

Burnout Interventions for Resident Physicians

A Scoping Review of Their Content, Format, and Effectiveness

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• **Context.**—Physicians face a high rate of burnout, especially during the residency training period when trainees often experience a rapid increase in professional responsibilities and expectations. Effective burnout prevention programs for resident physicians are needed to address this significant issue.

Objective.—To examine the content, format, and effectiveness of resident burnout interventions published in the last 10 years.

Design.—The literature search was conducted on the MEDLINE database with the following keywords: internship, residency, health promotion, wellness, occupational stress, burnout, program evaluation, and program. Only studies published in English between 2010 and 2020 were included. Exclusion criteria were studies on interventions related to the COVID-19 pandemic, studies on duty hour restrictions, and studies without assessment of resident well-being postintervention.

Results.—Thirty studies were included, with 2 random-

ized controlled trials, 3 case-control studies, 20 pretest and posttest studies, and 5 case reports. Of the 23 studies that used a validated well-being assessment tool, 10 reported improvements postintervention. These effective burnout interventions were longitudinal and included wellness training (7 of 10), physical activities (4 of 10), healthy dietary habits (2 of 10), social activities (1 of 10), formal mentorship programs (1 of 10), and health checkups (1 of 10). Combinations of burnout interventions, low numbers of program participants with high dropout rates, lack of a control group, and lack of standardized well-being assessment are the limitations identified.

Conclusions.—Longitudinal wellness training and other interventions appear effective in reducing resident burnout. However, the validity and generalizability of the results are limited by the study designs.

(*Arch Pathol Lab Med.* 2023;147:227–235; doi: 10.5858/arpa.2021-0115-EP)

Burnout is defined in the latest edition of the World Health Organization's International Classification of Diseases as "... a syndrome... resulting from chronic workplace stress that has not been successfully managed ... characterized by 3 dimensions: (1) feelings of energy depletion or exhaustion; (2) increased mental distance from one's job, or feelings of negativism or cynicism related to one's job; and (3) reduced professional efficacy."¹

Physicians face a higher rate of burnout than the general population. This is especially true during the residency training period, when trainees often experience a rapid increase in professional responsibilities and expectations. Dyrbye et al² conducted a survey on the well-being of US medical trainees and early career physicians, including 1701 residents from a wide range of subspecialties. They found alarmingly high rates of burnout (60.3%), depression (50.8%), and suicidal ideation (8.1%) within the preceding 12 months among residents. These rates of burnout and depression were significantly higher than the rates of early-career physicians (51.4% for burnout and 40% for depression) and a nonphysician cohort from similar socioeconomic demographics (31.4% for burnout and 41.1% for depression).² A recent online survey by Han et al³ on the well-being of 79 Canadian laboratory medicine residents during the COVID-19 pandemic identified very high rates of burnout (63%) and depression (47%) among the residents, with 14% of respondents reporting moderate to severe depression that would require immediate treatment. The COVID-19 pandemic likely further aggravated the residents' baseline distress by adversely impacting their learning and career planning, physical and mental health, and personal finance (such as spouse being laid off).³

Clearly, measures by residency programs and institutions are urgently needed to address this significant issue. Since 2017, the Accreditation Council for Graduate Medical

Accepted for publication January 4, 2022.

Published online June 10, 2022.

Supplemental digital content is available for this article at <https://meridian.allenpress.com/aplm> in the February 2023 table of contents.

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The authors have no relevant financial interest in the products or companies described in this article.

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Education formally requires programs to have resident well-being policies and initiatives, which will be monitored through accreditation.⁴ The most recently published standard of accreditation for anatomical pathology residency programs by the Royal College of Physicians and Surgeons of Canada⁵ also includes a requirement for programs to specifically address resident well-being issues, in addition to offering academic support to struggling residents. In response, our institution has developed comprehensive wellness guidelines for postgraduate medical trainees that outline the roles and responsibilities of the trainees, training programs, and institutions in trainee well-being, as well as available wellness resources and support.⁶

However, in the online survey by Han et al,³ although three-quarters of Canadian laboratory medicine residents surveyed reported having access to burnout prevention activities and resources through either their residency training programs or institutions, these initiatives did not significantly affect the rate of burnout. This survey identified some potential areas for intervention, such as measures to improve career satisfaction, peer support and pathologist mentors, time off for illness and maternity/paternity leave, and measures to decrease financial stressors.³ Several systematic reviews and meta-analyses have been conducted to examine the effectiveness of burnout interventions for resident physicians published prior to 2015.⁷⁻⁹ The majority of the interventions consisted of duty hour restriction as per Accreditation Council for Graduate Medical Education guidelines or wellness training programs, with both types of interventions found to be effective in reducing resident burnout.^{8,9} However, few other intervention types were examined in these review studies.

OBJECTIVE

This scoping review examines the content, format, and effectiveness of resident burnout interventions published in the last 10 years.

DESIGN

The literature search was conducted on the MEDLINE database from 1946 to September 18, 2020 with the help of a research librarian. Both subject headings and text word terms were used to search for articles with the following keywords: internship or residency AND health promotion, wellness, occupational stress, or burnout AND program evaluation, program (see supplemental digital content at <https://meridian.allenpress.com/aplm> in the February 2023 table of contents). Studies written in English published between 2010 and 2020 that described interventions to reduce burnout and provided detail on one or more of the following were included: program content, format, and postintervention well-being assessment. Interventions related to the COVID-19 pandemic were excluded because of their context specificity. Studies on duty hour restriction were also excluded, as this intervention has been extensively studied and may not apply to non-US residents. In total, 30 studies were included in this scoping review. The search results are presented in the form of a flow diagram (Figure 1), as recommended by the Preferred Reporting Items for Systematic Reviews.¹⁰

RESULTS

A summary of the included studies can be found in Tables 1 through 4, classified by burnout program effectiveness.

Two studies^{11,12} were published prior to 2015, and 28 studies¹³⁻⁴⁰ were published in 2015 or later. Twenty-eight studies^{11-22,24-26,28-40} were conducted in the United States and 2 studies^{23,27} in Canada. The studies included a variety of surgical and nonsurgical residency programs. However, no study involving laboratory medicine residents was identified. The results are synthesized under 3 themes: burnout program content, burnout program format, and burnout program effectiveness.

Burnout Program Content

Eighteen studies* reported burnout programs involving a single type of intervention, whereas other programs^{13,21,26,28-31,37,39} involved 2 or more types of interventions. Several types of burnout interventions were identified, targeting mental, physical, social, or occupational well-being (Figure 2). Twenty programs† involved wellness training designed to improve mindfulness, resilience, stress coping mechanisms, and sleep quality. The majority of these programs‡ consisted of a series of didactic lectures, with 4 programs specifically mentioning ongoing maintenance wellness activities such as daily or weekly mindfulness exercises^{13,24,37} and wellness check ins with other residents^{13,34} after the didactic lectures. One program consisted of individual meditation training using the Headspace (Headspace Inc, Santa Monica, California) mobile application.¹⁸ Nine programs§ involved initiatives to promote physical exercises in groups or individually, such as low-cost/free access to the gym, yoga classes, activity trackers, and fitness competitions. Five programs^{13,21,29,31,37} involved initiatives to promote healthy dietary habits, such as free access to healthy food, nutrition and cooking classes, and healthy diet competitions. Four programs^{13,21,26,37} involved social and team-building activities among residents other than group physical activities. Four programs^{15,21,23,30} involved formal mentorship by senior residents or faculty members. Other types of interventions included access to psychological counseling services,^{16,21} with the study by Salles et al²¹ going as far as offering weekly one-on-one meetings with a clinical psychologist to all residents; improvements to resident work structure such as streamlined patient admission process^{21,37}; incentives for health checkups and access to primary care providers^{29,37}; allotted time off for personal health- and wellness-related activities³⁸; and a peer recognition program.³⁵

Burnout Program Format

Twenty-eight programs^{11-13,15,17-37,39,40} were longitudinal in nature, consisting of a series of recurring lectures or activities. However, most of these were 1 year or less in duration. Two programs evaluated one-time sessions; one program consisted of a 90-minute session on wellness training,¹⁴ and the other program provided one-time psychological counseling.¹⁶ The majority of the programs had 50 or fewer participants, with the median number of program participants being 39.

* References 11, 12, 14-20, 22-25, 27, 32-36, 38, 40.

† References 11, 13, 14, 17-20, 22, 24, 25, 27-30, 32-34, 36, 37, 39, 40.

‡ References 11, 13, 14, 17, 19, 20, 22, 24, 25, 28-30, 32-34, 36, 39, 40.

§ References 12, 26, 28, 29-31, 37, 39.

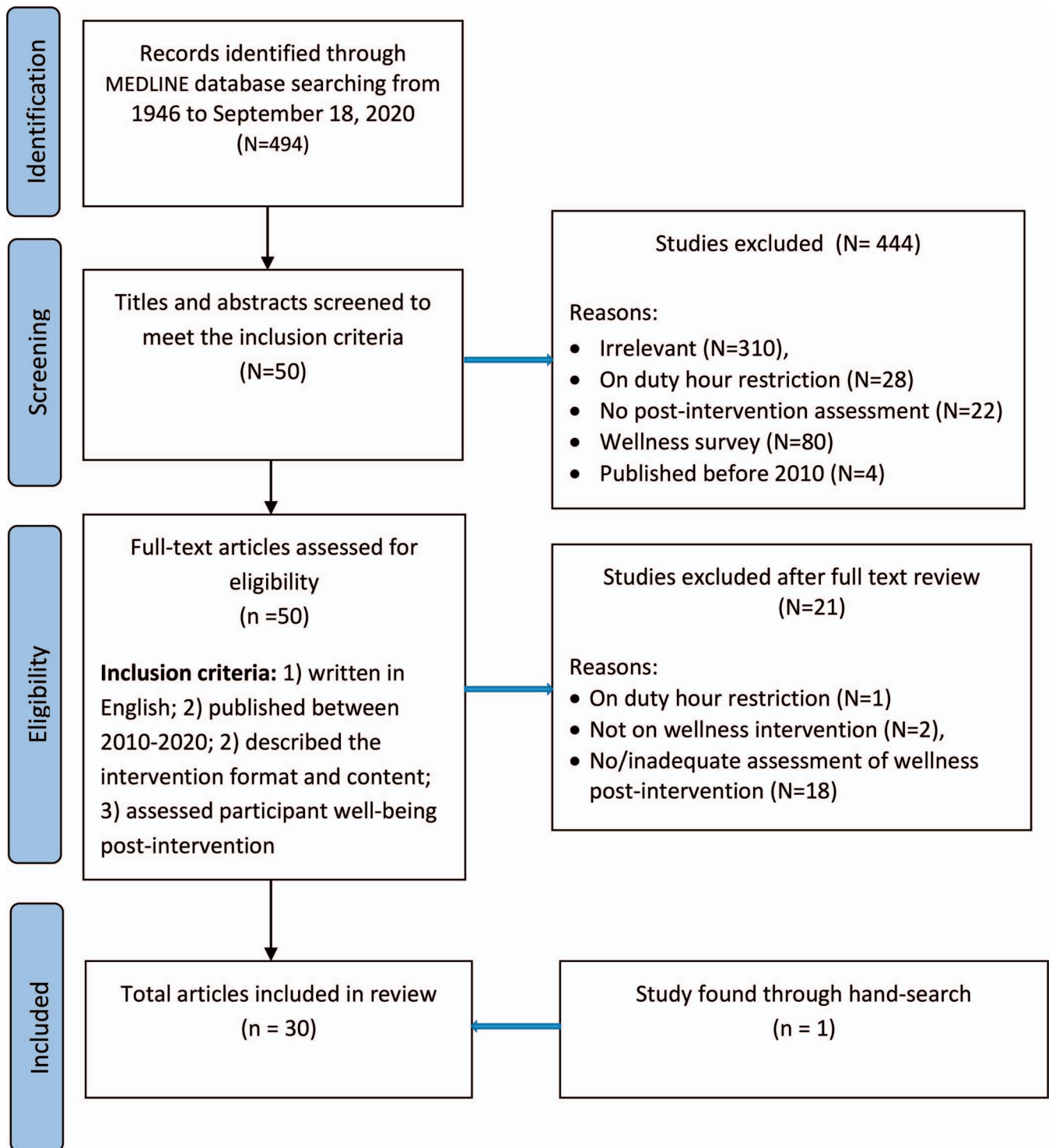


Figure 1. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram.

Burnout Program Effectiveness

Pretest and posttest was the most commonly used study design to evaluate burnout program effectiveness, with only 5 studies including a control group,^{11,20,22,24,32} including 2 randomized controlled trials.^{11,20} Nineteen studies¹¹ had

more than 70% of program participants involved in program evaluation, with the median number of evaluation participants being 25.5. The majority of the program evaluations were conducted immediately after the end of the programs, with only 2 studies having follow-up evaluations examining the long-term impacts of the burnout programs at 3 months⁴⁰ and 1 and 2 years³² after the completion of the

¹¹ References 11–13, 17, 19–25, 28–32, 38–40.

Table 1. Burnout Intervention Studies With Improved Well-Being Assessment(s) Postintervention

Source, y	Residency Program, Location	Program Content and Format	Program Duration	Study Design	No. of Participants, Program/Evaluation	Well-Being Assessment Methods	Effectiveness
Saadat et al, ¹¹ 2012	Anesthesia, United States	Coping with Work and Family Stress intervention: (1) identify stressors, (2) approaches to modify cognitive and appraisal processes, (3) stress management techniques, (4) creation of personal stress management plan	1 y (16 1.5-h weekly sessions)	Randomized controlled trial	19/19	48-item Role Quality Scale, Coping Strategy Indicator, Social Support Instrument, State-Trait Anxiety Inventory, Center for Epidemiologic Studies Depression Scale, Cohen-Hoberman Inventory of Physical Symptoms, National Survey on Drug Abuse	Significantly fewer stressors in their role as parent, increased social support at work, greater problem-solving coping, and less anxiety in program participants versus the 2 control groups
Weight et al, ¹² 2013	All, United States	Incentivized group exercise, 24-h access to low-cost fitness facility and fitness classes	12 wk	Pretest and posttest study	245/174	Physical activity measurement, quality of life questions, and 2 single-item measures from the Maslach Burnout Inventory	Significantly higher quality of life, nonsignificant trend toward less burnout postintervention
Slavin et al, ²² 2017	Psychiatry, United States	Resilience training and ethics discussion	NA (2 1- to 2-h lectures and 2 1-h sessions every 2 mo)	Case-control study	17/17	Center for Epidemiologic Studies Depression Scale, Maslach Burnout Inventory, State-Trait Anxiety Inventory	Significant improvement in Maslach Burnout Inventory scores, nonsignificant improvement in mean depression and anxiety scores in participants versus historic control
Zhang et al, ²³ 2017	Otolaryngology, Canada	Formal mentorship program	1 y (1 meeting every 3 mo)	Pretest and posttest study	8/8	Perceived Stress Survey, Maslach Burnout Inventory, World Health Quality of Life-Brief Questionnaire	Significant improvement in all scores and perceived benefits from participants
Thimmapuram et al, ²⁴ 2017	All (residents faculty members and nurses), United States	Heartfulness meditation training, weekly group meditation sessions, daily individual meditation practices	12 wk (1 lecture followed by 30-min weekly sessions with instructors and daily 5–20-min individual practices)	Pretest and posttest and case-control study	35 (including 18 residents)/35 (including 18 residents)	Maslach Burnout Inventory, Emotional Wellness Assessment, telomere length measurement	Significant improvement in all scores and telomere length in participants postintervention versus no improvement in control group
Riall et al, ²⁹ 2018	General surgery, United States	Energy Leadership Well-Being and Resiliency Program, healthy behavior challenges (incentive for annual physical and dental examinations, step count competition, daily meditation, challenges to eat 5 daily fruits/vegetables), resident social activities	1 y	Pretest and posttest study	49/48	Energy Leadership Index, Maslach Burnout Inventory, Perceived Stress Scale, Beck Depression Inventory, Physician Well-Being Index, ACGME resident survey	Significantly improved Energy Leadership Index score, Perceived Stress Scale score, and emotional exhaustion score of Maslach Burnout Inventory; improved rate of positive ACGME program evaluation from 80% to 96%
Babbar et al, ³¹ 2019	Obstetrics and gynecology, United States	Yoga sessions, nutritional and fitness challenge, fitness tracker	8 wk (8 1-h yoga sessions)	Pretest and posttest study	26/25	Abbreviated Maslach Burnout Inventory, Depression Anxiety Stress Scale, Five Facet Mindfulness Questionnaire	Significant improvement in depersonalization score of Maslach Burnout Inventory and anxiety. Significant reduction in blood pressure and improved feeling of camaraderie, appreciation, motivation, and overall training experience
Brennan et al, ³² 2019	Family medicine, United States	Wellness training	3 y (8 h in 1st y, 4–6 h in 2nd and 3rd y)	Case-control study	18/18	Maslach Burnout Inventory, Professional Quality of Life Scale, Connor Davidson Resiliency Scale	Immediately after the intervention: significantly improved Maslach Burnout Scale in participants compared with historic control. No worsened burnout scores in year 1 and 2 postintervention
Spioffa et al, ³⁹ 2019	Neurosurgery, United States	Weekly group workout sessions, biweekly lectures on mental health and sleep hygiene	1 y	Pretest and posttest study	8/8	Personal Health Questionnaire Depression Scale, the Generalized Anxiety Disorder 7-Item Scale, the Epworth Sleepiness Scale, satisfaction survey	Significant improvement in anxiety, quality of life, and sleepiness scores postintervention
Szuster et al, ⁴⁰ 2020	2 nonsurgical programs, United States	PRACTICE: a mindfulness-based curriculum	2 mo (4 2-h sessions)	Pretest and posttest study	14/14	Professional Fulfillment Index, Patient Health Questionnaire-4	Immediately after intervention: significant reduction in burnout and depression and stress also trended toward improvement. 3 mo after intervention: scores returned to preintervention level

Abbreviations: ACGME, Accreditation Council for Graduate Medical Education; NA, not applicable.

Table 2. Burnout Intervention Studies With Nonsignificant Changes in Well-Being Assessment(s) Postintervention

Source, y	Residency Program, Location	Program Content and Format	Program Duration	Study Design	No. of Participants, Program/Evaluation	Well-Being Assessment Methods	Effectiveness
Brennan and McGrady, ¹³ 2015	Family medicine, United States	Wellness training, individual and group wellness meetings, social activity calendar, daily 1–2-min mindfulness exercise, exercise equipment and fruits and vegetables in call rooms, healthy eating classes	1 y	Pretest and posttest study	10/10	Maslach Burnout Inventory, Connor-Davidson Resilience Scale, Professional Quality of Life Scale	Self-reported decreased overreactions to stress postintervention (data not provided)
Palamara et al, ¹⁵ 2015	Internal medicine, United States	1:1 academic coaching sessions	1 y (1–4 40-min meetings)	Pretest and posttest study	78/48	Maslach Burnout Inventory	Nonsignificant trend toward improved emotional exhaustion score of Maslach Burnout Inventory postintervention
Runyan et al, ¹⁷ 2016	Family medicine, United States	Wellness curriculum focusing on mindfulness training	1 mo (4 2-h weekly sessions)	Pretest and posttest study	12/9	Maslach Burnout Inventory, Self-Compassion Scale, Perceived Stress Scale, Jefferson Empathy Scale	Nonsignificant improvement in all scales postintervention
Taylor et al, ¹⁸ 2016	Pediatric, United States	Headspace meditation phone app	10 wk (10 10-min daily sessions)	Pretest and posttest study	33/11	Abbreviated Maslach Burnout Inventory, Mindful Attention Awareness Scale	No significant change in abbreviated Maslach Burnout Inventory postintervention
Ireland et al, ²⁰ 2017	Internal medicine, United States	Mindfulness training	10 wk (10 1-h weekly sessions)	Randomized controlled trial	23/23	Copenhagen Burnout Inventory, Perceived Stress Scale	Nonsignificant improvement in perceived stress and burnout during the study period for participants versus control
Salles et al, ²¹ 2017	General surgery, United States	Balance in Life program with measures targeting physical (healthy food in call room), psychological (weekly 1:1 meeting with clinical psychologist), professional (resident mentorship program and resident representatives system), and social (sponsored social events) well-being	2 y	Pretest and posttest study	76/56	Maslach Burnout Inventory, Dupuy Psychological General Well-Being Scale, Grit Scale	Despite positive feedback from participants for the interventions, there was no significant improvement in the burnout scales
Bentley et al, ²⁵ 2018	Psychiatry, United States	Mindfulness training	8 wk (8 1.5-h weekly sessions)	Pretest and posttest study	7/7	The Helpful Responses Questionnaire, Maslach Burnout Inventory	Nonsignificant improvement in all scores
Ares et al, ³⁰ 2019	Neurosurgery, United States	Bimonthly wellness lecture series, free access to the hospital gym, group gym visit, formal mentorship program	1 y	Pretest and posttest study	28/25	Maslach Burnout Inventory, Multidimensional Scale of Perceived Social Support	Nonsignificant improvement in burnout, variable satisfaction scores for wellness intervention with more practical tools rated as more helpful (eg, nutrition and fitness lectures, free gym access)
Hart et al, ³⁶ 2019	Emergency medicine, United States	The Happiness Practice: a corporate wellness initiative	6 mo (6 1-h monthly sessions)	Pretest and posttest study	46/24	Maslach Burnout Inventory	Nonsignificant trend toward worsened burnout postintervention. The overall satisfaction for the program was low (1.5 of 5) because of lack of relevance
Mari et al, ³⁷ 2019	Psychiatry, United States	Various wellness activities during “wellness day” and weekly mindfulness activities, task force to improve admission process, healthy food, funded sport leagues, primary care provider list	1 y	Pretest and posttest study	39/12	Copenhagen Burnout Inventory	Overall nonsignificant trend toward improved burnout postintervention

Table 3. Burnout Intervention Studies With Worsened Well-Being Assessment(s) Postintervention

Source, y	Residency Program, Location	Program Content and Format	Program Duration	Study Design	No. of Participants, Program/Evaluation	Well-Being Assessment Methods	Effectiveness
Kashani et al, ¹⁴ 2015	Critical care, United States	Stress management intervention	90 min	Pretest and posttest study	58/18	Gratitude Questionnaire-Six Item Form (GQ-6), Satisfaction with Life Scale, Subjective Happiness Scale, abbreviated Maslach Burnout Inventory, 14-item Perceived Stress Scale	Significantly higher stress levels and lower gratitude and happiness measures, no change in burnout and satisfaction postintervention. However, two-thirds of participants reported using the skills learned and the rating of program effectiveness was 4 of 5
Bird et al, ¹⁹ 2017	Internal medicine, United States	Resilience curriculum focusing on medical error disclosure and burnout resources	1 y (4 60–90 min small group sessions)	Pretest and posttest study	81/64	Connor-Davidson Resilience Scale, burnout symptom questions	Despite positive self-reported improvement in skills and coping mechanisms, mean resilience score significantly lowered and burnout symptoms significantly higher postintervention
Chaukos et al, ²⁰ 2018	Internal medicine and psychiatry, United States	Stress Management and Resilience Training Program for Residents (SMARTR), health-tracking technology (actigraphy and measured sleep)	6 mo (3 2-h sessions)	Pretest and posttest study	85/75 (SMART curriculum) and 72 (health tracker)	Maslach Burnout Inventory, Perceived Stress Scale, Patient Health Questionnaire 9-item, Functional Assessment of Chronic Illness Therapy–Fatigue Scale, Penn State Worry Questionnaire, Revised Life Orientation Test, Self-Efficacy questionnaire scale, Interpersonal Reactivity Index, Perspective-Taking subscale, Measure of Current Status-Part A, Cognitive and Affective Mindfulness Scale	Significantly worse Maslach Burnout Inventory depersonalization and emotional exhaustion scores, depression symptoms, and fatigue postintervention. No difference in other scores or in health tracker results. Satisfaction survey: 63% reported that it fostered connection and bonding and 87% reported that the skills were relaxing and helpful

burnout programs. Twenty-three studies[¶] used a validated well-being assessment tool as part of program outcome evaluation (Tables 1 through 3), with most of these studies using more than 1 tool. Full or abbreviated versions of the Maslach Burnout Inventory, which assesses emotional exhaustion, depersonalization/cynicism, and reduced personal accomplishment/professional efficacy, were the most commonly used tools. Other tools used in these studies assessed other aspects of well-being such as depression, anxiety, and quality of life. Of the studies that used a validated well-being assessment tool, 10 studies[#] reported significant improvements in the assessment scores post-intervention (Table 1), 10 studies^{**} reported nonsignificant changes in the assessment scores (Table 2), and 3 studies^{14,19,28} reported deteriorations in the assessment scores in spite of the positive feedback from program participants (Table 3). However, the programs appeared to affect various aspects of well-being differently. All 10 studies that reported improvements postintervention used more than 1 assessment tool, but only 2 studies reported improvements in the scores of all well-being assessment tools used.^{23,24} All 7 studies^{16,26,27,33–35,38} that did not use a validated well-being assessment tool reported improvements in some aspects of resident well-being postintervention (Table 4); however, the validity of these results is questionable. Of the studies that used a validated well-being assessment tool, wellness training appeared to be the most effective intervention in reducing resident burnout, with 7 of the 10 effective burnout programs^{11,22,24,29,32,39,40} having such training. These studies also had some of the most rigorous study designs, with 1 study¹¹ being a randomized control trial, 3 studies^{22,24,32} having a case-control design, and 5 studies^{11,22,24,32,40} with wellness training as the only type of intervention investigated. Interestingly, 6 of these wellness training programs^{11,22,29,32,39,40} had no formal ongoing maintenance wellness activities post–didactic lectures. However, all of these programs were longitudinal in nature, consisting of a series of lectures occurring during 2 months to 3 years. The long-term impacts of these wellness training programs were mixed: whereas 1 study found persistent improvements in well-being assessment scores among program participants at 1 and 2 years postintervention,³² another study found similar well-being assessment scores at baseline and 3 months postintervention among program participants, despite the initially improved scores immediately at the end of the program.⁴⁰ Regarding other types of burnout interventions, 4 of the 10 effective programs^{12,29,31,33} included incentives to promote physical exercises, 2 programs^{29,31} included incentives to promote healthy dietary habits, 1 program²⁹ included social activities among residents, 1 program²⁴ included a formal mentorship program with faculty mentors, and 1 program²⁹ included incentives for annual physical and dental exams.

DISCUSSION

Interest in burnout interventions for resident physicians and their effectiveness has increased substantially in the last decade, especially in North America. Although many burnout interventions targeting mental, physical, or social well-being at an individual level are described, few

[¶] References 11–15, 17–25, 28–32, 36, 37, 39, 40.

[#] References 11, 12, 22, 23, 24, 29, 31, 32, 39, 40.

^{**} References 13, 15, 17, 18, 20, 21, 25, 30, 36, 37.

Table 4. Burnout Intervention Studies Performed Without Using a Validated Burnout Assessment Tool

Source, y	Residency Program, Location	Program Content and Format	Program Duration	Study Design	No. of Participants, Program/Evaluation	Well-Being Assessment Methods	Effectiveness
Haskins et al, ¹⁶ 2016	All, United States	Wellness survey as an online screening tool for mental or substance abuse issues, followed by referral to counseling and psychiatric services as needed	1-time survey	Pretest and posttest study	51/6	Wellness survey	Improvement in mental health postintervention (data not provided)
Buchholz et al, ²⁶ 2018	Neurosurgery, United States	Weekly group exercises, quarterly social team building activities	3 y	Case report	NA/8	Satisfaction survey	100% of participants rated health and wellness initiatives as “very important” and “largely positive intervention,” with positive impacts on their physical and mental health, with actual physical exercise listed as the most valuable
Calder-Sprackman et al, ²⁷ 2018	Emergency medicine, Canada	Ice cream rounds; peer support and debriefing round	3 y (3–4 1-h rounds/y)	Case report	NA/20	Satisfaction survey	20% reported decreased burnout, 10% decreased stress and anxiety, 95% stronger collegiality, 58.8% improved coping strategies, 89% would recommend the round and skills in resilience postintervention
Bursch et al, ³³ 2019	Neurology, United States	Resilience skill training	11 wk (5 1-h sessions)	Pretest and posttest study	26/17	Survey on resident knowledge, beliefs, and self-efficacy	Significantly improved self-reported knowledge and skills in resilience postintervention
Fischer et al, ³⁴ 2019	Pediatric, United States	Wellness lecture, individual wellness check-in with chief residents focusing on specific resilience topics	1 y (1 lecture and 6–12 20–40-min monthly meetings)	Case report	32/14	Satisfaction survey	Intervention helpful for normalizing the intern experience, stress management and feeling connected to program leadership. Discussion on specific resilience topics less helpful than free-form discussion
Gribben et al, ³⁵ 2019	Pediatric, United States	Golden Ticket Project for peer recognition: electronically award residents for their positive behaviors (eg, teamwork, supervisory skills)	9 mo	Case report	83/46	Satisfaction survey	76% wanted program to continue, 49% agreed that the Golden Ticket Project made them “more aware of acts of kindness in the residency program” and “fostered a supportive community.”
Mendoza et al, ³⁸ 2019	Radiology, United States	Change 5 allotted sick days to wellness day to be used for medical, mental health, or dental care appointments and other self-care activities	NA	Case report	58/45	Satisfaction survey, single-item burnout assessment question	Burnout residents significantly more likely to take sick day than nonburnout residents. 86.7% agreed that “wellness days can help reduce or prevent burnout,” and 68.9% agreed that “wellness days have had a positive impact on [their] experience as a resident”

Abbreviation: NA, not applicable or not available.

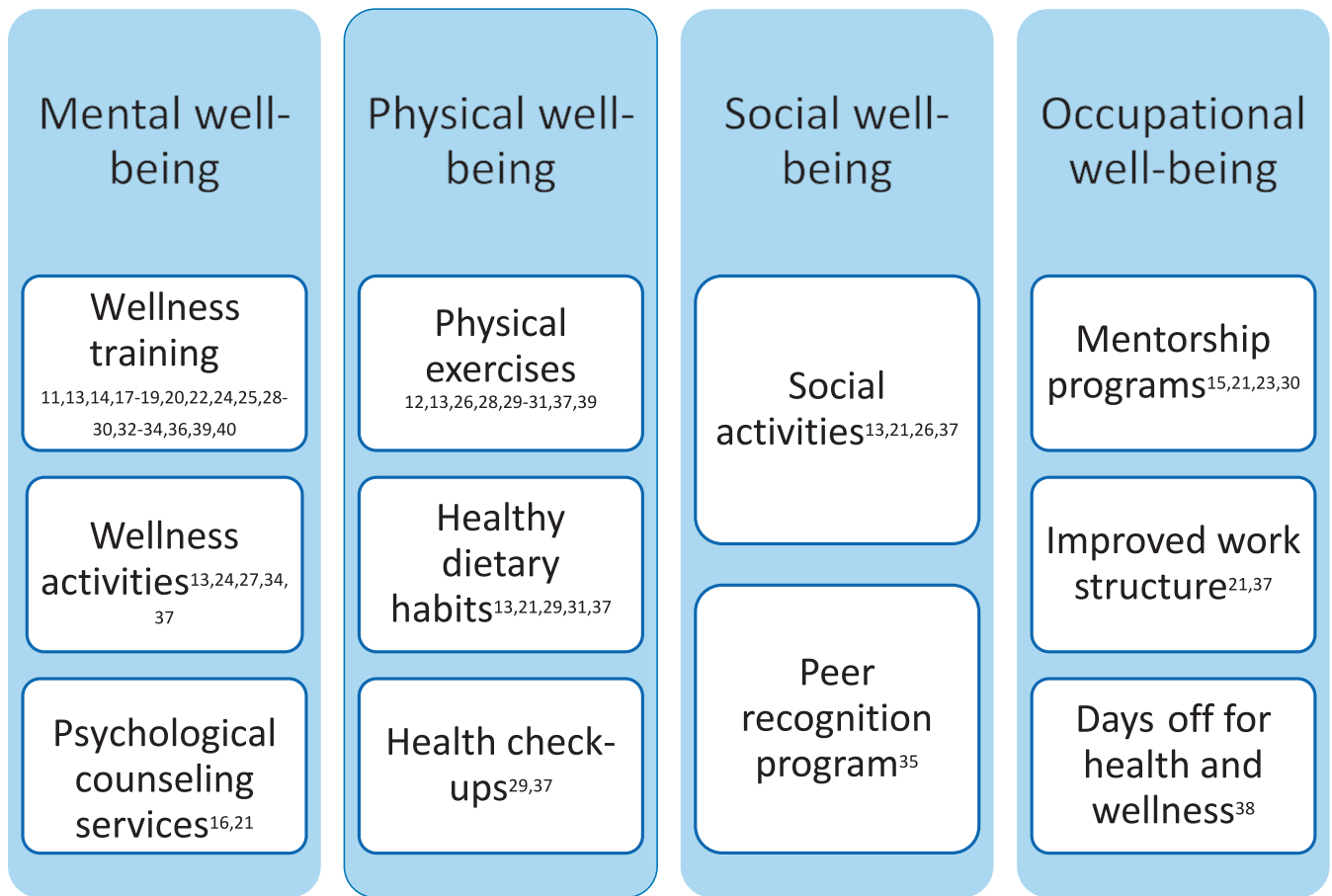


Figure 2. Burnout program content.

programs addressed occupational well-being, and only 2 programs^{21,37} addressed resident work structure. Burnout is an occupational phenomenon that cannot be mitigated by focusing only on individuals, and effective solutions have to involve occupational wellness initiatives.⁴¹ Organizational and systemic changes should also be explored to prevent burnout. Wellness training programs have been the most extensively and rigorously studied, with the effective interventions all being longitudinal programs occurring as a series of lectures with or without ongoing maintenance wellness activities during 2 months to 3 years. In addition, results on the persistent effects of wellness training were mixed, highlighting the need for ongoing support during the entire residency training period.

Many of these studies had significant flaws in their study designs. The majority of the studies used a combination of various types of burnout interventions. Although in practice resident physician burnout is a complex issue that likely requires multipronged burnout interventions, studies of such programs do not allow for conclusive evaluation of the effectiveness of an individual type of burnout intervention and also have limited generalizability. The majority of the studies also included fewer than 50 program participants and even lower numbers of evaluation participants, and the results can therefore be easily biased and lack statistical power. The lack of a control group in all but 5 studies further increases the likelihood of biases; literature has identified that resident physician burnout is influenced by

the training stage,⁴² making pretest and posttest study design, the most commonly used in this scoping review, potentially unsuitable. These biases may explain why several studies showed worse well-being assessment scores post-intervention, despite having positive feedback from program participants. Finally, and perhaps most importantly, only a subset of the studies included the use of a valid well-being assessment tool in program evaluation, with the majority of them using a combination of various assessment tools. Although versions of the Maslach Burnout Inventory were the most commonly used burnout assessment tools in this scoping review, studies have criticized the design and cost of the Maslach Burnout Inventory, as well as the nonequivalence between the full and abbreviated versions of the inventory.^{43,44} The lack of standardized well-being assessment and the conflicting results among the various assessment tools limit the validity of the study results and the ability to assess the effectiveness of different burnout interventions. Strategies to overcome these design flaws include focusing on one burnout intervention at a time; increasing sample size through the use of multicentered and/or multicohort approaches; minimizing dropout and loss to follow-up through the use of user-friendly burnout interventions, participation incentives, and frequent reminders; ensuring the presence of a well-matched control group; and using well-validated, user-friendly tools specific for burnout assessment.

Although data specific to laboratory medicine and pathology residents are lacking, based on the results from this scoping review, residency program directors and educators looking to implement wellness intervention for laboratory medicine and pathology trainees should consider a longitudinal program that focuses on wellness training, physical well-being, and work support such as mentorship and improved work structure. They should also strive to evaluate program effectiveness, taking into account the design flaws of existing studies and the strategies to overcome these flaws.

CONCLUSIONS

Longitudinal wellness training and other burnout interventions appear effective in reducing resident burnout. However, the validity and generalizability of the results are limited by the study designs.

The authors would like to acknowledge Elizabeth Uleryk, MLS, (medical literature search and health science librarian) for her assistance in the literature search.

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