

## Health Policy

## A Preliminary Survey Examining Predictors of Burnout in Pain Medicine Physicians in the United States

Henry Kroll, MD<sup>1,2</sup>, Taylor Macaulay, BA<sup>3</sup>, and Michelle Jesse, PhD<sup>3,4,5</sup>

From: <sup>1</sup>Department of Anesthesiology, Henry Ford Health System, Detroit, MI; <sup>2</sup>Department of Anesthesiology, Wayne State School of Medicine, Detroit, MI; <sup>3</sup>Transplant Institute, Henry Ford Health System, Detroit, MI; <sup>4</sup>Consultation-Liaison Psychiatry, Department of Behavioral Health, Henry Ford Health System, Detroit, MI; <sup>5</sup>Center for Health Policy & Health Services Research Detroit, MI

Address Correspondence: Henry Kroll, MD  
Clinical Associate Professor of Anesthesiology, Wayne State School of Medicine  
Senior Staff Anesthesiologist, Department of Anesthesiology, Henry Ford Health System  
2799 West Grand Boulevard, Detroit, MI  
E-mail: hkroll1@hfhs.org dd

Disclaimer: There was no external funding in the preparation of this manuscript.

Manuscript received: 02-05-2016  
Revised manuscript received: 04-25-2016  
Accepted for publication: 05-16-2016

Free full manuscript: [www.painphysicianjournal.com](http://www.painphysicianjournal.com)

**Background:** Burnout is a prolonged response to chronic emotional and interpersonal stressors on the job, defined by 3 dimensions: exhaustion, depersonalization, and reduced personal accomplishment. While there is a growing body of research on burnout in physicians, there is a dearth of literature on burnout in pain medicine physicians.

**Objective:** This study aimed to determine the incidence of burnout amongst pain medicine physicians and whether there are sociodemographic or psychological demand characteristics of the job setting that predict burnout in pain medicine physicians.

**Study Design and Setting:** Cross-section survey of pain medicine physicians across the United States.

**Methods:** Pain medicine physicians were asked questions on sociodemographics and professional characteristics and measures of decisional authority, psychological job demands, job insecurity, perceived coworker support, and job dissatisfaction.

**Results:** Two hundred seven pain medicine physicians' responses were analyzed, 60.4% reported high emotional exhaustion, 35.7% reported high depersonalization, and 19.3% reported low personal accomplishment. Greater psychological job demands and greater job dissatisfaction predicted greater emotional exhaustion. Younger age and greater job dissatisfaction predicted higher depersonalization. Lastly, lower coworker support and greater job dissatisfaction predicted lower personal accomplishment. There were no statistical violations of assumptions or collinearity.

**Limitations:** Low response rate and potential for response bias limit generalizability of the study.

**Conclusion(s):** Pain medicine physicians in the United States reported high levels of emotional exhaustion, often considered the most taxing aspect of burnout. Job dissatisfaction appeared to be the leading agent in the development of all 3 components of burnout in pain medicine physicians in the United States.

**Key words:** Burnout, pain medicine physicians, job dissatisfaction, decisional authority, psychological job demands

**Pain Physician 2016; 19:E689-E696**

Increased physician strain can hinder efficient and effective patient care (1,2). Strain occurs when job demands are high and decisional autonomy or latitude is low (3). Although strain exists in many occupations, chronic strain resulting in burnout has

been found to be highest in professions with low levels of personal control, poor support systems, and high job demands and expectations (4,5). Three dimensions characterize burnout: emotional exhaustion, depersonalization (cynicism), and reduced

personal accomplishment (inefficacy) (6). Burnout is prevalent in the practice of medicine and is associated with job dissatisfaction, increased risk of medical errors, malpractice lawsuits, as well as increased potential for substance abuse and suicidal ideations (7,8). As such, developing burnout has the serious potential to challenge a physician's ability to "do no harm."

Currently, there is a dearth of research on burnout in providers caring for patients with chronic, non-malignant pain. Research has examined provider burnout in anesthesiology (9) and to a lesser extent in physical medicine and rehabilitation (PM&R) (10). However, following a thorough literature search, no studies were located specifically on burnout in pain medicine physicians in the United States. In studies assessing anesthesiologists, compared to colleagues who do not develop burnout, anesthesia professionals at increased risk for burnout report greater psychological job demands and job dissatisfaction (11,12). Greater decisional authority or autonomy is related to higher levels of job satisfaction and appears to promote resiliency against the negative health effects of work related stress (13,14). Coworker support displayed similar patterns; greater perceived support from anesthesia colleagues and superiors is positively associated with job satisfaction and may counteract the effects of work related stressors (14-16). One study surveyed Italian PM&R therapists, nurses, and technicians, and included 24 PM&R physicians. The authors reported the physicians indicated moderate levels of emotional exhaustion, moderate levels of depersonalization, and low levels of personal accomplishment (10). These studies give some insight on burnout and work stress factors in anesthesiology or PM&R professions; however, the pain medicine subspecialty has yet to be examined.

The role of a pain medicine physician requires a delicate balance as working with chronic, non-malignant pain patients has many challenges. Some of the difficulties include diagnostic uncertainties (both pain related etiology but also identifying which patients are at increased risk for opiate abuse/misuse), costly interventions with potentially limited efficacy, and patients with high rates of comorbid psychiatric disorders (17-21). With an increase in patients suffering from chronic pain (22-24), focusing on the pain physicians' ability to provide specialized care while avoiding burnout is crucial.

Our first objective of this study was to estimate the prevalence of emotional exhaustion, depersonalization, and reduced personal accomplishment in pain

medicine physicians practicing in the United States. Our second study objective, applying Karasek's Job Demand-Control-Support (DCS) (25) model, was to assess the association between demographic, medical practice characteristics, decisional authority, psychological job demands, job insecurity, perceived coworker support, and job dissatisfaction on burnout in a sample of pain medicine physicians in the United States.

## **METHODS**

### **Study Design and Participants**

This study was an observational, cross-sectional study design. All data collection was performed with approval of the Institutional Review Board (IRB) within the Department of Research at Henry Ford Health Systems, Detroit, MI. Pain medicine physicians who were active members in good standing with the American Society of Interventional Pain Physicians (ASIPP) were recruited through registered email addresses (with ASIPP approval). Emails introduced the study and provided a link to the survey (via a secured external site, [www.surveymonkey.com](http://www.surveymonkey.com)). The first page of the survey explained that responding to the survey indicated consent. Participants were required to provide electronic written consent in order for the link to proceed to the survey. In order to maximize participation, 2 waves of recruitment email were sent during the summer of 2013, approximately one month apart, to all active ASIPP members.

### **Measurements**

Socio-demographic data included age, gender, and race/ethnicity. Professional data included characteristics of current practice (e.g., group versus private practice) and primary medical specialty.

To assess burnout we utilized the Maslach Burnout Inventory-Human Services Survey (MBI-HSS) (26). This 22-item measure is considered the "gold-standard" for assessing the 3 main dimensions of burnout: emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA). Responses are based upon a 7-point Likert subscale from 0 (never) to 6 (every day) and the 3 subscales are summed to produce total EE, DP, and PA scores. Scores were categorized as low, moderate, or high (EE, DP, and PA) as outlined in the MBI manual (26).

To assess psychological job characteristics we utilized components of the Job Content Questionnaire (JCQ) (25,27) which evaluates high-demand/low con-

trol/low support models of job stress. We evaluated 5 components of the JCQ survey: decisional authority, psychological job demands, job insecurity, perceived co-worker support, and job dissatisfaction. Responses for the scales are based upon a 4-point Likert scale from 1 (strongly disagree) to 4 (strongly agree). Each scale was scored in accordance with the JCQ manual (27).

**Statistical Methods**

Analyses were conducted using SAS/STAT® software. Descriptive statistics were run for all variables. Appropriate bivariate analyses were conducted to determine whether there were significant relationships between variables, to check for redundancy, and to test for individual significance with the 3 subscales of burnout (EE, DP, and PA). Three stepwise multiple linear regression analyses were conducted with each subscale of the MBI-HSS (EE, DP, and PA) as the outcome variables. We decided a priori to include outlined predictor variables in the models which included age, gender, current practice (private, group, university, community, and other), medical specialty (anesthesiology, PM&R, and other), decisional authority, psychological job demands, job insecurity, perceived coworker support, and job dissatisfaction. In an effort not to overfit the models and an empirically unclear history of relationship with the development of burnout, we determined we would include race/ethnicity in the final regression models only if there were significant bivariate differences on EE, DP, or PA based upon race/ethnicity. Age and gender were retained regardless as they have a stronger empirical history with the 3 subscales of burnout.

**RESULTS**

Of the 3,846 recruitment emails sent, 280 pain physicians responded (7.3% response rate), and 207 respondents provided adequate responses to be included in the final analysis (completed the survey in its entirety). This was a much lower response rate than expected, but was determined at least partially due to recipients' email security blocking the email due to the enclosed link (as deter-

mined by our information technology department). We do not know how many emails were blocked. Characteristics of the participants are shown in Table 1. Presented in Table 2 is the distribution of low, moderate, and high scores on the MBI-HSS. There were no significant differences on the 3 outcomes of interest (EE, DP, and PA; see Table 3) based upon gender, race, or current practice. There was no significant difference between the 3 specialty categories on either emotional exhaustion or personal accomplishment. However, there was a significant difference on the depersonalization scale,  $F(2, 204) = 3.751, P = .02$ . Follow-up Tukey's indicated those who reported their medical specialty to be PM&R reported significantly higher levels of depersonalization (M 13.08, SD 7.90) than those who reported their specialty to be anesthesiology (M 10.21, SD 6.87),  $P = .03$ . There was no significant difference between anesthesiology and "other" (M 9.06, SD 5.63),  $P = .81$ , or PM&R and "other,"  $P = .11$ . Presented in Table 4 are Pearson correlations between continuous variables. Finally, we ran 3 stepwise

Table 1. Respondent characteristics (N = 207).

Variable	N (%)
Age [mean, SD]	47.38 (8.62)
<b>Gender</b>	
Male	176 (85%)
Female	31 (15%)
<b>Race/Ethnicity</b>	
Black/African American	6 (2.9%)
Pacific Islander	3 (1.4%)
Asian	29 (14.0%)
White/Caucasian	142 (68.6%)
Other	16 (7.7%)
Prefer not to respond	11 (5.3%)
<b>Current Practice</b>	
Private practice (< 20 providers)	139 (67.1%)
Group practice	16 (7.7%)
University practice	22 (10.6%)
Community hospital	19 (9.2%)
other	11 (5.3%)
<b>Specialty</b>	
Anesthesiology	137 (66.2%)
PM&R	54 (26.1%)
Other (e.g., Internal Medicine, Neurology)	16 (7.7%)

Table 2. Burnout levels in pain medicine physicians.

	Low	Moderate	High
Emotional Exhaustion	45 (21.7%)	37 (17.8%)	<b>125 (60.4%)</b>
Depersonalization	67 (32.4%)	66 (31.9%)	<b>74 (35.7%)</b>
Personal Accomplishment	<b>40 (19.3%)</b>	71 (34.2%)	96 (46.4%)

Note: **Bolded** indicates high levels of burnout, N (%), based on established cutoffs from Maslach C, Jackson SE, Leiter MP. *Maslach Burnout Inventory*. Third edition. Scarecrow Education, Lanham, MD, 1997 (26).

Table 3. Differences on emotional exhaustion, depersonalization, and personal accomplishment subscales across demographic and professional characteristics.

	Emotional Exhaustion	Depersonalization	Personal Accomplishment
<b>Gender</b>			
Male	28.81 (12.98)	10.76 (7.11)	37.11 (7.49)
Female	30.74 (14.94)	11.46 (7.60)	37.45 (6.82)
<b>Race</b>			
Black/African American	29.00 (13.08)	11.67 (9.20)	35.16 (10.41)
Asian	25.89 (14.18)	9.59 (8.05)	36.16 (6.83)
White/Caucasian	30.03 (13.05)	11.26 (6.91)	37.59 (6.62)
Preferred not to respond	25.31 (11.54)	8.75 (7.00)	36.31 (8.49)
Other	34.40 (12.28)	10.20 (8.61)	38.20 (6.91)
<b>Practice</b>			
Private practice	28.87 (13.15)	10.43 (7.03)	37.66 (6.60)
University practice	26.35 (14.16)	11.73 (8.39)	37.45 (7.99)
Community practice	32.00 (11.90)	12.77 (7.00)	33.94 (8.28)
Group practice	30.87 (14.01)	12.38 (7.33)	39.10 (7.03)
Other	30.00 (13.19)	9.18 (6.38)	37.61 (4.58)
<b>Specialty</b>			
Anesthesiology	29.19 (12.34)	<b>10.21 (6.87)</b>	36.98 (6.79)
PM&R	29.83 (15.30)	<b>13.08 (7.90)</b>	38.74 (7.30)
Other	25.93 (13.06)	9.06 (5.63)	36.54 (6.29)

Note. Means and standard deviations (in parentheses) reported. Student's t-test was used to examine differences in gender. Analyses of variances (ANOVAs) were used to examine differences across races, practices, or specialties. On the 3 ANOVAs run, there were no violations of normality. **Bolded** items are significantly different from each other. Potential ranges of emotional exhaustion are 0 – 54, depersonalization ranges are 0 – 30, and personal accomplishment ranges are 0 – 48.

Table 4. Pearson correlations between continuous variables.

	2.	3.	4.	5.	6.	7.	8.	9.
MBI-EE	.623**	-.309**	-.039	-.208*	.572**	.284**	-.308**	.615**
MBI-DP		-.320**	-.163*	-.185*	.209*	.252**	-.240**	.436**
MBI-PA			-.001	.239**	-.172*	-.287**	.426**	-.470**
Age				.107	.019	.043	.051	-.009
JCQ DA					-.122	-.278**	.324**	-.403**
JCQ PJD						.250**	-.201*	.482**
JCQ JI							-.281**	.410**
JCQ CS								-.406**
JCQ JD								

Note. \* $P \leq .05$ , \*\* $P \leq .001$ , MBI-EE Emotional Exhaustion, MBI-DP Depersonalization, MBI-PA Personal Accomplishment, JCQ DA Decisional Authority, JCQ PJD Psychological Job Demands, JCQ JI Job Insecurity, JCQ CS Coworker Support, JCQ JD Job Dissatisfaction

multiple linear regressions with the 3 subscales of the MBI-HSS (EE, DP, and PA) as outcomes and predictors including age, gender, current practice, medical specialty, decisional authority, psychological job demands, job insecurity, perceived coworker support, and job dissatisfaction (Table 5). For emotional exhaustion the model was significant with 2 variables, accounting for 47.7% of the variance. Greater psychological job demands and more job dissatisfaction predicted high emotional exhaustion. For depersonalization, the model was significant with 2

variables, accounting for 21.5% of the variance. Younger age and more job dissatisfaction significantly predicted more depersonalization. For personal accomplishment, the model was also significant for 2 variables, accounting for 28.6% of the variance. Lower perceived coworker support and greater job dissatisfaction were associated with lower levels of personal accomplishment. None of the 3 models violated statistical assumptions (no indication of collinearity). Examples of distributions of job dissatisfaction responses are included in Table 6.

Table 5. *Stepwise multiple linear regressions.*

	Estimate (SE)	R <sup>2</sup>	P
Emotional Exhaustion, F (2) = 93.35		.477	< .001
Psychological Job Demands	0.75 (0.12)		< .001
Job Dissatisfaction	49.21 (6.42)		< .001
Depersonalization, F (2) = 27.94		.215	
Age	-0.13 (0.05)		< .011
Job Dissatisfaction	26.25 (3.75)		< .001
Personal Accomplishment, F (2) = 41.02		.286	< .001
Coworker Support	0.82 (1.19)		< .001
Job Dissatisfaction	-20.71 (3.76)		< .001

Note. n = 207

Table 6. *Examples of job dissatisfaction responses in pain medicine physicians.*

	Not satisfied/ not likely	Somewhat/ doubtful	Very much/ likely
Satisfied with job	40 (19.3%)	104 (50.2%)	63 (30.4%)
Recommend job to friend	42 (20.3%)	88 (42.5%)	77 (37.2%)
Look for new job	116 (56.0%)	49 (23.7%)	42 (20.3%)

Note: **Bolded** indicates high levels of job dissatisfaction, N (%)

## DISCUSSION

As the number of non-malignant, chronic pain patients and opioid prescription utilization continues to increase (28-30), research has emerged on provider beliefs/attitudes regarding chronic pain patients and mitigating risks associated with the provision of care to these patients (31-35). However, research has yet to emerge examining the negative effects of burnout on pain medicine providers. To our knowledge, this is the first study assessing burnout in pain medicine physicians in the United States. The respondents of this study reported high levels of burnout, particularly emotional exhaustion which is often considered the most obvious and draining symptom of burnout (6). In fact, almost two-thirds of the respondents reported high levels of emotional exhaustion, indicating they find their work draining, stressful, demanding, and frustrating. High emotional exhaustion puts American pain physicians at risk for a number of negative outcomes that have been associated with burnout.

Across the 3 components of burnout, job dissatisfaction appeared to be a driving force in relation to the development of burnout in pain medicine physicians. Contributors to job satisfaction in anesthesiologists have included having experienced and skilled assistants, professional autonomy, fewer working hours, and reduced workloads (14,15,36). However, a number of these studies were performed in countries other than the United States (with very different health care systems) and have not focused on the subspecialty of

pain medicine. In an older study, PM&R physicians have reported high levels of job satisfaction with professional autonomy as an important correlate with job satisfaction (37). While we can hypothesize what contributes to job dissatisfaction in pain medicine physicians in the United States given their known challenges, understanding which stressors most contribute is an important next step in addressing burnout in this population. Of this study's participants, approximately one fifth reported they were not satisfied with their job, would not recommend their job to a friend, and were likely to look for a different position. While job dissatisfaction in pain medicine physicians in the United States may not be arguably dissimilar in incidence from other physician populations (38,39), we would argue the importance of paying attention to these levels for 2 reasons. First, regardless if levels are comparable, this is a sizable proportion of highly trained and specialized individuals who are dissatisfied with their role, and thus warrants further attention. Second, job dissatisfaction is associated with greater risk of turnover in physician populations (38). This is particularly concerning given the incredible need for this specialty in the care of the expanding population of chronic pain patients (23).

Consistent with research in other physician populations (40,41) our study revealed reduced job satisfaction and greater psychological job demands (e.g., inadequate time to complete tasks, conflicting demands) played an important role in the development of emotional exhaustion in pain medicine physicians in the

United States. For depersonalization, consistent with prior research on burnout (42), age was an important factor such that older physicians reported lower levels of depersonalization. Previous authors have hypothesized that older physicians may have reduced levels of burnout due to developed self-efficacy within their roles and greater awareness of the potential risk factors for developing burnout (42). Across other physician populations, perceived individual and institutional support have been important in the development of personal accomplishment (43-45). For personal accomplishment, when pain medicine physicians in the United States feel supported by those in their workplace and are satisfied with their job, they also report greater feelings of empathy and efficacy in caring for their patients. For pain medicine physicians, efforts to encourage a collegial environment may help to encourage feeling successful in their roles.

Job insecurity and decisional authority have historically displayed strong relationships with the development of burnout (46,47). In this study, despite these 2 factors individually correlating with burnout, job insecurity and decisional authority were not significant in the overall models. This could be attributed to any number of factors, but is likely due to job dissatisfaction in pain medicine physicians in the United States having a much stronger relationship with burnout as illustrated in all 3 regression models. In other words, based upon the results of this study, job dissatisfaction appears to be an important element in the development of burnout in pain medicine physicians in the United States and to such an extent as to surpass other potential contributors.

Studies have been published examining the effects of interventions on burnout in the individual (48-50). However, experts in burnout research outline the need for interventions targeting more than the individual at risk but also institutional contributors to burnout (51). For example, an intervention entitled Civility, Respect, and Engagement at Work (CREW) has been implemented across large hospital systems and has shown improvements in burnout among providers which was sustained 12 months post-intervention (52-54). Additionally, when providers work well together, there can also be improved outcomes for patients as indicated from research on multidisciplinary care models for chronic pain patients (55-57).

All research has limitations and future directions. First, the response rate was surprisingly low and we

cannot be certain there is not a response bias. We cannot be sure that this sample is representative of all pain medicine physicians in the United States or that those who responded to the survey had different levels of burnout than those who did not participate. We are not entirely clear as to why the response rate was so low and more so than prior samples of physicians (58), though surely partially attributable to technological barriers. We also do not know whether other recruitment strategies would have resulted in a different cross-section of pain medicine physicians. We intend to continue to evaluate our strategies for recruitment in the future. However, despite the low response rate and possible response bias, prior research with physicians indicate higher response rates have not resulted in reduced response biases (58,59). Second, the cross-sectional design does not allow us to study burnout over time. Longitudinal-style data collection will be important for future research to examine how burnout develops over time (8). Despite these limitations, this is the first study on burnout in a national sample of pain medicine physicians, which should lead to necessary and important future dialogue and study.

## **CONCLUSION**

In conclusion, pain medicine physicians in the United States reported a high incidence of emotional exhaustion. Job dissatisfaction appears to be the leading agent in the development of all 3 components of burnout in this sample. Future research will need to continue to examine contributors to job dissatisfaction and burnout in pain medicine physicians, including the negative effects of burnout. This knowledge shall serve to limit the occurrence of burnout and help to develop treatment strategies.

## **Acknowledgments**

The authors would like to acknowledge Michelle Jankowski, M.S., for her assistance in performing the analyses. We would also like to acknowledge David Tonkin, M.D., for his assisting with establishing recruitment protocols. We would also like to thank the American Society of Interventional Pain Physicians for their invaluable assistance with recruitment of participants for this study.

Institutional Review Board: Henry Ford Health System Research Administration, Institutional Review Board approval No. 7931



## REFERENCES

- Halbesleben JR, Rathert C. Linking physician burnout and patient outcomes: Exploring the dyadic relationship between physicians and patients. *Health Care Management Review* 2008; 33:29-39.
- Dewa CS, Loong D, Bonato S, Thanh NX, Jacobs P. How does burnout affect physician productivity? A systematic literature review. *BMC Health Services Research* 2014; 14:325.
- Karasek R. Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly* 1979; 24:285-307.
- Nathan JI. Chronic pain treatment: A high moral imperative with offsetting personal risks for the physician – a medical student's perspective. *Pain Practice* 2009; 9:155-163.
- Luchman JN, Gonzalez-Morales MG. Demands, control, and support: A meta-analytic review of work characteristics interrelationships. *Journal of Occupational Health Psychology* 2013; 18:37-52.
- Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annual Review of Psychology* 2001; 52:397-422.
- Shanafelt TD, Boone S, Tan L, Dyrbye LN, Sotile W, West CP, Sloan J, Oreskovich MR. Burnout and satisfaction with work-life balance among US physicians relative to the general US population. *Arch Intern Med* 2012; 172:1377-1385.
- Shanafelt TD, Balch CM, Bechamps G, Russell T, Byrbye L, Satele D, Collicott P, Novotny PJ, Sloan J, Freischlag J. Burnout and medical errors among American surgeons. *Annals of Surgery* 2010; 251:995-1000.
- Rama-Maceiras P, Jokinen J, Kranke P. Stress and burnout in anaesthesia: A real world problem? *Current Opinion in Anaesthesiology* 2015; 28:151-158.
- Li Calzi S, Farinelli M, Ercolani M, Alianti M, Manigrasso V, Taroni AM. Physical rehabilitation and burnout: Different aspects of the syndrome and comparison between healthcare professionals involved. *Eurapa Medicophysica* 2006; 42:27-36.
- De Oliveira GS, Jr., Almeida MD, Ahmad S, Fitzgerald PC, McCarthy RJ. Anesthesiology residency program director burnout. *Journal of Clinical Anesthesia* 2011; 23:176-182.
- Lederer W, Kinzl JF, Trefalt E, Traweger C, Benzer A. Significance of working conditions on burnout in anesthetists. *Acta Anaesthesiologica Scandinavica* 2006; 50:58-63.
- Lindfors PM, Heponiemi T, Meretoja OA, Leino TJ, Elovainio MJ. Mitigating on-call symptoms through organizational justice and job control: A cross-sectional study among Finnish anesthesiologists. *Acta Anaesthesiologica Scandinavica* 2009; 53:1138-1144.
- Lindfors PM, Meretoja OA, Toyry SM, Luukkonen RA, Elovainio MJ, Leino TJ. Job satisfaction, work ability and life satisfaction among Finnish anesthesiologists. *Acta Anaesthesiologica Scandinavica* 2007; 51:815-822.
- Kluger MT, Bryant J. Job satisfaction, stress and burnout in anaesthetic technicians in New Zealand. *Anaesthesia and Intensive Care* 2008; 36:214-221.
- Kawasaki K, Sekimoto M, Ishizaki T, Imanaka Y. Work stress and workload of full-time anesthesiologists in acute care hospitals in Japan. *Journal of Anesthesia* 2009; 23:235-241.
- Baron R, Binder A, Wasner G. Neuropathic pain: Diagnosis, pathophysiological mechanisms, and treatment. *Lancet Neurology* 2010; 9:807-819.
- Tunks ER, Crook J, Weir R. Epidemiology of chronic pain with psychological comorbidity: Prevalence, risk, course, and prognosis. *Canadian Journal of Psychiatry* 2008; 53:224-234.
- Turk DC, Swanson KS, Gatchel RJ. Predicting opioid misuse by chronic pain patients: A systematic review and literature synthesis. *Clinical Journal of Pain* 2008; 24:497-508.
- Turk DC. Clinical effectiveness and cost-effectiveness of treatments for patients with chronic pain. *Clinical Journal of Pain* 2002; 18:355-365.
- Von Korff M, Crane P, Lane M, Miglioretti DL, Simon G, Saunders K, Stang P, Brandenburg N, Kessler R. Chronic spinal pain and physical-mental comorbidity in the United States: Results from the national comorbidity survey replication. *Pain* 2005; 113:331-339.
- Edlund MJ, Martin BC, Devries A, Fan MY, Braden JB, Sullivan MD. Trends in use of opioids for chronic noncancer pain among individuals with mental health and substance use disorders: The TROUP study. *Clinical Journal of Pain* 2010; 26:1-8.
- Freburger JK, Holmes GM, Agans RP, Jackman AM, Darter JD, Wallace AS, Castel LD, Kalsbeek WE, Carey TS. The rising prevalence of chronic low back pain. *Arch Intern Med* 2009; 169:251-258.
- Leijon O, Wahlstrom J, Mulder M. Prevalence of self-reported neck-shoulder-arm pain and concurrent low back pain or psychological distress: Time-trends in a general population, 1990-2006. *Spine* 2009; 34:1863-1868.
- Karasek R, Brisson C, Kawakami N, Houtman I, Bongers P, Amick B. The Job Content Questionnaire (JCQ): An instrument for internationally comparative assessments of psychosocial job characteristics. *Journal of Occupational and Health Psychology* 1998; 3:322-355.
- Maslach C, Jackson SE, Leiter MP. *Maslach Burnout Inventory*. Third edition. Scarecrow Education, Lanham, MD, 1997.
- Karasek R. *Job Content Questionnaire and User's Guide*. University of Massachusetts, Lowell, MA, 1985.
- Atluri S, Sudarshan G, Manchikanti L. Assessment of the trends in medical use and misuse of opioid analgesics from 2004 to 2011. *Pain Physician* 2014; 17:E119-E128.
- Joranson DE, Ryan KM, Gilson AM, Dahl JL. Trends in medical use and abuse of opioid analgesics. *JAMA* 2000; 283:1710-1714.
- Reid MC, Engles-Horton LL, Weber MB, Kerns RD, Rogers EL, O'Connor PG. Use of opioid medications for chronic non-cancer pain syndromes in primary care. *Journal of General Internal Medicine* 2002; 17:173-179.
- Starrels JL, Wu B, Peyser D, Fox AD, Batchelder A, Barg FK, Armsten JH, Cunningham CO. It made my life a little easier: Primary care providers' beliefs and attitudes about using opioid treatment agreements. *Journal of Opioid Management* 2014; 10:95-102.
- Kavukcu E, Akdeniz M, Avci HH, Altug M, Oner M. Chronic noncancer pain management in primary care: Family medicine physicians' risk assessment of opioid misuse. *Postgraduate Medicine* 2015; 127:22-26.
- Canada RE, DiRocco D, Day S. A better approach to opioid prescribing in primary care. *J Fam Pract* 2014; 63:E1-E8.
- Chelimsky TC, Fischer RL, Levin JB,

- Cheren MI, Marsh SK, Janata JW. The primary practice physician program for chronic pain ((c) 4PCP): Outcomes of a primary physician-pain specialist collaboration for community-based training and support. *Clinical Journal of Pain* 2013; 29:1036-1043.
35. Jamison RN, Sheehan KA, Scanlan E, Ross EL. Beliefs and attitudes about opioid prescribing and chronic pain management: Survey of primary care providers. *Journal of Opioid Management* 2014; 10:375-382.
36. Gaszynska E, Stankiewicz-Rudnicki M, Szatko F, Wieczorek A, Gaszynski T. Life satisfaction and work-related satisfaction among anesthesiologists in Poland. *Scientific World Journal* 2014; 2014:601865.
37. DeLisa JA, Kirshblum S, Jain SS, Campagnolo DI, Johnston M, Wood KD, Findley T. Practice and career satisfaction among physiatrists. A national survey. *Am J Phys Med Rehabil* 1997; 76:90-101.
38. Pathman DE, Konrad TR, Williams ES, Scheckler WE, Linzer M, Douglas J. Physician job satisfaction, dissatisfaction, and turnover. *J Fam Pract* 2002; 51:593.
39. O'Donnell EP, Humeniuk KM, West CP, Tilburt JC. The effects of fatigue and dissatisfaction on how physicians perceive their social responsibilities. *Mayo Clin Proc* 2015; 90:194-201.
40. Scheurer D, McKean S, Miller J, Wetterneck T. U.S. physician satisfaction: A systematic review. *Journal of Hospital Medicine* 2009; 4:560-568.
41. De Oliveira GS, Jr., Ahmad S, Stock MC, Harter RL, Almeida MD, Fitzgerald PC, McCarthy RJ. High incidence of burnout in academic chairpersons of anesthesiology: Should we be taking better care of our leaders? *Anesthesiology* 2011; 114:181-193.
42. Peisah C, Latif E, Wilhelm K, Williams B. Secrets to psychological success: Why older doctors might have lower psychological distress and burnout than younger doctors. *Aging and Mental Health* 2009; 13:300-307.
43. Bertges Yost W, Eshelman A, Raoufi M, Abouljoud M. A national study of burnout among American transplant surgeons. *Transplantation Proceedings* 2005; 37:1399-1401.
44. Jesse MT, Abouljoud M, Eshelman A. Determinants of burnout among transplant surgeons: A national survey in the United States. *American Journal of Transplantation* 2015; 15:772-778.
45. 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-A:1579-1586.
46. Geuskens GA, Koppes LL, van den Bossche SN, Joling CI. Enterprise restructuring and the health of employees: A cohort study. *Journal of Occupational and Environmental Medicine* 2012; 54:4-9.
47. Kozak A, Kersten M, Schillmoller Z, Nienhaus A. Psychosocial work-related predictors and consequences of personal burnout among staff working with people with intellectual disabilities. *Research in Developmental Disabilities* 2013; 34:102-115.
48. Fortney L, Luchterhand C, Zakletskaia L, Zgierska A, Rakel D. Abbreviated mindfulness intervention for job satisfaction, quality of life, and compassion in primary care clinicians: A pilot study. *Annals of Family Medicine* 2013; 11:412-420.
49. Goodman MJ, Schorling JB. A mindfulness course decreases burnout and improves well-being among healthcare providers. *International Journal of Psychiatry in Medicine* 2012; 43:119-128.
50. Krasner MS, Epstein RM, Beckman H, Suchman AL, Chapman B, Mooney CJ, Quill TE. Association of an educational program in mindful communication with burnout, empathy, and attitudes among primary care physicians. *JAMA* 2009; 302:1284-1293.
51. Leiter MP, Bakker AB, Maslach C. *Burnout at Work: A Psychological Perspective*. Psychology Press, New York, 2014.
52. Leiter MP, Laschinger HK, Day A, Oore D. The impact of civility interventions on employee social behavior, distress, and attitudes. *Journal of Applied Psychology* 2011; 96:1258-1274.
53. Leiter MP, Day A, Oore DG, Spence Laschinger HK. Getting better and staying better: Assessing civility, incivility, distress, and job attitudes one year after a civility intervention. *Journal of Occupational Health Psychology* 2012; 17:425-434.
54. Osatuke K, Mohr D, Ward C, Dyrenforth SR, Belton L. Civility, Respect, Engagement in the Workforce (CREW): Nationwide organization development intervention at Veterans Health Administration. *Journal of Applied Behavioral Science* 2009; 45:384-410.
55. Grumbach K, Bodenheimer T. Can health care teams improve primary care practice? *JAMA* 2004; 291:1246-1251.
56. Van Bogaert P, Wouters K, Willems R, Mondelaers M, Clarke S. Work engagement supports nurse workforce stability and quality of care: Nursing team-level analysis in psychiatric hospitals. *Journal of Psychiatric and Mental Health Nursing* 2013; 20:679-686.
57. Kamper SJ, Apeldoorn AT, Chiarotto A, Smeets RJ, Ostelo RWJG, Guzman J, Van Tulder MW. Multidisciplinary biopsychosocial rehabilitation for chronic low back pain. *Cochrane Database System Reviews* 2014; 9:CD000963.
58. Kellerman SE, Herold J. Physician response to surveys. A review of the literature. *American Journal of Preventative Medicine* 2001; 20:61-67.
59. McFarlane E, Olmsted MG, Murphy J, Hill CA. Nonresponse bias in a mail survey of physicians. *Evaluation & the Health Professions* 2007; 30:170-185.