

Distress and Career Satisfaction Among 14 Surgical Specialties, Comparing Academic and Private Practice Settings

Charles M. Balch, MD,* Tait D. Shanafelt, MD,† Jeffrey A. Sloan, PhD,† Daniel V. Satele, BS,* and Julie A. Freischlag, MD*

Objective(s): We compared distress parameters and career satisfaction from survey results of surgeons from 14 specialties practicing in an academic versus private practice environment.

Methods: The 2008 American College of Surgeons survey evaluated demographic variables, practice characteristics, career satisfaction, and distress parameters using validated instruments.

Results: The practice setting (academic vs. private practice) was independently associated with burnout in a multivariate (MV) analysis (odds ratio [OR] 1.172, $P = 0.02$). Academic surgeons were less likely to experience burnout compared to those in private practice (37.7% vs. 43.1%), less likely to screen positive for depression (27.6% vs. 33%) or to have suicide ideation (4.7% vs. 7.4%; all $P < 0.0001$). They were also more likely to have career satisfaction (77.4% of academic surgeons would become a surgeon again vs. 64.9% for those in private practice; $P < 0.0001$) and to recommend a medical career to their children (61.3% vs. 43.7%, $P < 0.0001$). For academic surgeons, the most significant positive associations with burnout were: (1) trauma surgery (OR 1.513, $P = 0.0059$), (2) nights on call (OR 1.062, $P = 0.0123$), and (3) hours worked (OR 1.019, $P < 0.0001$), whereas the negative associations were: (1) having older children (>22 years; OR 0.529, $P < 0.0001$), (2) pediatric surgery (OR 0.583, $P = 0.0053$), (3) cardiothoracic surgery (OR 0.626, $P = 0.0117$), and (4) being male (OR 0.787, $P = 0.0491$). In a private practice setting, the most significant positive associations with burnout were: (1) urologic surgery (OR 1.497, $P = 0.0086$), (2) having 31% to 50% time for nonclinical activities (OR 1.404, $P = 0.0409$), (3) incentive based pay (OR 1.344, $P < 0.0001$), (4) nights on call (OR 1.045, $P = 0.0029$), and (5) hours worked (OR 1.015, $P < 0.0001$), whereas the negative associations were: (1) older children (OR 0.677, $P = 0.0001$), (2) physician spouse (OR 0.753, $P = 0.0093$), and (3) older age (OR 0.989, $P = 0.0158$). The independent factors relating to career satisfaction for surgeons in private practice and academic practice were also different.

Conclusions: Factors associated with burnout were distinct for academic and private practice surgeons. Distress parameters were lower and career satisfaction higher for academic surgeons.

(*Ann Surg* 2011;254:558–568)

Burnout among surgeons has been reported at a rate of 28% to 42%, depending upon the size and composition of the surveys analyzed.^{1–3} Recent reports have confirmed these results at the individual institution level.^{4,5} Increasing evidence suggests that physician burnout can adversely affect patient safety, quality of patient care, and even contribute to medical errors.^{6–9} Major medical errors reported

by surgeons are strongly related to a surgeon's degree of burnout and their mental quality of life (QOL).⁶ Surgeon burnout can also have potentially profound personal consequences for the individual surgeon of which suicide is perhaps the most tragic example.¹⁰

We have previously reported on the overall results of burnout and career satisfaction among 7905 surgeons as well as the professional and personal factors associated with them.^{2,6,11} In a multivariate (MV) analysis, surgical subspecialty was an independent factor associated with both burnout (odds ratio [OR] 1.2–1.6, $P < 0.001$) and career satisfaction (OR 1.4–2.6, all $P < 0.02$).² In this analysis, we explore in depth the relative associations of burnout, depression, and career satisfaction for surgeons among 14 surgical subspecialties. In addition, the practice setting (academic vs. private) are analyzed separately based on a hypothesis that the factors associated with distress and career satisfaction may differ in these 2 practice settings.

METHODS

Methods and Statistics

Participants

All surgeons who were members of the American College of Surgeons (ACS), had an e-mail address on file with the College, and permitted their e-mail to be used for correspondence with the College were eligible for participation in this study. Participation was elective and all responses were anonymous. The study was commissioned by the ACS Governor's Committee on Physician Competency and Health with Institutional Review Board (IRB) oversight with respect to protection of human subjects by the Mayo Clinic IRB.

Data Collection

Surgeons were surveyed electronically in June of 2008. Participants were blinded to any specific hypothesis of the study. The survey included 61 questions about a wide range of characteristics including demographic information, practice characteristics, burnout, quality of life, symptoms of depression, and career satisfaction. Validated survey tools were used to identify burnout, mental and physical QOL, and symptoms of depression as described previously.² Burnout was measured using the Maslach Burnout Inventory (MBI), a validated 22-item questionnaire considered a standard tool for measuring burnout.² The MBI has 3 subscales to evaluate the 3 domains of burnout: emotional exhaustion, depersonalization, and low personal accomplishment. We considered surgeons with a high score for medical professionals on either the depersonalization and/or emotional exhaustion subscales as having at least 1 manifestation of professional burnout.² Symptoms of depression were identified using the 2-item Primary Care Evaluation of Mental Disorders (PRIME MD), a standardized depression screening tool which performs as well as longer instruments.^{12,13} Mental and physical QOL were measured using the Medical Outcomes Study Short Form (SF-12), with norm-based scoring methods used to calculate mental and physical QOL summary scores.^{14,15} The average mental and physical QOL summary scores for the U.S. population are 50 (scale 0–100; standard deviation = 10).¹⁵

From the *Johns Hopkins Medical Institutions, Baltimore, MD; and † Mayo Clinic, Rochester, MN.

Presented at the American Surgical Association Meeting, April 14, 2011 Boca Raton, FL.

Disclosure: The authors declare that they have nothing to disclose.

Reprints: Charles M. Balch, MD, UT Southwestern Cancer Center, Division of Surgical Oncology, 5323 Harry Hines Blvd, Dallas, TX 75390-8548. E-mail: charles.balch@utsouthwestern.edu.

Copyright © 2011 by Lippincott Williams & Wilkins

ISSN: 0003-4932/11/25404-0558

DOI: 10.1097/SLA.0b013e318230097e

Statistical Analysis

Prevalence of burnout, a positive depression screen, and mental and physical QOL by sex was compared using χ^2 tests or Kruskal-Wallis tests. All tests were 2-sided tests with type I error rates of 0.05. We performed logistic regression to evaluate independent associations of the independent variables with burnout and specialty choice satisfaction. Both forward and backward elimination methods were used to select significant variables for the models where the directionality of the modeling did not impact the results. The independent variables utilized in the modeling process included: age, relationship status, spouse/partner current profession, having children, age of children, subspecialty, years in practice, hours worked per week, hours per week spent in the operating room, number of nights on call per week, practice setting, current academic rank, primary method of compensation, percentage of time dedicated to nonpatient care activities, commitment to raising children slowed career advancement, who cares for youngest child when the child is ill or has a nonschool day, experienced a work-home conflict within the past 3 weeks, how the work-home conflict was resolved, experienced a career conflict with partner/spouse, how the career conflict was resolved, depression, and burnout. All analyses were done using SAS version 9 (SAS Institute Inc., Cary, NC) or R (R Foundation for Statistical Computing, Vienna, Austria; <http://www.r-project.org>.)

RESULTS

Demographic and Outcomes for Individual Surgical Specialties

The demographics, work characteristics, distress incidence and career satisfaction for each of the 14 surgical subspecialties are described below in approximate order of distress parameters. The ranking for burnout, screen + for depression, low mental QOL and career satisfaction is listed in Table 1.

Trauma Surgeons

The majority of the 345 respondents were located in an academic practice (68.7%). The mean age was 48 years (rank 11th among the 14 specialties) and 17.8% were women (rank 4th). Compared to the other 13 surgical specialties, they reported the highest workload of all surgical specialties, with 65% working >70 hours/week, and a mean workweek of 72.8 hours/week (rank 1st) and an average of 2.3 nights on call per week (rank 11th). On the other hand, they reported the lowest number of hours in the operating room at 12 hours/week (rank 14th). With regard to distress parameters, they had the highest incidence of burnout (51.6%), the lowest mental QOL score with a mean score of 46.9, and 36.7% having low QOL score that was half a standard deviation below the population norm (rank 1st), and the highest rate of work/home conflict (62.3%). They had a positive depression screen of 33.9% (rank 3rd), and a suicide ideation rate of 7.0% (rank 3rd). With regard to career satisfaction, 26.7% would not be a surgeon again (rank 8th of 14 specialties), whereas 42% would not recommend a medical career to their children (rank 10th).

Vascular Surgeons

The majority of the 463 respondents were located in a private practice (54%). The mean age was 52.9 years (rank 6th) and 6.1% were women (rank 10th). Compared to the other 13 surgical specialties, they reported an average workload, with 35.5% working >70 hours/week, a mean workweek of 61.6 hours/week (rank 7th), and an average of 2.7 nights on call per week (rank 5th). They reported a high number of hours in the OR at 20 hours/week (rank 2nd). With regard to distress parameters, they had the second highest incidence of burnout (44%), a lower mental QOL score of 48.7, with 29.1% having low QOL score (rank 6th), and an average rate of work/home conflict

(51.9%; rank 7th). They ranked 5th in having a positive depression screen (30.4%), and reported the highest incidence of suicide ideation rate at 7.7% (rank 1st). Vascular surgeons reported the lowest level of career satisfaction, with 36% stating they would not be a surgeon again (rank 1st), whereas 54.4% would not recommend a medical career to their children (rank 1st).

Transplant Surgeons

The vast majority of the 123 respondents were located in an academic practice (78%). They were one of the youngest groups, with a mean age of 47.9 years (rank 13th) and 10.6% were women (rank 8th). Compared to the other 13 surgical specialties, they reported a high workload, with 48.8% working >70 hours/week, a mean workweek of 68.8 hours/week and an average of 4.3 nights on call per week (rank 1st). They reported an average number of hours in the OR at 16.5 hours/week (rank 9th). With regard to distress parameters, they had the highest rate of having a positive depression screen (36.7%), an average incidence of burnout (39.8%; rank 6th), and a lower mental QOL score at 47.7, with 30.8% having low QOL score (rank 2nd). They reported a high rate of work/home conflict (59.3%; rank 3rd). Suicide ideation rate was relatively low at 4.1% (rank 13th). Transplant surgeons reported a high level of career satisfaction, with only 15.7% stating they would not be a surgeon again (rank 13th), whereas 37.7% would not recommend a medical career to their children (rank 13th).

Cardiothoracic Surgeons

Over half of the 488 respondents were located in an academic practice (54%). The mean age was 53 years (rank 5th) and 6% were women (rank 11th). Compared to the other 13 surgical specialties, they reported a high workload, with 47.8% working >70 hours/week, a mean workweek of 65.3 hours/week (rank 4th), and an average of 3.5 nights on call per week (rank 2nd). They reported the highest number of hours in the OR at 24.9 hours/week (rank 1st). With regard to distress parameters, they had a higher positive depression screen at 34.5% (rank 2nd), a lower mental QOL score of 48.5, with 29.3% having low mental QOL score (rank 4th), but a lower incidence of burnout at 34.8% (rank 11th), and an average rate of work/home conflict (52.7%; rank 5th). They also reported a higher incidence of suicide ideation rate at 7.3% (rank 2nd). Cardiothoracic surgeons reported an average level of career satisfaction, with 27.5% stating they would not be a surgeon again (rank 5th), whereas 49.1% would not recommend a medical career to their children (rank 12th).

Urologic Surgeons

The majority of the 315 respondents were located in a private practice (61.6%). The mean age was somewhat older at 54.5 years (rank 3rd), and only 3.5% were women (rank 13th). Compared to the other 13 surgical specialties, they reported a somewhat lower workload, with 22.8% working >70 hours/week, a mean workweek of 55.5 hours/week (rank 11th), an average of 2.7 nights on call per week (rank 5th), and a lower number of hours in the operating room at 12.3 hours/week (rank 13th). With regard to distress parameters, they ranked 3rd in burnout rate (42.9%), had an average rate of a positive depression screen at 28.8% (rank 6th), a lower mental QOL score of 49.4, with 26.3% having low QOL score (rank 10th), a lower rate of work/home conflict (43.3%; rank 12th) and a low incidence of suicide ideation rate (4.5%; rank 11th). Urologic surgeons reported an average level of career satisfaction, with 25.9% stating they would not be a surgeon again (rank 9th), whereas 47.6.1% would not recommend a medical career to their children (rank 12th).

TABLE 1. Distress Incidence and Career Satisfaction Among 14 Surgical Subspecialties

Burnout (%)	Screen + Depression (%)	Low Mental QOL (%)	Would Become a Surgeon Again (% who replied "No")	Recommend to Their Children to Become MDs (% who replied "No")
Trauma (51.6)	Transplant (37)	Trauma (37)	Vascular (36)	Vascular (54)
Vascular (44)	Cardiothoracic (34.5)	Transplant (31)	Plastic (33)	General (53)
Urologic (43)	Trauma (34)	General (29.6)	General (32)	Cardiothoracic (49)
ENT* (41.3)	General (33)	Cardiothoracic (29.3)	Colorectal (31)	Plastic (48)
General (41)	Vascular (30)	Colorectal (29.2)	ENT* (30.5)	Urologic (47.6)
Transplant (40)	Urologic (29)	Vascular (29.1)	Neurologic (28)	Obs/Gyn (47)
Colorectal (39.7)	Colorectal (28.6)	Obs/Gyn (27.5)	Cardiothoracic (27.5)	Colorectal (46)
Neurologic (38)	Plastic (28.4)	Pediatric (27.3)	Trauma (27)	ENT* 45.5)
Plastic (37)	Pediatric (28)	Plastic (27)	Urologic (26)	Neurologic (44)
Surg Oncology (36)	Surg Oncology (24)	Urologic (26.3)	Surg Oncology (25)	Orthopedic (44)
Cardiothoracic (35)	ENT* (23)	Surg Oncology (26.2)	Obs/Gyn (22)	Trauma(42)
Obs/Gyn (34)	Neurologic (21)	Neurologic (25)	Orthopedic (20)	Surg Oncology (40.5)
Orthopedic (32)	Orthopedic (20.8)	ENT* (21)	Transplant (16)	Transplant (38)
Pediatric (31)	Obs/Gyn (20)	Orthopedic (20)	Pediatric (15.6)	Pediatric (33)

ENT is Otolaryngology/Head and Neck Surgery.

TABLE 2. Independent Factors Related to (a) Burnout Among Both Academic and Private Practice Surgeons and (b) Career Satisfaction (would choose to be physician again) Among Both Academic and Private Practice Surgeons*

Response Variable	Independent Predictor	Odds Ratio ⁺ (95% CI)	P
(a) Burnout	Trauma Surgeon (vs. general surgeon)	1.413 (1.091, 1.831)	0.0088
	Urological Surgeon (vs. general surgeon)	1.350 (1.044, 1.745)	0.0222
	Otolaryngology Head and Neck Surgeon (vs. general surgeon)	1.282 (1.012, 1.625)	0.0397
	Incentive based pay (vs. salaried w/ no incentive pay)	1.274 (1.124, 1.444)	0.0002
	Spouse works as a non-MD health care professional (vs. nonmedical other job)	1.184 (1.018, 1.377)	0.0285
	Private Practice (vs. academic)	1.172 (1.024, 1.342)	0.0212
	Nights per week on call (for every additional night)	1.053 (1.027, 1.079)	<0.0001
	Years in practice (for every additional year)	1.032 (1.014, 1.051)	0.0004
	Hours worked per week (for every additional hour)	1.017 (1.014, 1.021)	<0.0001
	Age (for every year older)	0.962 (0.944, 0.980)	<0.0001
	Have children (vs. no children)	0.815 (0.693, 0.959)	0.0138
	Cardiothoracic Surgeon (vs. general surgeon)	0.776 (0.619, 0.974)	0.0284
	Pediatric Surgeon (vs. general surgeon)	0.670 (0.487, 0.920)	0.0135
	Youngest child age >22 (vs. youngest age < 5)	0.631 (0.532, 0.749)	<0.0001
(b) Choose to be a physician again	Otolaryngology/Head and Neck Surgeon (vs. general surgeon)	2.664 (1.908, 3.719)	0.0010
	Transplant Surgeon (vs. general surgeon)	2.212 (1.255, 3.899)	0.0060
	Plastic Surgeon (vs. general surgeon)	2.000 (1.513, 2.645)	<0.0001
	Urological Surgeon (vs. general surgeon)	1.869 (1.345, 2.596)	0.0002
	Pediatric Surgeon (vs. general surgeon)	1.794 (1.175, 2.379)	0.0068
	Orthopedic Surgeon (vs. general surgeon)	1.756 (1.038, 2.973)	0.0360
	Trauma Surgeon (vs. general surgeon)	1.581 (1.144, 2.185)	0.0055
	21% to 30% of time dedicated to nonpatient activities (vs. no time)	1.246 (1.043, 1.488)	0.0154
	Age	1.031 (1.024, 1.038)	<0.0001
	Hours per week in OR (for each additional hour)	1.014 (1.007, 1.020)	<0.0001
	Nights per week on call (for each additional night)	0.949 (0.922, 0.977)	0.0004
	Academic rank of Assistant professor (vs. rank of instructor)	0.748 (0.584, 0.957)	0.0211
	Vascular Surgeon (vs. general surgeon)	0.746 (0.582, 0.955)	0.0200
	Private practice (vs. academic)	0.527 (0.444, 0.625)	<0.0001
Burnout	0.219 (0.193, 0.248)	<0.0001	

+ OR > 1 indicates a greater risk for burnout (Table 2a) and greater career satisfaction (2b), whereas an OR < 1 indicates a lower risk for burnout (2a) and less career satisfaction (2b)

*Years in Practice excluded from final model as it was interchangeable w/age (pearson correlation of 0.95).

General Surgeons

The majority of the 3233 respondents were located in a private practice (63.6%). The mean age was 51.6 years (rank 8th) and 12.8% were women (rank 7th). Compared to the other 13 surgical specialties, they reported an average workload, with 28.4% working >70 hours/week, and a mean workweek of 58.8 hours/week (rank

9th), an average of 2.6 nights on call per week (rank 8th), but a higher number of hours in the operating room at 18.1 hours/week (rank 5th). With regard to distress parameters, they had a higher positive depression screen (32.8%; rank 4th), and burnout rate at 41% (rank 5th), a lower mental QOL score of 48.5, with 29.6% having low QOL score (rank 3rd), and an average rate of work/home conflict (50%;

TABLE 3. Personal Characteristics: Academic Versus Private Surgical Practices

	Private (N = 4240)	Academic (N = 2272)	P
Age			<0.0001
N	4226	2256	
Mean (SD)	51.0 (9.88)	50.0 (10.03)	
Median	51.0	49.0	
Q1, Q3+	43.0, 58.0	42.0, 57.0	
Range	(31.0–85.0)	(20.0–99.0)	
Gender			<0.0001
Missing	21 (%)	14 (%)	
Male	3764 (89.2%)	1886 (83.5%)	
Female	455 (10.8%)	372 (16.5%)	
Relationship status			0.1782
Missing	1 (%)	0 (%)	
Single	331 (7.8%)	209 (9.2%)	
Married	3771 (89%)	1980 (87.1%)	
Partnered	118 (2.8%)	70 (3.1%)	
Widowed or widower	19 (0.4%)	13 (0.6%)	
Ever gone through a divorce			<0.0001
Missing	27 (%)	13 (%)	
Yes	946 (22.5%)	408 (18.1%)	
No	3267 (77.5%)	1851 (81.9%)	
Partner or spouse works outside the home			0.8828
Missing	351 (%)	222 (%)	
Yes	2060 (53%)	1090 (53.2%)	
No	1829 (47%)	960 (46.8%)	
Partner or spouse current profession			<0.0001
Missing	2207 (%)	1194 (%)	
Surgeon	145 (7.1%)	153 (14.2%)	
Physician but not in surgery	423 (20.8%)	289 (26.8%)	
Other health care professional	651 (32%)	244 (22.6%)	
Nonmedical professional	561 (27.6%)	310 (28.8%)	
Other	253 (12.4%)	82 (7.6%)	
Have any children			<0.0001
Yes	3791 (89.4%)	1953 (86%)	
No	449 (10.6%)	319 (14%)	
Age of youngest child			0.0001
Missing	458 (%)	326 (%)	
Younger than 5	700 (18.5%)	446 (22.9%)	
5 to 12	918 (24.3%)	504 (25.9%)	
13 to 18	707 (18.7%)	342 (17.6%)	
19 to 22	441 (11.7%)	205 (10.5%)	
Older than 22	1016 (26.9%)	449 (23.1%)	

+ Q1 is the lower 25th percentile and Q3 is the upper 75% percentile.

rank 9th). They reported a higher incidence of suicide ideation rate of 6.9% (rank 4th). General surgeons reported a lower level of career satisfaction, with 31.8% stating they would not be a surgeon again (rank 3rd), whereas 53.6% would not recommend a medical career to their children (rank 2nd).

Colorectal Surgeons

The majority of the 302 respondents were located in a private practice (56.3%). The mean age was the youngest of all specialties at 47.7 years (rank 1st), whereas 19.3% were women (rank 2nd). Compared to the other 13 surgical specialties, they reported an above average workload, with 31.8% working >70 hours/week, a mean workweek of 62.2 hours/week (rank 6th), an average of 2.7 nights on call per week (rank 5th), and an average number of hours in the

TABLE 4. Professional Characteristics: Academic Versus Private Surgical Practices

	Private (N = 4240)	Academic (N = 2272)	P
Years in practice			<0.0001
N	4196	2237	
Mean (SD)	18.2 (10.15)	16.6 (10.73)	
Median	18.0	16.0	
Q1, Q3+	10.0, 26.0	7.0, 25.0	
Range	(0.0–53.0)	(0.0–53.0)	
Years of Experience			<0.0001
Missing	44 (%)	35 (%)	
<10 years exp	982 (23.4%)	715 (32%)	
10 to 19 years exp	1293 (30.8%)	639 (28.6%)	
20 to 30 years exp	1439 (34.3%)	637 (28.5%)	
>30 years exp	482 (11.5%)	246 (11%)	
Hours worked per week			<0.0001
N	4219	2260	
Mean (SD)	59.4 (16.88)	65.3 (15.64)	
Median	60.0	65.0	
Q1, Q3	50.0, 70.0	60.0, 75.0	
Range	(0.0–168.0)	(0.0–125.0)	
Hours worked per week			<0.0001
Missing	21 (%)	12 (%)	
<40 hours/week	297 (7%)	65 (2.9%)	
40 to 49 hours/week	498 (11.8%)	127 (5.6%)	
50 to 59 hours/week	862 (20.4%)	321 (14.2%)	
60 to 69 hours/week	1376 (32.6%)	808 (35.8%)	
70 to 79 hours/week	528 (12.5%)	406 (18%)	
>80 hours/week	658 (15.6%)	533 (23.6%)	
Hours per week in operating room			0.1486
N	4186	2250	
Mean (SD)	18.4 (10.60)	17.8 (9.96)	
Median	16.0	16.0	
Q1, Q3	10.0, 25.0	10.0, 24.0	
Range	(0.0–80.0)	(0.0–65.0)	
How many nights are you on call			<0.0001
N	4194	2244	
Mean (SD)	3.0 (2.25)	2.2 (1.99)	
Median	2.0	2.0	
Q1, Q3	1.0, 4.0	1.0, 3.0	
Range	(0.0–7.0)	(0.0–7.0)	
Current academic rank			0.2216
Missing	4234 (%)	17 (%)	
Instructor	1 (16.7%)	93 (4.1%)	
Assistant Professor	1 (16.7%)	680 (30.2%)	
Associate Professor	3 (50%)	627 (27.8%)	
Full Professor	1 (16.7%)	855 (37.9%)	
Primary method determining compensation			<0.0001
Missing	80 (%)	35 (%)	
Salaried position no incentive pay	325 (7.8%)	774 (34.6%)	
Salaried with bonus based on billing	914 (22%)	1162 (51.9%)	
Incentive pay based entirely on billing	2608 (62.7%)	167 (7.5%)	
Other	313 (7.5%)	134 (6%)	
Pct time dedicated to nonpt care activities			<0.0001
Missing	11 (%)	11 (%)	
None	211 (5%)	11 (0.5%)	
Less than 10%	1732 (41%)	204 (9%)	
10% to 20%	1558 (36.8%)	666 (29.5%)	
21% to 30%	490 (11.6%)	550 (24.3%)	
31% to 50%	175 (4.1%)	492 (21.8%)	
More than 50%	63 (1.5%)	338 (14.9%)	

+ Q1 is the lower 25th percentile and Q3 is the upper 75% percentile.

TABLE 5. Burnout/Depression, Career Satisfaction and QOL Comparing Private and Academic Surgical Practice

	Private (N = 4240)	Academic (N = 2272)	P
MBI Emotional Exhaustion			<0.0001
N	4211	2254	
Mean (SD)	22.0 (12.25)	20.5 (11.68)	
Median	21.0	19.0	
Q1, Q3+	12.0, 31.0	11.0, 29.0	
Range	(0.0–54.0)	(0.0–54.0)	
MBI EE: Categorization*			0.0005
Missing	29	18	
Low Burnout: ≤18	1856 (44.1%)	1078 (47.8%)	
Avg Burnout: 19–26	889 (21.1%)	498 (22.1%)	
High Burnout: ≥27	1466 (34.8%)	678 (30.1%)	
MBI Depersonalization			<0.0001
N	4210	2249	
Mean (SD)	7.1 (5.81)	6.4 (5.43)	
Median	6.0	5.0	
Q1, Q3	3.0, 10.0	2.0, 9.0	
Range	(0.0–30.0)	(0.0–30.0)	
MBI DP: Categorization*			0.0001
Missing	30	23	
Low Burnout: ≤5	2074 (49.3%)	1216 (54.1%)	
Avg Burnout: 6–9	928 (22%)	490 (21.8%)	
High Burnout: ≥10	1208 (28.7%)	543 (24.1%)	
MBI Personal Accomplishment			0.2521
N	4185	2235	
Mean (SD)	40.6 (6.16)	40.9 (6.05)	
Median	42.0	42.0	
Q1, Q3	37.0, 45.0	38.0, 45.7	
Range	(7.0–48.0)	(0.0–48.0)	
MBI PA: Categorization*			0.1922
Missing	60	40	
Low Burnout: ≥40	2737 (65.5%)	1480 (66.3%)	
Avg Burnout: 34–39	889 (21.3%)	491 (22%)	
High Burnout: ≤33	554 (13.3%)	261 (11.7%)	
Burnout (High EE or High DP)			<0.0001
Missing	24	14	
Yes	1819 (43.1%)	852 (37.7%)	
No	2397 (56.9%)	1406 (62.3%)	
Depressed			<0.0001
Missing	29	13	
Yes	1388 (33%)	623 (27.6%)	
No	2823 (67%)	1636 (72.4%)	
SF-12 mental scale:norm mean = 50, SD = 10			0.1722
N	4051	2175	
Mean (SD)	48.4 (10.09)	48.8 (9.87)	
Median	51.5	51.6	
Q1, Q3	42.7, 55.9	43.3, 56.0	
Range	(9.5–67.8)	(9.4–66.5)	
SF12 Mental QOL Score < 45 (1/2 SD Below Pop Norm)			0.2602
Missing	189	97	
Yes	1210 (29.9%)	620 (28.5%)	
No	2841 (70.1%)	1555 (71.5%)	
SF-12 physical scale:norm mean = 50, SD = 10			0.0161
N	4051	2175	
Mean (SD)	53.6 (6.65)	54.1 (6.07)	
Median	55.5	55.9	
Q1, Q3	51.5, 57.2	51.8, 57.3	
Range	(19.2–66.5)	(18.3–66.6)	

(Continued)

TABLE 5. (Continued)

	Private (N = 4240)	Academic (N = 2272)	P
SF12 Physical QOL Score < 45 (1/2 SD Below Pop Norm)			0.0774
Missing	189	97	
Yes	410 (10.1%)	190 (8.7%)	
No	3641 (89.9%)	1985 (91.3%)	
Would Become a Physician Again			<0.0001
Missing	18	7	
No	1276 (30.2%)	423 (18.7%)	
Yes	2946 (69.8%)	1842 (81.3%)	
Would Become a Surgeon Again			<0.0001
Missing	22	13	
No	1480 (35.1%)	510 (22.6%)	
Yes	2738 (64.9%)	1749 (77.4%)	
Recommend your children become physician or surgeon			<0.0001
Missing	479	338	
No	2116 (56.3%)	748 (38.7%)	
Yes	1645 (43.7%)	1186 (61.3%)	
Schedule leaves time for personal/family life			<0.0001
Missing	26	9	
Strongly agree	389 (9.2%)	139 (6.1%)	
Agree	1123 (26.6%)	555 (24.5%)	
Neutral	751 (17.8%)	404 (17.9%)	
Disagree	1300 (30.8%)	765 (33.8%)	
Strongly disagree	651 (15.4%)	400 (17.7%)	
Made major medical error in last 3 months			0.9808
Yes	393 (9.3%)	211 (9.3%)	
No	3847 (90.7%)	2061 (90.7%)	
Greatest contributing factor in medical error			0.0084
Missing	3856	2063	
A system issue	44 (11.5%)	47 (22.5%)	
Your degree of fatigue	26 (6.8%)	14 (6.7%)	
Lapse in your concentration	50 (13%)	26 (12.4%)	
Lapse in judgment	128 (33.3%)	60 (28.7%)	
Lack of knowledge	20 (5.2%)	7 (3.3%)	
Your degree of stress or burnout	59 (15.4%)	19 (9.1%)	
Other	57 (14.8%)	36 (17.2%)	
Had thoughts of taking your own life in past 12 mo			<0.0001
Missing	37	23	
Yes	310 (7.4%)	105 (4.7%)	
No	3893 (92.6%)	2144 (95.3%)	
Sought psych/psychologist help in last 12 months			0.2022
Missing	44	22	
Yes	312 (7.4%)	148 (6.6%)	
No	3884 (92.6%)	2102 (93.4%)	
Reluctant to seek depression help because of repercussions			<0.0001
Missing	20	15	
Yes	1775 (42.1%)	797 (35.3%)	
No	2445 (57.9%)	1460 (64.7%)	
Used depression medication in last 12 months			0.0081
Missing	2	0	
Yes	259 (6.1%)	103 (4.5%)	
No	3979 (93.9%)	2169 (95.5%)	

(Continued)

TABLE 5. (Continued)

	Private (N = 4240)	Academic (N = 2272)	P
Who prescribed depression medication			0.4849
Missing	3982	2169	
I prescribed for myself	28 (10.9%)	6 (5.8%)	
Colleague prescribed even though not their patient	18 (7%)	9 (8.7%)	
Professional of whom I am a patient	197 (76.4%)	81 (78.6%)	
Other	15 (5.8%)	7 (6.8%)	
Conflict between work/personal in last 3 weeks			<0.0001
Missing	21	21	
Yes	2138 (50.7%)	1281 (56.9%)	
No	2081 (49.3%)	970 (43.1%)	
Whose career took priority			<0.0001
Missing	2180	1186	
My partner or spouse	147 (7.1%)	94 (8.7%)	
My own career	670 (32.5%)	444 (40.9%)	
There has never been a conflict	1243 (60.3%)	548 (50.5%)	
How resolved last work/personal conflict			0.0595
Missing	129	61	
Resolved in favor of work	1516 (36.9%)	822 (37.2%)	
Resolved in favor of personal	476 (11.6%)	298 (13.5%)	
Resolved to meet both responsibilities	2119 (51.5%)	1091 (49.3%)	

+Q1 is the lower 25th percentile and Q3 is the upper 75% percentile.
*MBI: Maslach Burnout Inventory, EE: Emotional Exhaustion, DP: Depersonalization, PA: Personal Accomplishment.

operating room at 17.9 hours/week (rank 7th). With regard to distress parameters, they ranked 7th in burnout rate (39.7%), had an average rate of a positive depression screen at 28.6% (rank 7th), a lower mental QOL score of 48.3, with 29.2% having low QOL score (rank 5th), a higher rate of work/home conflict (59.5%; rank 2nd), and a suicide ideation rate of 6% (rank 7th). Colorectal surgeons reported a lower level of career satisfaction, with 31% stating they would not be a surgeon again (rank 4th of 14 specialties), whereas 45.8% would not recommend a medical career to their children (rank 7th).

Plastic Surgeons

The majority of the 458 respondents were located in a private practice (67.9%). The mean age was 50.8 years (rank 10th), whereas 14.7% were women (rank 6th). Compared to the other 13 surgical specialties, they reported a lower average workload, with 17.5% working >70 hours/week, a mean workweek of 54.6 hours/week (rank 12th), an average of 2.8 nights on call per week (rank 4th), and a higher number of hours in the operating room at 19.7 hours/week (rank 3rd). With regard to distress parameters, they had a burnout rate of 37.4% (rank 9th), a positive depression screen of 28.4% (rank 8th), a mental QOL score of 49.4, with 27.1% having low QOL score (rank 9th), and an average rate of work/home conflict (50%; rank 9th). They reported a higher incidence of suicide ideation rate (6.8%; rank 5th). Plastic surgeons reported a lower level of career satisfaction, with 32.7% stating they would not be a surgeon again (rank 2nd), whereas 48.6% would not recommend a medical career to their children (rank 4th).

Neurologic Surgeons

The majority of the 184 respondents were located in a private practice. The mean age was somewhat older at 54.3 years (rank 4th), whereas 6% were women (rank 12th). Compared to the other 13 surgical specialties, they reported a mean workweek of 61.5 hours/week (rank 8th), with 37.7% working >70 hours/week, an average of 2.4 nights on call per week (rank 10th), and 18 hours/week in the operating room (rank 6th). With regard to distress parameters, they had a burnout rate of 38.5% (rank 8th), a 21.3% rate of a positive depression screen (rank 12th), a mental QOL score of 49.8, with 25.3% having a low QOL score (rank 12th), a work/home conflict rate of 41.5% (rank 13th), and a suicide ideation rate of 4.4% (rank 12th). Neurosurgeons reported an average level of career satisfaction, with 28.3% stating they would not be a surgeon again (rank 6th), whereas 44.2% would not recommend a medical career to their children (rank 8th).

Otolaryngology/Head and Neck Surgeons

The majority of the 371 respondents were located in a private practice (54.7%). The mean age was 51.5 years (rank 7th) and 9.2% were women (rank 9th). Compared to the other 13 surgical specialties, they reported a mean workweek of 54.3 hours/week (rank 13th), with 12.8% working >70 hours/week, an average of 2.3 nights on call per week (rank 11th), and a lower number of hours in the operating room at 13.3 hours/week (rank 10th). With regard to distress parameters, they had a higher burnout rate of 41.3% (rank 4th), but a lower positive depression screen at 23.3% (rank 11th), a mental QOL score of 50.4, with 20.9% having low QOL score (rank 13th), a 51.8% rate of work/home conflict (rank 8th), and a suicide ideation rate of 4.6% (rank 10th). Otolaryngology/Head and Neck surgeons reported an average level of career satisfaction, with 30.5% stating they would not be a surgeon again (rank 5th of 14 specialties), whereas 45.5% would not recommend a medical career to their children (rank 8th).

Surgical Oncology

The majority of the 407 respondents were located in an academic practice (59.5%). The mean age was younger at 49.9 years (rank 11th) and they represented the highest proportion of women (26.4%). Compared to the other 13 surgical specialties, they reported a high workload, with 36.1% working >70 hours/week, a mean workweek of 62.6 hours/week (rank 5th), but a lower 2.1 nights on call per week (rank 13th), and 17.7 hours/week hours in the operating room (rank 8th). With regard to distress parameters, they had a lower rate of burnout at 36.1% (rank 10th), a positive depression screen rate of 24.3% (rank 10th), and a mental QOL score of 48.9, with 26.2% having low QOL score (rank 11th). They reported a 55.2% rate of work/home conflict (rank 6th), and a suicide ideation rate at 4.9% (rank 9th). Surgical Oncologists reported a higher level of career satisfaction, with 24.9% stating they would not be a surgeon again (rank 10th), whereas 30.5% would not recommend a medical career to their children (rank 12th).

Obstetrics/Gynecology

Of the 105 respondents, 48.6% were located in a private practice. The mean age was 54.8 years (rank 2nd), whereas 18.3% were women (rank 3rd). Compared to the other 13 surgical specialties, they reported a mean workweek of 57.0 hours/week (rank 10th), with 29.1% working >70 hours/week, an average of 3.4 nights on call per week (rank 3rd), and a lower number of hours in the operating room at 13.0 hours/week (rank 12th). With regard to distress parameters, they had a lower rate of burnout at 33.7% (rank 12th), a lower rate of positive depression screen at 19.6% (rank 13th), and an average mental QOL score of 50.1, with 27.5% having low QOL score (rank 7th). They reported a lower rate of work/home conflict at 44.1% (rank

TABLE 6. Independent Factors Related to (a) Burnout Among Academic Surgeons Only, (b) Career Satisfaction Among Academic Surgeons Only, (c) Burnout Among Private Practice Surgeons Only, and (d) Career Satisfaction Among Private Practice Surgeons

Response Variable	Independent Predictor	Odds Ratio+ (95% CI)	P
(a) Burnout (Academic surgeons)	Trauma Surgeon (vs. general surgeon)	1.513 (1.127, 2.032)	0.0059
	Nights per week on call (for each additional night)	1.062 (1.013, 1.113)	0.0123
	Hours worked per week (for each additional hour)	1.019 (1.012, 1.025)	<0.0001
	Male (vs. female)	0.787 (0.620, 0.999)	0.0491
	Cardiothoracic Surgeon (vs. general surgeon)	0.626 (0.434, 0.901)	0.0117
	Pediatric Surgeon (vs. general surgeon)	0.583 (0.399, 0.852)	0.0053
(b) Choose to be a physician again (Academic surgeons)	Youngest child age >22 (vs. youngest child age <5)	0.529 (0.406, 0.689)	<0.0001
	Youngest child age >22 (vs. youngest child age <5)	1.484 (1.015, 2.170)	0.0407
	Full Professor (vs. instructor)	1.398 (1.033, 1.893)	<0.0001
	Salaried w/ bonus pay based on billing (vs. salaried w/ no incentive based pay)	1.397 (1.111, 1.756)	0.0061
	Hours worked per week (for each additional hour)	1.010 (1.002, 1.018)	0.0313
	Assistant professor (vs. instructor)	0.702 (0.536, 0.920)	0.0085
(c) Burnout (Private practice surgeons)	Vascular Surgeon (vs. general surgeon)	0.516 (0.338, 0.786)	0.0040
	Burned out	0.214 (0.168, 0.272)	<0.0001
	Urologic Surgeon (vs. general surgeon)	1.497 (1.108, 2.023)	0.0086
	31% to 50% of time dedicated to nonpatient activities (vs. no time)	1.404 (1.014, 1.943)	0.0409
	Incentive based pay (vs. salaried w/ no incentive based pay)	1.344 (1.176, 1.535)	<0.0001
	Nights on call per week (for each additional night)	1.045 (1.015, 1.076)	0.0029
(d) Choose to be a physician again (Private practice surgeons)	Hours worked per week (for each additional hour)	1.015 (1.011, 1.019)	<0.0001
	Age (for each additional year older)	0.989 (0.981, 0.998)	0.0158
	<10% time dedicated to nonpatient activities (vs. no time)	0.857 (0.751, 0.978)	0.0218
	Spouse is a physician (vs. spouse is nonmedical other job)	0.753 (0.607, 0.932)	0.0093
	Youngest child age >22 (vs. youngest child age <5)	0.677 (0.554, 0.827)	0.0001
	Pediatric Surgeon (vs. general surgeon)	2.783 (1.354, 5.721)	0.0054
	Otolaryngology/Head and Neck Surgeon (vs. general surgeon)	2.517 (1.702, 3.722)	<0.0001
	Plastic Surgeon (vs. general surgeon)	1.906 (1.410, 2.575)	<0.0001
	Orthopedic Surgeon (vs. general surgeon)	1.811 (1.023, 3.208)	0.0416
	Urologic Surgeon (vs. general surgeon)	1.673 (1.173, 2.387)	0.0044
	21% to 30% of time dedicated to nonpatient care activities (vs. no time)	1.275 (1.019, 1.594)	0.0337
	Age (for each additional year older)	1.029 (1.020, 1.039)	<0.0001
Hours per week in the OR (for each additional hour)	1.016 (1.008, 1.024)	<0.0001	
Nights on call per week (for each additional night)	0.941 (0.912, 0.971)	0.0001	
Hours worked per week (for each additional hour)	0.990 (0.985, 0.995)	<0.0001	
Burned out	0.222 (0.191, 0.258)	<0.0001	

+OR > 1 indicates an increased risk of burnout (6a and c) or greater career satisfaction (6b and d); an OR < 1 indicates a lower risk of burnout (6a and c) or a lower level of career satisfaction (6b and d).

11th), and the lowest rate of suicide ideation at 3.8% (rank 14th). Responding Obstetrics/Gynecologists reported an average level of career satisfaction, with 22.1% stating they would not be a surgeon again (rank 11th), but a higher 47.5% would not recommend a medical career to their children (rank 6th).

Orthopedic Surgeons

The majority of the 155 respondents were located in a private practice (61%). They were the oldest group with a mean age was 58.9 years (rank 1st), whereas only 3.3% were women (rank 14th). Compared to the other 13 surgical specialties, they reported a lower mean workweek of 51.1 hours/week (rank 14th), with 18.5% working >70 hours/week (rank 12th), an average of 1.8 nights on call per week (rank 14th), and a lower number of hours in the OR at 13.2 hours/week (rank 11th). With regard to distress parameters, they had one of the lowest burnout rates of 32% (rank 13th), the lowest rate of a positive depression screen at 20.8% (rank 14th), a higher mental QOL score of 51.7, with only 20.4% having low QOL score (rank 14th), and the lowest rate of work/home conflict at 39.5% (rank 14th). The responding orthopedic surgeons reported an high level of career satisfaction, with only 20.1% stating they would not be a surgeon again (rank 12th), whereas 44.2% would not recommend a medical career to their children (rank 9th).

Pediatric Surgeons

The majority of the 243 respondents were located in an academic practice (61.6%). The mean age was 51.2 years (rank 9th), whereas 16.5% were women (rank 5th). Compared to the other 13 surgical specialties, they reported a high workload, with a mean workweek of 65.8 hours/week (rank 3rd), 42.7% working >70 hours/week (rank 4th), 2.6 nights on call per week (rank 8th), and a higher number of hours in the operating room at 19.4 hours/week (rank 4th). With regard to distress parameters, they had the lowest rate of burnout at 31.4% (rank 14th), a lower depression screen rate of 28% (rank 9th), and an average mental QOL score of 49.0, with 27.3% having low QOL score (rank 8th). They reported a higher rate of work/home conflict at 56.4% (rank 4th), and a suicide ideation rate of 6.3% (rank 6th). Pediatric surgeons reported the highest level of career satisfaction, with only 15.6% stating they would not be a surgeon again (rank 14th), and only 33.3% would not recommend a medical career to their children (rank 14th).

Multivariate Analysis of Distress Parameters and Career Satisfaction

Independent factors relating to burnout were analyzed in a MV analysis. In this model, the practice setting was included as a variable and the surgical subspecialties were compared to general surgery.

After accounting for all the variables, the practice setting was an independent variable, with surgeons in a private practice setting having a greater burnout risk compared to an academic practice setting (OR 1.172, $P = 0.0212$). Compared to general surgery, the subspecialties with a higher risk of burnout were trauma (OR 1.413, $P = 0.0088$), urology (OR 1.350, $P = 0.0222$) and otolaryngology/head and neck surgery (OR 1.282, $P = 0.0397$), while those with a relatively lower risk of burnout were pediatric surgery (OR 0.670, $P = 0.0135$) and cardiothoracic surgery (OR 0.776, $P = 0.0284$) after accounting for all other factors. As reported previously,² the other independent factors associated with burnout were hours worked per week, nights on call per week, incentive based pay, years in practice, younger age, having younger children and spouse working (Table 2).

Independent factors relating to career satisfaction included the practice setting in this analysis. Surgeons in a private practice setting had a lower career satisfaction response relative to those in an academic practice setting (OR 0.527, $P < 0.0001$). Compared to general surgery, the surgical subspecialties with a higher degree of career satisfaction were otolaryngology/head and neck surgery (OR 2.664, $P < 0.001$), transplant surgery (OR 2.212, $P = 0.0060$), plastic surgery (OR 2.000, $P < 0.0001$), pediatric surgery (OR 1.794, $P = 0.0068$), urology (OR 1.869, $P = 0.0002$), and orthopedic surgery (OR 1.756, $P = 0.0360$), whereas vascular surgeons had a lower degree of career satisfaction compared to general surgeons (OR 0.746, $P = 0.0200$). As reported previously (Shanafelt, 2009), the other independent factors associated positively with career satisfaction were hours in the operating room per week, older age, nonpatient care activities and negatively with nights on call per week and burnout (Table 2).

Academic Versus Private Practice Setting

Personal and professional characteristics of surgeons working in a private practice setting ($N = 4240$) and an academic practice setting ($N = 2272$) are shown in Tables 3 and 4. Compared to those in an academic practice, community-based surgeons were more likely to be younger (mean age of 50 years vs. age 51 for those in an academic practice), worked fewer hours per week (59.4 hours/week vs. 65.3 hours/week), had more nights on call (3.0 vs. 2.2 nights on call per week), were less likely to be salaried (29.8% vs. 86.5%), and had less nonpatient care activities (17.2% vs. 61% had $>20\%$ nonpatient care time per week; all $P < 0.0001$; Tables 3 and 4). Academic surgeons were less likely to experience burnout compared to those in private practice (37.7% vs. 43.1%), less likely to screen positive for depression (27.6% vs. 33%) or to have suicide ideation (4.7% vs. 7.4%; all $P < 0.0001$). They were also more likely to have career satisfaction (77.4% of academic surgeons would become a surgeon again vs. 64.9% for those in private practice; $P < 0.0001$) and to recommend a medical career to their children (61.3% vs. 43.7%, $P < 0.0001$; Table 5).

The independent factors associated with burnout and career satisfaction was different for those in an academic practice compared to those in a private practice (Table 6). For academic surgeons, the most significant associations with burnout were: being a trauma surgeon (OR 1.513, $P = 0.0059$), more nights on call (OR 1.062, $P = 0.0123$) and hours worked (OR 1.019, $P < 0.0001$), whereas the negative associations were: having older children (>22 years; OR 0.529, $P < 0.0001$), being a pediatric surgeon (OR 0.583, $P = 0.0053$), or a cardiothoracic surgeon (OR 0.626, $P = 0.0117$), and being male (OR 0.787, $P = 0.0491$; Table 6a). In a private practice setting, the most significant positive associations with burnout were: being a urologic surgeon (OR 1.497, $P = 0.0086$), having 31% to 50% time for non-clinical activities (OR 1.404, $P = 0.0409$), having incentive based pay (OR 1.344, $P < 0.0001$), more nights on call (OR 1.045, $P = 0.0029$) and more hours worked (OR 1.015, $P < 0.0001$), whereas the

negative associations were: older children (OR 0.677, $P = 0.0001$), having a physician spouse (OR 0.753, $P = 0.0093$), and older age (OR 0.989, $P = 0.0158$; Table 6c).

With regard to career satisfaction, the most significant positive associations were being a full professor (OR 1.398, $P < 0.001$), having a salary with bonus pay (OR 1.397, $P = 0.0061$), hours worked per week (OR 1.010, $P = 0.0313$) and having older children (OR 1.484, $P = 0.0407$), whereas the negative associations were being burned out (OR 0.214, $P < 0.0001$), being a vascular surgeon (versus general surgery; OR 0.516, $P = 0.0040$), and being an assistant professor (OR 0.702, $P = 0.0085$; Table 6b). The independent factors relating to career satisfaction for surgeons in private practice were different. Thus, the most significant positive associations were the subspecialties of otolaryngology/head and neck surgery (compared to general surgery; OR 2.517, $P < 0.0001$), plastic surgery (OR 1.906, $P < 0.0001$), pediatric surgery (OR 2.783, $P = 0.0054$), urology (OR 1.673, $P = 0.0044$), and orthopedics (OR 1.811, $P = 0.0416$) as well as older age (OR 1.029, $P < 0.0001$), more hours in the operating room (OR 1.016, $P < 0.0001$), more time for nonpatient activities (OR 1.275, $P = 0.0337$) and having older children (OR 1.258, $P = 0.0416$), whereas the 3 negative associations were hours worked per week (OR 0.990, $P < 0.0001$), nights on call (OR 0.941, $P = 0.0001$) and being burned out (OR 0.222, $P < 0.0001$; Table 6d).

DISCUSSION

If strategies are to be developed at the local level to prevent or mitigate stress and burnout . . . by the individual surgeon and at the organizational level . . . it is important to understand the contributing factors that, in combination, are associated with relatively higher and lower degrees of risk for distress to improve personal wellness and to optimize the quality of patient care. Each surgeon brings to the issue of personal wellness a complex array of risks factors, whereas each medical institution, surgical practice groups, and surgical specialty corporations face a complex array of workplace issues that may contribute to burnout. Our results highlight the importance of accounting for the diverse influences within each surgical specialty, the practice setting (private practice and academic practice) and their association with both surgeon distress and career satisfaction. Such information would be helpful to individuals and supervisors to target programs for surgeons that are more specific to the underlying factors associated with distress in their workplace environment, especially for those surgeons who are at particularly higher risk for stress, burnout and depression.^{5,16,17} For example, those surgeons who work more than 80 hours a week and/or have 2 or more nights on call per week was associated with a detrimental impact on surgeons in almost every setting, both professionally and personally.¹⁸ On the other hand, some surgical specialties independently correlated with burnout, both positively and negatively, even after accounting for these factors (Table 2a).

These results illustrate the dichotomy of issues that could impact on an individual surgeon and their workplace environment. Among these 14 surgical subspecialties, there was great variability in their demographics, age, gender, time in the operating room, workload, nonpatient activities, and practice setting. There were also differences in the incidence of burnout, depression, lower quality of life—issues that impact on personal wellness. These 3 indices of distress did not necessarily align together when comparing 1 surgical subspecialty to another. For example, otolaryngology/head and neck surgeons ranked in the upper third for burnout and the lower third for depression and lower mental QOL, and conversely, cardiothoracic surgeons ranked in the lower third for burnout and in the upper third for depression and low mental QOL. Although there was a general correlation between increased distress and lower career satisfaction, this was not always the case. For example, transplant surgeons reported a higher level of distress, but a relatively high level of career

satisfaction compared to other surgical specialties. Trauma surgery consistently ranked in the highest third of distress parameters, and was an independent variable after accounting for all other factors relative to the distress parameters of general surgery. At the other end of the spectrum, the specialty of pediatric surgery consistently ranked among the lowest third of distress parameters and was also identified as an independent variable.

When practice setting (private practice vs. academic practice) was inserted into the MV model, it was identified as an independent factor associated with burnout and with career satisfaction. As a result, we performed an in depth analysis comparing the demographics, distress parameters, and career satisfaction based on the practice setting. In these analyses, different surgical subspecialties were associated with burnout (both positively and negatively) and with career satisfaction (both positively and negatively). The results demonstrated that most, but not all, surgical specialties that rank at the highest and lowest levels of distress parameters correlate reciprocally with relatively higher and lower levels of career satisfaction.

The results from this analysis have some limitations. First, the sample size for some of the specialties (eg, orthopedics and obstetrics/gynecology) represents a minority of the practicing surgeons in these specialties. It is unknown whether the stress factors and career satisfaction is representative of the larger group of certain subspecialties. That would have to be confirmed with validated surveys targeted to these specialties. On the other hand, the information reported here is consistent with other published studies for these surgical subspecialties.^{1,2,4} We would encourage the leadership of these subspecialties to conduct surveys of their constituents to gain more insights about both incidence of and factors associated with burnout and career satisfaction, such as has been performed selectively for otolaryngology/head and neck surgery as well as surgical oncology.^{17,19} Second, this type of survey does not infer cause and effect relationship but only statistical associations. Many of these circumstances are bi-directional influences; for example, medical errors can contribute to burnout among some surgeons whereas the converse is true in other circumstances. Third, this survey was performed in June 2008 and represents a “snapshot” of distress factors and career satisfaction at that time. The American College of Surgeons has performed a second survey in October 2010 and the results from this should reveal interesting trends that will provide further insights at a second point in time. These may be impacted by national health care policy and economics that have occurred since 2008.

With these results, as well as those previously published, individual surgeons and group practices of specific specialty surgeons should be able to better understand the relative risk for distress for them personally and for their colleagues. Although it is important for all surgeons to address the issues of personal wellness, it is particularly important for those who are at increased risk based on combinations of increased workload, specific surgical specialty, practice environment, age, family responsibilities and work-home conflict resolution that, in the aggregate, span a spectrum of risk for burnout, depression and low mental quality of life. With this information, medical students and residents can better select their specialty choice and practice environment that is in better congruence with their life style, personal and professional expectations and stress tolerance. With this information, individual surgeons can understand the importance of addressing proactively their personal wellness, especially those that are at increased risk based on combinations of personal and professional factors. With this information, leaders of group practices, surgery departments and medical organizations can better calibrate their programs for personal wellness and a supportive workplace environment, especially among those surgeons both at the individual and specialty level who are at increased risk for burnout and depression. With this information, researchers can better understand the com-

plex variables that can impact on the professional and personal life of surgeons and other physician specialties in designing increasingly sophisticated approaches to identify successful methods for preventing or mitigating the consequences of burnout and other adverse effects on personal wellness and quality patient care.

Just as the approaches to “personalized medicine” take into account the individual variability of a disease state, the genetic background of the host, and their quality of life, so too do the solutions of preventing or treating burnout, depression and low mental quality of life among surgeons require solutions at the individual level and the individual surgical practice environment.

REFERENCES

- Kuerer HM, Eberlein TJ, Pollock RE, et al. Career satisfaction, practice patterns and burnout among surgical oncologists: report on the quality of life of members of the society of surgical oncology. *Ann Surg Oncol.* 2007;14:3043–3053.
- Shanafelt TD, Balch CM, Bechamps GJ, et al. Burnout and career satisfaction among American surgeons. *Ann Surg.* 2009a;250:463–471.
- Balch CM, Freischlag JA, Shanafelt TD. Stress and burnout among surgeons: understanding and managing the syndrome and avoiding the adverse consequences. *Arch Surg.* 2009;144:371–376.
- Guest R, Scardino P, et al. Cancer surgeons’ distress and well-being, i: the tension between a culture of productivity and the need for self-care. *Ann Surg Oncol.* 2011;18:1229–1235.
- Guest R, Scardino P, et al. Cancer surgeons’ distress and well-being, ii: modifiable factors and the potential for organizational interventions. *Ann Surg Oncol.* 2011;18:1236–1242.
- Shanafelt TD, Balch CM, Bechamps G, et al. Burnout and medical errors among American surgeons. *Ann Surg.* 2010;251:995–1000.
- Campbell DA, Jr DA. Physician wellness and patient safety. *Ann Surg.* 2010;251:1001–1002.
- West CP, Huschka MM, Novotny PJ, et al. Association of perceived medical errors with resident distress and empathy: a prospective longitudinal study. *JAMA.* 2006;296:1071–1078.
- West CP, Tan AD, Habermann TM, et al. Association of resident fatigue and distress with perceived medical errors. *JAMA.* 2009;302:1294–1300.
- Shanafelt TD, Balch CM, Dyrbye L, et al. Special report: suicidal ideation among American surgeons. *Arch Surg.* 2011;146:54–62.
- Dyrbye L, Shanafelt TD, Balch CM, et al. Relationships between work-home conflicts and burnout among American surgeons: a comparison by gender. *Arch Surg.* 2011;146:211–217.
- Spitzer RL, Williams JB, Kroenke K, et al. Utility of a new procedure for diagnosing mental disorders in primary care. The PRIME-MD 1000 study. *JAMA.* 1994;272:1749–1756.
- Whooley MA, Avins AL, Miranda J, et al. Case-finding instruments for depression. Two questions are as good as many. *J Gen Intern Med.* 1997;12:439–445.
- Ware J, Kosinski M, Keller SD. A 12-item short-form health survey: construction of scales and preliminary tests of reliability and validity. *Med Care.* 1996;34:220–233.
- Ware J, Kosinski M, Turner-Bowker D, et al. *How to Score Version 2 of the SF-12 Health Survey.* Lincoln, RI: Quality Metric Incorporated; 2002.
- Balch CM, Copeland E. Stress and burnout among surgical oncologists: a call for personal wellness and a supportive workplace environment. *Ann Surg Oncol.* 2007;14:2437–2439.
- Balch CM, Shanafelt TD, Sloan J, et al. Burnout and career satisfaction among surgical oncologists compared with other surgical specialties. *Ann Surg Oncol.* 2011;18:16–25.
- Balch CM, Shanafelt TD, Dyrbye L, et al. Surgeon distress as calibrated by hours worked and nights on call. *J Am Coll Surg.* 2010;211:609–619.
- Golub JS, Teknos TN, et al. Professional burnout among microvascular and reconstructive free-flap head and neck surgeons in the United States. *Arch Otolaryngol Head Neck Surg.* 2010;136:950–956.

DISCUSSANTS

T. J. Eberlein (St. Louis, MO):

Today, we are facing a real threat in the delivery of health care. The baby boomer generation is expanding and there appears to be a shortage in the number of surgeons, particularly general surgeons,

and most particularly, rural general surgeons, to care for this expanding number of potential patients. We all should be thankful to the American College of Surgeons Board of Governors Committee on Physician Health and Competency for commissioning this study and for all of the participants. They sponsored the survey and Dr Balch and his colleagues have done the analysis.

The field of surgery can be stressful. It requires long hours, quick decisions, often on inadequate data, and requires lots of responsibility and ownership of patient and the potential complications. Today, these issues are compounded by influences beyond the control of the individual surgeon. Reimbursement is declining. Scrutiny of outcomes is increasing. Issues of compliance and documentation have become ever more important. And a whole new vocabulary of healthcare reform terminology has been introduced into the lexicon of the practicing surgeon.

In this analysis, Dr Balch and his colleagues have performed the first thorough insight into the relationship of workload, stress, and burnout by subspecialty fields in surgery. Not unexpectedly, trauma surgeons have the highest workload, a relatively low amount of actual OR activity, and therefore, the highest incidence of burnout. Other subspecialties, such as vascular surgery, urology and otolaryngology, which are high-volume specialties and with declining reimbursement, are also associated with high rates of burnout.

But what can we learn from other subspecialties? Why is there a lower rate of burnout for other stressful occupations such as cardiothoracic surgery? Is this because of the infrastructure that has been produced over the years that includes a large number of surgeon extenders? Similarly, why does pediatric surgery have the lowest rate of burnout? Is it the environment that we frequently associate with the children's hospital that produces a supportive, nurturing, and therefore, less stressful and perhaps more rewarding environment to the pediatric surgeon?

Overall, I am struck by the average age of the participants in this study, which is about 50 years of age. 50 is oftentimes the peak of productivity in many other professions, such as the business world and the legal field. Yet in this analysis, all 14 of the subspecialties of surgeries studied had a relatively high degree of burnout whether in private practice or an academic setting. How does this high level of burnout compare with other professions?

How much of your results are dependent on the way certain subspecialties have evolved? For example, orthopedic surgery was or had among the lowest rates of burnout. Is this because orthopedic surgery has evolved into a specialty that does a relatively high volume of surgical procedures, yet takes advantage of extensive use of consultants and physician extenders to care for the patients? This profession also benefits from relatively high reimbursement. Is this the explanation for the low burnout? Or are there other intangibles that contribute to professional satisfaction and accomplishment?

It is also striking that less than 11% of the private practice respondents were women. And that number was only slightly higher, at 16.5%, for academic surgeons. Did the number of women participants in the survey have an impact on the results? Previously, you and your colleagues have published on the fact that women surgeons have a higher incidence of work/home conflict. Do you and your co-authors have any recommendations as to how to minimize those conflicts for either gender? Our department initiated a survey over 6 years ago and had 92% participation. Nine of 10 experienced stress, largely for the same reasons that you identified in your manuscript. However, the single largest reason identified by our faculty was the balance between professional activities and their personal lives. Do you have any additional information from this survey as to how participants balance their professional and personal lives? And was this part of the explanation for the rate of burnout among the subspecialty groups?

Armed with your detailed analysis of this survey, have you instituted of any prospective, proactive programs at your own institution? And have you had any opportunity to measure the impact of these programs on your faculty?

Finally, you are in the midst of analyzing a follow-up survey by the same group from the American College of Surgeons. Do you have any insight into the repercussions of the stress and burnout? For example, in this study, or in the follow-up study, do you have any data on substance abuse, alcoholism, and the impact that these stressors might have on patient safety and outcome?

This is a terribly important topic. I hope we can learn how to develop programs that will lead to better professional performance while promoting the health, work, and home balance for all surgeons, whether in private practice or in an academic setting.

Response from C. Balch

The College of Surgeons deserves a lot of credit for doing these studies using validated survey instruments, which most other professions have not done to this level of detail. As published, the data are not exactly comparable with other specialties, but specialties dealing with seriously ill patients and with life and death, do seem to have a higher incidences of burnout and depression, particularly medical oncology, anesthesia, and critical care. And hopefully, these and other specialties will be stimulated to do these kinds of studies through their professional organization.

As the number of women increases in the workplace, the issues that are unique to women, especially those women with children at home, need to be addressed. Greater flexibility needs to be added in the scheduling of their time or their attendance at some of the meetings. Balance is an elusive, dynamic tension that we never really achieve or get just right. When I talk to younger people, part of my message is to strive to achieve balance; without balance, one tilts toward work, stress and delayed gratification, putting off personal issues that may come back to haunt later in life or may impact quality of care. At Hopkins, we are very fortunate that our chair, Julie Freischlag, has been a champion of this from the beginning, not only at our own institution but also nationally. Her championing this issue gives the faculty permission to speak about our times of vulnerability and stress, and to seek some support, either from our colleagues or professionally. The topic is included annually on our grand rounds, and our residents and interns have a discussion about this issue in their lecture series each year, if for no other reason than to say, it is okay to talk about this, it is an important subject, it may impact you or your colleagues. And, finally, mentoring is a very important part of this, especially of young faculty, and a formal mentoring program is about to be launched for our junior faculty and new recruits at Johns Hopkins.

The reason for having these kinds of talks and for drilling down at this level of detail is to understand the complexity and diversity of these issues and the different combinations of factors that can then partition surgeons into lower, medium, or higher risk so that surgeons individually can understand that they need to be even more proactive if they are in a high-risk environment.

DISCUSSANTS

M. F. Brannan (New York, NY):

Most of the factors you described are things I have—I'm male, work clinically, take night call, have an incentive-based practice, work long hours, have adult children and have a physician spouse/partner. But I don't seem to be burnt out. I think what you are missing is all the good things about being a surgeon, all the things that balance these significant stresses.

Response from C. Balch

I think all of us probably go through burnout in various ways, but we may or may not recognize it formally as that. I believe there are 3 reasons that it is important for us to keep on the forefront of our approaches, professionally and individually. One is that this correlates with optimal patient care; the converse being that burn out or depression is associated with medical errors. Second, there is a correlation with early retirement. It is very important to help people get through their career even with a burnout, to use healthy compensation to get through it. Third, there are the personal consequences. About 15% of physicians—we don't know the incidence among surgeons—get into trouble with mental health, or drug or alcohol addiction, for which they ultimately lose their credentials or their license. And there is another small percentage of people who take their life because of depression and other stress.

We need to have healthy compensation for the times we go through our stress or our burnout, whenever it is, to recognize it in our colleagues, and to help people not get into a downhill, unhealthy spiral over time that can lead to adverse consequences for them personally or for their patients.

DISCUSSANTS

Unidentified Discussant:

My disclosure is that I'm both a vascular surgeon and a woman. I would like to comment on the work/life balance issues that you mentioned specifically for female surgeons, and suggest that we begin to reframe our thinking about the work/life balance issues for surgeons on both sides of the gender fence, if you will, so that fewer surgeons of either gender will burn out and will have better work/life balance. A side benefit to that will be that we reduce the polarization of women feeling like they have to have some special treatment because they are young and have young children at home.

Response from C. Balch

Our publication in the Archives pointed out that the major issue is the work/home conflict issue, which is common to both men and women, although it had a higher incidence among women. In an independent and a multivariate analysis, women, *per se*, did not come out as an independent factor after you have accounted for work/home balance.

DISCUSSANTS

J. Cameron:

Count me with Murray. I'm almost 75 and operate every day, but I'm some sort of an outlier. I've never had burnout. I'm just worried about what I'm going to do when I stop operating. I've never had serious ideation of hurting myself or anybody else. I continuously tell medical students, if you pick a profession you love, you will never have to work the rest of your life. In the OR with medical students, I'm saying, "I'm almost 75. I love what I'm doing. This is terrific."

So why is it that your survey shows so much negative data? Is there somehow that you can correlate the success these men and women are achieving with their responses to your questionnaire? It

seems to me that people in academics who are progressing along in their career and things are going well, are loving life. And in private practice, if your practice is growing, you're doing what you want to do.

I think burnout must somehow correlate with not being successful in whatever they have chosen to do because in my experience, people like Murray and me and others, we love what we do, and you have to drag us a way from what we're doing. We absolutely are in love with the profession.

Response from C. Balch

Count me in that group, too. But like both Dr Cameron and Dr Brannan, when I was a chair of surgery, this was not on my radar screen at all. I didn't even think about it; I didn't even know about it. Although I think I may have gone through burnout while I was chair.

After I left M. D. Anderson, one of our faculty members took his life. He was somebody I had published with, who I knew; I was shocked that his only escape was to take his life. If talking about this today will save even a few people who otherwise might find a very unhealthy outlet for their stress, as they see it, then I think this is helpful to our profession and to the patients that we treat.

Remember, also, that these are statistics that apply to groups of individuals. It doesn't mean that everybody is burned out or everything is negative. The data is the data—we analyze what surgeons filled out in a survey using validated survey instruments. If nothing else, I hope that we will continue to study this as a research area in a proactive way, to identify how to make our workplace environment better, and to emphasize the importance of personal wellness.

DISCUSSANTS

R. Touloukian (New Haven, CT):

I'm a member of that minority here of pediatric surgeons who are happy with what we do. We continue to smile. I think the children and the families have a lot to do with it.

But the real question is whether there is an issue of self-selection that is indeed a predictor of whether or not you will burn out or not over the long term. I think it would be useful to go back to the data and look at those individuals who are within the first 3–4 or 5 years of becoming members of the College, and examine whether or not those individuals begin to show a trend, as opposed to looking at the 50-year-olds, where the environment has had a bigger impact on them. In other words, look at self-selection versus an environment to predict an outcome for stress and then burnout.

Response from C. Balch

That is a very good point, and we have emphasized that we can only analyze the results from people who filled out the survey. We do not know how representative the results are for those who chose not to fill out the survey. There is evidence in other fields that with these questions, if anything, the survey instrument underestimates the issue of burnout, and that people who have distress are less likely to fill these surveys out than those who don't view themselves in a stressful circumstance. But that is an unknown for this type of data. Your specific question about analyzing among younger people is a good one that we will go back and get some answers for.