



# Addressing Surgeon Burnout Through a Multi-level Approach: A National Call to Action

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## Abstract

**Purpose of Review** Physician burnout is an epidemic and there are unique aspects of surgery that dictate rates of burnout among general surgeons and surgical trainees. This review characterizes the scope of burnout and its drivers within the field of surgery and advocates for strategies to address burnout at the individual, institutional, and national levels.

**Recent Findings** Rates of burnout in surgery are increasing with higher numbers of young and female surgeons affected. Contributing factors are generally related to work-life balance, longer hours, and mistreatment in the workplace. Attempts have been made at implementing structured initiatives in an effort to combat work dissatisfaction and emotional exhaustion. Still, rates of burnout continue to increase.

**Summary** General surgeons and trainees are at high risk for burnout with resulting attrition, depression, and suicidal ideation. The solution to burnout must be addressed at individual, institutional, and national levels. Further research into the factors leading to surgeon burnout and enactment of effective strategies to mitigate burnout must be pursued.

**Keywords** Burnout · Surgeon · Wellness · Well-being · Call-to-action

## Introduction

Burnout has been defined in the context of its three key dimensions that together drive a psychological syndrome developed in response to chronic interpersonal stressors on the job, specifically in those in “healing professions” [1, 2]. *Emotional exhaustion* is the feeling of being over-extended with depletion of both physical and emotional stores. *Depersonalization* represents the negative reaction to certain aspects of the job with a sense of detachment. Finally, *reduced efficacy* implies a feeling of incompetence and/or lack of self-confidence [2]. Individuals experiencing burnout are physically and emotionally drained leading to a lack of care regarding their work performance. As burnout

rates continue to rise, greater amplified by the COVID-19 pandemic, burnout in medicine is considered to be a public health crisis.

## Burnout in Surgery

Physicians experience more burnout and dissatisfaction with work-life balance than the general population [3], and it is the only field in which individuals feel they have worse work-life balance the further they advance in their professional career [4]. Surgeons exhibit some of the highest rates of burnout and stress in the field of medicine. In a 2021 online Medscape survey of over 12,000 physicians, 42% of all respondents and 35% of general surgeons reported symptoms of burnout. Other studies demonstrate the prevalence to be as high as 50% in attending surgeons [5] and nearly 70% in surgical trainees [6, 7]. Further, it is reported that burnout, stress, and distress are 2–5× higher in surgery residents compared with the general population [8, 9]. In the trauma surgery population, only 43% were satisfied with their work-life balance and 61% reported symptoms of burnout [10]. Looking past the nuances of each of these studies,

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the bottom line is that (1) rates of burnout are on the rise and (2) it is a systemic issue that should be remedied.

## Effects of Burnout

As the prevalence of burnout has increased, the need to better understand its negative mental, physical, and social effects on physicians is more important than ever. Rates of suicide are 1.4× higher in male physicians and 2.5–4× higher in female physicians compared to the general population [11]. In trainees, suicide is the second most common cause of death in residents and the leading cause of death in male residents [12]. In surgery-specific populations, Hewitt et al. demonstrated that 24% of general surgery residents had thoughts of attrition and 4.5% had suicidal thoughts during training [13]. Female surgeons, minorities, and individuals that identify as lesbian, gay, bisexual, transgender, queer, and other sexual and gender minority (LGBTQ+) have been shown to have similar rates of burnout, but they are more likely to have thoughts of attrition or suicide [14]. Surgical residents are 2× more likely to have severe depression and 3× more likely to have suicidal ideation than their age matched peers and had rates of alcohol misuse 5× higher than the general population [8].

Physicians who experience mental health problems are less likely to seek help to avoid perceived stigmatization, potentiating an already vicious cycle and pushing physicians to self-medicate through drugs or alcohol [15]. In a cohort of New England residents, out of 300 residents from 20 training hospitals, 35% did not have a routine place for healthcare. Those without access were less likely to have had a skin exam or routine labs drawn in the preceding year [16]. Additionally, residents without access to a mental health provider were more likely to have symptoms of burnout (50% vs 36%) and depression (81% vs 62%) [16].

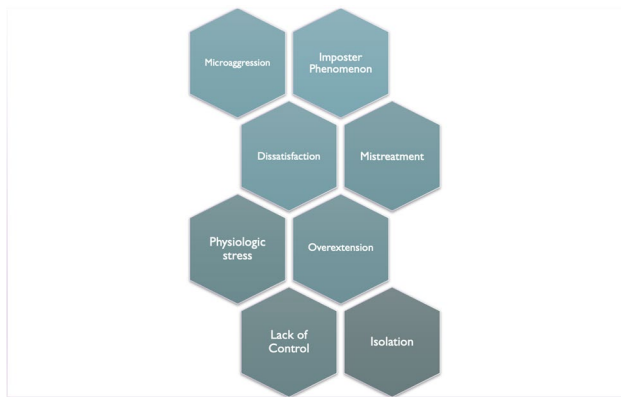
The negative effects of burnout are not restricted to the individual physician and can have a profound impact on those people around them. In regard to patient care, a systematic review published in 2017 concluded there is moderate evidence that burnout and safety-related quality of care are associated [17]. Further, it is estimated that every year, attrition and reduced clinical activity due to burnout cost the American healthcare system approximately \$4.6 billion [18]. As awareness of physician burnout has grown, efforts to tackle this problem have been implemented. Unfortunately, rates of burnout continue to increase and have placed significant strain on physicians and the healthcare system as a whole. The reason for this is multifactorial, but effective prevention of burnout is first reliant on fully understanding those elements that lead to its development.

Even the assumed level of burnout and quality of life of attending surgeons influences trainee career choices. A survey of 407 residents at 19 different programs which stratified surgical subspecialties based on quality of life (QOL) metrics and rates of burnout showed that subspecialties known to have better quality of life and lower burnout were more competitive and more enticing than low QOL and high burnout specialties. QOL was measured by hours worked per week, amount of call, and rates of work/home conflict. Family decision-making was additionally influenced by burnout and QOL, as residents with children were less likely to choose a specialty with low QOL and were more interested in high QOL fields [19]. On this survey, trauma surgery was listed as both a low QOL and high burnout specialty.

## Key Factors Associated with Burnout

Burnout is the culmination of small insults over many years. Individuals in medicine endure years of grueling higher education. Combining this with the pressure and responsibility of caring for patients and the internal motivation to succeed, it is no surprise physicians experience such high levels of burnout. Surgery presents an added level of stress that contributes to fatigue. While external and environmental influences are commonly cited as drivers of surgeon burnout, there are inherent characteristics of the individual that directly contribute to and increase one's susceptibility to burnout.

Female gender has been associated with burnout, with numerous studies demonstrating women experience more burnout than their male colleagues [20–23]. In a cohort of general surgery residents, female residents were 2.7× more likely than males to experience burnout after controlling for age, race, and hours worked [23]. Similarly, a 5-year study of surgical residents at the University of Alabama-Birmingham demonstrated that 62% of female residents met criteria for burnout compared to 55% of males [21]. Two of the largest studies of surgical residents found comparable results and reported higher rates of burnout in female residents compared to males: in 2017, a study by Dahlke et al. showed greater fatigue (58% vs 47%) and burnout (26% vs 20%) in female residents [20]. A year later, these findings were confirmed as unadjusted rates of burnout were higher in female residents compared to male residents (42% vs 36%). However, differences in burnout were negated after controlling for other variables and, more specifically, after adjusting for mistreatment [22]. This study highlighted what is likely a crucial component in the development of burnout in female surgical faculty and trainees—mistreatment and microaggressions within the workplace. These two factors, among a multitude of others, have been studied extensively in the context of burnout. These drivers are summarized into a set of key themes shown in Fig. 1. The figure is designed after



**Fig. 1** Drivers of burnout

the conceptual model of Surgical Resident Learning Environment and Well-Being by Zhang et al. which was adapted from the more generalized Shanafelt Model of Physician Burnout and Engagement [24, 25]. Figure 1 is further modified, drawing from both of these examples, to reflect surgery-specific factors of burnout.

*Microaggressions* are subtle, intentional, or unintentional insults that encourage an unhealthy learning environment and promote derogatory or discriminatory stereotypes. Related to this, *mistreatment* refers in a broader sense to any form of discrimination, abuse, or harassment. Female faculty surgeons are known to experience microaggressions more often than males, and this has been independently associated with burnout [26]. This observation is also true in trainees, as over 50% of residents have experienced at least one instance of mistreatment [22], and rates of bullying are associated with higher rates of burnout (61% vs 37%) [27]. Of those residents that reported discrimination, 80% of respondents were female. Attending physicians were more likely to make comments about having children or exhibit different standards of evaluation, co-residents were more likely to make one feel socially isolated or have negative reactions to pregnancy, and patients or family members were more likely to mistake one for a non-physician [28]. Interestingly, females with higher ABSITE scores experienced more mistreatment, whereas males with lower ABSITE scores experienced more mistreatment [28]. Beyond gender biases, LGBTQ+ individuals have experiences that may contribute to burnout. Although there are limited studies to date, those that identify as LGBTQ+ have been shown to have similar rates of burnout but higher thoughts of attrition (21% vs 11%) and suicide (8% vs 4%), likely driven by greater levels of discrimination, sexual harassment, and bullying [14].

Mistreatment and its relation to burnout have been further characterized in a multi-institutional study of seven university hospitals where disruptive behaviors were categorized as public humiliation, others taking credit for work, being

assigned work for punishment, physical abuse, threats to career, or discrimination based on gender, race, or sexual orientation [29]. The authors found that 49% of residents were at high risk for burnout, which was correlated with public humiliation [29]. When the components of burnout were classified further, emotional exhaustion was associated with public humiliation, others taking credit for one's work, being assigned tasks as punishment, and any behavior that was considered as gender-based harassment. Depersonalization was correlated with public humiliation, being assigned tasks as punishment, and threats to one's reputation [29]. All these examples may lead to *imposter phenomenon* (IP), a psychological occurrence where one doubts their own skills and has a persistent fear of failing or being exposed as a fraud. IP is reported more often by both surgical trainees and faculty that experience burnout [30].

The daily demands of surgical trainees and faculty can manifest as both physical and mental exhaustion leading to *overextension*. Total hours worked and more overnight calls are associated with burnout in attendings. In trainees, the hours worked, call taken, and violations of the 80-h work week are also related to burnout [10, 22, 23, 31]. In-house call and shift work, which are both more prevalent in the trauma surgeon population, can cause substantial *physiologic stress*, the consequences of which are not fully understood. In 2007, the World Health Organization classified night shift work as a probable carcinogen due to circadian disruption [32]. A follow-up study completed in 2015 as part of the Nurses' Health Study similarly reported the significant health effects of shift work as all cause and cardiovascular disease-related mortality was increased among women working greater than 5 years of rotating shift work when compared to women that never worked night shifts [33]. In those women that worked more than 15 years of shift work, lung cancer mortality was higher than that observed in women who did not work night shifts suggesting the potential carcinogenic effect of night shifts [33]. In a study of attending surgeons with in-house call responsibilities, it was shown that the stress related to call could persist for 2–3 nights following the call shift [34]. Additionally investigated was the effect of call on sleep patterns with results of sleep deprivation peaking on post call day 2 and returning to baseline on post call day 3. Nearly 65% of sleep patterns observed were categorized as either acute or chronic sleep deprivation [35].

Alterations in physician workflow may contribute to burnout, such as the implementation of the electronic medical record (EMR). Although widespread use of the EMR has led to improvements in both the quality and efficiency of patient care, it has resulted in countless additional hours of daily work for physicians. In an effort to comply with EMR requests and promptly respond to in-basket messages, there is concern that direct patient care has taken a backseat

to the obligations set forth by the EMR. In a study by Duke University, surgical residents spend on average 2.4 h daily and 23.7 h weekly on EMR, which equated to 38% of weekly hours being attributed to EMR usage [36]. For rotations without a night shift, EMR usage was greater after hours by service residents demonstrating the difficulty in completing charting during the scheduled workday [36]. In an observational study of 57 attending physicians, 27% of clinic time was spent on direct patient care and 49% using the EMR [37]. Of those physicians that also completed an after hour self-reported diary (21 participants), an additional 1–2 h of work was performed “off the clock,” the majority of which was attributed to EMR usage or documentation [37].

One of the most recognized factors leading to burnout is *dissatisfaction* with the job and/or one’s work-life balance. Individuals with poor work/life balance were more likely to meet criteria for burnout (77% vs 39%) [10]. Time for hobbies, consuming a healthy diet, and fair monetary compensation were associated with good work/life balance, whereas more hours worked and fewer hours at home were associated with poor work/life balance. It was reported that 24% of residents had dissatisfaction with social and community support, including a lack of mentorship, which negatively affected the learning environment and was associated with higher odds of resident burnout [38]. Resident satisfaction is related to program responsiveness in terms of conflict resolution and in offering mentorship opportunities, which in turn may result in less burnout, attrition, and suicidality [39].

Access to a support system and minimizing social *isolation*, both inside and outside of the hospital, have been associated with decreased burnout. Lund et al. showed that individuals with at least one form of community support (i.e., outside of the hospital) exhibited less burnout [40]. Surgical residents who felt they belonged to the “large group” had higher well-being and were less likely to display symptoms of burnout, depression, and attrition [41]. Residents at community-based programs may be at higher risk of lacking social and institutional support as they are nearly 15 times more likely to experience burnout compared to residents at academic programs after adjusting for age, race, gender, and hours worked [23].

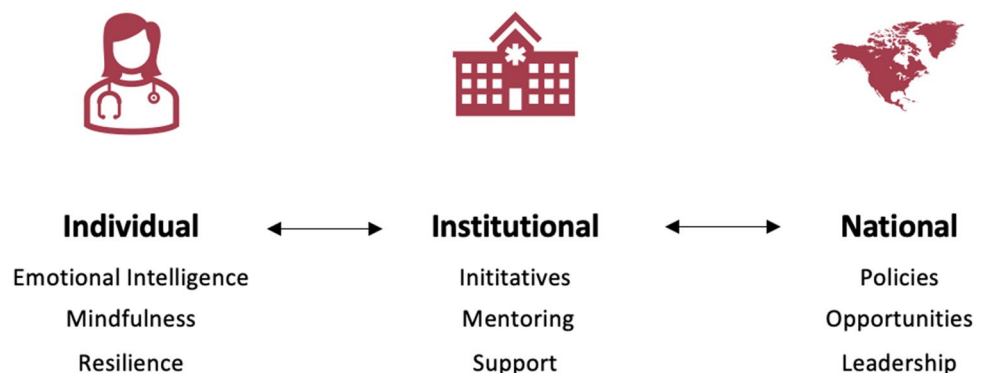
Finally, a *lack of autonomy and control* of one’s schedule may also lead to greater job dissatisfaction, fatigue, and burnout [42]. To quote Chow et al. “residents carry significant financial burdens in addition to clinical stressors, including a lack of control and autonomy in many aspects of their lives” [43]. Control over one’s schedule and life does not always improve once at attending surgeon level; it often just shifts to different tasks and responsibilities.

### Strategies to Address Burnout: Individual, Institutional, and National

Given the toll the life of a surgeon exerts on oneself mentally, emotionally, and physically, a call to action is warranted. It is evident that the issue of burnout is too prevalent and pervasive to simply be addressed by a single person, group, or process. A multi-faceted plan to address burnout is essential. This idea of addressing burnout at multiple levels was described in depth by Dr. Shanafelt et al. in a Lancet publication in 2016 [44]. Further exploration of this topic in the Journal of Internal Medicine described how addressing burnout should be a “shared responsibility across healthcare systems, organizations, institutions and individual physician.” [45]. Most recently, in October 2022, the National Academy of Medicine published its National Plan for Health Workforce Well-Being. This model creates a Clinician Well-Being Collaborative Systems Map which is a multi-item intertwined web including health systems, patients, health workers, academic institutions, professional and specialty societies, clinical training programs and academic bodies, health information technology companies, insurance and payers, and federal, state, and local governments [46].

A proposed three-pronged approach, based on these aforementioned ideas, but narrowed in scope to specifically address burnout in surgeons, is demonstrated as a Conceptual Model in Fig. 2. The model includes actionable items on the individual, institutional, and national levels with defined ideas introduced at each level. The double-sided arrows in the model represent engagement

**Fig. 2** Novel conceptual model for classifying actionable measures for surgeons at the individual, institutional, and national level



**Table 1** Burnout and well-being in surgical literature at the individual, institutional, and national levels (2017–2022)

Author (et al.)	Title	Study design	Category	Level
Kratzke (2022) [50]	Self-compassion Training to Improve Well-being for Surgical Residents	Mixed-methods: pre-/post-surveys and focus groups	EI	Individual
Palamara (2022) [51]	Impact of a Virtual Professional Development Coaching Program on the Professional Fulfillment and Well-Being of Women Surgery Residents	RCT	EI	Individual
Brandt (2017) [6]	Sustaining A Career in Surgery	Perspective	EI	Individual
Standage (2020) [74]	Revitalizing the Patient-Surgeon Relationship: Surgical Curriculum Including the Patient Perspective	Pre-/post-intervention survey	EI	Individual
Song (2020) [52]	Can We Coach Resilience? An Evaluation of Professional Resilience Coaching as a Well-Being Initiative for Surgical Interns	Mixed-methods: quantitative pre-/post-intervention survey and qualitative interviews	Resilience	Individual
Lebares (2021) [53]	Enhanced Stress Resilience Training in Surgeons	RCT	Resilience	Individual
Lebares (2018) [54]	Feasibility of Formal Mindfulness-Based Stress-Resilience Training Among Surgery Interns	RCT	Mindfulness	Individual
Lebares (2019) [75]	Key Factors for Implementing Mindfulness-based	Focus groups/qualitative	Mindfulness	Individual
Saway (2021) [49]	Mindfulness in the OR: A Pilot Study Investigating the Efficacy of an Abbreviated Mindfulness Intervention on Improving Performance in the Operating Room	Pre-/post-intervention survey	Mindfulness	Individual
Allespach (2020) [57]	Practice Longer and Stronger: Maximizing the Physical Well-Being of Surgical Residents with Targeted Ergonomics Training	Pre-/post-intervention survey	Initiative	Institutional
Cerier (2022) [58]	Ergonomics Workshop Improves MSK Symptoms in General Surgery Residents	Pre-/post-intervention survey	Initiative	Institutional
Mueller (2018) [59]	A Facilitated-Group Approach to Wellness in Surgical residency	Description of initiative	Initiative	Institutional
Salles (2017) [76]	Perceived Value of a Program to Promote Surgical Resident Well-being	Pre-/post-intervention survey	Initiative	Institutional
Price (2020) [60]	Are We Making an Impact? A Qualitative Program Assessment of the Resident Leadership, Well-being, and Resiliency Program for General Surgery Residents	Interviews and qualitative	Initiative	Institutional
Kratzke (2021) [77]	Pilot Study Using Neurofeedback as a Tool to Reduce Surgical Resident Burnout	Pre-/post-intervention survey	Initiative	Institutional
DeCaporale-Ryan (2020) [78]	We Orient Residents to Surgical Life: Why Not Their Families Too?	Survey	Initiative	Institutional
Pradarelli (2020) [79]	Performance Coaching for Practicing Surgeons Enhancing Clinical Performance, Well-Being, and Trainee Experience	Perspective	Initiative	Institutional
Bui (2020)[80]	The Impact of Program-Driven Wellness Initiatives on Burnout and Depression Among Surgical Trainees	Survey	Initiative	Institutional
Garcia (2021) [81]	Resident-Driven Wellness Initiatives Improve Resident Wellness and Perception of Work Environment	Pre-/post-intervention survey	Initiative	Institutional

**Table 1** (continued)

Author (et al.)	Title	Study design	Category	Level
Bisgaard (2021) [82]	Resident Engagement in a Wellness Program in a Large Academic Residency: A Follow-Up After Two Years of Wellness	Pre-/post-intervention survey	Initiative	Institutional
Johnson (2022) [83]	Take 10: A Resident Well-Being Initiative and Burnout Mitigation Strategy	Prospective observational study and post-intervention survey	Initiative	Institutional
Riall (2018) [84]	Maintaining the Fire but Avoiding Burnout: Implementation and Evaluation of a Resident Well-Being Program	Pre-/post-intervention survey	Initiative	Institutional
Shen (2022) [61]	How We Do It: An Innovative General Surgery Mentoring Program	Description of initiative	Mentoring	Institutional
Bingmer (2019) [62]	A Model for a Formal Mentorship Program in Surgical Residency	Survey	Mentoring	Institutional
Freischlag (2017) [55]	Preventing General Surgery Residency Attrition: It is all About the Mentoring	Perspective	Mentoring	Institutional
Weis (2020) [63]	The Fuel Gauge: A Simple Tool for Assessing General Surgery Resident Well-Being	Retrospective cohort study	Support	Institutional
Chow (2022) [43]	Using Human-Centered Design to Improve a Surgery Resident Well-Being Program	Interviews and qualitative	Support	Institutional
Doherty (2019) [64]	How Do We Prevent Burnout in Surgery?	Perspective	Policies	National
Castillo-Angeles (2021) [65]	Perspectives of General Surgery Program Directors on Paternity Leave During Surgical Training	Interviews and qualitative	Policies	National
Livingston-Rosanoff (2019) [66]	Got Milk? Design and Implementation of a Lactation Support Program for Surgeons	Description of program	Policies	National
Hu (2018) [67]	The Surgical Education Culture Optimization through Targeted Interventions Based on National Comparative Data – The SECOND Trial	RCT—in progress	Opportunities	National
Moris (2018) [68]	Attrition in General Surgery Residency: Can Global and Rural Surgery Shift the Paradigm?	Perspective	Opportunities	National
Huffman (2020) [69]	Why the Lab? What is Really Motivating General Surgery Residents to Take Time for Dedicated Research	Interviews/focus groups and qualitative	Opportunities	National
Bilimoria (2020) [70]	Fanning the Burnout Fire: How Our Misconceptions and Good Intentions Could Fail Tomorrow's Surgeons	Association for Academic Surgery Presidential Address	Leadership	National
Kemp (2021) [71]	Physician Heal Thyself: A Call to Action for Prioritizing Trainee Health	Perspective	Leadership	National

and interaction between the categories, which is compulsory for sustainable and durable results. Surgeons should use these examples as a guide to tailor their own personalized wellness toolbox. Table 1 depicts studies dedicated to improving burnout under the categories of individual, institutional, and national.

## Individual

The ability to recognize and subsequently address feelings of fatigue, depersonalization, and lack of accomplishment in one's self is critical in the mission to combat burnout. Three factors positively correlated with well-being are emotional

intelligence (EI), resilience, and mindfulness. High EI has consistently been shown to protect against burnout [21, 47, 48]. Resilience, or the capacity to recover quickly from adverse and challenging situations, is inversely associated with burnout risk [9]. Prior mindfulness-based interventions have demonstrated improved performance, stress-management, and quality of life [49]. The following subsections depict specific examples in each of these categories that have shown to be successful in decreasing burnout at the individual level. Additional studies are listed in Table 1.

### Emotional Intelligence

Self-compassion, a positively described method to respond to oneself in challenging times, contributes to emotional intelligence. Common humanity and self-kindness are deemed compassionate responses. Self-criticism and isolation are negative dimensions of self-compassion and are related to healthcare worker burnout. Kratzke et al. thus modified a previously developed self-compassion program to administer to surgical residents over a 3-year period at a single academic institution [50]. The program consisted of multiple sessions over a 6-week course by certified teachers of mindful self-compassion with the goals of both explaining how self-compassion can promote well-being and to provide tools to practice self-compassion. Post-program there was improvement in depression and emotional exhaustion.

A more wide-scale example of an EI related initiative is the randomized control trial (RCT) conducted nationally examining the impact of a virtual Professional Development Coaching Program on 237 women surgery resident participants [51]. Coaching has been shown to promote reflection while strengthening awareness and motivation. Through the Association of Women Surgeons, female surgery residents were recruited and randomized to intervention with three 1:1 coaching sessions over a nine-month period or the control group which entailed receiving wellness resources via email. Those in the intervention group had an increase in personal fulfillment, self-valuation, PERMA scale (positive emotion, engagement, relationships, meaning, and accomplishment), and decrease in burnout.

An opinion piece was published in 2017 in the *American Journal of Surgery* entitled “Sustaining a Career in Surgery” [6]. The article points out the high attrition rate of trainees emphasizing the need to highlight the importance of well-being early in the surgical career path. A table in the article lists individual emotional strategies which include the following: “protect and mature important relationships, debrief with trusted friends and family after stressful events, and seek professional help for symptoms of depression or anxiety.” These recommendations are pertinent from intern year to a surgeon nearing retirement.

### Resilience

In a single-institution study, surgical interns attended 8 resilience coaching sessions by a certified professional coach over the course of one year. The course included both group and individual components with the individual sessions specific to the resident’s needs. The residents stated the sessions provided useful skills and appreciated being able to talk to an unbiased party about any issues they may be struggling with at work or in life [52]. The Brief Resilience Scale scores increased significantly, though the interns noted that people who were more dedicated to the program likely got the most out of it. The PGY-1 residents had concerns with the durability of the coaching program; thus, feedback was to have the sessions for all years of residents, not just interns [52].

Two small randomized trials were performed to determine the effects of Enhanced Stress Resilience Training (ESRT) in surgeons [53]. At two institutions, ESRT was given to surgical interns for 8 weekly 2-h classes. The results demonstrate that ESRT may benefit executive function, burnout, and psychological distress. The authors recommend further tailoring the intervention for more optimal results.

### Mindfulness

Lebares et al. performed a pilot RCT of a modified mindfulness-based stress resilience training on surgical interns over the course of 8 weeks [54]. The structure included 2-h classes and 20 min of suggested practice at home. The results demonstrated that the interns were feasibly and independently able to integrate learned mindfulness skills into personal and professional settings.

A pilot study investigating mindfulness in the operating room was performed at the Medical University of South Carolina [49]. Described as a brief intervention, a 25-min mindfulness training and a 4-min audio recording of a breath awareness practice were administered to attendings, residents, and anesthesiologists in attempts to improve mindfulness, focus, and stress. The authors concluded that the intervention is feasible and efficient and improved factors associated with burnout including decreasing stress and increasing mindful awareness.

### Institutional

While individual insight is crucial to abate burnout, it is too large an issue to remain at this level alone. To quote Lebares et al. “to address burnout and distress in medicine, institutional change is necessary” [53]. Since the detrimental effects of burnout have been brought to light in the surgical community, multiple hospitals and residencies began to incorporate strategies into their programs in attempts

to alleviate burnout. This section highlights institutional endeavors across the country, specifically focusing on initiatives, mentoring, and support. The different initiatives are varied in duration and time-commitment with diverse efforts trialed across the country. Additionally, many expert opinions call attention to the importance of mentorship in surgery [55]. Unique surgical mentorship models have been described, with the intent of creating long-lasting and trusting relationships. Of note, Accreditation Council for Graduate Medical Education (ACGME) Program Requirements state “self-care and responsibility to support other members of the healthcare team are important components of Professionalism” [56]. The takeaway of the support aspect is the importance of the department’s willingness and assistance to personalize and adapt these initiatives to maximally benefit the group. In Table 1, the studies dedicated to improving burnout at the institutional level are detailed, a representative sampling described below.

### Initiatives

Ergonomics training has been a popular adjunct to well-being initiatives given that studies demonstrating physical pain are positively correlated with burnout and posture may be associated with depression. The University of Miami piloted a 3-module training course taught by physical therapists over the span of one year. After completion of the modules, 85% of residents reported reduced neck and lower back pain and 93% stated they believed they would “physically perform better in the operating room” [57]. A study out of Northwestern organized a didactic teaching and a personal posture coaching session for their general surgery residents which both improved knowledge about ergonomics and reduced the severity of residents’ musculoskeletal symptoms [58].

As a response to increasing rates of burnout in surgeons nationally, a program called “Balance in Life” was established at one residency program. Elements of Balance in Life include 24-h fridge with snacks, peer mentorship program, annual team building retreats, weekly facilitated group intervention, and 90-min therapy sessions every 6 weeks with a psychologist. The faculty have ensured protected time for residents to be able to attend. The authors note how having contact with a licensed therapist through the program has in turn led to residents seeking their therapists independently [59].

At the University of Arizona in Tucson, a formal resident well-being and resilience program was instilled through monthly experimental sessions [60]. The sessions occur during educational time and are interactive, based on energy leadership, which is an executive coaching model. A qualitative assessment showed that the skills were applicable to daily life as a resident and they are working to further modify and tailor the program to evolving needs of the residency. This intervention decreased residents’ perceived stress and

emotional exhaustion while it improved their life satisfaction and emotional intelligence.

### Mentoring

Structured mentoring programs have also been associated with decreased burnout and attrition rates. Lack of faculty mentorship has been associated with lower scores of personal fulfillment [40]. In a novel and innovative mentor structuring system, a group at University of Michigan came up with anastomosis families [61]. The mentoring program consisted of vertical groups (7) with 1–2 medical students, a PGY-1 intern, a PGY-1 research resident, and a faculty member. The groups had casual meetings every 3–4 months with an agenda of half the meeting focused on reflection and the other half holding an evidenced-based discussion on a surgical topic. The researchers hope to analyze and publish the perceptions of this program in a mixed-method study in the next 1–2 years.

At University Hospitals in Ohio, Bingmer et al. created a model for formal mentorship in residency [62]. It was structured as a year-long program with assigned mentors with two social events and recommended mentorship meetings. After the intervention, there was an improvement of resident perception of faculty in the categories of involvement and support, which can be seen as protective against burnout and attrition.

### Support

Departments, in essence, determine success of aforementioned initiatives by demonstrating their dedication and prioritization of the efforts. Specifically, the department needs to be flexible to resident and faculty scheduling to increase attendance, offset clinical responsibilities during these times, and not just recognize but champion the importance of the interventions [50]. If the leadership in the department is not supporting the anti-burnout initiatives, the fear is they will not be well-attended or strictly enforced [52].

At Stanford, a team created a human-centered design (HCD) sprint where residents over a 1-h time period interviewed one another regarding what is most important for their own well-being during residency. Of the participating residents, 77% deemed well-being lectures, emails, and curriculum “Not Useful” and 42% replied the same “Not Useful” in regard to mental health reflection and therapy. For the response of “Most Useful,” 42% of residents responded with scheduled breaks or free time, and there was a strong preference for increased social activities. This initiative demonstrates support by soliciting feedback on previous and current interventions. The responses are sent to department leadership to effect changes and continue work to optimize their wellness programs. The authors summarize the importance of tailoring programs and opportunities specifically to the needs of their own residents [43].



Another simple and time-efficient tool that may be used to quickly assess well-being weekly is fuel gauge [63]. This single-item survey was distributed over 2 years at the University of Texas Southwestern (UTSW) Medical Center with the question “Overall my well-being fuel tank is” and the response 1–5 on a Likert score from empty (1) to full (5). There is a space to add any additional comments if desired. The residents reported it was feasible and well-received while the program administrators valued its utility in ascertaining which residents may be struggling. When a score of 1–2 was submitted, the program director (PD)/associate program director (APD) would reach out to the resident and check in, offer support, or give certain resources as needed.

## National

The ultimate component of the call to action for addressing burnout exists at the national level. It is imperative to recognize that without the aid and encouragement of national surgical organizations, individual and institutional ventures have limitations. National committees and leaders dedicated to surgeon well-being both strengthen and enforce the cause. Official policies legitimize and ensure durability of proposed solutions. Opportunities created across state lines increase camaraderie and provide for an exchange of ideas at a broader level. National leaders have a responsibility to their constituents to prioritize the surgeon epidemic of burnout. Examples of papers exhibiting national-scale effects are displayed in Table 1.

## Policies

In an opinion piece, the author states that people need to embrace the generational changes and accept changes, many for the better, in what is expected from oneself, our co-workers, and our employers. Progressive policies need to be instated including, but not limited to, parental leaves, mid-career retraining, part-time work opportunities, and an emphasis on career development [64]. There is also mention of the utilization of medical scribes and/or other routes to decrease the burden of documentation. The administrative burden of documentation is both something that is not required for a physician to practice their profession and that can be performed by other individuals with training in this area. However, until policies are put into place to offload clerical work to another party, physicians will continue to experience increased dissatisfaction with the job and a reduced sense of personal accomplishment.

Conflict between family obligations and work as a surgeon has been linked to decreased career satisfaction and burnout. This phenomenon has been demonstrated in both

sexes; thus, progressive policies in categories such as breast-feeding and maternal/paternal leave are critical. Paternal leave has been a controversial topic, and thus, Castillo-Angeles et al. sought to identify program directors’ perspectives on the issue [65]. They found that male residents tend to take shorter leaves than desired due to fear of stigma. Lactation support programs have been developed for surgeons as well [66]. Creating a formalized policy emphasized that wellness was a priority of postpartum residents by the chair and department. Greater strides should be taken to solidify these policies at a national level.

## Opportunities

The Surgical Education Culture Optimization through targeted interventions based on National comparative Data (SECOND) Trial implores quality performance improvement methods in attempts to reduce trainee burnout and mistreatment [67]. There are 215 surgical residency programs enrolled currently in the trial. By interpreting ABSITE survey data from residents (individual), the SECOND trial principal investigators (PI’s) discuss feedback with each program (institutional) across the country (national). This is an ideal approach to integrate all three of the levels through one study. By identifying areas for improvement unique to each residency, a program personalized wellness toolkit is then created to guide recommendations.

It is suggested to offer rural and global rotations as part of the residency curriculum [68]. The thought is participation in humanitarian efforts rekindles the passion for a career in surgery. Additionally, the diversity of cases and commitment to communities may expand breadth of skills, facilitate interpersonal relationships and connections with patients, and overall strengthen one’s passion and commitment to surgery, thereby having positive effects on resilience.

Another important discussion is the opportunity to pursue other endeavors in research and professional development. More than one-third of surgical trainees pursue time off from clinical residency for these reasons. The motivation for going into lab years seems to be threefold: career planning, professional development, and personal rejuvenation [69]. The authors state “the need to take time off for more personal reasons, including burnout, was pervasive.” Another quote from the qualitative study of note was “I think it gives you time to really take back some of your time and take back some of your focus, and really put energy into the things that energize you and make you excited about choosing this career in the first place.” Seen as a positive in many aspects, it should be questioned why faculty are not easily offered similar opportunities for their personal growth and well-being.

## Leadership

National leaders emphasizing and modeling the importance of well-being in surgery are of utmost importance. Described best by Song et al. in their *Journal of Surgical Education* paper in 2020, there is a “general consensus that well-being initiatives would not be strictly enforced unless there was buy-in from leadership.” Having presidential speeches at large conferences highlighting the importance of adequately recognizing and addressing burnout. During the 2020 Association for Academic Surgery Presidential Address, a talk was given to this effect [70]. The address combined discussing aspects of the SECOND trial with giving general recommendations to stop “Fanning the Burnout Fire.” These include embracing change, appreciating trainees, stopping bullying, focusing on wellness, modeling excellent behavior, and giving feedback and mentorship.

Additionally, surgeons taking time to write opinion pieces about preventing burnout in surgery are necessary and beneficial to the cause. For instance in a piece called “Physician Heal Thyself” by a team at University of Michigan with the senior author being the section head of general surgery, they call for a dissolution of structural barriers as well as combating slow to change cultural factors [71]. A few examples given are eliminating guilt for prioritizing one’s own health, building a sense of community to be invested in co-worker’s health, and normalizing self-care.

Leaders throughout all fields of medicine have recognized the importance of support on the national level. One such example highlighting organizational involvement is the extensive list of resources created by the American Medical Association (AMA). Easily accessible on their website, the AMA offers an array of approaches to improve well-being in medical practices. One such example is the AMA STEPS Forward Program which details eight practice innovation topics from time-saving practices to behavioral health integration. There are webinars, videos, podcasts, toolkits, and more resources available to appeal to a wide audience. Though the AMA is not a surgeon-specific organization, their efforts are still applicable to general and trauma surgeons and imitable for a surgical society to construct surgery-specific resources and strategies [72].

## Conclusion

There is no question that burnout is a widespread issue in the medical community. Combating elements of burnout that are uniquely applicable to surgeons has become the focus of many researchers. This is especially important given the declining rate of general surgery applicants in an era where there is already a shortage of surgeons in the United States [73]. While being central to important

discussions among leaders and surgeons across the country, few proposals have reached national merit and are universally accepted. Additionally, while many of the investigations have focused on resident well-being, there is no reason why these initiatives and opportunities cannot be applied to attending surgeons as well, especially in the field of trauma surgery, which as a subspecialty has been known to exhibit some of the highest levels of burnout.

Neither the concept of burnout nor initiatives proposed to address this epidemic in a surgery-specific way are new to the literature. However, to date, there has yet to be a paper classifying and structuring ideas to improve surgeon well-being using a multi-level approach. Identifying how and where these opportunities can be enacted in a clear and concise manner will serve as a resource for years to come. The framework of the three-level approach lends to an efficient way to establish a solution or trial a suggestion appropriate for any given situation. It is anticipated that more initiatives and opportunities will arise over the next few years and thus this body of work will have new additions and be further enriched. The ability to have an accessible guide to describe the diverse interventions should not be understated. This call to action directory may be utilized by surgeons at various stages of their careers, institutions both at the resident and faculty level, and nationally from well-known surgical leaders and by large surgical organizations.

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