



FACTORS MEDIATING BURNOUT

IN MEDICAL RESIDENTS AND INTERVENTIONS TO ADDRESS THEM



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Burnout in Medical Residents

An Annotated Bibliography

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Methods (brief)

The PubMed database was searched for relevant literature using specific search terms including “burn-out”, “residency” and “resilience”. Papers not relating to residency in the United States, in languages other than English and prior to 20 years ago were omitted from the search results. The search results were further narrowed to meet criteria relevant to the topic and the target audi-

ence. While the majority of papers related specifically to residents, several pertaining to recent graduates of residency programs or practicing physicians were included for completeness and relevance. These have been marked with an asterisk. Systematic reviews and meta-analyses were prioritized but relevant clinical trials and case studies were included as well. ■

Executive Summary

Burnout among medical residents has received attention in the medical literature in recent years for its impact not only on physician quality of life, but also on professionalism and clinical performance, including tendency to commit medical error (West 2009). Although burnout has been defined in different ways depending on the body of work, it is most commonly defined according to the Maslach Burnout Inventory (MBI). While the MBI is a 22-item evaluation, research¹ suggests that burnout among medical professionals may be adequately predicted using only the responses to two of these items, emotional exhaustion (“I feel burned out from my work”) and callousness (“I have become more callous toward people since I took this job”). Recent literature investigating physician burnout often defines burnout according to affirmative reply to one or both of these two items with a frequency of one or more times per week, and the American Board of Family Medicine (ABFM) shares this definition in analyzing its annual Graduate Survey.

Existing research on resident physician burnout falls into two major categories: factors contributing to burn-

out, and interventions to address burnout and its impact. Within the first category, the literature includes factors at both the individual and workplace levels. The individual-level factors included in previous literature include demographic descriptors, which encompass age, gender, race or ethnicity. The body of research around these factors suggests that risk of burnout increases with younger age, female gender, White race, and non-Hispanic ethnicity. These factors also include social considerations such as culture, marital status, parenting status or family stress. Here, the literature suggests that single residents are at higher risk of burnout than those who are married, that family stress predisposes to burnout, that time spent with family or other social supports is protective against burnout, and that having children is correlated with lower scores on both emotional exhaustion and depersonalization. Individual factors further include psychological modulators like psychological flexibility, resilience, healthy habits, anxiety levels, depression levels, empathy levels, alcohol or substance use, awareness of meaning in life (also referred to as meaning salience), and perceived self-efficacy. Authors draw correlations between

1 West, CP et al (2009). “Single item measures of emotional exhaustion and depersonalization are useful for assessing burnout in medical professionals.” *Journal of General Internal Medicine* 24(12): 1318-21.

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anxiety, depression and substance use and risk of burnout, and further find that factors including psychological flexibility and resilience, healthy habits, higher empathy levels, meaning salience, and greater personal efficacy may protect health professionals against burnout. Finally, some previous research has also investigated academic success as an individual-level burnout modulator. In findings from general surgery, orthopedic surgery, and internal medicine, poor performance on the annual in-training exam (ITE) has been shown to be correlated with higher levels of burnout. However, in a recent study of residents in emergency medicine, there was no relationship established between academic struggle and burnout.

Workplace factors contributing to resident physician burnout, on the other hand, include medical specialty, region of practice, scope of practice, weekly hours worked, and access to mental health services. Importantly, workplace factors also encompass the nature of the work environment, which in turn includes measures such as satisfaction with clinical faculty. The findings on the relationship between medical specialty and burnout do vary somewhat from one analysis to another, but most find that surgical specialties and emergency medicine have higher rates of burnout than nonsurgical specialties. Several such studies fail to establish statistical significance in the differences in burnout rates between specialties. Family Medicine is cited in one study as having the lowest rate of burnout of any specialty (Low et al), and in another as having among the lowest rates of depersonalization (Rodrigues et al), although family practice physicians do demonstrate higher levels of depersonalization than psychiatrists in at least one study (Woodside et al). In addition to choice of specialty, workplace factors that can predispose resident physicians to burnout include working >80 hours per week, sensing a lack of control over work, having inadequate documentation time, being required to use an EMR at home, and experiencing job-related stress. On the other hand, two

separate studies indicate that being given more personal time or protected time decreases rates of burnout.

The resident physician burnout literature increasingly includes not just factors mitigating the prevalence and severity of burnout, but evidence on the development of interventions to improve burnout symptoms. These interventions range from short programs (as little as 4 hours) to longer, longitudinal cohort studies (up to two years), and incorporate a variety of tactics including access to counseling or therapy, residency support groups, stress management workshops, residency retreats, mindfulness curriculum, resilience training, and artistic analysis. Although implementations tend to be small, often limited to a single residency program or practice site, some interventions have instituted evaluation standards that suggest these curricula may help to reduce burnout through lower stress, better mental health, and enhanced resilience.

Burnout, frequently defined as emotional exhaustion or callousness based on the Maslach Burnout Inventory, has received significant attention within the medical community due to its negative impact on physician wellness and performance. The current literature demonstrates that certain demographic factors and psychological modulators make up the individual factors leading to resident burnout, while academic struggle and workplace factors such as scope of practice or specialty choice may also play a role. While there is some research on interventions to improve resident burnout, these studies are limited and lack generalizability. Although the body of literature on burnout among physicians is growing, there is room for more investigation into burnout factors within specific specialties, and more widespread longitudinal interventions to alleviate burnout. Addressing these knowledge gaps may facilitate a better understanding of the scope of the burnout problem, and lead to better outcomes for both physician wellness and patient care. ■

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Factors contributing to burnout

Individual factors

Demographic, social and psychological factors

The literature demonstrates that certain individual characteristics are associated with burnout while others are protective against it. Possible protective factors against burnout are psychological flexibility, optimism, resilience, forming meaning salience, reading for relaxation and developing healthy habits. Factors that are associated with increased burnout are working greater than 80 hours/week, predominantly working overnight shifts, being in the first year of training, experiencing gender-based discrimination, consuming more alcohol, experiencing family-related stress, being of non-Hispanic White ethnicity and having poor quality sleep. There were mixed findings in the literature on the correlation of marital status and having child dependents on burnout. ■

Barnes, K. Lauren, et al. "Gender bias experiences of female surgical trainees." *Journal of Surgical Education* 76.6 (2019): e1-e14.

The authors analyzed the impact of gender-based discrimination on female surgical trainees at a major academic center using the *Sexist Microaggression Experiences and Stress Scale (Sexist MESS)*. They found that female trainees universally reported experiencing gendered exclusion in the workplace. Quantitative analyses show that female trainees in male-dominated fields are more likely to experience microaggressions from both male and female superiors, nursing staff, cleaning staff and patients than those in female-dominant fields. Those who reported increased gender bias and discrimination also reported that they would be likely to leave their profession early or not recommend their profession to other trainees.

Bellolio, M. Fernanda, et al. "Compassion fatigue is similar in emergency medicine residents compared to other medical and surgical specialties." *Western Journal of Emergency Medicine* 15.6 (2014): 629.

The authors surveyed 255 emergency medicine residents, examining burnout correlation with hours worked and family structure. They find that burnout levels are higher for those residents who work >80 hours per week and who primarily work overnight shifts. They further find that secondary traumatic stress levels are higher in residents who work >80 hours per week, and in those with child dependents.

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Buck, Katherine, et al. "Family physician burnout and resilience: a cross-sectional analysis." *Family Medicine* 51.8 (2019): 657-663.

The authors administered a survey to 295 Family Medicine residents and attending physicians to study the impact of demographic variables on four components of burnout (depersonalization, emotional exhaustion, accomplishment, and resilience). They found that depersonalization was positively predicted by younger age, non-Hispanic white ethnicity, and lower resilience. Emotional exhaustion was also positively predicted by non-Hispanic white ethnicity, increased work stress (administrative and practice-based issues), fewer healthy habits, and lower resilience. Accomplishment was positively predicted by greater psychological flexibility, more healthy habits, and greater resilience. Finally, resilience was positively predicted by younger age and greater psychological flexibility.

Dyrbye, Liselotte N., et al. "Association of clinical specialty with symptoms of burnout and career choice regret among US resident physicians." *JAMA* 320.11 (2018): 1114-1130.

In a study of 4696 resident physicians from a variety of medical specialties in the United States, the authors followed the participants from the first year of medical school through the second year of residency training. They found that characteristics associated with higher risk of reported symptoms of burnout included female sex and higher reported levels of anxiety during medical school. Conversely, a higher reported level of empathy during medical school was associated with a lower risk of reported symptoms of burnout during residency. The specialties with higher relative risk of burnout than Internal Medicine included urology, neurology, emergency medicine, ophthalmology, and general surgery. Both higher levels of burnout and clinical specialty choice were significantly associated with career choice regret.

Dyrbye, Liselotte, et al. "Association of racial bias with burnout among resident physicians." *JAMA Network Open* 2.7 (2019): e197457-e197457.

In this study, the authors follow participants through medical school and residency, ultimately including 3392 nonblack resident physicians in their sample. They find that burnout in the second year of residency training is positively correlated in a multivariable analysis with greater levels of explicit and implicit racial bias. Moreover, there is a dose-response relationship between increase in depersonalization between second and third years of residency and increase in explicit bias during the same time period.

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Eden, Aimee R., et al. "Burnout among family physicians by gender and age." *The Journal of the American Board of Family Medicine* 33.3 (2020): 355-356.

The authors administered an online survey to 2176 practicing Family Medicine physicians regarding burnout and their responses to mitigate burnout. Female respondents reported that they reduced burnout by reducing work hours or seeking domestic help, while male respondents sought out hobbies. This gender difference in approach to relieve burnout can be relevant to producing interventions.

Hooker, Stephanie, Robert Post, and Michelle Sherman. "Awareness of meaning in life is protective against burnout among family physicians: a CERA study." *Family Medicine* 52.1 (2020): 11-16.

The authors conducted an online survey of 231 Family Medicine residency program directors through the Council of Academic Family Medicine (CAFM) to investigate the relationship between burnout, as defined by depersonalization and emotional exhaustion, and awareness of meaning in life (called meaning salience). They found that those program directors who experience greater meaning salience have significantly less self-reported burnout, less fatigue, and greater quality of life.

Houser, Melissa Marotta, et al. "Wellness skills for medical learners and teachers: perspective taking and cognitive flexibility." *MedEdPORTAL* 14 (2018).

Based on literature that links greater cognitive flexibility with lower burnout rates, the authors documented the development of a program to increase cognitive flexibility. This curriculum was implemented with a mixed group of resident physicians, attendings, rotating medical students and administrators, and pre and post-intervention cognitive flexibility was measured according to two scales: the Cognitive Flexibility Scale (CFS) and the Physician Wellness Inventory Cognitive Flexibility sub scale (PWI-CF). The group showed an increase in the mean score on both assessments after completing the curriculum, and qualitative findings indicated that participants felt more able to exercise empathy and cognitive flexibility after the workshop, although no statistical analysis was conducted.

Ishak, Waguih William, et al. "Burnout during residency training: a literature review." *Journal of Graduate Medical Education* 1.2 (2009): 236-242.

This meta-analysis of the burnout literature encompasses fifty-one studies published between 1974 and 2009. The authors find that the rate of burnout in medical residents varies between 27% and 75% depending on specialty. They identify a host of factors as contributing to early career burnout in physicians, including time demands, lack of control, work planning, work organization, inherently difficult job situations, and interpersonal relationships. They divide potential interventions to mediate burnout into individual-level (promoting

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interpersonal professional relations, meditation, counseling, and exercise) and workplace-level (education about burnout, workload modification, increasing the diversity of work duties, stress management training, mentoring, emotional intelligence training, and wellness workshops).

Janko, Matthew R., and Matthew R. Smeds. “Burnout, depression, perceived stress, and self-efficacy in vascular surgery trainees.” *Journal of Vascular Surgery* 69.4 (2019): 1233-1242.

The authors conducted an online survey of 177 vascular surgery resident physicians and found that those in the highest quartile of burnout are more likely to be moderately or severely depressed, to have higher stress scores, to have lower social support and lower self-efficacy, and are more likely to indicate that they would choose a career other than vascular surgery if they were able to do it again. They further find that lower burnout scores are correlated with increased program mentorship and access to program-sponsored social events.

Lebensohn, Patricia, et al. “Resident wellness behaviors.” *Fam Med* 45.8 (2013): 541-549.

The authors used an online survey to measure stress, depression, life satisfaction, and burnout in 168 first-year Family Medicine resident physicians. They found that those residents who were in the highest risk group for burnout also had statically significant higher levels of perceived stress, drank more alcohol, were less likely to wake up feeling rested and reported lower life satisfaction.

Marchalik, Daniel, et al. “The impact of institutional factors on physician burnout: a national study of urology trainees.” *Urology* 131 (2019): 27-35.

The authors surveyed 211 European urology resident physicians about burnout and found that 68% of respondents met the criteria for burnout. They further discovered that, in univariate modeling, lower levels of burnout were observed in those who read for relaxation, regularly spent time with family and friends, had access to a structured mentorship program, and had greater access to mental health services. They further found that residents who worked greater than 80 hours a week were more likely to exhibit burnout than those who worked fewer hours. Following multivariate analysis, only access to mental health services and reading for relaxation were found to be statistically significantly associated with lower levels of burnout.

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Martini, Shahm, et al. "Burnout comparison among residents in different medical specialties." *Academic psychiatry* 28.3 (2004): 240-242.

The authors conducted a study of resident physicians across different specialties including Family Medicine at the Wayne State University School of Medicine. They found that burnout rates were not statistically significant according to specialty or number of hours worked, but that there is a significant association between burnout and being in the first year of training, being dissatisfied with clinical faculty, being unmarried, experiencing family-related stress, and having lower mood.

Michels, Philip J., et al. "Anxiety and anger among family practice residents: a South Carolina family practice research consortium study." *Academic Medicine* 78.1 (2003): 69-79.

This paper examines depression, anxiety, mood, burnout, and anger levels in a sample of 350 resident family physicians. The authors find that levels of anxiety and anger are lower in this sample of family physicians than among physicians of other specialties, and among adults in the general population. Furthermore, the authors find that although residents experience more hassles than the average member of the general population, they do not consider them severe. However, they also note that higher than average levels of depersonalization are present among male physicians, Caucasian physicians, and residents in their third year of training.

Papp, Klara K., et al. "The effects of sleep loss and fatigue on resident-physicians: a multi-institutional, mixed-method study." *Academic Medicine* 79.5 (2004): 394-406.

The authors studied 149 resident physicians across different specialties who responded to a quantitative questionnaire assessing sleepiness and workplace sleep attitudes. They found that 84% of residents report Epworth Sleepiness Score (ESS) in the range for which clinical intervention is indicated, and that residents report that sleepiness or sleep deprivation leads to decreased learning and retention, decreased ability to meet the demands of work, decreased empathy toward patients, decreased quality of interpersonal relationships, and decreased physical and emotional health.

West, Colin P., et al. "Burnout and distress among internal medicine program directors: results of a national survey." *Journal of general internal medicine* 28.8 (2013): 1056-1063.

This paper draws from the 2010 Association of Program Directors in Internal Medicine annual survey, which is sent to 377 program directors (representing 99% of the full population). They find that 28.7% of the sample reported burnout, and that symptoms are more common among younger program directors, women, and people working more weekly hours.

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Puffer, James C., et al. "Prevalence of burnout in board certified family physicians." *The Journal of the American Board of Family Medicine* 30.2 (2017): 125-126.*

The authors of this paper administered the Mini Z burnout survey to a subset of practicing family physicians taking the 2016 recertification exam, ultimately surveying 2099 family physicians. Of those, 24.5% report symptoms of burnout, with female physicians and younger people being at especially high risk.

Woodside, Jack Richard, et al. "Observations on burnout in family medicine and psychiatry residents." *Academic Psychiatry* 32.1 (2008): 13-19.

The authors surveyed 155 residents in Family Medicine and Psychiatry at East Tennessee State University College of Medicine at fixed intervals over a three-year period using the Maslach Burnout Inventory and Work Environment Scale. They found that women score significantly lower than men on the depersonalization domain of burnout, and that residents who have children scored lower on both depersonalization and emotional exhaustion. Residents from the U.S. had higher levels of both depersonalization and emotional exhaustion than those from other countries. In comparing residents in the two specialties, Psychiatry residents experienced less depersonalization and emotional exhaustion than Family Medicine residents. Finally, younger residents tended to have higher depersonalization scores, and no significant differences were reported in burnout depending on marital status.

Academic achievement

There are several studies examining the effect of low academic performance (measured by in-training exam scores and other board scores) on physician burnout across specialties including Emergency Medicine, Internal Medicine and various surgical specialties. While some studies found that lower in-training exam scores were associated with increased burnout, other studies failed to demonstrate a statistically significant relationship. One study found that there was an increase in reported burnout among Internal Medicine residents who report that they have made medical errors. These differences may be specialty dependent, and no published literature currently exists on academic performance and burnout in Family Medicine. ■

Smeds, Matthew R., et al. "Relationships between study habits, burnout, and general surgery resident performance on the American Board of Surgery In-Training Examination." *Journal of Surgical Research* 217 (2017): 217-225.

The authors surveyed 157 surgical resident physicians at 10 surgical training programs on burnout (defined by the Oldenburg Burnout Inventory), demographics, study habits, career interests, and residency characteristics in order to link these factors to scores on the American Board of Surgery In-Training Exam (ABSITE) as well

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as USMLE Step 1 and USMLE Step 2. They found that residents in the top ABSITE quartile are more likely to read work-related texts regularly, are more disciplined in study habits, and use more active study styles. They further found that those residents in the highest quartile of ABSITE scores report significantly lower rates of burnout, as measured by lower levels of exhaustion and disengagement, than their lower-scoring peers.

Strauss, Eric J., et al. "Orthopaedic Resident Burnout Is Associated with Poor In-Training Examination Performance." *JBJS* 101.19 (2019): e102.

The authors conducted a cross-sectional study of 62 orthopedic residents at a large academic institution, administering the MBI and documenting the following scores for each resident: Orthopedic In-Training Examination (OITE), USMLE Step 1, and USMLE Step 2. They found that 25.8% of residents experience at least moderate emotional exhaustion, 51.6% experience at least moderate depersonalization, and 12.9% experience at least moderately impaired sense of personal accomplishment. They found that, when controlling for level of training and USMLE Step 1 score, each 1-point increase in emotional exhaustion is associated with a 3.9 percentile decrease in performance on the OITE.

West, Colin P., et al. "A prospective study of the relationship between medical knowledge and professionalism among internal medicine residents." *Academic Medicine* 82.6 (2007): 587-592.

The authors used a longitudinal evaluation of 87 Internal Medicine residents at the Mayo Clinic in Rochester, MN to evaluate the relationship between scores on the Internal Medicine In-Training Examination (ITE and the Interpersonal Reactivity Index), which measured empathy. They concluded that medical knowledge, as defined by ITE scores, increases over the first year of training while mean level of emotive empathy decreases, both at statistically significant levels. They failed to find a correlation between medical knowledge and empathy.

West, Colin P., et al. "Association of resident fatigue and distress with perceived medical errors." *JAMA* 302.12 (2009): 1294-1300.

The authors examined data from 380 Internal Medicine residents on self-assessment of medical errors, self-assessment of quality of life and fatigue, burnout (determined by MBI), depression, and sleepiness. They found that just over 14% of residents reported that they have made medical errors, and that self-reported medical error is associated with higher sleepiness scores, fatigue, positive depression screen, overall quality of life, and burnout at statistically significant levels.

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West, Colin P., Tait D. Shanafelt, and Joseph C. Kolars. "Quality of life, burnout, educational debt, and medical knowledge among internal medicine residents." *JAMA* 306.9 (2011): 952-960.

The authors studied data from 16,394 Internal Medicine residents, including scores on the Internal Medicine ITE, demographic information, quality of life, and burnout. They found that 51.5% of their sample experiences at least one symptom of burnout, and physicians educated in the United States are more likely to experience burnout than peers who are educated abroad. They also find that women and primary care residents are more likely to experience emotional exhaustion and depersonalization. Furthermore, they found that greater education debt is significantly associated with higher levels of at least one of the components of burnout, and with lower ITE scores. Finally, the authors note that residents with poor subjective quality of life and high levels of emotional exhaustion have lower average ITE scores than their peers.

Williams, Barbara J., Sherri L. Rudinsky, and Michael J. Matteucci. "Burnout in Military Emergency Medicine Resident Physicians: A Cross-Sectional Study With Comparisons to Other Physician Groups." *Military Medicine* 185.3-4 (2020): e331-e334.

The authors looked at data from 30 Emergency Medicine resident physicians to examine the prevalence of burnout and the relationship between burnout and academic achievement. Using a definition of either high depersonalization, high emotional exhaustion or low personal achievement, they found that 73% of residents surveyed demonstrated burnout. They did not find a relationship between level of burnout and academic achievement, as defined by percentile scores on the American Board of Emergency Medicine In Training Exam (ABEM-ITE).

Workplace factors contributing to burnout

Choice of specialty, practice location and scope of practice

Studies across specialties demonstrate some differences in levels of burnout among residents of medical specialties with mixed findings. In one study, burnout scores were higher than average for Internal Medicine and lower than average for Neurosurgery. Other studies found a non-statistically significant but slightly higher level of burnout among surgical specialties or no statistically significant difference in burnout prevalence among specialties. Family Medicine was found to have the lowest prevalence of burnout. Within practicing Family Medicine physicians, increased scope of practice (physicians practicing inpatient medicine and obstetrics) was correlated with lower burnout. Among Family Medicine physicians who had completed residency, practicing in rural and medium sized towns were associated with lower burnout than large urban centers. ■

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Dyrbye, Liselotte N., et al. "Association of clinical specialty with symptoms of burnout and career choice regret among US resident physicians." *JAMA* 320.11 (2018): 1114-1130.

Fowler, James B., et al. "The Correlation of Burnout and Optimism among Medical Residents." *Cureus* 12.2 (2020).

The authors of this study assessed resident physicians across different specialties for two years in a community-based hospital using two survey instruments: a single item burnout inventory, and a Life Oriented Test Revised (LOT-R) instrument. They found statistically significant deviation from the mean burnout score in 2019 for internal medicine residents (higher than average) and neurosurgery residents (lower than average). The authors also found a statistically significant correlation between burnout and optimism in both years that they collected data.

Hogue, Amy, and Mark K. Huntington. "Family Physician Burnout Rates in Rural versus Metropolitan Areas: A Pilot Study." *South Dakota medicine: the journal of the South Dakota State Medical Association* 72.7 (2019): 306-308.*

The authors surveyed 302 graduates of a Midwest Family Medicine residency program across rural locations, medium-sized towns, and metropolitan locations to compare rates of burnout. In the completed sample of 99 surveys, they found statically significant findings that suggest rates of burnout in rural areas are lowest (25%), followed by those for residents practicing in medium-sized towns (37.5%) and then metropolitan areas (51.4%).

Ishak, Waguih William, et al. "Burnout during residency training: a literature review." *Journal of graduate medical education* 1.2 (2009): 236-242.

Jackson, Theresa, et al. "Traumatized Residents—It's Not Surgery. It's Medicine." *Journal of Surgical Education* 76.6 (2019): e30-e40.

This study surveys a sample of 1904 residents from anesthesiology, emergency medicine, internal medicine, general surgery, obstetrics and gynecology, psychiatry and surgical subspecialties for symptoms of post-traumatic stress disorder (PTSD). The authors find that prevalence of PTSD ranges between 14% and 23% between specialties, and there is no statistically significant difference. They identify the following eight risk factors as increasing the probability that a resident will display PTSD symptoms: higher postgraduate year, female gender, public embarrassment, emotional exhaustion, feeling unhealthy, job dissatisfaction, hostile hospital culture, and unsafe patient load.

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Low, Zhi Xuan, et al. "Prevalence of burnout in medical and surgical residents: a meta-analysis." *International journal of environmental research and public health* 16.9 (2019): 1479.

The authors conducted a meta-analysis of a total of 22,778 participants in 47 studies, looking at rates of burnout among resident physicians in surgical and non-surgical specialties. They found that burnout is slightly higher among surgical residents (53.27%) than non-surgical residents (50.13%) but that this difference is not statistically significant. They found that Family Medicine residents have the lowest prevalence of burnout of any residency type, at 35.97% burnout rate, but that there is no statistically significant difference in prevalence rates between specialties.

Martini, Shahm, et al. "Burnout comparison among residents in different medical specialties." *Academic psychiatry* 28.3 (2004): 240-242.

RRodrigues, Hugo, et al. "Burnout syndrome among medical residents: A systematic review and meta-analysis." *PLoS One* 13.11 (2018): e0206840.

This meta-analysis incorporates 26 papers dealing with medical residents and burnout, ultimately including a sample of 4664 resident physicians. The authors find that the overall prevalence of burnout was 35.7%, but the rate of burnout ranged by specialty. The highest risk specialties including general surgery, anesthesiology, obstetrics/gynecology, and orthopedics (40.8% burnout), while the intermediate risk specialties comprised internal medicine, plastic surgery, and pediatrics (30.0%) and the lowest risk specialties were otolaryngology and neurology (15.4%). The specialties showing the highest percentages of low depersonalization were plastic surgery (59.6%), radiology (50.8%) and family medicine (50.6%).

Weidner, Amanda KH, et al. "Burnout and scope of practice in new family physicians." *The Annals of Family Medicine* 16.3 (2018): 200-205.*

The authors analyzed data from the 2016 National Family Medicine Graduate Survey on respondents who provide outpatient continuity care. They found that 42% of respondents report symptoms of burnout, and residents who were female or U.S. medical graduates were more likely to exhibit burnout. Elements of scope of practice associated with lower burnout rates included working in more settings than the primary practice site (particularly hospital and patient homes) and providing more than the mean number of procedures/clinical areas of practice. In adjusted analysis, the authors found that practicing inpatient medicine and practicing obstetrics were associated with lower levels of burnout.

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Work environment

There are mixed findings regarding workplace factors that contribute to burnout, and how some workplace-level interventions may lead to a reduction in physician burnout at all levels of training. Among practicing physicians, lack of time to complete documentation at work and needing to take documentation and work-related tasks home was associated with increased burnout. One study found that higher personal time availability among Family Medicine residents was associated with less reported burnout, but a smaller study among Otolaryngology residents did not find that protected non-clinical time was associated with lower burnout.

There are several interpersonal factors within and outside the workplace that contribute to resident physician burnout. Increased program mentorship, accessibility to program-sponsored social events, access to mental health services and robust social support from both friends and colleagues are protective against burnout. Being dissatisfied with clinical faculty was correlated with increased burnout. ■

Bellolio, M. Fernanda, et al. “Compassion fatigue is similar in emergency medicine residents compared to other medical and surgical specialties.” *Western Journal of Emergency Medicine* 15.6 (2014): 629.

An electronic survey was completed by 191 resident physicians across different specialty areas. Survey results showed a significant increase in burnout rates among residents working greater than 80 hours/week and working more overnight shifts than day shifts.

Choi, Dongseok, et al. “Resident wellness: institutional trends over 10 years since 2003.” *Advances in Medical Education and Practice* 8 (2017): 513.

The authors surveyed over 2,200 resident physicians in Family Medicine over 10 years, finding that residents with higher personal time availability (PTA) reported less burnout. They found that there was an upward trend in PTA over time, consistent with an institutional policy implemented in 2010 that allows residents to take up to 4 half-days off per year for personal or familial health care needs. While the ACGME resident reduction in working hours also occurred during this study (2011), the authors note that findings regarding its impact on resident career satisfaction have been mixed.

Ishak, Waguih William, et al. “Burnout during residency training: a literature review.” *Journal of graduate medical education* 1.2 (2009): 236-242.

Marchalik, Daniel, et al. “The impact of institutional factors on physician burnout: a national study of urology trainees.” *Urology* 131 (2019): 27-35.

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Rassolian, Monee, et al. “Workplace factors associated with burnout of family physicians.” *JAMA internal medicine* 177.7 (2017): 1036-1038.*

The authors used data from the 2016 ABFM certification questionnaire to study 1923 physicians to examine the relationship of burnout to variables including perceived control over workload, time allotted to and spent on documentation, and work stress. The authors found that 25% of their sample report symptoms consistent with burnout using a single question that captures emotional exhaustion. They found significant associations between burnout symptoms and lack of perceived control over work, lack of adequate time for documentation, need to spend time on EMR documentation at home, and job-related stress. In adjusted analyses, positive independent associations were found between burnout and job stress and burnout and time required to complete EMR input at home.

Rogers, Eamonn, Andrea N. Polonijo, and Richard M. Carpiano. “Getting by with a little help from friends and colleagues: testing how residents’ social support networks affect loneliness and burnout.” *Canadian Family Physician* 62.11 (2016): e677-e683.

The authors used an online survey of 198 Canadian postgraduate medical trainees to examine the relationship between social supports, loneliness, and burnout. They found that loneliness is significantly associated with both personal and work-related burnout. They also found a negative correlation between friend and colleague social support levels and loneliness.

Stevens, Kristin, Cynthia Davey, and Amy Anne Lassig. “Association of weekly protected nonclinical time with resident physician burnout and well-being.” *JAMA Otolaryngology–Head & Neck Surgery* 146.2 (2020): 168-175.

The authors conducted a survey of 19 otolaryngology residents in a pilot study on protected time at the University of Michigan. During the intervention, each resident received two hours per week of protected nonclinical time for six-weeks, and also completed a control period in which they did not have access to that protected time. The authors found that the protected time intervention was associated with a mean decrease in both emotional exhaustion and the Resident and Fellow Well-Being Index Score, indicating improved well-being. They find no meaningful change in depersonalization, personal accomplishment or subjective perception of quality of life after the protected time intervention.

West, Colin P., et al. “Burnout and distress among internal medicine program directors: results of a national survey.” *Journal of general internal medicine* 28.8 (2013): 1056-1063.

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Interventions to address resident burnout

In response to rising awareness of physician burnout, residency programs have begun implementing interventions to help prevent the onset of burnout in their residents. Interventions include counselors, support groups, stress management workshops and residency retreats. These interventions seem to be more commonly offered in small and mid-sized residency programs, particularly in the West. The literature shows several interventions, including the LIFE curriculum, FRAME workshop and 1-month Family Medicine resilience, to have moderately improved burnout rates in participants. However, many of the studies have a low sample size and several showed non-statistically significant results. ■

Brennan, Julie, et al. “Effects of a resiliency program on burnout and resiliency in family medicine residents.” *The International Journal of Psychiatry in Medicine* 54.4-5 (2019): 327-335.

The authors examined an eight-hour curriculum (the LIFE curriculum) developed to reduce resident burnout and delivered by a residency program to 32 residents. Study participants were divided into intervention and control groups, and the authors found that those in the intervention group had significantly lower scores on the emotional exhaustion and depersonalization elements of the Maslach Burnout Inventory (MBI) directly after completing the program, but these results were not robust to evaluation at one, two or three years after program completion.

Gardiner, Paula, et al. “The incorporation of stress management programming into family medicine residencies-results of a national survey of residency directors: a CERA study.” (2015).

The authors conducted a national survey of 212 Family Medicine residency program directors about of the following stress management options to their residents: counselors or therapists, residency support groups, stress management workshops, and residency retreats. They found that 29% of responding programs provide all four domains of stress management options. Smaller and mid-size residency programs, and those in the West, were more likely to offer all four types of program to their resident physicians.

Goldhagen, Brian E., et al. “Stress and burnout in residents: impact of mindfulness-based resilience training.” *Advances in medical education and practice* 6 (2015): 525.

The authors examine the effects of a mindfulness-based curricular intervention for resident physicians in the Duke Departments of Family Medicine, Psychiatry and Anesthesia, using data from 30 completed resident surveys. They found that there was no significant improvement in stress, burnout, mindful-awareness, or cognitive failures either directly after completing the curriculum or at a one-month follow-up point. However, they do find limited, non-statistically significant effects in reduction of stress and burnout among female residents and residents in the first and second program years.

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Ishak, Waguih William, et al. "Burnout during residency training: a literature review." *Journal of graduate medical education* 1.2 (2009): 236-242.

Kemper, Kathi J., et al. "Do mindfulness and self-compassion predict burnout in pediatric residents?." *Academic Medicine* 94.6 (2019): 876-884.

The authors surveyed 872 Pediatrics residents enrolled at the Pediatric Resident Burnout-Resilience Study Consortium over the course of two years. They found that there were no changes in level of burnout (58%) or average level of mindfulness of these residents across the two years of study, and that the average level of stress, confidence in providing compassionate care, and self-compassion also remained essentially the same. However, after controlling for 2016 levels of stress and burnout, higher mindfulness scores in 2016 were associated with lower stress scores in 2017 and two other similar multivariate longitudinal relationships, which could indicate longitudinal relationships among mindfulness, self-compassion and burnout.

Minichiello, Vincent, et al. "Developing a Mindfulness Skills-Based Training Program for Resident Physicians." *Family Medicine* 52.1 (2020): 48-52.

The authors piloted a 10-hour mindfulness training program over the course of two months with 17 Family Medicine resident physicians. Eight residents completed the full quantitative assessment, and showed improvement in depersonalization, perceived stress, and experience of mindfulness.

Orr, Andrew R., et al. "The Fostering Resilience through Art in Medical Education (FRAME) workshop: a partnership with the Philadelphia Museum of Art." *Advances in Medical Education and Practice* 10 (2019): 361.

This study evaluates a new 4-hour workshop on visual artistic analysis (FRAME) hosted at the Philadelphia Museum of Art for 17 senior internal medicine residents. Three months after completing the workshop, the residents reported moderate improvement in emotional exhaustion, depersonalization, and a sense of personal accomplishment compared to preworkshop scores.

Runyan, Christine, et al. "Impact of a family medicine resident wellness curriculum: a feasibility study." *Medical education online* 21.1 (2016): 30648.

The authors studied the impact of a 1-month wellness curriculum administered to 12 Family Medicine resident physicians in their second year of training. At the three month follow-up point, residents who had taken the course showed increased levels of self-compassion and empathy, and lower levels of perceived stress and burnout (as defined by the three-domain Maslach scale of professional efficacy, exhaustion and cynicism).

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