

A Road Map to Foster Wellness and Engagement in Our Workplace—A Report of the 2018 Summer Intersociety Meeting

SA-CME

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Credits awarded for this enduring activity are designated “SA-CME” by the American Board of Radiology (ABR) and qualify toward fulfilling requirements for Maintenance of Certification (MOC) Part II: Lifelong Learning and Self-assessment. To access the SA-CME activity visit <https://cortex.acr.org/Presenters/CaseScript/CaseView?CDId=Qs1y3SGMfSY%3d>.

Abstract

The 2018 radiology Intersociety Committee reviewed the current state of stress and burnout in our workplaces and identified approaches for fostering engagement, wellness, and job satisfaction. In addition to emphasizing the importance of personal wellness (the fourth aim of health care), the major focus of the meeting was to identify strategies and themes to mitigate the frequency, manifestations, and impact of stress. Strategies include reducing the stigma of burnout, minimizing isolation through community building and fostering connectivity, utilizing data and benchmarking to guide effectiveness of improvement efforts, resourcing and training “wellness” committees, acknowledging value contributions of team members, and improving efficiency in the workplace. Four themes were identified to prioritize organizational efforts: (1) collecting, analyzing, and benchmarking data; (2) developing effective leadership; (3) building high-functioning teams; and (4) amplifying our voice to increase our influence.

Key Words: Stress, burnout, wellness, engagement, joy in work, practice management

J Am Coll Radiol 2019;16:869-877. Copyright © 2018 Published by Elsevier Inc. on behalf of American College of Radiology

INTRODUCTION

That radiologists are manifesting growing symptoms of stress in the workplace is well recognized [1-3], as are the many drivers of burnout and disengagement [1,3,4], which have led to plausible recommendations for resolving the current epidemic [1,3,5]. Abundant online resources offer personal wellness solutions [6], yet

gaps exist in developing effective, implementable organizational strategies leading to sustained workplace improvements. To foster wellness in our imaging workplace, the goals of the 2018 Intersociety Summer Conference held in Stowe, Vermont, were to identify themes and strategies to implement at the individual, work unit, and organizational level. To best serve our

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Jonathan B. Kruskal is an author for Up-To-Date, Inc. Claire Bender reports other from Kaiser Permanente School of Allied Health Sciences; other from CB Firm, PLLC; other from Fairview Health System, outside the submitted work. Tait Shanafelt reports other from Physician Well-Being Index, Medical Student Well-Being Index, Nurse Well-Being Index, and the Well-Being Index, outside the submitted work. The other authors state that they have no conflict of interest related to the material discussed in this article.

patients and sustain an engaged radiologist workforce, now is the time for us to collectively and effectively confront the clinician-burnout crisis [7].

BURNOUT—THE CURRENT STATE OF OUR STATE

In the United States, burnout among health care professionals is a public health crisis [8] with calls to address and prioritize the moral imperative of preserving health professionals' well-being [8-10]. In the ACR 2018 HR Commission Workforce Survey, 78% of radiologists, midlevel providers, and physicists reported burnout being a significant problem in their work place; only 19% reported having mechanisms for assessing it, and only 21% said they had effective ways of addressing it [Claire Bender - personal communication]. To accurately measure the incidence and manifestations of stress, it is important to define the relationship between stress (the cause) and burnout (the symptoms), and then to manage and minimize the consequences. Burnout, a work-related syndrome characterized by emotional exhaustion, depersonalization, and a sense of reduced personal accomplishment [11], inversely impacts quality of care, patient satisfaction, productivity, and access to care [12]. Efforts focusing on engagement, wellness, and instilling joy in the workplace are necessary and aspirational [13] yet must recognize and acknowledge that burnout exists and must be addressed simultaneously.

THE DETRIMENTAL IMPACTS OF BURNOUT

The empirical relationship between stress, performance, and burnout was described by Yerkes and Dodson in 1908 [14]. When levels of stress become too high, performance decreases. Stress inversely impacts cognitive processes like attention, memory, and problem solving (Fig. 1). As stress increases, a person's ability to function diminishes, ultimately leading to symptoms of anxiety, anger, frustration, disruptive behavior, depression, and the syndrome of burnout.

The personal impact of burnout can be devastating; stress and its more dire consequence, burnout, can lead to depression, substance abuse, divorce, and even suicide [15-18]. A physician experiencing burnout may impact work colleagues and patients. The organizational and societal impact can be equally devastating through loss of productivity, inefficiencies, morale challenges, diminished quality of care, outcomes and safety, and medical errors [19-21].

A strong business case exists for organizations to address burnout [22]. Although financial concerns can be

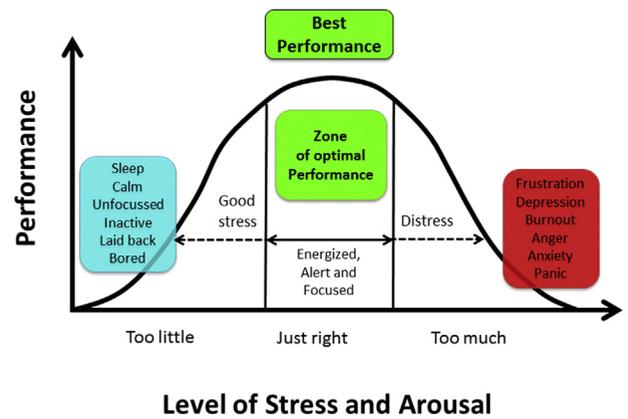


Fig 1. Stress curve illustrating the relationship between performance and level of stress. Based in part on the original description by Yerkes and Dodson [14], this figure shows that the zone of optimal performance straddles situations that sit between too little or too much stress. The curve also illustrates that by reducing the level of stress, performance may return back from the distressed side of the curve into the zone of optimal performance.

a major stressor, burnout has its own economic impact on a practice and organization. The incidence of burnout varies with compensation plans; higher burnout is seen in pure productivity-based compensation plans [23-25]. Personal frustrations with salaries, perceptions of salary inequity, and concerns about reductions in reimbursements are impactful, as are the costs of turnover and recruitment, reduced productivity and efficiency, poor quality, safety and patient satisfaction, litigation expenses [26], and damage to an organization's reputation.

Burnout may manifest as disruptive behavior, including verbal outbursts and physical threats, as well as passive activities, such as refusing to perform assigned tasks or quietly exhibiting uncooperative attitudes [15]. Managing disruptive individuals is costly [27]; for a 400-bed hospital, the combined costs for disruptive physician behaviors can exceed \$1,000,000 per disruptive individual [27]. The costs of efforts to reduce and prevent burnout are far less than the impact and costs of mitigating burnout in disruptive individuals [27].

RECOGNIZED CONTRIBUTORS TO BURNOUT

The National Academy of Medicine has produced a conceptual model of factors contributing to and affecting clinician well-being and resilience [28]. Physicians have higher burnout levels than the general population [5,29]; hours worked, medical errors, and exposure to death and human suffering may in part explain this difference. The contributors to burnout in medical providers are

Table 1. Recognized factors adding to the challenges in our contemporary work environment

Factors
Isolation in the workplace
Excessive workload
Lack of control over work schedule
Inefficient practice
Malpractice risk
Lack of meaning in work
Concerns about job security
Call schedule
Clinical demands
Decreased autonomy, control, flexibility
Regulatory and related reimbursement issues
Economic recession, pressures
Decreased time with patients
Difficulty integrating personal and professional lives
Inefficiency, clerical burden, and intrusion of the electronic health record
Generational differences
Loss community or connection with colleagues
Lack of alignment between the altruistic motivation of individual physicians and the organizations in which they work

numerous and complex (Table 1) [4,29,30,31] and vary depending on staff category and subspecialty.

Physician leaders impact the well-being and satisfaction of individual physicians [32,33]. Four key leadership behaviors reduce burnout rates [34]: keeping staff informed, demonstrating humble inquiry (ie, asking for suggestions on how to improve the work unit) [35], facilitating career development, and recognizing staff for jobs that are well done. Training leaders to exhibit these behaviors can improve the workplace environment for everyone and reduce burnout.

The mismatches that exist between learning styles, work-life integration, and desire for consistent feedback of our millennial trainees and staff are likely adding to our workplace stressors [36]. Although older and younger physicians value wellness equally, they often have different definitions and priorities, which may lead to conflict regarding work hours and learning preferences. Distress varies over the course of a career. Training is a time of elevated distress among physicians [37,38], and those who have been in practice for 10 years or less have the lowest overall satisfaction with career choice, the highest frequency of work-home conflicts, and the highest rates of depersonalization [39]. Midcareer physicians (in the workplace for 11 to 20 years) have the lowest satisfaction with choice of subspecialty and

work-life balance and the highest rates of emotional exhaustion [39].

EVIDENCE-BASED SOLUTIONS THAT WORK

Mitigation strategies must recognize that burnout is primarily a system-level problem driven by excess job demands and inadequate resources, not a marker of inadequate personal resilience [30,40,41]. Although interventions focused on the individual can produce meaningful reductions in burnout [42,43], research is needed to determine what systemwide interventions will be most impactful for our organizations and specialty. Published strategies [1] (such as work less and hire more staff) may not always be practical.

Effective personal strategies include mindfulness, stress management, communication-skills training, exercise programs, and participation in small-group programs to decrease isolation while promoting community and connectedness [3,42,44]. A culture of wellness that incorporates peer support programs, leadership effectiveness, appreciation and compassion, and flexibility should be combined with personal resiliency skills and efficient practice patterns to optimize professional fulfillment [45]. The amount of time spent working on the activity that is most personally meaningful to a physician is strongly related to the risk of burnout [46]. Physicians spending less than 20% of their professional time on the activity that is most meaningful to them have higher rates of burnout [46]. Leaders should engage the members of their team to understand what motivates each individual and take this into account when assigning work [32].

MAJOR THEMES AND STRATEGIES THAT MITIGATE BURNOUT

The participants at the Intersociety Committee agreed on four themes that practices, departments, wellness committees, organizations, and societies can employ to frame their improvement efforts.

Theme 1: You Cannot Manage What You Cannot Measure

Wellness and Burnout Should Be Measured and Benchmarked. An organizational strategy to improve clinician well-being should first measure it, then develop and implement interventions based on the data, and then remeasure to assess the impact and outcomes of interventions [4,47]. We recommend longitudinal efforts to benchmark our data that will permit prospective evaluation of the effectiveness of mitigation interventions.

Table 2. Leadership approaches for preventing and reducing burnout and promoting wellness

Theme	Comments
Build strong community and connectivity	Radiologists incur potentially high levels of isolation. Community and connectivity must be intentionally built, including social media networks. Leaders can help to ensure that radiologists and physicists are not isolated.
Model the way	Radiology leaders need the proper skills and should demonstrate behaviors that foster and lead to wellness and joy among members of their practice.
Increase organizational influence	Leaders need a strong voice, advocating for practices that foster wellness and reduce stress.
Ensure burnout is not a stigma	By inviting dialogue about burnout and encouraging staff members to seek assistance, with no judgment, leaders can ease the stigma often attached to burnout.
Know those you lead	Attention to individuals, observing signs of burnout, can lead to early intervention and prevention. Understand generational differences.
Measure burnout and joy	By having data, a leader can make a more accurate assessment of individuals and groups and establish a baseline by which progress can be measured.
Create an effective wellness center or committee	This implies a group that is well educated on the issues that can measure the impact of interventions on individuals, the work group, and the organization.
Make patient care and physician satisfaction top priorities	Understanding the risks to the patient, as well as the individual and work group, leaders need to implement individualized strategies prioritizing high-quality patient care and physician satisfaction. Consider including physician satisfaction as a practice quality indicator.
Align conflicting goals, roles, processes	Misalignment leads to confusion, inefficiencies, and inability to achieve. Leaders should be attentive to how these are coordinated.
Value staff members	By listening to, engaging, and recognizing staff members, leaders can create a climate of respect for everyone.
Recognize the power of small acts of relationship building	The small acts of praise and acknowledgement that can be infused into daily activity, have significant impact on morale.
Improve efficiencies	Eliminate, delegate, consolidate, assist. By using these principles, leaders can reduce unnecessary work. Twenty percent of preferred work activity brings the most joy.

Use Effective Survey Tools and Know How to Interpret the Data. Tools exist for measuring burnout, well-being, and resilience [4,48] (Table 2, Table 3). No radiology practice-specific survey tool currently accounts for our unique and varied work stressors. Although the majority of survey tools estimate the contributions of electronic health records to physician stress, none survey the impact of our unique PACS environment. We are surrounded by constant technological evolution, with rising productivity expectations and little data describing safe limits on interpretive case volumes or work hours. This environment and our ignorance of its impact place our teams and patients at risk.

Undertake Evidence-Based Research Relevant to Our Field. Apart from surveys, little to no data exist regarding strategies for improving radiologist wellness in the contemporary work environment [49,50]. We need effective research so improvement efforts are based on

evidence rather than anecdotes [49]. Without such data, we may passively rely on strategies deployed by other subspecialties that may be ineffective.

Money, Metrics, and Misery. One elephant in the burnout conversation room is money, specifically as it relates to salaries and incentive programs. Staffing models and compensation plans that are closely linked to clinical productivity metrics (eg, individual physician relative value units) will contribute to stress and burnout [23,24,51], and leaders and radiologists practicing in such settings should consider their wellness priorities.

The Downside of Data. Data are useful for understanding and managing processes yet can have negative impact on morale and stress if misused or manipulated. We are all aware of the negative impact of data when used to measure productivity, set compensation, manage staffing numbers, evaluate performance of peers, or determine incentive bonuses and maximize profit.

Table 3. An overview of instruments used for measuring stress, burnout, and wellness (see also Table 1 of Shanafelt and Noseworthy [4])

Instrument	Advantages	Disadvantages
Maslach Burnout Inventory [69]	Gold standard for measurement of burnout 22 items 40-year track record Can be used for all members of health care team Population comparators available	Long Expensive—\$2.50 per individual Only measures burnout, not other dimensions of distress Difficult to administer more often than annually, which limits utility for evaluating effects of interventions over shorter interval
Stanford Professional Fulfillment Index [70]	Measures both burnout and professional satisfaction 16 items Free to use by nonprofit organizations and for research purposes; third-party administration and analysis services available for a fee Useful for evaluating changes because can reassess every 2-3 months Can be used for all members of health care team	Only measures burnout, not other dimensions of distress
Physician Well-Being Index [65]	Measures burnout, fatigue, stress nine items Free to use by nonprofit organizations and for research purposes Interactive version that provides immediate feedback and resources to the individual Available free to the individual with organization version available for fee Can be used for all members of health care team with nurse, advanced practice providers, resident or fellow, and health care worker versions available Population comparators available	Not intended to deeply profile or diagnose any domain of distress specifically
Mini Z Burnout Survey [71]	Functionally a short survey about satisfaction with different dimensions of practice that includes a single question about burnout 12 items Free to use; third-party administration and analysis services available for a fee Specific to physicians and possibly advanced practice providers	Only one question on burnout Other items may not be relevant to all practices Not relevant to all members of the health care team

Theme 2: Foster the Development of High Functioning Teams

Apply the Principles of Organizational Development. Organizational development improves organizational structure and culture, supporting systems and processes, leadership development, succession planning, and talent acquisition, and emerges as one approach to mitigating burnout. For any imaging organization to accomplish its goals, it must clearly articulate its values and mission [52]. Without a vision, mission, value statement, and clearly defined goals, a radiology organization will struggle to focus and adapt its processes, position itself for success, and respond to current and anticipated future challenges posed by our dynamic health care

marketplace [52]. Striving to develop a continuous learning environment within a fair and just culture can decrease the risk of provider burnout.

Optimize the Composition of Your Team. As physicians, we depend entirely on the skills of our technologists, nurses, and other team members to jointly improve the outcome for each of our patients. Building a diverse, inclusive, and tolerant workforce and work environment [53] by eliminating bias and barriers to diversity and engagement, being culturally aware and sensitive, and fostering effective community building are conducive to engagement and wellness. It is important that members practice at the top of their licenses, that individual talents are continuously developed, and that teams

function in both learning and teaching capacities. The term “inclusive” implies understanding and embracing generational differences in the workplace [35,36,53]. Any radiologist who fails to recognize or work within the framework of this interdependent team will not be successful, and patient outcomes will be impacted [54].

Optimize the Function of Your Team. For teams to be effective, they must function in a collaborative, respectful, and professional manner. The contribution from each member should be recognized and acknowledged whenever possible. Internal communication should be proactive rather than reactive. Members should play an active role in decision making, be allowed autonomy, and should not feel isolated. A just culture exists where members are not blamed for reasonable efforts that may not work. Team members are empowered [55] and share responsibility for their actions and outcomes. All members should be willing and able to speak up about any safety concerns [56]. Fairness, equity, and transparency in all processes are essential. The team learns continuously and shares successes and failures. Effective teams facilitate constructive debate, which builds community. High-functioning teams take a systems approach for problem solving and recognize that burnout can be infectious and that the well-being of team members is interdependent [57,58].

Theme 3: Develop and Nurture Effective Leaders

High-functioning teams are run by effective leaders who possess task, people, communication, and diagnostic skills. Such leaders must model excellence, foster open communication, and build cultures of partnership and shared values. Trust, teamwork, and collaboration create an environment of support that is an antidote to burnout. To be effective, our leaders must create awareness, acknowledge wellness, and insist on its importance [10].

Do we have the best-prepared leaders currently in place to guide us through the epidemic of burnout? Are current radiology leadership development and evaluation programs effective? Is there an opportunity for new content in current leadership development programs? Are our leaders able to recognize the symptoms of burnout and ensure that no stigma is attached? Are leaders aware of resources to help the ailing physician, and are leaders taking care of their own wellness? How are leaders fostering their own resilience? What wellness metrics do leaders employ to gauge their own effectiveness and organizational health?

Leaders must play a role in managing known contributors of burnout that impact the practice environment—understanding and managing staff flexibility,

autonomy, and workload expectations [30,32,59]. To what extent are leaders or practices willing to consider contemporary workplace arrangements, such as part-time programs, working remotely, including from home, or working alternate service hours? How do groups approach parental or aging parent leave?

Theme 4: Amplify Our Voice at the Organizational and National Levels

We must not wait until we rise to the top of the subspecialty list of physicians experiencing burnout. Each of us and our national organizations must help raise awareness of our current situation and trend line.

Advocacy Efforts. Some of the most onerous drivers of burnout relate to growing burdens of regulation, billing, compliance, and certification [10]. Leaders and organizations must stand up to and work with regulatory groups to lessen this burden. Peer review is one such example. Current outcome metrics to which we are held accountable often conflict with how we function. For example, drivers of earlier diagnosis, intervention, and discharge do not necessarily translate well into improved outcomes for radiologists or our patients and are adding to our workplace stress. We contribute to the care that our patients receive, yet few processes have been developed that show this added value in a way that it can be acknowledged [60].

Physician Wellness as an Indicator of Health-System Quality [61]. Staff wellness is one excellent indicator of the quality of a practice; are we ready to commit to including “wellness biomarkers” (such as annual personal and global unused vacation time) in our practice or organizations key performance indicators?

Collaboration at the National Level. In 2017, the National Academy of Medicine launched the Action Collaborative on Clinician Well-Being and Resilience, a network of more than 60 organizations (including the ACR) committed to reversing trends in clinician burnout [50]. The Collaborative has three goals: (1) improve baseline understanding of challenges to clinician well-being; (2) raise the visibility of clinician stress and burnout; and (3) elevate evidence-based, multidisciplinary solutions that will improve patient care by caring for the caregiver. Unlike efforts in the United Kingdom and Canada [61], no formal national programs exist to support members of our imaging teams who are seriously ailing. Similar to what our surgical colleagues have developed, we

propose that an up-to-date and managed toolkit be developed [62,63].

NEXT STEPS—A ROAD MAP TO FOSTER WELLNESS AND ENGAGEMENT

The Intersociety Committee, recognizing the urgency of rising burnout, committed to continuing the dialogue over an extended period by considering the following:

- Convene a work group to develop a survey tool for radiologists to assess burnout [62-68], then use the aggregate data to benchmark and make needed changes.
- Explore quantifiable and comparable indicators for physician wellness and include these in organizational quality measures. One example is personal and group unused vacation time.
- Partner with national organizations that offer national or statewide programs for improving physician wellness. Examples include the National Clinical Assessment Service in the United Kingdom and the dedicated national and provincial Centres for Physician Health and Wellbeing administered by the Canadian Medical Association.
- Develop and disseminate a wellness toolkit.
- Share data that can influence leaders of organizations to change systemic conditions that cause burnout among radiologists.
- Conduct research to understand the contributors and impact of interventions.
- Foster personal wellness.
- Encourage effective leadership development programs.
- Implement deliberate approaches to build community and collegiality.

TAKE-HOME POINTS

- The reported burnout rate among radiologists continues to rise, which suggests that we are not addressing the causes and alternate strategies are necessary if this epidemic is to be effectively managed.
- To manage the impact and consequences of burnout, we must clearly articulate the causes and understand how best to measure the incidence and manifestations of burnout.
- Effective mitigation of burnout should include different strategies designed for the individual, the

practice, and the organization. A multipronged and sustained effort will be required.

- The fourth aim of health care implores physicians to take care of themselves and their own wellness. We must encourage such behavior and remove the stigma associated with requests for help.
- Strategies to reduce burnout include embracing the principles of organizational development: strategic planning and thinking, leadership development, and high-functioning teams.
- Through local and national advocacy efforts, we must amplify our voice and show the true value that we add to patient care.

REFERENCES

1. Harolds JA, Parikh JR, Bluth EI, Dutton SC, Recht MP. Burnout of radiologists: frequency, risk factors, and remedies: a report of the ACR commission on human resources. *J Am Coll Radiol* 2016;13:411-6.
2. Carol Peckham. Medscape National Physician Burnout and depression report 2018. Available at: <https://www.medscape.com/slideshow/2018-lifestyle-burnout-depression-6009235>. Accessed October 12, 2018.
3. Fishman M, Mehta TS, Siewert B, Bender C, Kruskal JB. The road to wellness—engagement strategies to help radiologists to achieve joy at work. *Radiographics* 2018;38:1651-64.
4. Shanafelt TD, Noseworthy JH. Executive leadership and physician well-being. Nine organizational strategies to promote engagement and reduce burnout. *Mayo Clin Proc* 2017;92:129-46.
5. Shanafelt T, Hasan O, Dyrbye LN, et al. Changes in burnout and satisfaction with work-life balance in physicians and the general US working population between 2011 and 2014. *Mayo. Clin Proc* 2015;90:1600-3.
6. Bodenheimer T, Sinsky C. From triple to quadruple aim: care of the patient requires care of the provider. *Ann Fam Med* 2014;12:573-6.
7. Dzau VJ, Kirch DG, Nasca TJ. To care is human—collectively confronting the clinician-burnout crisis. *N Engl J Med* 2018;378:312-4.
8. Noseworthy J, Madara J, Cosgrove D, et al. Physician burnout is a public health crisis: message to our fellow health care CEOs. *Health Affairs Blog March*. Available at: 2017. <https://www.healthaffairs.org/doi/10.1377/hblog20170328.059397/full/>. Accessed October 12, 2018.
9. Thomas LR, Ripp JA, West CP. Charter on physician well-being. *J Am Med Assoc* 2018;319:1541-2.
10. The Blue Ridge Academic Health Group Report 22: The hidden epidemic: the moral imperative for academic health centers to address health professionals' well-being. Available at: <http://whsc.emory.edu/blueridge/publications/archive/blue-ridge-winter2017-2018.pdf>. Accessed October 12, 2018.
11. Maslach C, Jackson SE, Leiter MP. *Maslach burnout inventory manual*. 3rd ed. Palo Alto, CA: Consulting Psychologists Press; 1996.
12. Shanafelt TD, Dyrbye LN, West CP, Sinsky CA. Potential impact of burnout on the US Physician Workforce. *Mayo Clin Proc* 2016;91:1667-8.
13. Perlo J, Balik B, Swensen S, Kabenell A, Landsman J, Feeley D. *IHI framework for improving joy in work*. IHI White Paper. Cambridge, MA: Institute for Healthcare Improvement;

2017. <http://www.ihl.org/resources/Pages/IHIWhitePapers/Frame-work-Improving-Joy-in-Work.aspx>.
14. Yerkes RM, Dodson JD. The relation of strength of stimulus to rapidity of habit-formation. *Journal of Comparative Neurology and Psychology* 1908;18:459-82.
 15. The Joint Commission Sentinel Event Alert 40. Behaviors that undermine a culture of safety. Available at: https://www.jointcommission.org/assets/1/18/SEA_40.PDF. Accessed October 12, 2018.
 16. Martino A. Battling burnout and its consequences. Available at: <https://acrbulletin.org/topics/practice-management/1032-tackling-radiology-burnout>. Accessed October 12, 2018.
 17. Bender CE, Parikh JR, Arleo EK, Bluth E. The radiologist and depression. *J Am Coll Radiol* 2016;13:863-7.
 18. Oreskovich MR, Shanafelt T, Dyrbye LN, et al. The prevalence of substance use disorders in American physicians. *Am J Addict* 2015;24:30-8.
 19. Tawfik DS, Profit J, Morgenthaler TI, et al. Physician burnout, well-being and work unit safety grades in relationship to reported medical errors. *Mayo Clin Proc* 2018;93:1571-80.
 20. West CP, Huschka MM, Novotny PJ, et al. Association of perceived medical errors with resident distress and empathy: a prospective longitudinal study. *JAMA* 2006;296:1071-8.
 21. Shanafelt TD, Balch CM, Bechamps G, et al. Burnout and medical errors among American surgeons. *Ann Surg* 2010;251:995-1000.
 22. Shanafelt T, Goh J, Sinsky C. The business case for investing in physician well-being. *JAMA Intern Med* 2017;177:1826-32.
 23. Shanafelt TD, Balch CM, Bechamps GJ, et al. Burnout and career satisfaction among American surgeons. *Ann Surg* 2009;250:463-71.
 24. Shanafelt TD, Gradishar WJ, Kosty M, et al. Burnout and career satisfaction among US oncologists. *J Clin Oncol* 2014;32:678-86.
 25. Williams ES, Skinner AC. Outcomes of physician job satisfaction: a narrative review, implications and directions for future research. *Health Care Manage Rev* 2003;28:119-40.
 26. Balch CM, Oreskovich MR, Dyrbye LN, et al. Personal consequences of malpractice lawsuits on American surgeons. *J Am Coll Surg* 2011;213:657-67.
 27. Rawson JV, Thompson N, Sostre G, Deitte L. The cost of disruptive and unprofessional behaviors in healthcare. *Acad Radiol* 2013;20:1074-6.
 28. National Academy of Medicine. Factors affecting clinician well-being and resilience. Available at: <https://nam.edu/clinicianwellbeing/wp-content/uploads/2018/03/Factors-that-Affect-Clinician-Well-Being-and-Resilience.pdf>. Accessed October 12, 2018.
 29. 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;172:1137-87.
 30. 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.
 31. Gunderman RB. Burnout: a mismatch made in hell. *J Am Coll Radiol* 2017;14:854-5.
 32. Shanafelt T, Swenson S. Leadership and physician burnout: using the annual review to reduce burnout and promote engagement. *Am J Med Qual* 2017;32:563-5.
 33. Shanafelt T, Trockel M, Ripp J, Murphy ML, Sandborg C, Bohman B. Building a program on well-being: key design considerations to meet the unique needs of each organization. *Acad Med* 2019;94:156-61.
 34. Shanafelt T, Gorringer G, Menaker R, et al. Impact of organizational leadership on physician burnout and satisfaction. *Mayo Clin Proc* 2015;90:432-40.
 35. Schein EH. *Humble enquiry: the gentle art of asking instead of telling*. San Francisco, CA: Berrett-Koehler Publishers, Inc; 2013.
 36. Chen P-H, Scanlon MH. Teaching radiology trainees from the perspective of a millennial. *Acad Radiol* 2018;25:794-800.
 37. 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.
 38. Brazeau CM, Shanafelt T, Durning SJ, et al. Distress among matriculating medical students relative to the general population. *Acad Med* 2014;89:1520-5.
 39. Dyrbye LN, Varkey P, Boone SL, et al. Physician satisfaction and burnout at different career stages. *Mayo Clin Proc* 2013;88:1358-67.
 40. Bakker AB, Van Emmerik H, Van Riet P. How job demands, resources, and burnout predict objective performance: a constructive replication. *Anxiety Stress Coping* 2008;21:309-24.
 41. Maslach C, Leiter MP. Understanding the burnout experience: recent research and its implications for psychiatry. *World Psychiatry* 2016;15:103-11.
 42. West CP, Dyrbye LN, Erwin PJ, Shanafelt TD. Interventions to prevent and reduce physician burnout: a systematic review and meta-analysis. *Lancet* 2016;388:2272-81.
 43. 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;177:195-205.
 44. West CP, Dyrbye LN, Shanafelt TD. Physician burnout: contributors, consequences and solutions. *J Intern Med* 2018;283:516-29.
 45. Bohman B, Dyrbye L, Sinsky C, et al. Physician well-being: the reciprocity of practice efficiency, culture of wellness and personal resilience. Available at: <https://catalyst.nejm.org/physician-well-being-efficiency-wellness-resilience/>. Accessed October 12, 2018.
 46. Shanafelt TD, West CP, Sloan JA, et al. Career fit and burnout among academic faculty. *Arch Intern Med* 2009;169:990-5.
 47. National Academy of Medicine. Clinician Well-Being and Knowledge Hub. Valid and reliable survey instruments to assess work-related dimensions of well-being. Available at: <https://nam.edu/clinicianwellbeing/resources/valid-and-reliable-survey-instruments-to-measure-burnout/>. Accessed October 12, 2018.
 48. National Academy of Medicine. Clinician Well-Being and Knowledge Hub. Prevalence of burnout in board-certified family physicians. Available at: <https://nam.edu/clinicianwellbeing/category/measuring-burnout/>. Accessed October 12, 2018.
 49. Dyrbye LN, Shanafelt TD, Sinsky CA, et al. Burnout among health care professionals: a call to explore and address this unrecognized threat to safe, high quality care. National Academy of Medicine. Available at: <https://nam.edu/burnout-among-health-care-professionals-a-call-to-explore-and-address-this-underrecognized-threat-to-safe-high-quality-care/>. Published July 5, 2017. Accessed October 12, 2018.
 50. National Academy of Medicine. Action Collaborative on Clinician Well-Being and Resilience. Available at: <https://nam.edu/initiatives/clinician-resilience-and-well-being/>. Accessed October 12, 2018.
 51. Gunderman R. The root of physician burnout. *The Atlantic* 2012;August 27.
 52. Sharpe RE, Mehta TS, Eisenberg RL, Kruskal JB. Strategic planning and radiology practice management in the new health care environment. *Radiographics* 2015;35:239-53.
 53. Kruskal JB, Patel AK, Levine D, et al. Fostering diversity and inclusion: a summary of the 2017 intersociety summer conference. *J Am Coll Radiol* 2018;15:794-802.
 54. Leonard M, Graham S, Bonacum D. The human factor: the critical importance of effective teamwork and communication in providing safe care. *Qual Saf Health Care* 2004;13:i85-90.
 55. Larson DB, Mickelsen LJ, Garcia K. Realizing improvement through team empowerment: a team-based, project-based multidisciplinary improvement program. *Radiographics* 2016;36:2170-83.
 56. Siewert B, Swedeen S, Brook OR, Eisenberg RL, Hochman M. Barriers to safety event reporting in an academic radiology department: authority gradients and other human factors. *Radiology* 2018;288:793-8.

57. Welp A, Meier LL, Manser T. Emotional exhaustion and workload predict clinician-rated and objective patient safety. *Front Psychol* 2015;5:1573.
58. Helfrich CD, Simonetti JA, Clinton WL, et al. The association of team-specific workload and staffing with odds of burnout among VA primary care team members. *J Gen Intern Med* 2017;32:760-6.
59. Riano NS, Linos E, Accurso EC, et al. Paid family and childbearing leave policies at top US medical schools. *JAMA* 2018;319:611-4.
60. Patel S. Value management program: performance, quantification and presentation of imaging value-added actions. *J AM Coll Radiol* 2015;12:239-48.
61. Wallace JE, Lemaire JB, Ghali WA. Physician wellness: a missing quality indicator. *Lancet* 2009;374:1714-21.
62. American College of Surgeons. Surgeon well-being. Available at: <https://www.facs.org/member-services/surgeon-wellbeing>. Accessed October 12, 2018.
63. American College of Surgeons. Surgeon well-being resources. Available at: <https://www.facs.org/member-services/surgeon-wellbeing/resources>. Accessed October 12, 2018.
64. Dyrbye LN, et al. Development and preliminary psychometric properties of a well-being index for medical students. *BMC Med Educ* 2010;10:8.
65. Dyrbye LN, Satele D, Sloan J, Shanafelt TD. Utility of a brief screening tool to identify physicians in distress. *J Gen Intern Med* 2013;28:421-7.
66. Shanafelt TD, Kaups KL, 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.
67. Dyrbye LN, Satele D, Sloan J, Shanafelt TD. Ability of the physician well-being index to identify residents in distress. *J Grad Med Educ* 2014;6:78-84.
68. Dyrbye LN, Satele D, Shanafelt T. 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.
69. Maslach C, Jackson SE. The measurement of experienced burnout. *Journal of Occupational Behavior* 1981;2:99-113.
70. Trockel M, Bohman B, Lesure E, et al. A brief instrument to assess both burnout and professional fulfillment in physicians: reliability and validity, including correlation with self-reported medical errors in a sample of resident and practicing physicians. *Acad Psychiatry* 2018;42:11-24.
71. Linzer M, Konrad TR, Douglas J, et al. Managed care, time pressure and physician job satisfaction. *J Gen Intern Med* 2000;15:441-50.