DISCUSSION

BURNING BRIGHTLY, NOT BURNING OUT

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ABSTRACT: Burnout affects health care professionals at all levels of training. Tangible solutions targeted at the individual, leadership and organizational levels are not being widely used. This might be because the literature on burnout syndrome is broad, yet a review of evidence-based interventions is scarce. This report aims to spotlight remediation options, and concludes that organizational efforts, combined with or supported by individual efforts, are most effective.

PHYSICIAN BURNOUT IS A WORK-RELATED syndrome of emotional exhaustion, cynicism, decreased personal accomplishment, and reduced satisfaction, effectiveness at work and empathy for patients.[1] The problem has been well established in the U.S. health care system, with a burnout rate between 31 percent and 49.6 percent among medical students,[2] 50 percent in surgical residents, 76 percent in internal medicine residents[3] and 45.8 percent of practicing physicians.[4]

In a survey of 6,880 U.S. physicians assessing burnout rates and satisfaction with work-life balance between 2011 and 2014, physicians who experienced at least one symptom of burnout increased from 45.5 percent in 2011 to 54.4 percent in 2014 (p-value less than 0.01), demonstrating a steady rise in burnout rates over the past several years.[5] Physician burnout is present globally, with 61 percent to 80 percent of physicians in British Columbia experiencing exhaustion and/or depersonalization,[6] and 33 percent of physicians in the United Kingdom experiencing one symptom of burnout,[7] which is comparable to results reported in several Arabic countries (e.g., Yemen, Qatar and Saudi Arabia).[8-10]

Several factors contribute to burnout, including time demands, work organization and planning, difficult job situations and interpersonal relationships.[11] The gold standard for diagnosing burnout is the Maslach Burnout Inventory, consisting of a 22-item questionnaire that measures three dimensions of burnout: emotional exhaustion, depersonalization and low personal accomplishment.[12] Results from the MBI show that up to one-third of physicians have experienced burnout at some point during their career.[4] The literature shows that burnout inevitably results in increased malpractice risk, failed personal relationships, substance abuse, decreased quality of life, early retirement[13-15] and increased risk of suicide *(see Table 1)*.[16]

Additionally, physician burnout threatens patient safety, quality of care and patient satisfaction.[14] Physician distress has been associated with risk of medical lawsuits, physician prescribing practices and decreased patient compliance with physician recommendations.[17]

Burnout has been linked to self-reported errors and higher mortality ratios in hospitalized patients.[18] From an organizational standpoint, the financial ramifications of physician turnover can cost two to three times a physician's salary[17] — measured in lost patient-care revenue and efforts to hire a new physician.[19] Herein, we provide a comprehensive review of the interventions that can be employed at the individual, leadership and organizational levels to improve burnout rates.

INDIVIDUAL INTERVENTIONS

The most effective methods in decreasing burnout rates come from individual-directed approaches that are supplemented by organizational-directed interventions, as evidenced by 19 studies (sample size: 1,550 physicians in the United States and worldwide) that show that physician-directed interventions alone were associated with important-but-small decreases in burnout.[20-31]

These interventions included mindfulness-based stress-reduction techniques, educational interventions targeting a clinician's communication skills and self-confidence, exercise or a combination of all. Furthermore, physicians who were expected to deal with their burnout individually and remotely from their institution felt less "resilient" and took more personal ownership of the fact that they were burned out,

as opposed to those physicians who received support from their institution to cope with it.[32,33] Thus, physician-directed interventions combined at the organizational level had longer-lasting positive effects (for 12 months or more) than at the individual level alone.[28-34]

We reviewed four domains of resiliency that allow physicians to better cope with the consequences of burnout at the individual level: emotional (calming techniques), mental (mindfulness), spiritual (knowing one's purpose) and physical (including exercise and proper sleep).

EMOTIONAL — Stress management courses include individual-based relaxation classes, and cognitive behavioral and patient-centered therapy.[35] For the latter to be successful, it should be instituted at the organizational level.[36] Physicians who seek help or resort to effective coping strategies in the form of stress management courses demonstrate lower levels of emotional exhaustion versus the control groups.[37] In a systematic review evaluating stress-management strategies in general practitioners, results showed that targeting relaxation and cognitive behavioral skills were more beneficial and cost-effective in decreasing burnout rates than individual counseling alone.[38] Additionally, in a review of 19 studies (six randomized controlled trials and 13 cohort studies) with 2,030 residents, examining 12 interventions to decrease burnout, it was found that self-care workshops showed a decrease in depersonalization, and meditation reduced emotional exhaustion.[39]

MENTAL — Mindfulness, a concept stemming from Buddhism, is a self-directed practice of relaxing the body and calming the mind by paying attention to experiences as they happen.[40] In evaluating the evidence for practicing mindfulness to prevent burnout, six studies involving health care professionals and teachers who received mindfulness training over a span of two to eight weeks showed a significant decrease in job burnout.[41] Shanafelt argues that training physicians in the art of mindful practice has the ability to promote physician health through work.[3,42] In two randomized controlled trials (sample size: 86), physicians were assigned to a 10-week mindfulness training intervention versus weekly hour breaks for 10 weeks in one study,[43] and an eight-week mindfulness-based stress-reduction program with an additional 10-month maintenance period versus no intervention in the second study.[44] The results showed a small-but-meaningful reduction in stress and burnout in the groups that underwent the mindfulness training programs versus control groups. Although larger trials are lacking in the literature, mindful meditation is cost-effective and can be relatively easily implemented at the individual and organizational levels to enhance a physician's well-being and his or her approach to patient-centered care.[42]

SPIRITUAL — Spirituality has been shown to be a protective factor in medical professionals at all levels, evidenced by a cross-sectional study of 259 medical students showing a strong inverse correlation between spirituality and psychological distress or burnout.[45] In two studies (cross-sectional and comparative) involving 335 residents in primary care fields (internal medicine, pediatrics and family medicine), results showed residents who used active coping strategies, positive reframing and acceptance had a decreased level of emotional exhaustion/depersonalization (p-value less than 0.03) in one study, with the other showing a 25-percent prevalence of depressive symptoms associated with worse spiritual well-being.[46,47] In another study involving oncology attending physicians, house staff and nurses (sample size: 261), spirituality and religion led to greater empathy and decreased levels of exhaustion, thereby effectively combating burnout.[48]

TABLE 1: SIGNS OF PHYSICIAN BURNOUT

Personal	Professional
Depersonalization	Physician turnover
Suicide	Decreased patient adherence
Substance abuse	Increased lawsuits
Failed relationships	Decreased patient satisfaction
Emotional exhaustion	Decreased work productivity
Cynicism	Increased medical errors
	Decreased quality of care

EXERCISE — Aerobic exercise has been found to reduce depression,[49] by reducing stress and even improving the biomarkers that link burnout with cardiovascular disease.[50] In a randomized controlled trial involving 134 logistics company workers, a stretching program of 10 minutes after work over a span of three months was effective in reducing anxiety (p-value of 0.004) and exhaustion (p-value of 0.025), and increasing general health (p-value of 0.028) and mental health (p-value of 0.017) versus control groups. Shanafelt conducted studies on U.S. surgeons and found that those who partook in aerobic and muscle-strengthening exercises adherent to Centers for Disease Control and Prevention guidelines were found to have higher quality-of-life scores. Moreover, Shanafelt found that those surgeons who maintained optimism, found meaning in their work, focused on what they felt was important in their life, and maintained a work-life balance were less likely to get burned out than those who did not perform these exercises.[14]

LEADERSHIP INTERVENTIONS

Physician leaders play a vital role in health care delivery at the institutional level and have a profound impact on the job satisfaction rates of the physicians they lead.[51-53] A physician leader's behavior that models a positive and healthy work environment allows other physicians to be engaged and effectively communicate with their peers.[54]

Shanafelt says leaders must keep an open-door policy and keep colleagues informed of any changes that might affect them personally or at a departmental level.[54] Leaders who openly ask for input and opinions from their people can

increase engagement and open dialogue, allowing them to express their interest and concern for a colleague's future to enhance professional development.[54] And leaders who offer praise and recognition for the achievements and contributions of their people can promote the drive for workers to bring out their best qualities in the workplace.[54]

METRICS FOR BURNOUT — It is essential for leaders to create and regularly follow metrics to observe trends and determine burnout levels among faculty members.[55] The gold standard for measuring burnout is the MBI, but other tools include the Physician Job Satisfaction Scale, the Utrecht Work Engagement Scale and the Brief Fatigue Index.[17,56-61] Metrics on burnout levels in a practice or hospital setting should be transparent and available publicly, thereby causing organizations and leaders to be held accountable for their metrics.[55] As a result, physicians looking for employment can use these scores to determine the provider-satisfaction rate of a particular institution, thereby encouraging leaders and organizations to improve their scores if they are low, and helping to attract more physicians to join their institutions.[55]

ANNUAL REVIEW — The annual review is a powerful-yet-overlooked tool leaders can use to reduce burnout and foster physician engagement.[62] Shanafelt found that providing metric scores (e.g., patients rehospitalized or patient satisfaction reports) and general praise during an appraisal can help leaders provide individual feedback.[62] Bringing out the best in someone requires a leader to figure out the individual's unique strengths, which would allow him or her to feel value and meaning in their work and, in turn, would benefit the organization.[62] Furthermore, Shanafelt found that physicians are willing to spend 80 percent of their time fulfilling the duties leaders require of them if 20 percent of their time is dedicated to an area of work that they find worthwhile.[51] It is important, then, that a leader effectively elicits what his or her people find most meaningful in their work.

Shanafelt outlines four behaviors leaders must demonstrate to promote well-being and professional satisfaction in the physicians they lead.[51] These include transparency in communication, humble inquiry (showing interest, curiosity and vulnerability to build a collaborative relationship),[51,63] aiding in professional development (coaching/mentoring) and acknowledging the contributions of each physician they lead. The annual review is an art that requires practice and fine tuning on the leader's part, but it can promote engagement and reduce burnout.[51]

ORGANIZATIONAL INTERVENTIONS

Organizational interventions often are limited or unfulfilled, because some leaders believe they are costly and short-term. While much varies on the organization and resources available, most interventions can be cost-neutral in the long term, and small investments can cause change at a larger scale.[17] In a meta-analysis of 19 studies, Panagioti *et al.* found the most-effective interventions involved physicians having more control over their jobs, fostering a sense of teamwork and increasing the level of communication among team members.[20] The majority of interventions that were able to be implemented involved a reduction in the workload and a more accommodating schedule.[20]

OPTIMIZING TECHNOLOGY — The electronic medical record is hurting the physician-patient relationship, because the need for increased documentation has decreased face-to-face time for patients. Because of the lack of collaboration and closed platforms among the various EMR systems, it is difficult to extrapolate information from one system to another to get a complete medical record of the patient. To counteract this problem, there are industry proposals for EMR vendors to open their platforms to allow for collaboration and better patient outcomes.[55] Having information technology specialists regularly in the clinic would allow EMR vendors to understand and help alleviate the challenges physicians face. Moreover, physicians have the increased burden of having to learn and relearn new EMR systems, causing anxiety, increased time spent navigating the EMR, and an increased level of frustration overall.[55] To increase patient-physician interaction time, one team member (such as a scribe) could manage the EMR documentation, while the physician takes control of the patient encounter and spends less time doing clerical work.[55]

WORK-HOUR LIMITATIONS — When the Accreditation Council of Graduate Medical Education set the resident work-hour limit to 80 hours a week, it stirred mixed emotions in the medical community.[64,65] It has been difficult to strike a balance between preventing burnout while still providing the necessary degree of resident training, thereby raising the question of whether duty-hour restrictions can improve burnout rates. In a study involving 118 internal medicine residents evaluating work-hour limitations and effects on resident well-being, patient care and education, the results showed an increase in the proportion of resident satisfaction with their careers (p-value of 0.02), and a decrease in emotional exhaustion (p-value of 0.05) but a negative effect on patient care and resident education.[66] While it is clear that fewer adverse patient-care events might arise by decreasing the work hours, this same conclusion cannot be reached for residents.[66] Decreasing work hours for residents might help decrease burnout,[39] but additional individual-based interventions, such as stress-management courses and exercise, are necessary for residents to sustain long and productive careers.[67]

ACKNOWLEDGE AND MEASURE — Opportunities for candid communication between physicians and CEOs can show physicians that factors related to burnout are being addressed at the highest level. Creating such communication allows physicians to gain the trust of leaders to promote progress, and it ensures solutions are effective when organizations create and administer performance metrics to track physician well-being.[17,18,68,69] Numerous dimensions should be measured, including burnout, engagement, satisfaction, emotional exhaustion or stress, and quality-of-life factors.[17] These metrics should be conducted us-

ing standardized instruments[17,56-61] and should be interpreted in the context of national benchmarks.[4,5,58,59,61,70] Responses should be anonymous to bolster honesty among individuals, and results should be broken down by division/department to dedicate resources where they are needed most.[17]

SHARED SPACE — The idea of creating a common physical environment where doctors can unwind at work can help build faculty camaraderie.[41] Institutions such as the University of California at San Francisco have brought back the concept of the "doctor's lounge," with amenities such as chargers for electronics, a printer, snacks, etc. Burnout rates have decreased as a result of physicians feeling they are being taken care of.[71] Moreover, these spaces allow physicians to congregate to discuss nonwork matters such as family life and vacation time, which has increased communication and fostered more personal relationships among colleagues.[35] A result is informal peer support and mentorship among colleagues to discuss difficult situations physicians may face; for example, physicians may debrief about their work or personal lives, discuss challenging cases, celebrate achievements or collaborate on project ideas.[14,72-77]

SATISFACTION IN MEDICINE — Along the lines of cultivating camaraderie, a randomized trial conducted at Mayo Clinic showed an hour of protected time every other week for physicians to congregate and discuss professional experiences decreased burnout and revived satisfaction in their work.[33] In a second trial redesigning these small groups, six or seven colleagues would gather over a meal at a restaurant, funded by Mayo Clinic, to discuss a question involving the challenges of being a physician. It was so well-received that 1,100 physicians and scientists joined the groups within the first 10 months.[78]

REWARDS AND INCENTIVES — Productivity-based compensation, based on working longer hours, seeing more patients in a given time, or ordering more tests or procedures, increases burnout rates.[14,79] Physicians with a skewed perception of increased productivity (e.g., modeling their work hours during residency, unhealthy emulation of a colleague) are most vulnerable to overwork.[17] To combat this unhealthy model, a salary-based compensation model affords physicians a base pay, thereby eliminating the need to push a physician beyond his or her limits.[80]

ORGANIZATIONAL CULTURE — Most health care organizations' mission statements speak to patient care, scholarly activity, and/or service to the community, and they aim to ensure their missions indeed are being carried out and to find ways to assess and promote their values.[17] Annual anonymous surveys of physicians, seeking to evaluate how well their missions are being achieved, can help guide organizations on which areas they are promoting well and which they need to target better.[17] Such a strategy was carried out by Mayo Clinic in 2011, eliciting honest feedback on areas that needed improvement, constructing a document that expresses the principles that form the partnership between the organization and its doctors, and allowing for this partnership to work toward a common goal to improve the culture of the institution.[17]

WORK-LIFE BALANCE AND FLEXIBILITY — More than 40 percent of U.S. physicians work more than 60 hours a week, posing challenges to maintain a healthy life outside of medicine.[4,5] Reducing work hours, and providing schedule flexibility to accommodate personal needs (such as maternity leave or sick days) can reduce burnout.[81] Female physicians particularly are affected and often postpone pregnancy because of perceived career threats.[82] This can be accomplished by providing physicians the option of having their salaries adjusted based on work hours.[56,83-85] In a study of 422 generalist physicians in New York, part-time physicians reported less burnout (p-value less than 0.01), higher satisfaction (p-value less than 0.001) and greater work control (p-value less than 0.001), compared to full-time physicians.[84] While accommodating for a part-time physician may not be possible for an organization, providing more flexible hours could be a win-win.[17]

RESOURCES FOR INDIVIDUAL INTERVENTIONS — The most effective interventions at the individual level are those promoted and supported at the institutional level.[20] Tools to promote self-care in the realms of exercise, sleep hygiene, diet, personal relationships and preventive care not only improve the health of the physician, but also the patients they care for.[86-88] Institutions can provide training to increase resilience, mindfulness and strategies to achieve work-life balance.[89,90] By doing so, organizations demonstrate they are playing a role in addressing burnout at the systemic level.[17]

ACCOUNTABLE WORK TIME — Physicians work an average of 10 hours more weekly than other professionals, and there is an inverse relationship between the number of hours worked and job satisfaction.[91] As a result, work hours play an important role in physician lifestyles, student specialty choice and patient safety.[92] In a pilot program initiated at Stanford Hospital in California, the idea of "time banking" was adopted to counteract the rising rate of burnout. The concept is that the time physicians dedicate to unpaid or additional responsibilities (such as mentoring or serving on a committee) is given back by means of vouchers, which can be used for tasks such as laundry, housecleaning, clerical assistance, picking children up from school, elderly care, and others that can be completed by other able-bodied individuals. The program changed the culture at Stanford Hospital and afforded physicians the ability to make the work-life balance more achievable.[93]

HEALTHY PRACTICE ENVIRONMENT — Mayo Clinic has pioneered the Listen-Act-Develop model, which is an integration of interventions at the crux of the individual and organization.[94] It comprises three basic principles: choice, camaraderie and excellence. The model begins by creating a safe haven for physicians to be able to voice their concerns about the work they find cumbersome or burdensome (such as lacking control over schedules). This allows physicians to feel valued and have their schedules created in a manner they deem fit, not by how

the organization schedules them. The idea of camaraderie focuses on having physicians congregate more frequently; excellence involves allowing physicians to pursue work that they find meaningful, which can be gauged by asking physicians for their perspectives. This sense of safety decreases stress, because physicians feel they are being valued.[94]

EVOLVING EFFORTS

Even though physician burnout is well-established in the literature, there are no definitive guidelines to treat it. Burnout is the inevitable result of rapid and highly disruptive changes in the medical profession and society as a whole. Further research trials evaluating organization-based interventions combined with individual-directed ones are needed to provide greater insight on the most effective context for delivery, evaluation and implementation of interventions to tackle physician burnout.[95]

Our aim was to review interventions that can be implemented at the individual, leadership and organizational levels to target burnout. We found that the most-effective interventions to combat burnout are aimed at organizational-directed interventions combined with or supported by individual-directed efforts. This evidence is derived from solutions developed and implemented in a broad range of physicians and health-care practice settings. Given the risks burnout poses to both physicians and patients, it is crucial to put these tangible, evidence-based interventions into effect to decrease burnout rates.

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REFERENCES

1. Shanafelt TD, Dyrbye LN and West CP. Addressing Physician Burnout: The Way Forward. *JAMA* 317, 901-902, doi:10.1001/jama.2017.0076 (2017).
2. Dyrbye LN, *et al.* Relationship between Burnout and Professional Conduct and Attitudes among US Medical Students. *JAMA* 304, 1173-1180, doi:10.1001/jama.2010.1318 (2010).
3. Shanafelt TD. Enhancing Meaning in Work: A Prescription for Preventing Physician Burnout and Promoting Patient-Centered Care. *JAMA* 302, 1338-1340, doi:10.1001/jama.2009.1385 (2009).
4. Shanafelt TD, *et al.* Burnout and Satisfaction with Work-Life Balance among US Physicians Relative to the General US Population. *Archives of Internal Medicine* 172, 1377-1385, doi:10.1001/archinternmed.2012.3199 (2012).
5. Shanafelt TD, *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* 90, 1600-1613, doi:10.1016/j.mayocp.2015.08.023 (2015).
6. Thommasen HV, Lavanchy M, Connelly I, *et al.* Mental Health, Job Satisfaction, and Intention to Relocate. Opinions of Physicians in Rural British Columbia. *Can Fam Physician* 47, 737-744 (2001).
7. Sharma A, Sharp DM, Walker LG and Monson JR. Stress and Burnout in Colorectal and Vascular Surgical Consultants Working in the UK National Health Service. *Psychooncology* 17, 570-576, doi:10.1002/pon.1269 (2008).
8. Al-Dubai SA and Rampal KG. Prevalence and Associated Factors of Burnout among Doctors in Yemen. J *Occup Health* 52, 58-65 (2010).
9. Aldrees TM, Aleissa S, Zamakhshary M, *et al.* Physician well-being: prevalence of burnout and associated risk factors in a tertiary hospital, Riyadh, Saudi Arabia. *Ann Saudi Med 33,* 451-456, doi:10.5144/0256-4947.2013.451 (2013).
10. Elbarazi I, Loney T, Yousef S. and Elias A. Prevalence of and Factors Associated with Burnout Among Health Care Professionals in Arab Countries: a systematic review. *BMC Health Serv Res* 17, 491, doi:10.1186/s12913-017-2319-8 (2017).
11. Ishak WW, *et al.* Burnout during Residency Training: a literature review. *Journal of Graduate Medical Education* 1, 236-242, doi:10.4300/JGME-D-09-00054.1 (2009).
12. Schaufeli WB, Maslach C, Jackson SE. *Maslach Burnout Inventory-General Survey. The Maslach* Burnout Inventory Test Manual. 3rd ed. (1996).
13. Maslach C, Schaufeli WB and Leiter MP. Job Burnout. *Ann Rev of Psych 52*, 397-422, doi:10.1146/annurev.psych.52.1.397 (2001).
14. Shanafelt TD, *et al.* Burnout and Medical Errors among American Surgeons. *Annals of Surgery* 251, 995-1000, doi:10.1097/SLA.0b013e3181bfdab3(2010).
15. Dyrbye LN, *et al.* Patterns of Distress in US Medical Students. *Medical Teacher 33*, 834-839, doi:10.3109/0142159X.2010.531158 (2011).
16. The Burnout Prevention Matrix (2012). https://thehappymdmembers.com/wp-content/uploads/2014/10/BurnoutPreventionMatrix-V3.pdf.
17. Shanafelt TD and Noseworthy JH. Executive Leadership and Physician Wellbeing: nine organizational strategies to promote engagement and reduce burnout. *Mayo Clin Proc 92,* 129-146, doi:10.1016/j.mayocp.2016.10.004(2017).
18. Wallace JE, Lemaire JB and Ghali WA. Physician Wellness: a Missing Quality Indicator. *Lancet* 374, 1714-1721, doi:10.1016/S0140-6736(09)61424-0(2009).
19. Misra-Hebert AD, Kay R. and Stoller JK. A Review of Physician Turnover: Rates, Causes, and Consequences. *Am Jour Med Quality* 19, 56-66, doi:10.1177/106286060401900203 (2004).
20. Panagioti M, *et al.* Controlled Interventions to Reduce Burnout in Physicians: a systematic review and meta-analysis. *JAMA Internal Medicine* 177, 195-205, doi:10.1001/jamainternmed.2016.7674 (2017).
21. Asuero, AM, *et al.* Effectiveness of a Mindfulness Education Program in Primary Health Care Professionals: a pragmatic controlled trial. *Jour of Cont Edu in Health Professions* 34, 4-12, doi:10.1002/chp.21211 (2014).
22. Bragard I, Etienne AM, Merckaert I, *et al.* Efficacy of a Communication and Stress Management Training on Medical Residents' Self-Efficacy, Stress to Communicate and Burnout: a randomized controlled study. *Journal of Health Psych* 15, 1075-1081, doi:10.1177/1359105310361992(2010).
23. Butow P, *et al.* Can Consultation Skills Training Change Doctors' Behavior to Increase Involvement of Patients in Making Decisions about Standard

Treatment and Clinical Trials: a randomized controlled trial. *Health Expectations* 18, 2570-2583, doi:10.1111/hex.12229 (2015).

24. Butow P, *et al.* Increasing Oncologists' Skills in Eliciting and Responding to Emotional Cues: Evaluation of a Communication Skills Training Program. *Psychooncology* 17, 209-218, doi:10.1002/pon.1217 (2008).
25. Gunasingam N, Burns K, Edwards J, *et al.* Reducing Stress and Burnout in Junior Doctors: the impact of debriefing sessions. *Postgraduate Med Jour* 91, 182-187, doi:10.1136/postgradmedj-2014-132847 (2015).
26. Margalit AP, Glick SM, Benbassat J, *et al.* Promoting a Biopsychosocial Orientation in Family Practice: effect of two teaching programs on the knowledge and attitudes of practising primary care physicians. *Medical Teacher* 27, 613-618, doi:10.1080/01421590500097091 (2005).
27. Martins AE, *et al.* Impact of a Brief Intervention on the Burnout Levels of Pediatric Residents. *Jornal de pediatria* 87, 493-498, doi:doi:10.2223/JPED.2127 (2011).
28. Milstein JM, *et al.* Burnout Assessment in House Officers: evaluation of an intervention to reduce stress. *Medical Teacher* 31, 338-341, doi:10.1080/01421590802208552 (2009).
29. Ripp JA, *et al.* The Impact of Duty Hours Restrictions on Job Burnout in Internal Medicine Residents: a three-institution comparison study. *Acad Med* 90, 494-499, doi:10.1097/ACM.0000000000000641 (2015).
30. Verweij H, *et al.* Mindfulness-based stress Reduction for GPs: results of a controlled mixed methods pilot study in Dutch primary care. *British Journal of General Practice* 66, e99-105, doi:10.3399/bjgp16X683497 (2016).
31. Weight CJ, *et al.* Physical activity, Quality of Life, and Burnout among Physician Trainees: the effect of a team-based, incentivized exercise program. *Mayo Clin Proc* 88, 1435-1442, doi:10.1016/j.mayocp.2013.09.010 (2013).
32. Ruotsalainen JH, Verbeek JH, Marine A. and Serra C. Preventing Occupational Stress in Healthcare Workers. The Cochrane Database of Systematic Reviews, CD002892, doi:10.1002/14651858.CD002892.pub5(2015).
33. West CP, *et al.* Intervention to Promote Physician Well-Being, Job Satisfaction, and Professionalism: a randomized clinical trial. *JAMA Internal Medicine* 174, 527-533, doi:10.1001/jamainternmed.2013.14387 (2014).
34. West CP, Dyrbye LN, Erwin PJ and Shanafelt TD. Interventions to Prevent and Reduce Physician Burnout: a systematic review and meta-analysis. *Lancet* 388, 2272-2281, doi:10.1016/S0140-6736(16)31279-X (2016).
35. Amutio-Kareaga A, Garcia-Campayo J, Delgado LC, *et al.* Improving Communication between Physicians and Their Patients through Mindfulness and Compassion-Based Strategies: A Narrative Review. *Jour of Clin Med* 6, doi:10.3390/jcm6030033 (2017).
36. Shanafelt TD, *et al.* Burnout and Career Satisfaction among American Surgeons. *Annals of Surgery* 250, 463-471, doi:10.1097/SLA.0b013e3181ac4dfd (2009).
37. Ito JK. Resources, Coping Strategies, and Emotional Exhaustion: a conservation of resources perspective. *J Vocat Behav.*, 490-509 (2003).
38. Sims J. The Evaluation of Stress Management Strategies in General Practice: an evidence-led approach. *British Journal of General Practice* 47, 577-582(1997).
39. Busireddy KR, *et al.* Efficacy of Interventions to Reduce Resident Physician Burnout: a systematic review. *Journal of Graduate Medical Education* 9,294-301, doi:10.4300/JGME-D-16-00372.1 (2017).
40. Crane RS, *et al.* What Defines Mindfulness-Based Programs? The Warp and the Weft. *Psychological Medicine* 47, 990-999, doi:10.1017/S0033291716003317 (2017).
41. Luken M and Sammons A. Systematic Review of Mindfulness Practice for Reducing Job Burnout. *American Journal of Occupational Therapy* 70, 7002250020p7002250021-7002250020p7002250010, doi:10.5014/ajot.2016.016956 (2016).
42. Romani M and Ashkar K. Burnout among Physicians. *Libyan Journal of Medicine* 9, 23556, doi:10.3402/ljm.v9.23556 (2014).
43. Amutio A, Martinez-Taboada C, Hermosilla D and Delgado LC. Enhancing Relaxation States and Positive Emotions in Physicians through a Mindfulness Training Program: A one-year study. *Psychology, Health and Medicine* 20, 720-731, doi:10.1080/13548506.2014.986143 (2015).
44. Ireland MJ, *et al.* A Randomized Controlled Trial of Mindfulness to Reduce Stress and Burnout among Intern Medical Practitioners. *Medical Teacher* 39, 409-414, doi:10.1080/0142159X.2017.1294749 (2017).
45. Wachholtz A. and Rogoff M. The Relationship between Spirituality and Burnout among Medical Students. *Journal of Contemporary Medical Education* 1, 83-91, doi:10.5455/jcme.20130104060612 (2013).
46. Doolittle BR, Windish DM and Seelig CB. Burnout, Coping, and Spirituality among Internal Medicine Resident Physicians. *Journal of Graduate Medical Education* 5, 257-261, doi:10.4300/JGME-D-12-00136.1 (2013).
47. Yi, MS, *et al.* Religion, Spirituality, and Depressive Symptoms in Primary Care House Officers. *Ambulatory Pediatrics* 6, 84-90, doi:10.1016/j.ambp.2005.10.002 (2006).
48. Kash KM, *et al.* Stress and Burnout in Oncology. *Oncology* (Williston Park) 14, 1621-1633; discussion 1633-1624, 1636-1627 (2000).
49. Toker S. and Biron M. Job Burnout and Depression: unraveling their temporal relationship and considering the role of physical activity. *The Journal of Applied Psychology* 97, 699-710, doi:10.1037/a0026914 (2012).
50. Melamed S, Shirom A, Toker S, *et al*. Burnout and Risk of Cardiovascular Disease: evidence, possible causal paths, and promising research directions. *Psychological Bulletin* 132, 327-353, doi:10.1037/0033-2909.132.3.327 (2006).
51. Shanafelt T and Swensen S. Leadership and Physician Burnout: using the annual review to reduce burnout and promote engagement. *American Journal of Medical Quality,* 1062860617691605, doi:10.1177/1062860617691605 (2017).
52. Shanafelt TD, *et al.* Impact of Organizational Leadership on Physician Burnout and Satisfaction. *Mayo Clin Proc* 90, 432-440, doi:10.1016/j.mayocp.2015.01.012 (2015).
53. Rosengart TK, *et al*. Key Tenets of Effective Surgery Leadership: perspectives from the Society of Surgical Chairs Mentorship Sessions. *JAMA Surgery* 151, 768-770, doi:10.1001/jamasurg.2016.0405 (2016).
54. Shanafelt T and Swensen S. Leadership and Physician Burnout: using the annual review to reduce burnout and promote engagement. *American Journal of Medical Quality* 32, 563-565, doi:10.1177/1062860617691605(2017).
55. Maples W, Duffy B, Cosgrove T, Paulus R. Physician Burnout in America: a roadmap for restoring joy and purpose to medicine. *Modern Healthcare online*, June 22, 2016. odernhealthcare.com/article/20160622/NEWS/160629975. Retrieved Feb. 27, 2018.
56. Shanafelt TD, *et al.* Longitudinal Study Evaluating the Association Between Physician Burnout and Changes in Professional Work Effort. *Mayo Clin Proc* 91, 422-431, doi:10.1016/j.mayocp.2016.02.001 (2016).
57. West CP, Dyrbye LN, Sloan JA and Shanafelt TD. Single item Measures of Emotional Exhaustion and Depersonalization Are Useful for Assessing Burnout in Medical Professionals. *Journal of General Internal Medicine* 24, 1318-1321, doi:10.1007/s11606-009-1129-z (2009).
58. Dyrbye LN, Satele D and Shanafelt T. Ability of a 9-Item Well-Being Index to Identify Distress and Stratify Quality of Life in US Workers. *Journal of Occupational and Environmental Medicine* 58, 810-817, doi:10.1097/JOM.0000000000000798 (2016).

59. Dyrbye LN, Satele D, Sloan J. and Shanafelt TD. Utility of a Brief Screening Tool to Identify Physicians in Distress. *Journal of General Internal Medicine* 28, 421-427, doi:10.1007/s11606-012-2252-9 (2013).

60. West CP, Dyrbye LN, Satele DV, *et al.* Concurrent Validity of Single-Item Measures of Emotional Exhaustion and Depersonalization in Burnout Assessment. *Journal of General Internal Medicine* 27, 1445-1452, doi:10.1007/s11606-012-2015-7 (2012).

61. Maslach C and Leiter M. *Maslach Burnout Inventory Manual.* 3rd ed. Sunnyvale , CA: Consulting Psychologists Press (1996).

62. Shanafelt TD, *et al.* Career Fit and Burnout among Academic Faculty. *Archives of Internal Medicine* 169, 990-995, doi:10.1001/archinternmed.2009.70 (2009).

63. Schein EH. The Humble Inquiry: the gentle art of asking instead of telling, San Francisco, CA: Berret-Koehler (2013).

64. Sun NZ and Maniatis T. Scheduling in the Context of Resident Duty Hour Reform. *BMC Medical Education* 14 Suppl 1, S18, doi:10.1186/1472-6920-14-S1-S18 (2014).

65. Bina RW, Lemole Jr. GM and Dumont TM. On Resident Duty Hour Restrictions and Neurosurgical Training: review of the literature. *Journal of Neurosurgery* 124, 842-848, doi:10.3171/2015.3.JNS142796 (2016).

66. Goitein L, Shanafelt TD, Wipf JE, *et al.* The Effects of Work-Hour Limitations on Resident Well-Being, Patient Care, and Education in an Internal Medicine Residency Program. *Archives of Internal Medicine* 165, 2601-2606, doi:10.1001/archinte.165.22.2601 (2005).

67. Gopal R, Glasheen JJ, Miyoshi TJ and Prochazka AV. Burnout and Internal Medicine Resident Work-Hour Restrictions. *Archives of Internal Medicine* 165, 2595-2600, doi:10.1001/archinte.165.22.2595 (2005).

68. Linzer M, *et al.* 10 Bold Steps to Prevent Burnout in General Internal Medicine. *Journal of General Internal Medicine* 29, 18-20, doi:10.1007/s11606-013-2597-8 (2014).

69. Spinelli WM. The Phantom Limb of the Triple Aim. *Mayo Clin Proc* 88, 1356-1357, doi:10.1016/j.mayocp.2013.08.017 (2013).

70. Williams ES, *et al.* Refining the Measurement of Physician Job Satisfaction: results from the Physician Worklife Survey. SGIM Career Satisfaction Study Group. Society of General Internal Medicine. *Medical Care* 37, 1140-1154 (1999).

71. Zimmerschied C. Once Endangered, Doctor's Lounge Revived to Battle Burnout. *AMA Wire* (2017). https://wire.ama-assn.org/practice-management/once-endangered-doctors-lounge-revived-battle-burnout.

72. Blendon RJ, *et al.* Views of Practicing Physicians and the Public on Medical Errors. *New England Journal of Medicine* 347, 1933-1940, doi:10.1056/NEJMsa022151 (2002).

73. Christensen JF, Levinson W. and Dunn PM. The Heart of Darkness: the impact of perceived mistakes on physicians. *Journal of General Internal Medicine* 7, 424-431 (1992).

74. Jena AB, Seabury S, Lakdawalla, D and Chandra A. Malpractice Risk According to Physician Specialty. *New England Journal of Medicine* 365, 629-636, doi:10.1056/NEJMsa1012370 (2011).

75. Meier DE, Back AL and Morrison RS. The Inner Life of Physicians and Care of the Seriously Ill. *JAMA* 286, 3007-3014 (2001).

76. Pratt SD and Jachna BR. Care of the Clinician after an Adverse Event. *International Journal of Obstetric Anesthesia* 24, 54-63, doi:10.1016/j.ijoa.2014.10.001 (2015).

77. Waterman AD, *et al.* The emotional Impact of Medical Errors on Practicing Physicians in the United States and Canada. *Joint Commission Journal on Quality and Patient Safety* 33, 467-476 (2007).

78. West CP, Satele D and Shanafelt TD. A Randomized Controlled Trial Evaluating the Effect of COMPASS (COlleagues Meeting to Promote and Sustain Satisfaction) Small Group Sessions on Physician Well-Being, Meaning, and Job Satisfaction. *Journal of General Internal Medicine*, S89 (2015).

79. Shanafelt TD, *et al.* Burnout and Career Satisfaction among US Oncologists. *Journal of Clinical Oncology* 32, 678-686, doi:10.1200/JCO.2013.51.8480 (2014).

80. Khullar D, Kocher R, Conway P and Rajkumar R. How 10 Leading Health Systems Pay Their Doctors. *Healthcare* 3, 60-62, doi:10.1016/j.hjdsi.2014.11.004 (2015).

81. Shanafelt TD, Dyrbye LN, West CP and Sinsky CA. Potential Impact of Burnout on the US Physician Workforce. *Mayo Clin Proc* 91, 1667-1668, doi:10.1016/j.mayocp.2016.08.016 (2016).

82. Willett LL, *et al.* Do Women Residents Delay Childbearing due to Perceived Career Threats? *Academic Medicine* 85, 640-646, doi:10.1097/ACM.0b013e3181d2cb5b (2010).

83. Levine RB, Harrison RA, Mechaber HF, *et al.* Professional Characteristics and Job Satisfaction among SGIM Members: a comparison of part-time and full-time physician members. *Journal of General Internal Medicine* 23, 1218-1221, doi:10.1007/s11606-008-0635-8 (2008).

84. Mechaber HF, *et al.* Part-time Physicians ... Prevalent, Connected, and Satisfied. *Journal of General Internal Medicine* 23, 300-303, doi:10.1007/s11606-008-0514-3 (2008).

85. Panattoni L, Stone A, Chung S, and Tai-Seale M. Patients Report Better Satisfaction with Part-Time Primary Care Physicians, Despite Less Continuity of Care and Access. *Journal of General Internal Medicine* 30, 327-333, doi:10.1007/s11606-014-3104-6 (2015).

86. Hlubocky FJ, Back AL and Shanafelt TD. Addressing Burnout in Oncology: Why Cancer Care Clinicians Are At Risk, What Individuals Can Do, and How Organizations Can Respond. *American Society of Clinical Oncology.* Meeting 35, 271-279, doi:10.14694/EDBK_156120 (2016).

87. Shanafelt TD, *et al.* Avoiding Burnout: the personal health habits and wellness practices of US surgeons. *Annals of Surgery* 255, 625-633, doi:10.1097/SLA.0b013e31824b2fa0 (2012).

88. Shanafelt TD, Sloan JA and Habermann TM. The Well-being of Physicians. *American Journal of Medicine* 114, 513-519 (2003).

89. Back AL, Steinhauser KE, Kamal AH and Jackson VA. Building Resilience for Palliative Care Clinicians: an approach to burnout prevention based on individual skills and workplace factors. *Journal of Pain and Symptom Management* 52, 284-291, doi:10.1016/j.jpainsymman.2016.02.002 (2016).

90. Krasner MS, *et al.* Association of an Educational Program in Mindful Communication with Burnout, Empathy, and Attitudes among Primary Care Physicians. *JAMA* 302, 1284-1293, doi:10.1001/jama.2009.1384 (2009).

91. *Work/Life Profiles of Today's U.S. Physician*. Chicago, IL: American Medical Association (2014).

92. Leigh JP, Tancredi D, Jerant A. and Kravitz RL. Annual Work Hours across Physician Specialties. *Archives of Internal Medicine* 171, 1211-1213, doi:10.1001/archinternmed.2011.294 (2011).

93. Schulte B. Time in the Bank: a Stanford plan to save doctors from burnout. *The Washington Post.* Aug. 20, 2015.

94. Swensen S, Kabcenell A and Shanafelt T. Physician-Organization Collaboration Reduces Physician Burnout and Promotes Engagement: The Mayo Clinic Experience. *Journal of Healthcare Management* 61, 105-127 (2016).

95. Johnson MJ and May CR. Promoting Professional Behaviour Change in Healthcare: what interventions work, and why? A theory-led overview of systematic reviews. *BMJ* open 5, e008592, doi:10.1136/bmjopen-2015-008592 (2015).