

# Burnout During Residency Training: A Literature Review

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## Abstract

**Objective** Burnout is a state of mental and physical exhaustion related to work or care giving activities. Burnout during residency training has gained significant attention secondary to concerns regarding job performance and patient care. This article reviews the relevant literature on burnout in order to provide information to educators about its prevalence, features, impact, and potential interventions.

**Methods** Studies were identified through a Medline and PsychInfo search from 1974 to 2009. Fifty-one studies were identified. Definition and description of burnout and measurement methods are presented followed by a thorough review of the studies.

**Results** An examination of the burnout literature reveals that it is prevalent in medical students (28%–45%), residents (27%–75%, depending on specialty), as well as practicing physicians. Psychological distress and physical symptoms can impact work performance and patient safety. Distress during medical school can lead to burnout, which in turn can result in negative

consequences as a working physician. Burnout also poses significant challenges during early training years in residency. Time demands, lack of control, work planning, work organization, inherently difficult job situations, and interpersonal relationships, are considered factors contributing to residents' burnout. Potential interventions include workplace-driven and individual-driven measures. Workplace interventions include education about burnout, workload modifications, increasing the diversity of work duties, stress management training, mentoring, emotional intelligence training, and wellness workshops. Individual-driven behavioral, social, and physical activities include promoting interpersonal professional relations, meditation, counseling, and exercise.

**Conclusions** Educators need to develop an active awareness of burnout and ought to consider incorporating relevant instruction and interventions during the process of training resident physicians.

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## Introduction

Burnout in health care professionals has gained significant attention over the last several years. Given the intense emotional demands of the work environment, clinicians are particularly susceptible to developing burnout above and beyond usual workplace stress. Residency training, in particular, can cause a significant degree of burnout, leading to interference with individuals' ability to establish rapport, sort through diagnostic dilemmas, and work through complex treatment decision making. Overall, burnout is associated with a variety of negative consequences including depression, risk of medical errors, and negative effects on patient safety. The goal of this review is to provide medical educators and leaders with an overview of the existing factors that contribute to burnout, the impact of burnout, interspecialty variation, and suggestions for interventions to decrease burnout.

## Definition of Burnout

The term *burnout* was coined by psychologist Herbert Freudenberger<sup>1</sup> in 1974 in an article entitled “Staff Burnout” in which he discussed job dissatisfaction precipitated by work-related stress. A broadly applicable description defines burnout as a state of mental and physical exhaustion related to work or caregiving activities. A long-standing conceptual and operational definition characterized burnout as a triad of emotional exhaustion (emotional overextension and exhaustion), depersonalization (negative, callous, and detached responses to others), and reduced personal accomplishment (feelings of competence and achievement in one’s work).<sup>2</sup> In the World Health Organization International Classification of Diseases, 10<sup>th</sup> revision, burnout is defined as a “state of vital exhaustion.”<sup>3</sup> Although no specific diagnosis of burnout is mentioned in the *Diagnostic and Statistical Manual of Mental Disorders*,<sup>4</sup> burnout is a clear syndrome with significant consequences.

Burnout may be associated with decreased productivity and decreased job satisfaction. The rates of depression,<sup>5</sup> suicidal ideation, plans, and attempts<sup>6</sup> were noted to be high in burnout states and tended to decline with recovery from it. Other risks include cardiovascular disease<sup>7</sup> and increased inflammation biomarkers.<sup>8</sup> Physical symptoms may take many different forms, including insomnia, appetite changes, fatigue, colds or flu, headaches, and gastrointestinal distress. Physical symptoms alone may interfere with one’s sense of well-being and ability to function fully at work.<sup>9–11</sup> Psychological symptoms such as low or irritable mood, cynicism, and decreased concentration can negatively affect productivity and rapport.<sup>12</sup> A 2008 preliminary study surveying 178 matched pairs of physicians and patients who had been hospitalized within the previous year revealed that (after controlling for illness severity and demographic factors) the depersonalization aspect of physician burnout was associated with lower patient satisfaction and longer postdischarge recovery time.<sup>13</sup> Additional components of burnout may include daydreaming while with patients, excessive cancellations, procrastination, and delaying paperwork and vocational tasks.<sup>14</sup> Burnout may also lead to increased alcohol or drug use, which can also impact patient care.<sup>15,16</sup>

## Review Methods

We searched MEDLINE and PsychINFO from 1974 to 2009 using the following keywords: “burnout” AND “residents or residency.” Fifty-one studies were identified that addressed issues related to burnout. Key findings were derived from the full text of the published articles after reviewing the abstracts.

## Measuring Burnout: The Maslach Burnout Inventory

The Maslach Burnout Inventory (MBI)<sup>17</sup> is the most commonly used questionnaire to measure burnout in research studies. The MBI human services survey is a self-

administered, 22-item questionnaire that was developed to measure burnout in human services workers and is regarded to be the “gold standard” in measuring burnout.<sup>18</sup> The MBI items are rated on a Likert scale from 0 to 6 (0 = never, 1 = a few times per year, 2 = once a month, 3 = a few times per month, 4 = once a week, 5 = a few times per week, and 6 = every day) and score sample items such as: “I feel emotionally drained from my work.” It is designed to assess the 3 primary dimensions of burnout: emotional exhaustion, depersonalization, and personal accomplishment. Burnout is detected using cutoff scores of high emotional exhaustion ( $\geq 27$ ), high depersonalization ( $\geq 10$ ), and low personal accomplishment ( $\leq 33$ ), based on normative data from 1104 medical professionals.<sup>19</sup> Many studies using the MBI define burnout as high emotional exhaustion or depersonalization. The personal accomplishment scores are less commonly included because they are thought to correlate less with psychological strain.<sup>18</sup>

## Burnout in Residency Training

For medical professionals, the seeds of burnout may be planted as early as medical school. The literature to date seems to support the notion that there are a variety of factors during medical school that contribute to burnout in physicians, and that burnout is a phenomenon that develops cumulatively over an extended time period.<sup>20–27</sup> Burnout rates in medical students range from 28% to 45%.<sup>20,25</sup> Evidence shows that the factors contributing to burnout include environmental aspects such as stress during medical school, as well as inherent personality traits such as introversion and neuroticism.<sup>22,24</sup> Burnout is a phenomenon that may present during medical schools, and may develop or continue to exist in residents and practicing physicians. Several studies have explored possible reasons for burnout in residency training. In these studies, residents report that time demands, lack of control over time management, work planning, work organization, inherently difficult job situations, and interpersonal relationships are stressors that may contribute to burnout.<sup>16,28,29</sup>

## Prevalence of Burnout During Residency

Multiple studies have looked at burnout rates among resident physicians. A 2006 study by Rosen et al<sup>30</sup> showed that at the beginning of intern year, 4.3% of internal medicine residents met criteria for burnout as measured by the MBI. By the end of the first year, the rates had increased to 55.3%, with a significant increase in both the depersonalization and emotional exhaustion subscales. Another study of internal medicine residents at the University of Washington found that 76% met criteria for burnout as measured by the MBI, regardless of postgraduate year.<sup>31</sup> A notable nationwide study by Collier et al<sup>32</sup> looked at cynicism and humanism in internal medicine residents across the United States. Sixty-one percent of the 4128 residents who responded admitted to becoming more cynical and 23% reported becoming less humanistic during medical training. Although this study did

TABLE	EMOTIONAL EXHAUSTION (EE) AND DEPERSONALIZATION (DP) DIMENSIONS OF BURNOUT ON THE MASLACH BURNOUT INVENTORY BY RESIDENCY TRAINING SPECIALTY				
Source	Residency Specialty	No. of Subjects	Percentage of High EE	Percentage of High DP	Notes and Other Findings
Nyssen et al, <sup>29</sup> 2003	Anesthesiology	119	34	NA	Burnout rate detected in trainees younger than 30 years old (Belgium)
Martini et al, <sup>33</sup> 2004	Dermatology	6	NA	NA	Burnout rate = 50%
No Studies	Emergency medicine	NA	NA	NA	No studies
Purdy et al, <sup>28</sup> 1987	Family medicine	67	NA	NA	Mean scores ranged from moderate to high
Martini et al, <sup>33</sup> 2004	Family medicine	15	NA	NA	Burnout rate = 27%
Shanafelt et al, <sup>31</sup> 2002	Internal medicine	115	53	64	Residents with high EE or DP = 76%
Martini et al, <sup>33</sup> 2004	Internal medicine	24	NA	NA	Burnout rate = 63%
Gopal et al, <sup>38</sup> 2005	Internal medicine	121	42	61	Before duty hours restrictions
Gopal et al, <sup>38</sup> 2005	Internal medicine	106	29	55	After duty hours restrictions
Martini et al, <sup>33</sup> 2004	Neurology	8	NA	NA	Burnout rate = 63%
No Studies	Neurological Surgery	NA	NA	NA	No studies
Martini et al, <sup>33</sup> 2004	Obstetrics/gynecology	12	NA	NA	Burnout rate = 75%
Becker et al, <sup>39</sup> 2006	Obstetrics/gynecology	125	50	32	Depression rate = 34.2%
Castelo-Branco et al, <sup>40</sup> 2007	Obstetrics/gynecology	109	NA	NA	Burnout rate = 58% (Spain)
Martini et al, <sup>33</sup> 2004	Ophthalmology	5	NA	NA	Burnout rate = 60%
Sargent et al, <sup>41</sup> 2004	Orthopedic surgery	21	NA	NA	Mean EE and DP scores ranged from moderate to high
Golub et al, <sup>42</sup> 2007	Otolaryngology	514	33	53	Strongest associated factor was work hours
No Studies	Pathology	NA	NA	NA	No studies
Fahrenkopf et al, <sup>43</sup> 2008	Pediatrics	123	NA	NA	Residents with both high EE and DP = 75% Depression rate = 25%
Martini et al, <sup>33</sup> 2004	Psychiatry	15	NA	NA	Burnout rate = 40%
No Studies	Physical medicine and rehabilitation	NA	NA	NA	No studies
No Studies	Radiology	NA	NA	NA	No studies
Martini et al, <sup>33</sup> 2004	Surgery	25	NA	NA	Burnout rate = 40%
Gelfand et al, <sup>44</sup> 2004	Surgery	37	58	56	One week before duty hours restrictions
Gelfand et al, <sup>44</sup> 2004	Surgery	37	47	70	6 months after duty hours restrictions
No Studies	Urology	NA	NA	NA	No studies

Abbreviations: NA, no data available.

not employ a formally validated burnout scale, it can be assumed that cynicism and decreased humanism can lead to emotional exhaustion and depersonalization, thus contributing to burnout.

### Burnout Rates Vary Across Different Residency Specialties

In 2004, Martini et al<sup>33</sup> did a unique study that compared burnout rates among the different specialties using the MBI.

The overall burnout rate was 50% and ranged from 27% to 75% among different specialties. This variation among specialties was not statistically significant; however, burnout rates were as follows: 75% in obstetrics-gynecology followed by 63% in internal medicine, 63% in neurology, 60% in ophthalmology, 50% in dermatology, 40% in general surgery, 40% in psychiatry, and 27% in family medicine. However, this variation among specialties was not

statistically significant. Being in one's first year in residency, mood fluctuation, dissatisfaction with clinical faculty, recent family stress, and being unmarried were all associated with increased likelihood to meet burnout criteria.<sup>33</sup> Psychiatry residents were noted to have additional stressors including fear and exposure to patient violence and suicide.<sup>34–38</sup>

The TABLE offers a summary of the findings from available studies performed with residents in different specialties and details the percentage of residents experiencing burnout on the 2 most frequently-used subscales: emotional exhaustion and depersonalization.

### Effect of Age, Family, and Culture on Burnout During Residency

There are a wide variety of inherent and environmental factors that have been shown to affect burnout rates in resident physicians. The effect of gender on burnout shows conflicting results. Some studies showed that female residents scored significantly lower than male residents on the depersonalization subscale, emotional exhaustion, and personal accomplishment subscales, whereas other studies have shown the opposite.<sup>29,31,45</sup> Woodside et al<sup>36</sup> evaluated the association between age and burnout, and showed an inverse correlation between depersonalization scores and age of residents. However, 3 other studies showed no significant correlation between age and burnout.<sup>37,45,46</sup>

Marriage and parenting have also been examined in relation to burnout. Martini et al<sup>33</sup> showed that 65.2% of single, divorced, or unmarried residents met the criteria for burnout compared with 40.0% of married individuals ( $P < .01$ ). Other studies report no correlation between marriage and burnout.<sup>31,47</sup> Although it could be assumed that having the added responsibility of caring for children would add to burnout, research has shown that parenting can act as a protective factor against burnout. Parenting has a possible humanizing effect on residents, resulting in less detachment and depersonalization.<sup>31</sup> Collier et al<sup>32</sup> showed that having children during residency resulted in lower rates of depression and cynicism as well as an increase in humanistic feelings. However, other studies showed that parenting has no effect on burnout.<sup>46</sup> Interestingly, residents from other cultures who train in the United States experienced significantly less burnout, with significantly lower scores on both emotional exhaustion and depersonalization, than those who were born in the United States.<sup>31,48</sup> Finally, in 2004 Thomas<sup>49</sup> reviewed the literature and showed that the intensity of the workday and its interference with the resident's home life plays a more influential role in burnout than inadequate sleep. The same review also showed that studies on the relationship between burnout and personality traits were inconclusive.

### Impact of Burnout on Patient Care

The impact of burnout on patient care has been investigated in several studies. Some studies have shown that residents

reporting burnout were more inclined to self-report suboptimal patient care and practices and medical errors than those without burnout.<sup>31,50</sup> However, in a study by Fahrenkopf et al<sup>43</sup> no actual correlation was found between burnout and the number of medical errors seen in collected data. One plausible explanation may be that residents reporting symptoms of burnout may be more likely to overreport their errors.

### Impact of Duty Hour Restrictions on Burnout

The effect of work hour limitations on residents has been researched widely as an important environmental consideration in the development of burnout. In July 2003, the Accreditation Council for Graduate Medical Education implemented work hour limitations, cutting down the workweek to 80 hours and no more than 24 consecutive hours, with an additional 6 hours for transfer of care and educational activities per call. Gelfand et al<sup>44</sup> looked at the effect of the 80-hour workweek restriction on resident burnout. Surgical residents and faculty completed the MBI 1 week before and 6 months after the mandated time restrictions took effect in 2003. Despite a reduction of approximately 18 work hours per week, there was no statistical difference in emotional exhaustion, depersonalization, or personal accomplishment scores, although others have commented on methodological flaws in the study.<sup>51</sup> Martini et al<sup>47</sup> also looked at burnout rates in all interns and residents in a variety of different specialties at Wayne State University School of Medicine, before and after the work hour limits were placed. Residents who reported working more than 80 hours had higher rates of burnout (69.2%) compared with a burnout rate of 38.5% after the time restriction was in effect. Overall internal medicine residents reported that the work hour limits have had a positive effect with a decrease in the amount of teaching by attending physicians, as well as "having to cut corners" on both patient care and educational activities.<sup>52</sup>

### Interventions

Current data on interventions for physician burnout are insufficient to recommend particular measures. Although a number of interventions have been studied in other caregiving and health care professionals and not necessarily residents, some of the same interventions may or may not be effective. More studies are needed to examine the applicability and utility of these interventions in resident physicians. Interventions to address burnout fall into 2 categories: workplace-driven interventions and individual-driven behavioral, social, and physical activities.

### Workplace-Driven Interventions

Suggested interventions in the workplace include developing stress-reduction programs, increasing staff awareness of burnout, enhancing support for health professionals treating challenging populations, and ensuring a reasonable

workload.<sup>53</sup> Some programs have attempted to manage workload by instituting night float or home call systems. Positive effects include increased opportunities for rest; potential negative effects include decreased clinical and surgical experience and decreased opportunities for development of professionalism and communication skills.<sup>54</sup> Furthermore, increasing variety in workplace roles (opportunities to conduct research, teach, and supervise) in addition to performing direct clinical care has been documented to improve satisfaction.<sup>55</sup> Mentoring programs in residency training can also be helpful in this regard.<sup>48,56</sup> Emotional intelligence training and team building for residents may decrease burnout. Emotional awareness and emotional management abilities help to maintain effective and appropriate relationships within a team, thereby preventing dysfunctional relationships and stress, leading to subsequent burnout.<sup>57</sup> The Cedars-Sinai Obstetrics and Gynecology Residency uses a program to develop self-awareness profiles for residents. Through this program, residents reflect on their interpersonal styles, participate in interactive group activities, and have the opportunity to debrief from group activities.<sup>58</sup> Process groups have also been used (especially in psychiatry) to provide a protected setting to address issues that are professional and bordering on personal, and to help foster work-related relationships. Some institutions have developed “GME (graduate medical education) Wellness Teams,” or resident-specific employee assistance programs to support a healthy approach to the training environment. Such programs address a wide variety of personal and professional issues while ensuring confidentiality.<sup>59</sup> In the Cedars-Sinai Psychiatry Residency Program, a wellness consultant developed modules incorporating time management, relaxation response techniques, focused breathing, and meditation methods. The modules are administered interactively to the residents in order to facilitate heightened awareness of stress response and managing stress through intra-workday rather than post-workday activities.<sup>60</sup> It is critical, moving forward, to continue to develop, rigorously study in a randomized controlled fashion, and publish the impact of such workplace-driven interventions on burnout in residency programs.

### Individual-Driven Behavioral, Social, and Physical Activities

There are a number of interventions that can be used individually by residents. Peer support around challenging cases can be validating and stress reducing. In a sample of 200 professionals, Maslach<sup>61</sup> showed that venting, laughing, and discussing care with colleagues decreased personal anxiety. Participating in professional organizations and attending lectures or conferences can further develop work-related social networks. Meditation has been shown to improve burnout.<sup>62</sup> Another study on meditation and stress among health care professionals revealed improved mood and emotional states for those who practice meditation

regularly.<sup>63</sup> Physical exercise has also been shown to ameliorate depression, anxiety, and mood, making it an ideal intervention for burnout.<sup>64</sup> Creating a defined boundary between work and home has also been strongly suggested in the literature.<sup>65</sup> Counseling can provide an opportunity to explore occupational challenges and increase self-awareness. Some residency programs are encouraging and supporting personal psychotherapy for residents.<sup>66</sup> Other suggested interventions include vacation, mindfulness techniques, yoga, reflective writing, spiritual activities, scheduled daily rest, music, massage, and enjoying nature. It is important for residency training directors and educators to model and demonstrate self-care and awareness; it is also important to support residents in identifying and pursuing the individual techniques that each individual finds most useful.

Maslach<sup>67</sup> summarized effective working through burnout by stating: “If all of the knowledge and advice about how to beat burnout could be summed up in 1 word, that word would be balance—balance between giving and getting, balance between stress and calm, balance between work and home.”

### Discussion

Burnout is a triad of emotional exhaustion, depersonalization, and a sense of decreased personal accomplishment. It is a phenomenon that reflects the complex interaction between environmental stressors, genetic vulnerabilities, and coping styles. Burnout can contribute to multiple physical symptoms, psychological symptoms, and substance abuse, all of which can impact a resident’s quality of life, ability to provide sustainable and safe patient care, quality of learning and teaching, and the overall morale of a residency program. The studies we reviewed suggest that residents, especially in the early years of training, are particularly vulnerable to burnout, with a prevalence rate ranging from 27% to 75%. The negative impact of burnout on patient care includes risk of medical errors, patient safety risks, and potential compromise of quality of care. Negative consequences of burnout on physicians in training include depression, suicidal tendencies, and medical illnesses. Effective interventions to address burnout should be developed at both the individual and institutional levels. Work hour regulations developed by the Accreditation Council for Graduate Medical Education are only part of the solution to improving patient safety. Although preliminary studies indicate that work hour limitations have improved resident quality of life, there is potential risk to decreased educational opportunities and a “shift” mentality. As a result, individuals and programs must also incorporate other interventions to balance appropriate service responsibilities with the academic and educational training mission. Easy, affordable access to adequate counseling services is an additional tool in creating educational programs that enhance resident performance

and provide outstanding, safe, high-quality patient care. New physician generations were shown to have a significant attraction to work and life balance activities,<sup>68</sup> thus creating readily accepting participants for burnout interventions.

## Conclusion

Burnout is a well-known phenomenon that must be addressed by leadership in academic medicine. As we move toward national health care reform and attempt to reconfigure our approach to training, attention to personal well-being is critical to the successful education of the next generation of physicians.

## References

- Freudenberger HJ. Staff burnout. *J Soc Issues*. 1974;30(1):159–165.
- Maslach C. Burnout: a multidimensional perspective. In: Schaufeli WB, Maslach C, Marek T, eds. *Professional Burnout: Recent Developments in Theory and Research*. Washington, DC: Taylor & Francis; 1993.
- World Health Organization. *International Statistical Classification of Diseases and Related Health Problems*. 10th Revision (ICD-10). Geneva: World Health Organization; 2004.
- American Psychiatric Association. *Diagnostic and Statistical Manual*. 4th ed, text revision (DSM-IV-TR). Washington, DC: American Psychiatric Publishing, Inc; 2000.
- Martin F, Poyen D, Boudriouque E, et al. Depression and burnout in hospital health care professionals. *Int J Occup Environ Health*. 1997;3(3):204–209.
- Dyrbye LN, Thomas MR, Massie FS, et al. Burnout and suicidal ideation among US medical students. *Ann Intern Med*. 2008;149(5):334–341.
- Melamed S, Shirom A, Toker S, Berliner S, Shapira I. Burnout and risk of cardiovascular disease: evidence, possible causal paths, and promising research directions. *Psychol Bull*. 2006;132(3):327–353.
- Toker S, Shirom A, Shapira I, Berliner S, Melamed S. The association between burnout, depression, anxiety, and inflammation biomarkers: C-reactive protein and fibrinogen in men and women. *J Occup Health Psychol*. 2005;10(4):344–362.
- Sherman MD. Distress and professional impairment due to mental health problems among psychotherapists. *Clin Psychol Rev*. 1996;16(4):299–315.
- Figley CR. Compassion fatigue as secondary traumatic stress disorder: an overview. In: Figley CR, Lutherville MD, eds. *Compassion Fatigue: Coping with Secondary Traumatic Stress*. Baltimore, MD: Sidran Press; 1995.
- Mahoney M. Psychologists' personal problems and self care patterns. *Prof Psychol Res Pr*. 1997;28(1):14–16.
- Solomon M. Therapeutic depletion and burnout in countertransference. In: Solomon M, Siegel J, eds. *Couples Therapy*. New York: WW Norton; 1997.
- Halbesleben JR, Rathert C. Linking physician burnout and patient outcomes: exploring the dyadic relationship between physicians and patients. *Health Care Manage Rev*. 2008;33(1):29–39.
- Kottler JA. *On Being a Therapist*. San Francisco, CA: Jossey-Bass; 1986.
- Ahola K, Honkonen T, Pirkola S, et al. Alcohol dependence in relation to burnout among the Finnish working population. *Addiction*. 2006;101(10):1438–1443.
- Cohen JS, Patten S. Well-being in residency training: a survey examining resident physician satisfaction both within and outside of residency training and mental health in Alberta. *BMC Med Educ*. 2005;22(5):21.
- Maslach C, Jackson SE, Leiter MP. *Maslach Burnout Inventory Manual*. 3rd ed. Palo Alto, CA: Consulting Psychologists Press; 1996.
- Schaufeli WB. Burnout. In: Firth-Cozens J, Payne R, eds. *Stress in Health Professionals: Psychological and Organizational Causes and Interventions*. Chichester, NY: Wiley; 1999.
- Maslach C, Jackson SE, Leiter M. The Maslach burnout inventory. In: Zalaquett CP, Wood RJ, eds. *Evaluating Stress: A Book of Resources*. 3rd ed. Lanham, MD: Scarecrow Press; 1997.
- Dyrbye LN, Thomas MR, Huntington JL, et al. Personal life events and medical student burnout: a multicenter study. *Acad Med*. 2006;81:374–384.
- Zoccolillo M, Murphy GE, Wetzel RD. Depression among medical students. *J Affect Disord*. 1986;11:91–96.
- Firth J. Levels and sources of stress in medical students. *BMJ*. 1986;292:1177–1180.
- Delva MD, Kirby JR, Knapper CK, Birtwhistle RV. Postal survey of approaches to learning among Ontario physicians: implications for continuing medical education. *BMJ*. 2002;325:1218.
- McManus IC, Keeling A, Paice E. Stress, burnout and doctors' attitudes to work are determined by personality and learning style: a twelve year longitudinal study of UK medical graduates. *BMC Med*. 2004;2:29.
- Willcock SM, Daly MG, Tennant CC, Allard BJ. Burnout and psychiatric morbidity in new medical graduates. *Med J Aust*. 2004;181:357–360.
- Dahlin ME, Runeson B. Burnout and psychiatric morbidity among medical students entering clinical training: a three year prospective questionnaire and interview-based study. *BMC Med Educ*. 2007;7:6.
- Rosal MC, Ockene IS, Ockene JK, Barrett SV, Ma Y, Hebert JR. A longitudinal study of students' depression at one medical school. *Acad Med*. 1997;72:542–546.
- Purdy RR, Lemkau JP, Rafferty JP, Rudisill JR. Resident physicians in family practice: who's burned out and who knows? *Fam Med*. 1987;19:203–208.
- Nyssen AS, Hansez I, Baele P, et al. Occupational stress and burnout in anaesthesia. *Br J Anaesth*. 2003;90:333–337.
- Rosen IM, Gimotty PA, Shea JA, et al. Evolution of sleep quantity, sleep deprivation, mood disturbances, empathy and burnout among interns. *Acad Med*. 2006;81(1):82–85.
- Shanafelt TD, Bradley KA, Wipf JE, Back AL. Burnout and self-reported patient care in an internal medicine residency program. *Ann Intern Med*. 2002;136:358–367.
- Collier VU, McCue JD, Markus A, Smith L. Stress in medical residency: status quo after a decade of reform? *Ann Intern Med*. 2002;136(5):384–390.
- Martini S, Arfken CL, Churchill A, et al. Burnout comparison among residents in different medical specialties. 2004; 28(3):240–242.
- Deahl M, Turner T. General psychiatry in no-man's land. *Br J Psychiatry*. 1997;171:6–8.
- Hoop JG. Hidden ethical dilemmas in psychiatric residency training: the psychiatric resident as a dual agent. *Acad Psych*. 2004;28:183–189.
- Woodside JR, Miller MN, Floyd MR, et al. Observations on burnout in family medicine and psychiatry residents. *Acad Psych*. 2008; 32(1):13–19.
- Prins JT, Hoekstra-Weebers JEHM, van de Wiel HBM, et al. Burnout among Dutch medical residents. *Int J Behav Med*. 2007;14(3):119–125.
- Gopal R, Glasheen JJ, Miyoshi TJ, Prochazka AV. Burnout and internal medicine resident work-hour restrictions. *Arch Intern Med*. 2005;165:2595–2600.
- Becker JL, Milad MP, Klock SC. Burnout, depression, and career satisfaction: cross-sectional study of obstetrics and gynecology residents. *Am J Obstet Gyn*. 2006;195(5):1444–1449.
- Castelo-Branco C, Figueras F, Eixarch E, et al. Stress symptoms and burnout in obstetric and gynaecology residents. *BJOG*. 2007;114(1):94–98.
- Sargent MC, Sotile W, Sotile MO, Rubash H, Barrack RL. Stress and coping among orthopaedic surgery residents and faculty. *J Bone Joint Surg Am*. 2004;86:1579–1586.
- Golub JS, Weiss PS, Ramesh AK, Ossoff RH, Johns MM. Burnout in residents of otolaryngology—head and neck surgery: a national inquiry into the health of residency training. *Acad Med*. 2007;82:596–601.
- Fahrenkopf AM, Sectish TC, Barger LK, et al. Rates of medication errors among depressed and burnt out residents: prospective cohort study. *BMJ*. 2008;336(7642):488–491.
- Gelfand DV, Podnos YD, Carmichael JC, et al. Effect of the 80-hour workweek on resident burnout. *Arch Surg*. 2004;139:933–940.
- Lemkau JP, Purdy RR, Rafferty JP, Rudisill JR. Correlates of burnout among family practice residents. *J Med Educ*. 1988;63(9):682–691.
- McCranie EW, Brandsma JM. Personality antecedents of burnout among middle-aged physicians. *Behav Med*. 1988;14:30–36.
- Martini S, Arfken CL, Balon R. Comparison of burnout among medical residents before and after the implementation of work hours limits. *Acad Psych*. 2006; 30(4):352–355.
- Eckleberry-Hunt J, Lick D, Boura J, et al. An exploratory study of resident burnout and wellness. *Acad Med*. 2009;84(2):269–277.
- Thomas NK. Resident burnout. *JAMA*. 2004; 292:2880–2889.
- West CP, Huschka MM, Novotny PJ. Association of perceived medical errors with resident distress and empathy: a prospective longitudinal study. *JAMA*. 2006;296(9):1071–1078.
- Daly MG, Willcock SM. Examining stress and responses to stress in medical students and new medical graduates. *Med J Aust*. 2002;177:514–515.
- Goitein L, Shanafelt TD, Wipf JE, Slatore CG, Back AL. The effects of work-hour limitations on resident well-being, patient care, and education in an internal medicine residency program. *Arch Intern Med*. 2005;165:2601–2606.
- Dupree P, Day HD. *Psychotherapists' Job Satisfaction and Job Burnout as a Function of Work Setting and Percentage of Managed Care Clients*. New York: Haworth Press; 1995.
- Fletcher KE, Underwood W, Davis SQ, et al. Effects of work hour reduction on residents' lives: a systematic review. *JAMA*. 2005;294(9):1088–1100.
- Norcross JC. Psychotherapist self-care: practitioner tested, research informed strategies. *Prof Psychol Res Pr*. 2000;31:710–713.

- 56 Ramanan RA, Taylor WC, Davis RB, Phillips RS. Mentoring matters: mentoring and career preparation in internal medicine residency training. *J Gen Intern Med.* 2006;21(4):340–345.
- 57 Gewertz BL. Emotional intelligence: impact on leadership capabilities. *Arch Surg.* 2006;141(8):812–814.
- 58 Jordan JP, Troth AC. Managing emotions during team problem solving: emotional intelligence and conflict resolution. *Human Performance not Human Performance.* 2004;17(2):195–218.
- 59 Dabrow S, Russell S, Ackley K, Anderson E, Fabri P. Combating the stress of residency: one school's approach. *Acad Med.* 2006;81:436–439.
- 60 Seligman L. Physicians heal thyself. Available at: <http://www.transformationconsultinginc.com>. Accessed on June 1, 2009.
- 61 Maslach C. Burned out. *Hum Behav.* 1976;5(9):16–22.
- 62 Shapiro S, Astin J, Bishop S, Cordova M. Mindfulness-based stress reduction for health care professionals: results from a randomized trial. *Int J Stress Manage.* 2005;12(2):164–176.
- 63 Galantino ML, Baime M, Maguire M, Szapary PO, Farrar, JT. Short communication: in association of psychological and physiological measures of stress in health-care professionals during an 8-week mindfulness meditation program. *Stress Health.* 2005;21(4):255–261.
- 64 Vuori I. Does physical activity enhance healthy? *Patient Educ Couns.* 1998;33:S95–S103.
- 65 Sherman MD, Thelen, MH. Distress and professional impairment among psychologists in clinical practice. *Prof Psych Res Pr.* 1998;29(1):79–85.
- 66 Macaskill N, Macaskill A. Psychotherapists-in-training evaluate their personal therapy: results of a UK study. *Br J Psychother.* 1992;9:133–138.
- 67 Maslach C. *Burnout: The Cost of Caring.* Englewood Cliffs, NJ: Prentice-Hall; 1982.
- 68 Howell LP, Joad JP, Callahan E, Servis G, Bonham AC. Generational forecasting in academic medicine: a unique method of planning for success in the next two decades. *Acad Med.* 2009;84(8):985–993.