contribute to burnout and poor job dissatisfaction among HCPs have been studied. There is a scarcity of research studies exploring differences by work setting (e.g., inpatient, outpatient, skilled nursing home) and the work experience of other members of the health care team, including nurse practitioners, physician assistants, pharmacists, medical assistants, and nonclinical staff. Terminology and measurement tools used vary substantially across studies, limiting comparisons across HCP populations, hampering efforts to quantitatively summarize outcomes (for example through meta-analyses), and slowing the rate of advancement in the field. Most intervention studies have used convenience sampling, lacked appropriate comparison groups, were short in duration, involved only a single discipline or organization, and focused primarily on individual interventions, such as mindfulness-based stress reduction, despite problems within the health care system being a much greater contributing factor to burnout and

Box 1 | High-Priority Research Principles

All Studies

- Build on existing models and conceptual frameworks
- Use robust study design (e.g., prospective cohort, case control, randomized)
- Use valid and reliable metrics
- Employ multivariate analysis consistent with conceptual framework

To Explore Causation

- Use longitudinal study design

Intervention Studies

- Use randomized controlled or cohort study designs with crossover or appropriate comparison group
- Include appropriate follow-up (e.g., 6–12 months after the end of intervention)
- Include multidisciplinary team or consider, when appropriate, effect of intervention on other members of health care team
- Should be feasible for scaling and implementation
- Report on cost

Box 2 | Research to Identify Organizational and Health Care System Factors That Contribute to Distress and Threaten Well-Being for Health Care Professionals

Organizational environment

- What structural, functional (including clinical), financial, and operational features are associated with risk of burnout, depression, and suicidality among HCPs, and which features are associated with higher levels of well-being?
- What factors most strongly differentiate higher-performing from lower-performing systems with respect to HCP well-being?
- What models of health care delivery system (forms of economic integration and employment models) optimize HCP performance, well-being, and satisfaction?
- How do different types of delivery system organizational structures compare with respect to workforce efficiency, autonomy, and meaning in work?
- How do nonfinancial performance incentives, such as price transparency, public performance reporting for consumers, and private performance feedback reports to physicians, affect HCP distress and well-being?

Practice environment

- What is the relationship between practice-level factors (e.g., delivery model, team composition, employment status, hours of operation) and HCP distress and well-being?
- Which care team design facilitates high-quality care, meaning in work, work efficiency, job satisfaction, and well-being among all care team members?
- What is the relationship between panel characteristics (e.g., panel size, complexity of patients seen, changing patient expectations/engagement) and HCP distress and well-being?
- What is the effect of health IT systems and changes on HCP distress and well-being?
- What are optimal workloads for HCPs that promote quality of care, prevent burnout, and achieve patient safety?
- What effect does case complexity have on HCP distress and well-being?
- To what extent does lack of continuity of care contribute to HCP burnout, especially in primary care?
- What is the relationship between implementation of safety interventions (e.g., reporting of patient safety events, prevention and control of health care-associated infections, improving diagnostic error, the safe use of medical devices and medications, and transitions of care and handoffs between health care providers) and HCP distress and well-being?

Financial environment

- How do different payment models (e.g., bundled payment) and financial incentives affect HCP distress and well-being?
- Which changes done at a system level to better align financial incentives have improved HCP well-being, and which ones have negatively affected HCP well-being?
- Does measuring cost of care affect HCP well-being?

Regulatory and liability environment

- Do medical licensing requirements discourage HCPs from accessing mental health care?
- What is the effect of malpractice liability and tort reform on HCP distress and well-being?

dissatisfaction [82]. These shortcomings should be addressed.

Future research should adhere to core research principles (*Box 1*). Methodologically rigorous research should build on existing models and conceptual frameworks [53,83-87] and use instruments to measure domains of HCPs' work-lives, experiences, burnout, and well-being (i.e., emotional, psychological, and social well-being) that have acceptable levels of reliability

and validity. Despite the widespread use of study-specific and often single-item approaches to explore these dimensions, instruments with established reliability and validity to measure burnout, stress, engagement, quality of life, fatigue, and other dimensions of mental health exist, and their use should be encouraged [87]. The Maslach Burnout Inventory (MBI) is the gold standard for measuring burnout, with the MBI-Human Services Survey version most suitable for measuring

Box 3 | Research to Gain Further Understanding of the Implications of Health Care Professional Distress and Well-Being for Health Care Outcomes

- What is the relationship between HCP distress and well-being and quality of care and patient health outcomes?
- What is the relationship between HCP distress and well-being and patient safety?
- What is the relationship between HCP distress and well-being and patient experience, patient engagement, and patient adherence to treatment? What are the short- and long-term economic costs of HCP distress?
- What role does HCP distress and well-being have in turnover and reduced work effort?
- What is the relationship between HCP distress and well-being and referral patterns, test ordering, and prescribing practices in relation to health care costs and overuse of health care?
- What role does HCP mental health play in attitudes toward cost-conscious care?
- What is the effect of HCP distress and well-being on overuse of health care overutilization?

burnout among HCPs (e.g., nurses, physicians, health aides, social workers, counselors, therapists) and the MBI-General Survey version for others working in jobs such as customer service, management, and most other professions. Instruments designed to measure multiple dimensions of well-being (burnout, stress, work-life integration, meaning/purpose in work) specifically for physicians have also been developed [88-93] and validated [87]. These instruments have also proved useful for workers in other fields [88], and studies to establish national benchmarks for nurses, nurse practitioners, and physician assistants are ongoing. Those instruments with published national benchmarks for HCPs and demonstrated to have predictive validity for relevant outcomes are particularly useful [87-91]. Development of additional instruments to measure new constructs need to apply established rigorous scientific processes of instrument development and validation, including particular attention to concurrent and predictive validity.

To move the field forward, methodologically rigorous research should be conducted within the following three major areas:

1) Research to identify organizational and health care system factors that increase risk of distress for health care professionals

Research is needed that creates new knowledge by identifying the organizational and health care system factors that are placing HCPs at increased risk for burnout. In particular, longitudinal studies are needed to better identify individual, work-unit, health care organization/employer, and health care system factors that

contribute to poor well-being among HCPs. Research priorities within this domain are listed in *Box 2*. It is critical that researchers consider how factors may differentially affect different members of the health care team. For example, the incorporation of computer order entry may affect physicians, pharmacists, and nurses in different ways, increasing workload or stress for some while lessening it for others.

2) Research to gain further understanding of the implications of health care professional distress and well-being for health care outcomes

Longitudinal study designs and measured (rather than self-reported) health care outcomes are needed to advance our understanding of the professional consequences of HCP burnout and other forms of distress (*Box 3*). Given the effect of HCPs' decisions on health care outcomes and costs, research should also focus on exploring relationships between HCPs' distress, well-being, and referral patterns, test ordering, prescribing practices, and other decisions that affect health care quality, safety, and costs. Economic models that estimate the costs of poor HCP well-being are also needed. Efforts in this regard have begun, and additional studies are needed to maximize precision and generalizability [19,94].

3) Intervention research to improve the work-lives and well-being of health care professionals

Relatively few methodologically robust intervention studies have been conducted [81,95]. Intervention research should be a high priority. A recent systematic review and meta-analysis evaluating interventions to

reduce physician burnout identified only 15 randomized controlled trials and 37 cohort studies [81]. The analysis concluded that a broad range of interventions are mildly to modestly effective in reducing physician burnout and that both organizational/structural- and individual-focused interventions are effective [81]. A second, subsequent meta-analysis resulted in similar findings [95]. Targets for intervention research are listed in *Box 4* and will be further informed by the research proposed in area 1 above. Both interventions that include diverse groups of HCPs and others that target the unique needs of each type of HCP (e.g., physicians, nurses, nurse practitioners, physician assistants, pharmacists) are needed. It is also vital to determine the work conditions and HCP individual factors necessary for successfully implementing interventions that improve performance and well-being. Furthermore, studies assessing the degree to which interventions that improve HCP well-being also improve patient outcomes, access to care, and cost of care could have a transformative effect. Implementation-science principles should be used to promote the uptake of research findings into common health care environments.

Overcoming Barriers to Research

To date, research funding for studies designed to advance these three aims has been limited. Given the potentially serious ramifications of poor well-being and low job satisfaction among HCPs on the success of efforts

to advance the patient experience of care, improve the health of populations, and reduce cost of health care, this should be remedied. Implementation of health care legislation and associated regulations should include appropriately scaled resources that can be allocated to study the effects of regulatory requirements associated with health care legislation on population health, patient satisfaction, cost, and HCP well-being and job satisfaction. Only with such effort will viable and sustainable solutions be realized.

Conclusion

The high prevalence of burnout among HCPs is cause for concern because it appears to be affecting quality, safety, and health care system performance. Efforts are needed to address this growing problem. Progress will require methodologically sound studies, adequate funding, and collaborative efforts. Formation of the National Academy of Medicine Action Collaborative (for a full list of participants, please see <https://nam.edu/initiatives/clinician-resilience-and-well-being>) is an important step. Many organizations have initiated steps to address aspects of the problem, but as indicated in this article, many important questions remain. The authors hope that research sponsors, institutions, clinician organizations, researchers, clinicians, and patients join in supporting enhanced research efforts focused on these topics.

Box 4 | Intervention Research to Improve the Work-Lives and Well-Being of Health Care Professionals

- What organizational interventions in the practice environment reduce distress and cultivate well-being among HCPs?
- What work conditions and HCP individual factors are necessary for successfully implementing interventions that improve performance and well-being?
- What are the optimal approaches to designing and implementing individual and organizational interventions to reduce HCP distress and promote HCP well-being?
- What system-level factors are necessary for implementing interventions that improve performance and HCP well-being?
- How do health care organizations optimally incorporate regular assessment of HCP well-being and act on results?
- What is needed for delivery systems to implement best practices known to create positive work environments that support high-performing teams and individual well-being?
- What practice environment factors optimize implementation of interventions aimed at increasing efficiency and controlling and improving affordability without increasing HCP distress?
- What interventions to improve HCP well-being also improve patient outcomes?
- How should organizations evaluate and improve the work environment, help individuals promote their well-being, and support those who experience distress?
- What is an effective way to screen for distress, reduce barriers to care, and treat distress?
- What personal strategies are essential to facilitating recovery from burnout?

References

1. 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;172:1377-85.
2. Shanafelt TD, Hasan O, Dyrbye L, 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;90:1600-13.
3. Mata DA, Ramos MA, Bansal N, et al. Prevalence of depression and depressive symptoms among resident physicians: A systematic review and meta-analysis. *JAMA* 2015;314:2373-83.
4. Rotenstein LS, Ramos MA, Torre M, et al. Prevalence of depression, depressive symptoms, and suicidal ideation among medical students. *JAMA* 2016;316:2214-36.
5. Dyrbye LN, Massie FS, Jr., Eacker A, et al. Relationship between burnout and professional conduct and attitudes among US medical students. *JAMA* 2010;304:1173-80.
6. Dyrbye LN, Shanafelt TD. A narrative review on burnout experienced by medical students and residents. *Med Educ* 2016;50:132-49.
7. Dyrbye LN, Thomas MR, Massie FS, et al. Burnout and suicidal ideation among US medical students. *Ann Intern Med* 2008;149:334.
8. Dyrbye LN, West CP, Satele D, et al. Burnout among US medical students, residents, and early career physicians relative to the general US population. *Acad Med* 2014;89:443-51.
9. West CP, Shanafelt TD, Kolars J. Quality of life, burnout, educational debt, and medical knowledge among internal medicine residents. *JAMA* 2011;306:952-60.
10. Aiken LH, Clarke SP, Sloane DM, Sochalski J, Silber JH. Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *JAMA* 2002;288:1987-93.
11. McHugh MD, Kutney-Lee A, Cimiotti JP, Sloane DM, Aiken LH. Nurses' widespread job dissatisfaction, burnout, and frustration with health benefits signal problems for patient care. *Health Aff* 2011;30:202-10.
12. Letvak SA, Ruhm CJ, Gupta SN. Nurses' presenteeism and its effects on self-reported quality of care and costs. *Am J Nurs* 2012;112:30-8; quiz 48, 39.
13. Benson MA, Peterson T, Salazar L, et al. Burnout in rural physician assistants: An initial study. *J Physician Assist Educ* 2016;27:81-3.
14. Shanafelt TD, Balch CM, Bechamps G, et al. Burnout and medical errors among American surgeons. *Ann Surg* 2010;251:995-1000.
15. Balch CM, Oreskovich MR, Dyrbye LN, et al. Personal consequences of malpractice lawsuits on American surgeons. *J Am Coll Surg* 2011;213:657-67.
16. West CP, Huschka M, Novotny P, et al. Association of perceived medical errors with resident distress and empathy: A prospective longitudinal study. *JAMA* 2006;296:1071-8.
17. West CP, Tan AD, Habermann TM, Sloan JA, Shanafelt TD. Association of resident fatigue and distress with perceived medical errors. *JAMA* 2009;302:1294-300.
18. Jones JW, Barge BN, Steffy BD, Fay LM, Kunz LK, Wuebker LJ. Stress and medical malpractice: Organizational risk assessment and intervention. *J Appl Psychol* 1988;73:727-35.
19. Cimiotti JP, Aiken LH, Sloane DM, Wu ES. Nurse staffing, burnout, and health care-associated infection.[Erratum appears in *Am J Infect Control*. 2012 Sep;40(7):680]. *Am J Infect Control* 2012;40:486
20. Welp A, Meier LL, Manser T. Emotional exhaustion and workload predict clinician-rated and objective patient safety. *Front Psychol* 2015;5:1-13.
21. Welp A, Meier LL, Manser T. The interplay between teamwork, clinicians' emotional exhaustion, and clinician-rated patient safety: A longitudinal study. *Crit Care (London, England)* 2016;20:110.
22. Halbesleben JRB, Rathert C. Linking physician burnout and patient outcomes: Exploring the dyadic relationship between physicians and patients. *Health Care Manage Rev* 2008;33:29-39.
23. Haas JS, Cook EF, Puopolo AL, Burstin HR, Cleary PD, Brennan TA. Is the professional satisfaction of general internists associated with patient satisfaction? *J Gen Intern Med* 2000;15:122-8.
24. DiMatteo MR, Sherbourne CD, Hays RD, et al. Physicians' characteristics influence patients' adherence to medical treatment: Results from the Medical Outcomes Study.[see comment]. *Health Psychol* 1993;12:93-102.
25. Leiter MP, Harvie P, Frizzell C. The correspondence of patient satisfaction and nurse burnout. *Soc Sci Med* 1998;47:1611-7.
26. Vahey DC, Aiken LH, Sloane DM, Clarke SP, Vargas D. Nurse burnout and patient satisfaction. *Med Care* 2004;42:II57-66.
27. Shanafelt TD, Balch CM, Bechamps GJ, et al. Burnout and career satisfaction among American surgeons. *Ann Surg* 2009;250:463-71.

28. Shanafelt TD, Sloan JA, Satele D, Balch C. Why do surgeons consider leaving practice? *J Am Coll Surg* 2011;212:421-2.
29. Shanafelt TD, Raymond M, Kosty M, et al. Satisfaction with work-life balance and the career and retirement plans of US oncologists. *J Clin Oncol* 2014;32:1127-35.
30. Leiter MP, Maslach C. Nurse turnover: The mediating role of burnout. *J Nurs Manag* 2009;17:331-9.
31. Spence Laschinger HK, Leiter M, Day A, Gilin D. Workplace empowerment, incivility, and burnout: Impact on staff nurse recruitment and retention outcomes. *J Nurs Manag* 2009;17:302-11.
32. Hayes LJ, O'Brien-Pallas L, Duffield C, et al. Nurse turnover: A literature review—an update. *Int J Nurs Stud* 2012;49:887-905.
33. 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;91:422-31.
34. Shanafelt TD, Dyrbye LN, West CP, Sinsky C. Potential impact of burnout on the US physician workforce. *Mayo Clin Proc* 2016;91:1667-8.
35. Dyrbye LN, Boone SL, Satele DV, Sloan JA, Shanafelt TD. Physician satisfaction and burnout at different career stages. *Mayo Clin Proc* 2013;88:1358-637.
36. Linn LS, Brook RH, Clark VA, Davies AR, Fink A, Kosecoff J. Physician and patient satisfaction as factors related to the organization of internal medicine group practices. *Med Care* 1985;23:1171-8.
37. Association of American Medical Colleges, Center for Workforce Studies. The complexities of physician supply and demand: Projections through 2025. 2008.
38. Jones CB. The costs of nurse turnover, part 2: Application of the Nursing Turnover Cost Calculation Methodology. *J Nurs Adm* 2005;35:41-9.
39. Jones CB. Revisiting nurse turnover costs: Adjusting for inflation. *J Nurs Adm* 2008;38:11-8.
40. Fibuch E, Ahmed A. Physician turnover: A costly problem. *Physician Leadersh J* 2015;2:22-5.
41. Buchbinder SB, Wilson M, Melick CF, Powe NR. Estimates of costs of primary care physician turnover. *Am J Manag Care* 1999;5:1431-8.
42. Kushnir T, Greenberg D, Madjar N, Hadari I, Yermiahu Y, Bachner YG. Is burnout associated with referral rates among primary care physicians in community clinics? *Fam Pract* 2014;31:44-50.
43. Bachman KH, Freeborn DK. HMO physicians' use of referrals. *Soc Sci Med* 1999;48:547-57.
44. Parker PA, Kulik JA. Burnout, self- and supervisor-rated job performance, and absenteeism among nurses. *J Behav Med* 1995;18:581-99.
45. Stone PW, Du Y, Gershon RRM. Organizational climate and occupational health outcomes in hospital nurses. *J Occup Environ Med* 2007;49:50-8.
46. Toppinen-Tanner S, Ojajarvi A, Vaananen A, Kalimo R, Jappinen P. Burnout as a predictor of medically certified sick-leave absences and their diagnosed causes. *Behav Med* 2005;31:18-27.
47. Hilton MF, Scuffham PA, Sheridan J, Cleary CM, Vecchio N, Whiteford HA. The association between mental disorders and productivity in treated and untreated employees. *J Occup Environ Med* 2009;51:996-1003.
48. Oreskovich M, Kaups K, Balch C, et al. The prevalence of alcohol use disorders among American surgeons. *Arch Surg* 2011;147:168-74.
49. Shanafelt TD, Balch CM, Dyrbye LN, et al. Suicidal ideation among American surgeons. *Arch Surg* 2011;146:54-62.
50. Center C, Davis M, Detre T, et al. Confronting depression and suicide in physicians: A consensus statement. *JAMA* 2003;289:3161-6.
51. Maslach C, Jackson SE, Leiter MP. *Maslach Burnout Inventory Manual*. 3 ed. Palo Alto, CA: Consult Psychol Press; 1996.
52. Williams ES, Konrad TR, M. L, et al. Physician, practice, and patient characteristics related to primary care physician physical and mental health: Results from the Physician Worklife Study. *Health Serv Res* 2002;37:119-41.
53. Williams ES, Manwell LB, Konrad TR, Linzer M. The relationship of organizational culture, stress, satisfaction, and burnout with physician-reported error and suboptimal patient care: Results from the MEMO study. *Health Care Manag Rev* 2007;32:203-12.
54. Balch CM, Shanafelt TD, Dyrbye LN, et al. Surgeon distress as calibrated by hours worked and nights on call. *J Am Coll Surg* 2010;211:609-19.
55. Dyrbye LN, Shanafelt TD, Balch C, Satele D, J. F. Relationship between work-home conflicts and burnout among American surgeons: A comparison by sex. *Arch Surg* 2011;146:211-7.
56. Dyrbye LN, West CP, Satele D, Sloan JA, TD S. Work-home conflict and burnout among academic internal medicine physicians. *Arch Intern Med* 2011;171:1207-9.
57. Shanafelt TD, West CP, Sloan JA, et al. Career fit and burnout among academic faculty. *Arch Intern Med* 2009;169:990-5.

58. 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;91:836-48.
59. Campbell DA, Jr., Sonnad SS, Eckhauser FE, Campbell KK, Greenfield LJ. Burnout among American surgeons. *Surg* 2001;130:696-702; discussion -5.
60. Bertges Yost W, Eshelman A, Raoufi M, Abouljoud MS. A national study of burnout among American transplant surgeons. *Transplant Proc* 2005;37:1399-401.
61. Leiter MP, Spence Laschinger HK. Relationships of work and practice environment to professional burnout: Testing a causal model. *Nurs Res* 2006;55:137-46.
62. Spence Laschinger HK, Leiter MP. The impact of nursing work environments on patient safety outcomes: The mediating role of burnout/engagement. *J Nurs Adm* 2006;36:259-67.
63. Laschinger HKS, Wong CA, Greco P. The impact of staff nurse empowerment on person-job fit and work engagement/burnout. *Nurs Adm Q* 2006;30:358-67.
64. Woodhead EL, Northrop L, Edelstein B. Stress, social support, and burnout among long-term care nursing staff. *J of Appl Gerontol* 2016;35:84-105.
65. Rushton CH, Batcheller J, Schroeder K, Donohue P. Burnout and resilience among nurses practicing in high-intensity settings. *Am J Crit Care* 2015;24:412-20.
66. Hamric AB, Blackhall LJ. Nurse-physician perspectives on the care of dying patients in intensive care units: Collaboration, moral distress, and ethical climate. *Crit Care Med* 2007;35:422-9.
67. Shanafelt TD, Oreskovich MR, Dyrbye LN, et al. Avoiding burnout: The personal health habits and wellness practices of US surgeons. *Ann Surg* 2012;255:625-33.
68. 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;Epub ahead of print 6 September 2016.
69. Dyrbye LN, West CP, Burriss TC, Shanafelt TD. Providing primary care in the United States: The work no one sees. *Arch Intern Med* 2012;172:1420-1.
70. Shanafelt TD, Gorringer G, Menaker R, et al. Impact of organizational leadership on physician burnout and satisfaction. *Mayo Clin Proc* 2015;90:432-40.
71. Dyrbye LN, Shanafelt TD, Balch C, Satele D, Freischlag J. Physicians married/partnered to physicians: A comparative study in the American College of Surgeons. *J Am Coll Surg* 2010;211:663-71.
72. Dyrbye LN, Thomas MR, Eacker A, et al. Race, ethnicity, and medical student well-being in the United States. *Arch Intern Med* 2007;167:2103-9.
73. Maslach C. Burnout. The cost of caring. Cambridge, MA: Malor Books; 2003.
74. McManus IC, Keeling A, Paice E. Stress, burnout and doctors' attitudes to work are determined by personality and learning style: A twelve year longitudinal study of UK medical graduates. *BMC Med* 2004;2:29.
75. Tyssen R, Hem E, Vaglum P, Gronvold NT, Ekeberg O. The process of suicidal planning among medical doctors: Predictors in a longitudinal Norwegian sample. *J Affect Disord* 2004;80:191-8.
76. Tyssen R, Vaglum P, Gronvold NT, Ekeberg O. Factors in medical school that predict postgraduate mental health problems in need of treatment. A nationwide and longitudinal study. *Med Educ* 2001;35:110-20.
77. Dyrbye LN, Thomas MR, Huntington JL, et al. Personal life events and medical student well-being: A multicenter study. *Acad Med* 2006;81:374-84.
78. Brazeau CM, Shanafelt TD, Satele D, Sloan JA, Dyrbye LN. Distress among matriculating medical students relative to the general population. *Acad Med* 2014;89:1520-5.
79. Shanafelt TD, Bradley K, Wipf J, Back A. Burnout and self-reported patient care in an internal medicine residency program. *Ann Intern Med* 2002;136:358-67.
80. Shanafelt TD, Sloan JA, Habermann TM. The well-being of physicians. *Am J Med* 2003;114:513-9.
81. West CP, Dyrbye LN, Erwin PJ, Shanafelt TD. Interventions to prevent and reduce physician burnout: A systematic review and meta-analysis. *The Lancet* 2016.
82. Dyrbye LN, Shanafelt TD. Physician burnout. A potential threat to successful health care reform. *JAMA* 2011;305:2009-10.
83. West CP, Shanafelt TD. The influence of personal and environment factors on professionalism in medical education. *BMC Med Educ* 2007;7.
84. West CP, Shanafelt TD. Physician well-being and professionalism. *Minn Med* 2007;90:44-6.

85. Dunn LB, Iglewicz A, Moutier C. A conceptual model of medical student well-being: Promoting resilience and preventing burnout. *Acad Psych* 2008;32:44-53.
86. Dyrbye LN, Thomas MR, Shanafelt TD. Medical student distress: Causes, consequences, and proposed solutions. *Mayo Clin Proc* 2005;80:1615-22.
87. Shanafelt TD, Noseworthy JH. Executive leadership and physician well-being: Nine organizational strategies to promote engagement and reduce burnout. *Mayo Clin Proc* 2016;92:129-46.
88. Dyrbye LN, Satele D, Shanafelt TD. Ability of a 9-item well-being index to identify distress and stratify quality of life in US workers. *J Occup Environ Med* 2016;58:810-7.
89. Dyrbye LN, Satele D, Sloan JA, Shanafelt TD. Utility of a brief screening tool to identify physicians in distress. *J Gen Intern Med* 2013;28:421-7.
90. Dyrbye LN, Schwartz A, Downing SM, Szydlo DW, Sloan JA, Shanafelt TD. Efficacy of a brief screening tool to identify medical students in distress. *Acad Med* 2011;86:907-14.
91. Dyrbye LN, Satele D, Sloan JA, Shanafelt TD. Ability of the Physician Well-Being Index to identify residents in distress. *J Grad Med Educ* 2014;6:78-84.
92. Linzer M, Poplau S, Babbott S, et al. Worklife and wellness in academic general internal medicine: Results from a national survey. *J Gen Intern Med* Published online May 2, 2016.
93. Shanafelt TD, Kaups KA, Nelson H, et al. An interactive individualized intervention to promote behavioral change to increase personal well-being in US surgeons. *Ann Surg* 2014;259:82-8.
94. Dewa CS, Jacobs P, Thanh NX, Loong D. An estimate of the cost of burnout on early retirement and reduction in clinical hours of practicing physicians in Canada. *BMC Health Serv Res* 2014;14:254.
95. Panagioti M, Panagopoulou E, Bower P, et al. Controlled interventions to reduce burnout in physicians: A systematic review and meta-analysis. *JAMA Intern Med* 2016.

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