To the Point: a prescription for well-being in medical education

Laura Hopkins, MD; Helen Morgan, MD; Samantha D. Buery-Joyner, MD; LaTasha B. Craig, MD; Elise N. Everett, MD; David A. Forstein, DO; Scott C. Graziano, MD; Brittany S. Hampton, MD; Margaret L. McKenzie, MD; Sarah M. Page-Ramsey, MD; Archana Pradhan, MD; Susan Bliss, MD; Undergraduate Medical Education Committee, Association of Professors of Gynecology and Obstetrics

This article is from the "To The Point" series prepared by the Association of Professors of Gynecology and Obstetrics Undergraduate Medical Education Committee. The purpose of this review was to provide an overview of the importance of well-being in medical education. A literature search was performed by a Reference Librarian who used Ovid/MEDLINE to identify scholarly articles published in English on learner well-being, using the search terms "burnout," "resilience," "wellness," and "physicians" between 1946 and January 11, 2019. The accreditation expectations and standards, available assessment tools for learner well-being, existing programs to teach well-being, and some key elements for curriculum development are presented. This is a resource for medical educators, learners, and practicing clinicians from any field of medicine.

Key words: assessment tool, curriculum, medical education, well-being

Training to become a physician is a time of significant stress, and it may even be harmful to the health of learners. High academic and professional expectations, significant workload, sleep deprivation, long hours, constant exposure to intense life situations, the transformation from trainee to consultant, and the realities of clinical practice all contribute to decreases in well-being. The additional reality of unstructured work hours coupled with the capacity and expectation of 24-hour responsiveness means that working after hours, on weekends, and during holiday time is usual practice.

For some physicians, the working environment has reached limits of personal accommodation with increasing reports of depression, burnout, and suicide. A 2015 study that described physician burnout over a 3-year span (2011 and 2014) surveyed 35,992 physicians, with 6880 (19.2%) of United States (US) physicians responding.[1] More than one-half of these physicians were experiencing professional burnout. The Medscape National Physician Burnout and Depression Report for 2018, which surveyed 15,543 practicing physicians from 29 specialties, shows that 23% (Plastic Surgery) to 48% (Critical Care) of physicians are experiencing burnout.[2] Medical student burnout rates are just as sobering; a systematic review estimated that at least one-half of all medical students may be affected by burnout during their education.[3] Factors that contribute to medical student burnout include learner mistreatment, high stress, and high stakes environments that may lead to high levels of disrespect and communication breakdown among colleagues.[4,5] According to research from the Mayo Clinic in 2018, resident physician burnout is just as high, with 45% of resident respondents (N=3588) reporting at least 1 symptom of burnout.[6] It is no wonder that leaders in medical education are being called to develop curricula that teach and support well-being and resilience across the training continuum.

Definitions of Well-Being, Wellness, Resilience, and Burnout

Clarity of the terminology at baseline is important so that we know how to communicate with each other and our learners about goals. *Well-being* and *wellness* are terms that frequently are used interchangeably: well-being is the state of being comfortable, healthy or happy[7]; wellness is the state of being in good health, especially as an actively pursued goal.[8] Wellness includes a spectrum of domains that include social, physical, emotional, intellectual, financial, spiritual, and environmental. Resilience refers to the ability to rebound from a stressful experience and is believed to contribute positively to well-being and wellness.[9,10] Burnout includes 3 distinct elements that include depersonalization (going through the motions), emotional exhaustion (out of energy), and the feeling of inefficacy or low personal accomplishment (just don't care anymore).[11]

From the University of Ottawa, Ottawa, ON, Canada (Dr Hopkins); University of Michigan, Ann Arbor, MI (Dr Morgan); Virginia Commonwealth University, Inova Campus, Falls Church, VA (Dr Buery-Joyner); University of Oklahoma Health Sciences Center, Oklahoma City (Dr Craig); The Robert Larner, MD, College of Medicine at the University of Vermont, Burlington, VT (Dr Everett); Touro College of Osteopathic Medicine—Harlem, New York, NY (Dr Forstein); Loyola University Chicago, Stritch School of Medicine, Maywood, IL (Dr Graziano); Women & Infants Hospital of RI- Division of Urogynecology, Providence, RI (Dr Hampton); Cleveland Clinic South Pointe Hospital, Cleveland, OH (McKenzie); University of Texas Health Science Center, San Antonio, TX (Dr Page-Ramsey); UMDNJ-Robert Wood Johnson-New Brunswick; New Brunswick, NJ (Dr Pradhan); Carolinas Medical Center, Charlotte, NC (Dr Bliss).

Received April 2, 2019; revised May 10, 2019; accepted May 14, 2019.

The authors report no conflict of interest.

Corresponding author: Laura Hopkins, MD. lahopkins@toh.ca

0002-9378/$36.00 • • https://doi.org/10.1016/j.ajog.2019.05.012

How Are Professional Organizations Assessing Learner Well-Being?

The Association of American Medical Colleges,[12] Institute of Medicine,[13] the Liaison Committee on Medical Education,[14] the Committee on Accreditation of Canadian Medical Schools,[15] and the American Association of Colleges of Osteopathic Medicine[16] unanimously support and/or require policies and programs to promote well-being in medical education. The Association of American Medical Colleges longitudinally tracks issues critical to medical education and the well-being of medical students using student surveys. These voluntary surveys include the post-Medical College Admission Test survey, the Matriculating Student Questionnaire, the Medical School Year 2 Questionnaire, and the Medical School Graduation Questionnaire. The online Medical School Year 2 Questionnaire is a voluntary questionnaire that asks medical students near the end of their second year of training to share their thoughts on a variety of topics, including the learning climate, the adjustment to medical school, future career plans, and well-being. There is a Quality of Life scale assessment, measuring the following: overall quality of life, mental (intellectual) well-being, physical well-being, emotional well-being, level of social activity, and spiritual well-being. Quality of Life scores are calculated by summing across these 6 items, which are measured on a 0−10 point scale. The possible range of responses is 0−60; higher scores are correlated with higher quality of life. Reliability estimates >0.7 are considered internally consistent. Between 2015 and 2017, >10,000 students completed the questionnaire each year. Across each of these 3 years, the scores were consistently between 40.1 and 40.6, with reliability of 0.9, which suggests that well-being is a stable concern among year 2 medical students across the United States.

How Are Professional Organizations Supporting Learner Well-Being?

The Accreditation Council for Graduate Medical Education (ACGME) puts significant focus on well-being. According to Dr Tim Brigham, Senior Vice President of Education, "We need to protect the workforce that protects our patients."[17] As such, the ACGME is focusing on 5 key areas to support its ongoing commitment to physician well-being: resources, education, influence, research, and collaboration. Additionally, the ACGME Common Program Requirements (Section VI), revised in March 2017, attests that there is a responsibility to address well-being in postgraduate education and give it the same importance as other aspects of resident competence.[18] The ACGME specifically calls for commitment to the well-being of students, residents, faculty members, and all members of the healthcare team. Programs will be accountable to develop curricula to foster and teach about strategies to promote well-being. A tangible manifestation of this priority is the ACGME's guideline on duty hour limits, which cites both patient safety and resident well-being as its foundational elements.[19] The ACGME has also implemented the Clinical Learning Environment Review program as part of its Next Accreditation System. The Clinical Learning Environment Review program is designed to provide US teaching hospitals, medical centers, health systems, and other clinical settings that are affiliated with ACGME−accredited institutions with periodic feedback that addresses the following 6 focus areas: patient safety, healthcare quality, care transitions, supervision, fatigue management and mitigation, and professionalism.

The American Medical Association has an online resource called "Steps Forward−Physician Wellness: Preventing Resident and Fellow Burn-out." This is a comprehensive guide for the development and implementation of a program to promote well-being that uses center-specific resources and data to create a tailored and specific program suited for the identified needs of learners.[20]

The Royal College of Physicians and Surgeons of Canada developed the CanMEDS framework in the 1990s to identify competencies and describe abilities that physicians require to meet the needs of the people that they serve. Within the CanMEDS role of "Professional," it is recognized that, to provide optimal patient care, physicians must take responsibility for their own health and well-being and that of their colleagues. In 2009, the Royal College of Physicians and Surgeons of Canada published a CanMEDS Physician Health Guide, which is a handbook for physician health and well-being.[21] The handbook describes a framework for teaching and learning about personal well-being. An overview of the selected domains of well-being with examples of how each can be explored and taught is provided in Table 1.

How Are Undergraduate Medical Education and Postgraduate Medical Education Programs Supporting Well-Being and Resilience?

In the future, it will be important for undergraduate medical education and postgraduate medical education to work together to build curricula to teach and foster well-being across the curriculum in a longitudinal fashion. Because medical schools are relatively "high resource and low stakes" settings for learners (students are not in a position of direct patient responsibility), implementation of programs during this period is ideal. If we permit our learners to transition to a lower-resource, higher-stakes setting of residency training without imparting any well-being education and training beforehand, they may struggle and show signs of stress.

Undergraduate well-being programs

Close association between the ability to care for self and to care for others must be emphasized in order for learners and faculty to embrace a curriculum for well-being and resilience. A longitudinal self-care thread embedded in the curriculum has been suggested by Outram and Kelly in their review of medical student preparedness for a career that is associated with high personal and professional expectations.[22] Important suggested domains within this curriculum would include basic education about personal mental health assessment and that of their peers, mindfulness strategies to build resilience, teaching devoted to managing and coping with errors in practice, and incorporation of a gender-sensitive perspective on the experience of being a learner and practitioner.

Many medical schools already have designed and implemented programs

TABLE 1
Suggested curriculum fundamentals to teach well-being

Domains	Value	Examples
Mindfulness	Pay attention to what you are doing while you are doing it	Meditation, deep breathing exercises, yoga, guided imagery, visualization
Journal writing	Clarifies values and beliefs; helps slow down; focuses attention on emotions.	Blog, diary, journal, values classification process, develop a personal and professional mission statement
Exercise	Fun, feasible with friends	Walking, hiking, biking, running, swimming, rock climbing, skating, etc.
Spirituality	Connectivity with self, others, the environment	Gratitude practice, humor
Nutrition and sleep optimization	Adequate nutrition and sleep can influence a person professionally and personally	Model and reward healthy habits; replace muffins/donuts for rounds with yogurt and fruit; take time for meals while on duty and encourage healthy choices
Finding a family physician	For personal care, physically and mentally	Encourage everyone to obtain and visit a family physician at least once a year.

Hopkins. Well-being in Medical Education. Am J Obstet Gynecol 2019.

that promote optimization of learner well-being. Evaluation of the programs and their long-term impact is limited. Table 2 provides a sample of programs that already are implemented with a brief description of their key elements (ordered chronologically by year of publication).

Postgraduate well-being programs

Thus far, only a few postgraduate training programs have implemented curricula in well-being. Those programs that have launched curricula have outcome results that are based on assessments from a very small number of residents (Table 3). It will be necessary to incorporate relevant

TABLE 2
Well-being program profiles in undergraduate medical education

University	Program name/year of training	Key elements	Evaluation
Georgetown University School of Medicine, Washington, DC[25]	Mind-body skills: elective 11-week course (2 hr/wk), offered in year 1	Groups of 8—12 students (2 faculty facilitators) meet weekly with an opening ritual, shared personal discovery, mind-body skills focus (ie, meditation, biofeedback, deep breathing, guided imagery, autogenic training, and several forms of relaxation training, journaling), and a closing ritual	Not mandatory, 30% of medical students participated; participants believed that stress was more manageable and that participation enhanced academic performance, improved a sense of community and social support, and provided greater opportunity for self-care and openness toward mind/body skills.
Monash University, Melbourne, Australia[26]	Health Enhancement Program, year 1 medical students	Cohort study design lectures, supplemented by tutorials on the Stress Release Program and ESSENCE (Education, Stress Management, Spirituality, Exercise, Nutrition, Connectedness, Environment) lifestyle program with measurement at baseline and 6 weeks after intervention; measurement scales included the depression, anxiety, and hostility subscale of the Symptom Checklist—90-R that incorporates the Global Severity Index and the World Health Organization Quality of Life questionnaire.	Ninety percent of students reported using the mindfulness practices; improved student well-being was noted on all measures, reaching significance for depression and hostility subscales.
Vanderbilt School of Medicine, Nashville, TN[27]	Wellmed	Advisory College System provides advice on wellness and career counseling; Student Wellness Committee promotes mind, body, social, community, and mentoring wellness activities; Vanderbilt Medical Attitude Live provides a longitudinal curriculum that focuses on "personal development of physicians in training."	Outcome data were not presented.

Hopkins. Well-being in Medical Education. Am J Obstet Gynecol 2019. *(continued)*

TABLE 2
Well-being program profiles in undergraduate medical education *(continued)*

University	Program name/year of training	Key elements	Evaluation
University of Hawaii, Honolulu, HI[28]	Year 3 medical students, assessed monthly by survey	Increased on-demand, individual and anonymous[31] counseling by volunteer psychiatrists; annual faculty education; specialized curriculum that includes lectures in year 1 and 3 and a handbook on student well-being that is provided to all medical students, irrespective of year of training.	Reduced depressive symptoms and suicidal ideation among medical students was measured with the use of the Center for Epidemiologic Studies Depression Scale and the Primary Care Evaluation of Mental Disorders Patient Health Questionnaire.
University of Tasmania, Hobart, Australia[29]	Medical students in their final 2 years of school	Multicenter, single-blinded, randomized controlled trial with intention-to-treat analysis in 3 sites; intervention uses an audio compact disk of mindfulness practice that was designed and produced for the trial; the intervention was used daily for 8 weeks, with questionnaire at baseline and 8 weeks and 16 weeks in both intervention and control groups; scales that were used included the Perceived Stress Scale and the Depression, Anxiety and Stress Scale	Mindfulness practice reduced stress and anxiety significantly in the intervention group and was sustained at 8 weeks after study completion.
Boston University School of Medicine, Boston, MA[30]	Embodied Health: 11-week elective course for year 1 and 2 medical students	Breathing and meditation exercises once per week plus 1 hour of yoga (with assignment to practice 3 times per week); each weekly session included a 30-min lecture about neuroscience of yoga, relaxation, and breathing exercises	Self-regulation and compassion rose, with favorable changes in empathy and perceived stress.
Saint Louis University School of Medicine, St. Louis, MO[31,32]	Resilience Mindfulness Program	Pass/fail grading system; reduced contact hours; longitudinal electives; establishment of learning communities that affect well-being by increasing engagement because of greater control over elective design and strengthening the relationship between faculty and peers	Lower levels of depression, anxiety, and stress and significantly higher community cohesion were noted.
University of Minnesota, Minneapolis, MN[33]	Resiliency and Well-being for Health Professionals	Eight-week, online course focused on resiliency and well-being; self-assessment at the beginning with weekly discussion groups based on readings, reflective writing, and watching videos	Outcome data were not presented.

Hopkins. Well-being in Medical Education. Am J Obstet Gynecol 2019.

findings from studies of all medical learners to progress in our understanding of how to best teach the well-being basics. We also have to reach for programmatic solutions, rather than small optional programs for which only a few residents participate and benefit from the education. Ratanaawongsa et al[23] surveyed 49 residents from 9 different programs at 2 academic hospitals in Baltimore in 2005 to better understand well-being. Certain programmatic actions that were cited by residents as helpful included the provision of forums where feedback can be shared with faculty, protected time away from work, provision of flexibility in scheduling, and tangible value placed on well-being training. The importance of flexibility in particular, as a means of enhancing resident well-being, has been studied in a randomized fashion by Billimoria et al.[24] From their study of 4330 residents in 117 general surgery programs in the United States, they concluded that allowing some flexibility did not impact patient care, continuity of care, or resident training negatively. Flexibility across the work-day was believed to enhance resident well-being.

What Assessment Tools for Well-Being, Resilience, Stress and Burnout Can We Use in Our Learning Environments?

There are several validated scales that are available that can be used to "take the vitals" of medical learners and educators. Baseline data can be obtained at any point in training and then used to either justify curriculum development or to monitor and reassess well-being annually, semiannually, or as needed after the implementation of strategies that are designed to improve and address well-being. It is possible to open a discussion with implementation of 1 of these scales at any education event and progress from there with the use of baseline information as a guide. Table 4 is a collection of available resources that have been used in medical education.

Conclusions

It is commendable to implement local programs and courses to promote or introduce the importance of well-being

TABLE 3
Well-being program profiles in postgraduate medical education

University/ organization	Program name	Key elements	Evaluation
Emory University School of Medicine, Atlanta, GA[34]	Wellness Days, Department of Radiology	N= 45 residents; implementation of 5 wellness days, rebranded sick leave days (previously 12 sick days) reduced to 7 to permit rebranding of 5 wellness days	Voluntary, anonymous survey at the end of the implementation year (N=58, with 45 respondents); use of wellness days and sick days, opinions regarding wellness days, and a validated single item burnout assessment question were included; the outcome was no statistical change in the number of total days taken off; 87.7% of respondents agreed that wellness days could help reduce or prevent burnout.
Medical University of South Carolina, Charleston, SC[35]	'La Sierra,' Department of Neurosurgery	Voluntary, N=8 residents; biweekly wellness lectures, 1-hour team-based exercise session, and promotion of independent physical exercise	Baseline psychologic and sleepiness testing, with a repeat at end of the pilot year, shows statistically significant improvements in anxiety, quality of life, and sleep scores with no change in depressive symptoms.
Radboud University Medical Center, Nijmegen, The Netherlands[36]	Mindfulness-based Stress Reduction, Department of General Internal Medicine	Voluntary randomized controlled trial over a 3-month period of intervention (N=138 residents completed final evaluation); 2.5 hrs/wk in the evening for 8 weeks and a 6-hr silent day during the week-end; an evening session was education around stress and practiced mindfulness exercises	Baseline and 3-month assessments of burnout, worry, work-home interference, mindfulness, self-compassion, positive mental health, and empathy; primary outcome was emotional exhaustion; no change in emotional exhaustion at end of study.
Resident Wellness Consensus Summit[37]	Wellness Curriculum, Department of Emergency Medicine	Seventeen foundational topics: introduction, self-care, physician suicide, clinical care and miscellaneous topics structured as short and large group lecture and small break-out sessions	No reported outcomes; published information is a curriculum framework only.
University of Arizona, Tucson, AZ[38]	Energy Leadership Well-being and Resiliency Program, General Surgery	N=49 residents; throughout the year, the program addresses mental, physical, and social well-being through monthly experiential and interactive sessions delivered during residents protected education time; topics include leadership, team building, communication, work-life integration, goal setting, empathy, strategic diet and exercise, posture for the operating room, stress reduction, and mindfulness/meditation.	Baseline and 1-year postimplementation questionnaires that included Maslach (emotional exhaustion decreased), Perceived Stress Scale (scores decreased), Beck Depression Inventory (decreased), Energy Leadership Index (for Emotional Intelligence) showed improved scores.
Ohio State University College of Medicine, Columbus, OH[39]	Mind-body skills training for pediatric residents	N=10 residents; in-person peer-led training groups on mindfulness practice once per week for 4 weeks (6 hours total) supported by online modules (up to 8 hours); participants completed 2.8/4 sessions and 4.3/8 modules; only 5 residents completed measures across all time intervals for the study.	Wellness measured at 3 points; baseline, after completion of the intervention and at follow up 6 months after completion; scales included Maslach, Perceived Stress Scale, Smith's Brief Resiliency Scale, Cognitive and Affective Mindfulness Scale, and Neff's Self-Compassion Scale; significant improvements were seen in perceived stress, resilience, mindfulness, and self-compassion.
Stritch School of Medicine, Loyola University, Maywood, IL[40]	Pediatric and medical residents	N=31 residents; intervention included 2 separate 2-hour workshops that focused on developing emotional intelligence with strategies to improve self-awareness and management; a second workshop provided strategies to improve social awareness and social skills.	With the use of baseline and post-intervention assessment with the Bar-On Emotional Quotient Inventory 2.0, there was a significant increase in total emotional intelligence scores; stress management improved, and the overall wellness scores also improved significantly.

Hopkins. Well-being in Medical Education. Am J Obstet Gynecol 2019.

TABLE 4
Assessment tools previously applied to undergraduate medical education/graduate medical education learners and physicians

Measure	Assessment tool	Descriptive data	Free online
Well-being	Physician Wellness Inventory[41]	The 14 questions assess meaning of work, distress and stress specific to physician responsibilities, and open mindedness.	Yes
	Well-being Survey—the Berkeley Well-Being Institute[42]	The 11 items include happiness, self-worth, and insight and can be taken online; a summary report is emailed to respondents.	Yes
	Subjective Happiness Scale[43]	The 4 questions yield a composite score comparable with a validated range of scores.	Yes
	Cognitive and Affective Mindfulness Scale[44]	For the 12 items, higher scores reflect greater mindfulness qualities.	Yes
Resilience	Connor-Davidson Resilience Scale[45]	The 10 questions assess self-esteem, depression, religiosity, and psychological distress, which is a validated measure of resilience.	No ($)
	Wagnild-Young Resilience Scale[46]	For the 25 items, a higher score is given for higher resilience.	Yes
	Response to Stressful Experience Scale[47]	The 22-item scale emphasizes coping processes; the overall score is comparable with validated reference totals for "low," "medium," and "high" resilience.	Yes
Stress	Perceived Stress Scale-10[48]	The 10 items are validated, questions about feelings and thoughts during the last month; higher scores are associated with more colds, greater vulnerability to stressful life events.	Yes
	Penn State Worry Questionnaire[49]	The 16-item scale aims to measure the trait of worry with the use of Likert scale 1—5.	Yes
Burn-out	Maslach Burnout Inventory[50]	The 22 items pertain to occupational burnout; the 3 dimensions of burnout are emotional exhaustion, depersonalization, and personal accomplishment.	No ($)

Hopkins. Well-being in Medical Education. Am J Obstet Gynecol 2019.

in medical training, but could we create a framework that we could all benefit from irrespective of location? Notwithstanding an available and multilevel framework/toolkit/guide, we must make time to focus on well-being training. We also have to consider developing the capacity for well-being training in the fourth year of undergraduate medical education at which time the match and transition to residency present extreme challenges, stress, and anxiety for learners. A well-being "bundle" that contains well-being assessment tools, transition assessment tools, and handbooks for students and online education links, courses, help-line connections, and confidential blogs could be valuable to medical educators and learners.

There is an opportunity now for undergraduate medical education and postgraduate medical education programs to join forces and begin developing resources collaboratively that can be shared. These programs could be customized according to center-specific resources and expertise. Well-being and resilience training has never been more relevant to our competency frameworks, our everyday work, and our everyday lives. ■

REFERENCES

1. Shanafelt T, 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.
2. Medscape. Medscape National Physician Burnout and Depression Report [Online]; 2018. Cited 2019 February 06. Available at: https://www.medscape.com/slideshow/2018-lifestyle-burnout-depression-6009235#2. Accessed July 9, 2019.
3. Ishak W, Nikravesh R, Lederer S, Perry R, Ogunyemi D, Bernstein C. Burnout in medical students: a systematic review. Clin Teach 2013;10:242–5.
4. Brown R, Dunn S, Byrnes K, Morris R, Heinrich P, Shaw J. Doctors' stress responses and poor communication performance in simulated bad-news consultations. Acad Med 2009;84:1595–602.
5. Sexton J, Thomas E, Helmreich R. Error, stress, and teamwork in medicine and aviation: cross-sectional surveys. BMJ 2000;320:745–9.
6. Dyrbye L, Burke S, Hardeman R, et al. Association of Clinical Specialty with Symptoms of Burnout and Career Choice Among US Resident Physicians. JAMA 2018;320:1114–30.
7. Well-being. Encyclopedia.com [Online]. Cited 2018 February 27. Available at: http://www.encyclopedia.com. Accessed July 9, 2019.
8. Wellness. Oxford Living Dictionaries [Online]. Cited 2018 February 27. Available at: https://en.oxforddictionaries.com/definition/wellness. Accessed July 9, 2019.

9. Bonanno GA. Loss, trauma, and human resilience: have we underestimated the human capacity to thrive after extremely aversive events? Am Psychol 2004;59:20–8.

10. Campbell-Sills L, Stein MB. Psychometric analysis and refinement of the Connor-Davidson Resilience Scale (CD-RISC): validation of a 10-item measure of resilience. J Trauma Stress 2007;20:1019–28.

11. Maslach C, Schaufeli W, Leiter M. Job burnout. Ann Rev Psychol 2001;52:397–422.

12. Martin JP, Alpern RJ, Betz AL. Educating doctors to provide high quality medical care: a vision for medical education in the United States. Association of American Medical Colleges, Report of Ad Hoc Committee of the Deans. Washington (DC): AAMC; 2004.

13. Institute of Medicine (US) Committee on Behavioral and Social Sciences in Medical School Curricula; Cuff PA, Vanselow N, editors. Improving medical education: enhancing the behavioral and social science content of medical school curricula. Brief. Institute of MedicineWashington (DC): National Academies Press; 2004.

14. Liaison Committee on Medical Education. Available at: https://med.virginia.edu/ume-curriculum/wp-content/uploads/sites/216/2016/07/2017-18_Functions-and-Structure_2016-03-24.pdf. [Online]; 2016. Accessed July 9, 2019.

15. Committee on Accreditation of Canadian Medical Schools. 2018. Available at: http://cacms-cafmc.ca/sites/default/files/documents/CACMS_Standards_and_Elements_-_AY_2019-2020.pdf. Accessed July 9, 2019.

16. American Association of Colleges of Osteopathic Medicine. AACOM [Online]; 2018. Available at: https://www.aacom.org/news-and-events/publications/iome/by-topic/wellness.

17. Brigham T. Accreditation Council for Graduate Medical Education [Online]. Cited 2018 January 7. Available at: http://www.acgme.org/What-We-Do/Initiatives/Physician-Well-Being. Accessed July 9, 2019.

18. Nasca T. Summary of Changes to ACGME Common Program Requirements Section VI [Online]. Cited 2017. Available at: www.acgme.org/What-We-Do/Accreditation/Common-Program-Requirements/Summary-of-Proposed-Changes-to-ACGME-Common-Program-Requirements. Accessed July 9, 2019.

19. Burchiel K, Zetterman R, Ludmerer K, Philibert I, Brigham T, Malloy K. The 2017 ACGME common work hours standards: promoting physician learning and professional development in a safe, humane environment. J Grad Med Educ 2017;9:692–6.

20. Okanlawon T. AMA Steps Forward [Online]. Cited 2018 February 26. Available at: https://www.stepsforward.org. Accessed July 9, 2019.

21. Puddester D, Cohen J, Flynn L. CanMEDS Physician Health Guide: a practical handbook for physician health and well-being [Online]; 2009. Cited 2019 January 6. Available at: www.royalcollege.ca/rcsite/canmeds-faculty-development-resources-e. Accessed July 9, 2019.

22. Outram S, Kelly B. "You teach us to listen, but you don't teach us about suffering": self-care and resilience strategies in medical school curricula. Perspect Med Educ 2014;3:371–8.

23. Ratanaawongsa N, Wright S, Carrese J. Well-being in residency: a time for temporary imbalance? Med Educ 2007;41:273–80.

24. Billimoria K, Chung J, Hedges L, et al. National cluster-randomized trial of duty-hour flexibility in surgical training. N Engl J Med 2016;374:713–27.

25. Saunders P, Tractenberg LE, Chaterji R, Amri H, Harazduk N, Gordon JS. Promoting self-awareness and reflection through an experiential mind-body skills course for first-year medical students. Med Teach 2007;29:778–84.

26. Hassed C, deLisle S, Sullivan G, Pier C. Enhancing the health of medical students: outcomes of an integrated mindfulness and lifestyle program. Adv Health Sci Educ Theory Pract 2009;14:387–98.

27. Drolet BC, Rogers S. A comprehensive medical student wellness program - design and implementation at Vanderbilt School of Medicine. Acad Med 2010;85:102–10.

28. Thompson D, Goebert D, Takeshita N. A program for reducing depressive symptoms and suicidal ideation in medical students. Acad Med 2010;85:1635–9.

29. Warnecke E, Quinn S, Ogden K, Towle N, Nelson MR. A randomized controlled trial of the effect of mindfulness practice on medical students stress levels. Med Educ 2011;45:381–8.

30. Bond AR, Mason HF, Lemaster CM, Shaw SE, Mullin CS, Holick EA. Embodied health: the effects of a mind-body course for medical students. Med Educ Online 2013;18:1–8.

31. Stuart S, Chilbnall J. Finding the why, changing the how: improving the mental health of medical students, residents and physicians. Acad Med 2016;91:1194–6.

32. Slavin SJ, Schlindler D, Chibnall J. Medical student mental health 3.0: improving student wellness through curricular changes. Acad Med 2014;89:573–7.

33. Kreitzer MJ, Klatt M. Educational innovations to foster resilience in the health professions. Med Teach 2017;39:153–9.

34. Mendoza D, Holbrook A, Bertino F, Theriot D, Ho C. Using wellness days to mitigate resident burnout. Am Coll Radiol 2019;16:221–3.

35. Spiotta A, Fargen K, Patel S, Larrew T, Turner R. Impact of a residency-integrated wellness program on resident mental health, sleepiness and quality of life. Neurosurgery 2019;84:341–6.

36. Verweij H, van Ravesteijn H, van Hooff M, Lagro-Janssen A, Speckens A. Mindfulness-based stress reduction for residents: a randomized controlled trial. J Gen Intern Med 2018;33:429–36.

37. Arnold J, Tango J, Walker I, et al. An evidence-based, longitudinal curriculum for resident physician wellness: the 2017 Resident Wellness Consensus Summit. West J Emerg Med 2018;19:337–41.

38. Riall T, Teiman J, Chang M, et al. Maintaining the fire but avoiding burnout: implementing and evaluation of a resident well-being program. J Am Coll Surg 2018;226:369–79.

39. Romcevich LE, Reed S, Flowers SR, Kemper KJ, Mahan JD. Mind-body skills training for resident wellness: a pilot study of a brief mindfulness intervention. J Med Educ Curric Dev 2018;5:1–10.

40. Shahid R, Stirling J, Adams W. Promoting wellness and stress management in residents through emotional intelligence training. Adv Med Educ Pract 2018;9:681–6.

41. Eckleberry-Hunt J, Kirkpatrick H, Tahu K, Hunt R, Vasappa R, Essian J. What makes a Physician Well: Development of the Physician Wellness Inventory [Online]. Cited 2018 February 27. Available at: https://resourcelibrary.stfm.org/HigherLogic/./.DownloadDocumentFile.ashx?.0. Accessed July 9, 2019.

42. Davis T. The Berkeley Well-Being Institute. [Online]. Cited 2018 February 27. Available at: https://www.berkeleywellbeing.com/well-being-survey.html. Accessed July 9, 2019.

43. Lyubomirsky S, Lepper H. A measure of subjective happiness: preliminary reliability and construct validation. Social Indicators Research 1999;46:137–55.

44. Feldman G, Hayes A, Kumar S. [Online]. Cited 2018 February 27. Available at: https://ogg.osu.edu/media/documents/MB Stream/CAMS-R.pdf. Accessed July 9, 2019.

45. Connor KM, Davidson JRT. CDRSIC-The Connor Davidson Resilience Scale. [Online]. Cited 2018 February 27. Available at: www,connordavidson-resiliencescale.com/submit-ofr.php. Accessed July 9, 2019.

46. Wagnild G, Young HM. [Online]. Cited 2018 February 27. Available at: https://hr.un.org/sites/hr.un.org/files/The Resilience Scale (Wagnild%26Young)_0.pdf. Accessed July 9, 2019.

47. Johnson DC, Polusny MA, Erbes CR, et al. Responses to Stressful Experiences Scale [Online]. Cited 2018 February 27. Available at: https://www.reginfo.gov/public/do/DownloadDocument?objectID=39162801. Accessed July 9, 2019.

48. Cohen S, Kamarck T, Mermelstein R. Perceived Stress Scale [Online]. Cited 2018 February 27. Available at: www.mindgarden.com. Accessed July 9, 2019.

49. Meyer TJ, Miller ML, Metzger RL, Borkovec TD. Penn State Worry Questionnaire [Online]. Cited 2018 February 27. Available at: https://outcometracker.org/library/PSQQ.pdf. Accessed July 9, 2019.

50. Maslach C, Jackson S. Maslach Burnout Inventory [Online]. Cited 2018 February 27. Available at: www.mindgarden.com/315-mbi-human-services-survey-medical-personnel. Accessed July 9, 2019.