

# Burnout and Career Satisfaction Among American Surgeons

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**Objective:** To determine the incidence of burnout among American surgeons and evaluate personal and professional characteristics associated with surgeon burnout.

**Background:** Burnout is a syndrome of emotional exhaustion and depersonalization that leads to decreased effectiveness at work. A limited amount of information exists about the relationship between specific demographic and practice characteristics with burnout among American surgeons.

**Methods:** Members of the American College of Surgeons (ACS) were sent an anonymous, cross-sectional survey in June 2008. The survey evaluated demographic variables, practice characteristics, career satisfaction, burnout, and quality of life (QOL). Burnout and QOL were measured using validated instruments.

**Results:** Of the approximately 24,922 surgeons sampled, 7905 (32%) returned surveys. Responders had been in practice 18 years, worked 60 hours per week, and were on call 2 nights/wk (median values). Overall, 40% of responding surgeons were burned out, 30% screened positive for symptoms of depression, and 28% had a mental QOL score  $>1/2$  standard deviation below the population norm. Factors independently associated with burnout included younger age, having children, area of specialization, number of nights on call per week, hours worked per week, and having compensation determined entirely based on billing. Only 36% of surgeons felt their work schedule left enough time for personal/family life and only 51% would recommend their children pursue a career as a physician/surgeon.

**Conclusion:** Burnout is common among American surgeons and is the single greatest predictor of surgeons' satisfaction with career and specialty choice. Additional research is needed to identify individual, organizational, and societal interventions that preserve and promote the mental health of American surgeons.

**Key Words:** surgeon, burnout, satisfaction, depression

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Despite its virtues, a career in surgery brings with it significant challenges that can lead to substantial personal distress for the individual surgeon and their family. Training for and practicing of the specialty of surgery are stressful endeavors.<sup>1–3</sup> A study of the graduates of a single academic medical center suggest that approximately one third of U.S. surgeons may experience burnout.<sup>4</sup> Similarly, national samples of member surgeons of surgical subspecialty societies suggest burnout rates ranging from 30–38%.<sup>5,6</sup> Burnout is a syndrome of emotional exhaustion and depersonalization that

leads to decreased effectiveness at work.<sup>7</sup> Treating patients as objects rather than human beings and becoming emotionally depleted are common symptoms of burnout. Burnout can effect both physicians' satisfaction with their work and the quality of medical care they provide.<sup>8–10</sup> Additional data suggests surgeon distress may contribute to their plans to take an early retirement.<sup>3,4</sup> Studies suggest that difficulty balancing personal and professional life, administrative tasks, lack of autonomy, and patient volume are the greatest sources of surgeon stress.<sup>2–5</sup>

A limited amount of information exists about the relationship between specific demographic and practice characteristics with burnout among American surgeons. The available evidence suggests that younger physicians<sup>11</sup> and female surgeons<sup>4,6</sup> are at higher risk for burnout than their older colleagues. Although trials in internal medicine related specialties suggest physicians in private practice may be at greater risk for burnout,<sup>12,13</sup> the available studies of surgeons have found no difference in burnout based on practice setting.<sup>4,6</sup> Although limited evidence also suggests differences in burnout may exist between different surgical subspecialties,<sup>4</sup> there are not adequate data to derive firm conclusions.

We conducted a survey of the membership of the American College of Surgeons (ACS) to determine the incidence of burnout among American surgeons and to evaluate personal and professional characteristics associated with surgeon burnout. The hypothesis of this cross-sectional study was that burnout is prevalent among American surgeons and that specific personal and professional characteristics may place surgeons at risk for experiencing the burnout syndrome. The specific objectives of this study were to: 1) measure burnout and quality of life among surgeons who are members of the ACS utilizing validated instruments; 2) evaluate the personal and practice characteristics of American surgeons; 3) determine the relationship between specific personal and practice characteristics and burnout among American surgeons.

## METHODS

### Participants

All surgeons who were members of the 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. A cover letter stated the purpose of the survey was to better understand the factors that contribute to career satisfaction among surgeons. 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 satis-

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faction. Up to 3 follow-up e-mail messages reminded surgeons to complete the survey.

Validated survey tools were used to identify burnout,<sup>7,14–16</sup> mental and physical quality of life (QOL),<sup>17,18</sup> and symptoms of depression.<sup>19,20</sup> Burnout was measured using the Maslach Burnout Inventory (MBI), a validated 22-item questionnaire considered a standard tool for measuring burnout.<sup>7,14–16</sup> The MBI has 3 subscales to evaluate the 3 domains of burnout; emotional exhaustion, depersonalization, and low personal accomplishment. A high score in any of these 3 domains can be considered a symptom of the burnout syndrome. We considered surgeons with a high score for medical professionals on either the depersonalization and/or emotional exhaustion subscales as having at least one manifestation of professional burnout.<sup>7</sup> Symptoms of depression were identified using the 2-item Primary Care Evaluation of Mental Disorders (PRIME MD),<sup>19</sup> a standardized depression screening tool which performs as well as longer instruments.<sup>20</sup> Mental and physical QOL were measured using the Medical Outcomes Study Short Form (SF-12)<sup>17,18</sup> with norm-based scoring methods used to calculate mental and physical QOL summary scores.<sup>18</sup> The average mental and physical QOL summary scores for the U.S. population are 49 (scale 0–100; standard deviation = 10).<sup>18</sup>

Additional questions were developed to explore demographic factors and professional characteristics. Two questions, based on similar measures from previous physician surveys, were used to assess career satisfaction.<sup>6,8,21–24</sup> One question asked, if given the opportunity to revisit their career choice, “would you choose to become a physician again” (career choice). A second question asked, if given the opportunity to revisit their career choice, “would you choose to be a surgeon again” (specialty choice). Response options included “definitely not,” “probably not,” “not sure, neutral,” “probably,” and “definitely yes.” Responses of “probably” or “definitely yes” were considered to indicate greater career satisfaction. After development, the survey was pilot-tested by 9 surgeons and subsequently modified on the basis of their feedback prior to use.

### Statistical Analysis

The primary analysis involved descriptive summary statistics for estimating the incidence of burnout, positive depression screen, and mental and physical QOL among surgeons. Next we compared burnout, positive depression screen, and mental and physical QOL by various demographic and professional characteristics.  $\chi^2$  tests were used for assessing differences in proportions between groups. Kruskal-Wallis tests were used for testing differences in continuous variables.

Logistic regression was used to evaluate independent associations among demographic and professional characteristics with categorical dependent variables related to burnout and career satisfaction. A backward elimination method was used to select significant variables for the models. The primary intention of these analyses was not so much as to ascertain how one might predict an individual's level of burnout (since it is a highly individualistic experience), but to identify and rank order the independent variables that may contribute to burnout and/or career satisfaction. The independent variables used in the model for burnout included: age, gender, relationship status, whether spouse/partner worked outside the home, spouse/partners 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 (private practice, academic medical center, Veteran's hospital, active military practice, not in practice or retired, other), current academic rank, primary method of compensation (eg., salaried, incentive based pay, mix), and percent of time dedicated to nonpatient care activities (eg., administration, education, research). Models for career satisfaction contained the same

factors as well as overall burnout. All analyses were done using SAS version 9 (SAS Institute Inc., Cary, North Carolina).

## RESULTS

Of the approximately 64,300 Fellows and Associate Fellows (surgeons in their first year of practice) in the ACS at the time of the survey, 28,126 had an e-mail addresses on record with the college and permitted use of their e-mail address for purposes of correspondence. Of these 28,126, a correct e-mail address could be confirmed for ~89% (n = 24,922). Among these surgeons, 7905 (32%) returned surveys including 7112 Fellows and 769 Associate Fellows.

The demographic and practice characteristics of the study participants are summarized in Tables 1 and 2. Approximately 55%

**TABLE 1. Personal Characteristics**

	N (%) or Median (Q1, Q3) <sup>§</sup> N = 7905
Age, median	51 yr (43, 59)
Gender	
Male	6815 (86.7)
Female	1043 (13.3)
Relationship status	
Missing	6
Single	678 (8.6)
Married	6950 (88)
Partnered	221 (2.8)
Widowed or widower	50 (0.6)
Ever gone through a divorce	
Missing	58
Yes	1671 (21.3)
No	6176 (78.7)
Partner or spouse works outside home*	
Yes	3700 (51.6)
No	3471 (48.4)
Partner or spouse's current profession <sup>†</sup>	
Surgeon	335 (9.2)
Physician but not surgeon	830 (22.7)
Other health care professional (eg. nurse, therapist)	1060 (29)
Non-medical professional (eg. engineer, business)	1033 (28.3)
Other	397 (10.9)
Have children	
Missing	1
Yes	6917 (87.5)
No	987 (12.5)
Age of youngest child <sup>‡</sup>	
Missing	19
<5 yr	1314 (19)
5–12 yr	1605 (23.3)
13–18 yr	1208 (17.5)
19–22 yr	746 (10.8)
>22 yr	2025 (29.4)

\*Only asked of surgeons indicating they currently are married or partnered.

<sup>†</sup>Only asked of surgeons indicating their spouse currently working outside the home.

<sup>‡</sup>Only asked of surgeons indicating they have children.

<sup>§</sup>Q1 is the lower 25<sup>th</sup> percentile and Q3 is the upper 75<sup>th</sup> percentile.

TABLE 2. Professional Characteristics

	N (%) or Median (Q1, Q3)*
Membership with ACS	
Associate fellows <sup>†</sup>	769 (9.8)
Fellows	7112 (90.2)
Specialty	
Missing	44
Cardiothoracic	489 (6.2)
Colorectal	302 (3.8)
Dermatologic	2 (0)
General	3233 (41.1)
Neuro	184 (2.3)
Otolaryngology	371 (4.7)
Ob/Gyn	105 (1.3)
Oncologic	407 (5.2)
Ophthalmologic	181 (2.3)
Orthopedic	155 (2.0)
Pediatric	243 (3.1)
Plastic	458 (4)
Transplant	123 (1.6)
Trauma	345 (4.4)
Urologic	315 (4)
Vascular	463 (5.9)
Other	485 (6.2)
Years in practice	
Median	18.5 (9, 27)
<10 yr	1987 (25.7)
10–19 yr	2209 (28.3)
20–30 yr	2467 (31.6)
>30 yr	1132 (14.5)
Hours worked per week	
Median	60 (50, 70)
<40 h	666 (8.5)
40–49 h	800 (10.3)
50–59 h	1410 (18.2)
60–69 h	2539 (32.6)
70–79 h	1048 (13.4)
>80 h	1336 (17.1)
Hours per week in operating room, median	16 (10, 24)
Number of nights on call per week, median	2 (1, 4)
Primary practice setting	
Missing	9
Private practice	4240 (53.7)
Academic medical center	2272 (28.8)
Veterans hospital	155 (2)
Active military practice	114 (1.4)
Not in practice or retired	290 (3.7)
Other	825 (10.4)
Current academic rank <sup>‡</sup>	
Instructor	111 (4.6)
Assistant professor	737 (30.6)
Associate professor	666 (27.7)
Full professor	893 (37.1)

	N (%) or Median (Q1, Q3)*
Primary method for determining compensation	
Missing	179
Salaried, no incentive pay	1674 (21.7)
Salaried, bonus pay based on billing	2372 (30.7)
Incentive pay based entirely on billing	2934 (38)
Other	746 (9.7)
Percentage of time dedicated to non-patient care activities	
Missing	57
0%	384 (4.9)
<10%	2273 (29)
10–20%	2539 (32.4)
21–30%	1204 (15.3)
31–50%	805 (10.3)
>50%	643 (8.2)

\*Q1 is the lower 25<sup>th</sup> percentile and Q3 is the upper 75<sup>th</sup> percentile.

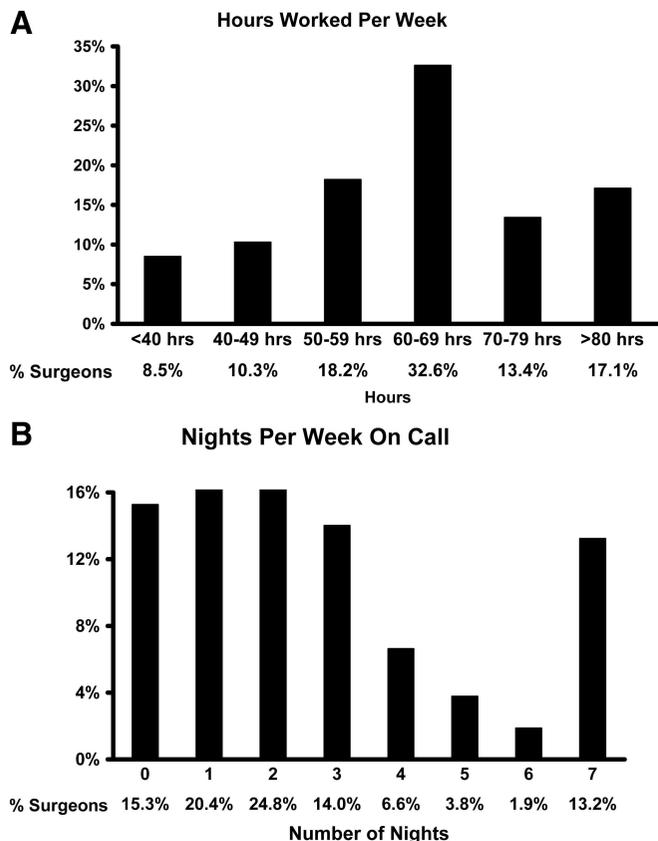
<sup>†</sup>Associate fellows are practicing surgeons who have completed residency/fellowship training but are in their first year of practice.

<sup>‡</sup>Only asked of surgeons indicating they currently worked at academic medical center or veteran's hospital.

of the study participants were age 50 or older and 13% were women. Based on official ACS data regarding the demographics of U.S. members, 63% of all ACS members are age 50 or older and 8% are women. While women and younger surgeons were slightly more likely to respond, these demographics appear similar enough to allow generalizations to the entire ACS membership. Over 90% of responders were either married or had a partner. Approximately 21% of responders indicated that they had previously gone through a divorce, and 88% had children. Responders had been in practice a median of 18 years, worked a median of 60 hours per week, spent 16 hours per week in the operating room (OR), and were on call a median of 2 nights per week (Fig. 1). Over half of the responders were in private practice, 29% in academic practice, and approximately 4% were retired.

Characteristics of responding surgeons with respect to burnout, depression, QOL and career satisfaction are summarized in Table 3. Overall, 32% had high emotional exhaustion, 26% demonstrated high depersonalization, and 13% had a low sense of personal accomplishment. In aggregate, 40% of respondents had either a high emotional exhaustion score and/or a high depersonalization score and were considered burned out. Approximately 30% of study participants screened positive for depression. Given the sensitivity (96%) and specificity (57%) of the screening instrument used,<sup>19,20</sup> this finding implies that between 10–15% of respondents would have met the criteria for major depressive disorder at the time of the survey if they had undergone a full psychiatric assessment. The mean mental and physical QOL scores for surgeons participating in the survey were 48.8 and 53.5, respectively (the mean scores for the U.S. population are  $49 \pm 9$  for both mental and physical QOL<sup>18</sup>). Overall, 28% of surgeons had a mental QOL score more than one half standard deviation below the population norm while 11% had a physical QOL score more than one half standard deviation below the population norm.

With respect to career satisfaction, the majority of the study participants indicated that they would become a physician again (71%) and, specifically, would become a surgeon again (74%) if they could revisit their career and specialty choice. Despite these high degrees of career satisfaction, only 51% of surgeons indicated they would recommend their children pursue a career as a physician/



**FIGURE 1.** Hours worked and call schedule of American surgeons. A, Distribution of average hours worked per week. B, Distribution of nights on call per week.

surgeon and only 36% felt their work schedule left enough time for personal/family life.

Factors independently associated with burnout on multivariate analysis are shown in Table 4. Demographic characteristics associated with a higher overall risk of burnout were younger age and having a spouse employed outside the home as a nonphysician health care professional (eg., nurse, therapist, pharmacist, etc.). Having children was associated with a lower risk of burnout, however, among those with children, those whose youngest child was <21 were at higher risk than those whose youngest child was >age 21. Professional characteristics associated with a higher overall risk of burnout included area of specialization (higher risk among trauma surgeons, urologist, otolaryngologists, vascular surgeons, and general surgeons), a higher number of nights on call per week, working more hours per week, a greater number of years in practice, and having compensation determined entirely based on billing. Having more than 50% of professional effort dedicated to nonpatient care tasks (administration, education, research) was associated with a lower risk of burnout.

Factors independently associated with career and specialty choice satisfaction on multivariate analysis are shown in Table 5. Personal characteristics associated with a greater satisfaction with overall career choice (being a physician) were older age and the absence of burnout. Having a partner or spouse who works outside of the home was associated with a lower satisfaction with overall career choice. Professional characteristics associated with greater satisfaction with overall career choice were area of specialization (greater satisfaction among otolaryngologists, transplant surgeons,

**TABLE 3.** Career Satisfaction, Burnout, Depression, and Quality of Life Among the 7905 Members of the American College of Surgeons Who Participated in the Survey Study

	N (%) or Median
<b>Burnout indices*</b>	
Emotional exhaustion	
Median score	19.0
% Low score	3667 (47.2)
% Moderate score	1639 (21.1)
% High score	2464 (31.7)
Depersonalization	
Median score	5.0
% Low score	4079 (52.6)
% Moderate score	1657 (21.4)
% High score	2020 (26)
Personal accomplishment	
Median score	42.0
% High score	5056 (65.7)
% Moderate score	1656 (21.5)
% Low score	982 (12.8)
Burned out†	3083 (39.6)
Depression screen positive for depression	2349 (30)
<b>Quality of life</b>	
Mental QOL score, mean ± SD	48.8 ± 9.9
Percentage of surgeons with mental QOL score .5 SD below population norm	2124 (28.3)
Physical QOL score, mean ± SD	53.5 ± 6.7
% Surgeons with physical QOL score .5 SD below population norm	791 (10.5)
<b>Career satisfaction</b>	
Would become physician again (career choice)	5548 (70.5)
Would become a surgeon again (specialty choice)	5823 (74.0)
Would you recommend your children pursue a career as a physician/surgeon	3462 (50.5)
Work schedule leaves enough time for personal/family life	2856 (36.4)

\*Participants with high scores on the Emotional Exhaustion (score >27) and Depersonalization (score >10) subscales or low scores on the Personal Accomplishment subscale (score <33) are considered to have symptoms of burnout.

†High score on Emotional Exhaustion and/or Depersonalization subscales (see methods).

plastic surgeons, ophthalmologists, orthopedic surgeons, pediatric surgeons, urologists, trauma surgeons, neurosurgeons, and oncologic surgeons), having academic rank of full professor among academic surgeons, being in active military practice, having time dedicated to non-patient care activities, and spending more working hours in the OR. Having more nights on call per week was associated with a lower satisfaction with overall career choice. Similar to satisfaction with overall career choice, personal characteristics associated with a greater satisfaction with specialty choice (being a surgeon) were older age and the absence of burnout. Professional characteristics associated with greater satisfaction with specialty choice were area of specialization (greater satisfaction among transplant surgeons and pediatric surgeons) having higher academic rank among academic surgeons, and spending more working hours in the OR. Having more nights on call per week, being a vascular surgeon, and being in private practice were associated with a lower satisfaction with respect to specialty choice.

**TABLE 4.** Factors Independently Associated With Burnout on Multi-Variate Logistic Analysis

Characteristic and Associated Factors	Odds Ratio*	P Value
Sub-specialty choice <sup>†</sup>	1.2–1.6	All <0.009
Youngest child ≤ age 21	1.54	<0.001
Compensation = incentive pay based entirely on billing	1.37	<0.001
Spouse works as other healthcare professional (nurse, pharmacist, etc.)	1.23	0.004
Number of nights on call per week (each additional night)	1.05	<0.001
Number of years in practice (each additional year)	1.03	<0.001
Hours worked per week (each additional hour)	1.02	<0.001
Age (each additional year older)	0.96	<0.001
Has children	0.82	0.006
>50% time dedicated to non-patient care (research, admin.)	0.81	0.035

\*OR >1 indicate increased risk of burnout; OR <1 indicate lower risk of burnout.

<sup>†</sup>Trauma (OR = 1.56); Urologic (OR = 1.48); Otolaryngology (OR = 1.34); Vascular (OR = 1.36); General (OR 1.17).

**TABLE 5.** Factors Independently Associated With Satisfaction With Specialty and Career Choice on Multi-Variate Analysis

Characteristic and Associated Factors	Odds Ratio*	P Value
Satisfaction overall career choice (being a physician)		
Absence of burnout	4.59	<0.001
Sub-specialty <sup>†</sup>	1.4–2.6	All ≤0.020
Academic rank of full professor	1.36	0.020
Active military practice	1.85	0.014
Time reserved for nonpatient care activities <sup>‡</sup>	1.5–1.8	All <0.02
Age (each additional year older)	1.03	<0.001
Hours per week in OR (each additional hour)	1.01	<0.001
Number of nights on call per week (each additional night)	0.96	0.005
Partner/Spouse works outside home	0.89	0.05
Satisfaction overall specialty choice (surgery)		
Absence of burnout	4.12	<0.001
Sub-specialty <sup>§</sup>	1.8–2.2	All <0.002
Higher academic rank <sup>¶</sup>	1.31–1.37	All ≤0.018
Age (each additional year older)	1.03	<0.001
Hours per week in OR (each additional hour)	1.01	0.033
Number of nights on call per week (each additional night)	0.95	<0.001
Private practice	0.71	<0.001
Sub-specialty choice vascular surgery	0.71	0.002

\*OR >1 indicates greater satisfaction career/specialty choice; OR <1 indicate lower satisfaction career/specialty choice.

<sup>†</sup>Otolaryngology (OR = 2.57); Transplant (OR = 2.18); Plastic (OR = 2.18); Ophthalmology (OR = 2.10); Orthopedic (OR = 1.98); Pediatric (OR = 1.87); Urology (OR = 1.90); Trauma (OR = 1.69); Neuro (OR = 1.62); Oncologic (OR = 1.46).

<sup>‡</sup>Non-patient care time; non (OR = 1.0; referent), 1–9% (OR = 1.49), 10–20% (OR = 1.54), 20–30% (OR = 1.83); 50% (OR = 1.59), >50% (OR = 1.51).

<sup>§</sup>Transplant (OR = 2.24); Pediatric (OR = 1.81).

<sup>¶</sup>Associate professor (OR = 1.37); Full professor (OR = 1.31).

## DISCUSSION

We report here a comprehensive, national study of the professional characteristics, career satisfaction, and burnout of American Surgeons. The responding sample of nearly 8000 surgeons represents the largest study of burnout among physicians ever reported. We found a high rate of burnout among American surgeons with nearly 40% meeting criteria for burnout. Consistent with this result, nearly 30% of surgeons had a mental QOL score more than a half standard deviation below the population norm, a decrement shown to be clinically meaningful.<sup>25</sup> Both personal and professional characteristics were associated with burnout on multivariate analysis. Younger surgeons were at higher risk as were surgeons whose compensation was based entirely on billing/productivity, those who worked more hours per week, and those who spent more nights on call per week. Area of subspecialization was also associated with burnout with higher risk among trauma, urologic, otolaryngology, vascular and general surgeons. Burnout was the single greatest predictor of career satisfaction among surgeons and accounted for more of the variation in satisfaction with career and specialty choice than any other personal or professional factor.

Despite a high frequency of burnout and low mental QOL, surgeons were generally satisfied with their career and specialty choice where approximately 70% would choose to become both a physician and surgeon again. While these numbers suggest American surgeons are personally satisfied with a career in surgery, only half would recommend their children pursue a career as a physician/surgeon and only one third felt their career left enough time for personal/family life. One interpretation of these findings is that although American surgeons generally enjoy the practice of surgery, their work loads are excessive, often leave inadequate time for personal/family pursuits, and frequently lead to burnout and poor mental QOL relative to the general population.

In addition to these potential personal costs of practicing surgery, extensive data suggests burnout among physicians may impact quality of care. Research has found strong associations between physician burnout/dissatisfaction with medical errors,<sup>8–10,26</sup> prescribing habits,<sup>27,28</sup> patient compliance,<sup>29</sup> patient satisfaction with their medical care,<sup>30,31</sup> and medical malpractice suits.<sup>32</sup> These findings underscore that surgeons' mental health and professional burnout matter not only to the individual surgeon and their family but to their patients, colleagues, societies, hospitals and government agencies tasked with promoting quality of care.<sup>33</sup> These physician societies and government agencies have a responsibility to recognize this issue, help identify its underpinnings, promote reasonable limits on work, and help surgeons develop strategies to prevent burnout and promote their personal mental health. In this respect, it is noteworthy that the present study was initiated at the request of and with the financial support of the American College of Surgeons who is using the data collected as part of their efforts to recognize specific challenges faced by surgeons, understand their impact on the profession, and advocate for the changes necessary to preserve professional integrity and promote quality of care by America's surgeons.

How does the prevalence of burnout among American surgeons compare with physician in other specialties and other studies of surgeons? Unfortunately, there is no good comparative data available for national samples of U.S. physicians in nonsurgical specialties. Most of the available studies from both the U.S. and abroad are limited by their small sample size and few represent national samples (Table 6). Crude calculations pooling the physicians from all the previous studies of nonsurgical specialties listed in Table 6A suggests the rate of emotional exhaustion and depersonalization for physicians in fields other than surgery are approximately 30% and 29%. These values are very similar to the 32% and

**TABLE 6.** Burnout in Practicing Physicians

	Sample Size	High EE %	High DP %
A. Burnout in specialties other than surgery from studies using the MBI			
United States			
American Critical Care Physicians <sup>38</sup>	253	29	20
Emergency Physicians in Los Angeles <sup>39</sup>	77	29	60
Primary Care Clinicians at Legacy Clinic <sup>40</sup>	32	21–29	6–8
International studies			
Italian Primary Care Physicians and Hospitalists <sup>41</sup>	328	28	26
Greek Internal Medicine Physicians <sup>42</sup>	103	17	9
European Family Physicians (12 countries) <sup>43</sup>	1393	43	35
Canadian Family Physicians in British Columbia <sup>44</sup>	129	54	30
Swiss General Practitioners <sup>45</sup>	141	36	36
French Critical Care Physicians <sup>46</sup>	1189	19	37
British Oncologists #1 <sup>11</sup>	207	25	15
British Oncologists #2 <sup>47</sup>	322	35	27
Swiss Oncologists <sup>45</sup>	113	27	21
Japanese Oncologists and Palliative Care Physicians <sup>48</sup>	697	22	11
Canadian Oncologists in Ontario <sup>49</sup>	131	53	22
British Radiation Oncologists <sup>11</sup>	126	38	31
Italian Hematologists <sup>50</sup>	121	32	30
British Gastroenterologists <sup>47</sup>	299	31	28
British Radiologists <sup>47</sup>	260	33	21
Italian Nephrologists <sup>51</sup>	61	18	13
Canadian Ophthalmologists in Quebec <sup>52</sup>	133	45	40
British Palliative Care Physicians <sup>53</sup>	126	23	13
Australian Palliative Care Physicians <sup>54</sup>	41	23	8
Swiss Pediatricians <sup>45</sup>	117	37	24
Canadian Emergency Physicians <sup>55</sup>	268	13	61
Australian & New Zealand Anaesthesiologists <sup>56</sup>	422	20	20
B. Burnout in other studies of surgeons using the MBI			
United states			
American Surgeons (current study)	7905	32	26
Surgical Oncologists <sup>6</sup>	549	24	15
Surgeons practicing or trained in Michigan <sup>4</sup>	582	32	13
American Transplant Surgeons <sup>57</sup>	209	38	27
OB/GYN Department Chairs and Program Directors <sup>58</sup>	119	54	36
Otolaryngology Department Chairs and Program Directors <sup>59</sup>	107	26	13
Orthopaedic Department Chairs and Program Directors <sup>60</sup>	193	41	27

	Sample Size	High EE %	High DP %
International studies			
British Surgeons <sup>47</sup>	161	27	19
British Colorectal Surgeons <sup>61</sup>	253	31	17
British Vascular Surgeons <sup>61</sup>	248	32	25
Orthopaedic Surgeons in Saudi Arabia <sup>62</sup>	69	51	59
Canadian Gynecologic Oncologists <sup>63</sup>	35	34	14

Additional studies of burnout in physicians either did not use the MBI,<sup>13,34,35,64,65</sup> did not score the MBI according to standard convention,<sup>12,66,67</sup> did not report the percent of physicians with high scores in the individual domains,<sup>23,68–73</sup> or did not report data on physicians distinct from nurses and other care providers.<sup>74,75</sup>

26% observed in the present study of U.S. surgeons and in previous publications of burnout among surgeons (Table 6). These results suggest the degree of distress and burnout experienced by American surgeons may be similar to their colleagues in other specialties. It is also unknown whether certain subspecialties that require treating patients with higher acuity or more complex health problems may place physicians at higher risk. Previous studies suggest that specialties in which physicians frequently deal with the chronically ill or incurable/dying patients may be higher risk than specialties that focus on curable diseases or conditions with a favorable prognosis.<sup>34</sup> In our study, we found higher rates of burnout among trauma surgeons, urologist, otolaryngologists, vascular surgeons, and general surgeons relative to other surgical subspecialties. Additional research dissecting the specific practice characteristics that contribute to burnout would be insightful.

Our study is subject to a number of limitations. First, although similar to national survey studies of the members of physician societies,<sup>6,35</sup> our response rate of 35% is lower than physician surveys in general<sup>36,37</sup> and could introduce substantial response bias. It is unknown whether physicians who are burned out are less likely to complete surveys due to apathy or more likely to complete surveys related to job stress due to greater interest in the topic. Second, our survey is cross-sectional and we are unable to determine whether the associations observed are causally related and the potential direction of the effects. Third, there are no doubt numerous important aspects related to both burnout and career satisfaction that were not measured by our study. No doubt some challenges vary by subspecialty, geography, practice type, and local practice environments, aspects that are difficult to address in a national study.

Our study also has several notable strengths. As noted, it is the largest study of physician burnout conducted to date. The survey included standardized instruments that are validated measures of burnout and QOL and facilitate comparison to prior studies of physicians/surgeons. The results of our study are consistent with prior studies of American surgeons from single specialty groups or specific regions which have found burnout rates between 28–40%.<sup>4–6</sup> The survey also included an extensive evaluation of personal and practice characteristics where the large number of responders allowed robust multivariate analysis with sufficient power to dissect complex associations and interactions.

In conclusion, burnout appears to be prevalent among American surgeons. A variety of personal and professional characteristics were related to burnout and burnout was the single greatest predictor of surgeons' satisfaction with their career and specialty choice. Given that extensive data indicates a relationship between physician burnout and the quality of care they provide patients,<sup>8–10</sup> these data have important implications for departmental, institutional, and national efforts to reduce errors and promote quality of care. The

desire to satisfy the demands of patients and colleagues may subvert surgeon's self-awareness of a declining emotional state, and reduce the likelihood they seek help. Additional research is needed to identify individual, organizational, and societal interventions that preserve and promote the physical and emotional health of American surgeons. We also encourage similar efforts by other physician specialty organizations.

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## Discussions

DR. CARLOS A. PELLEGRINI (SEATTLE, WASHINGTON): As the authors appropriately pointed out, burnout and depression not only negatively effect the surgeon's and his family's personal lives, but also the quality of care provided by those affected. Indeed, substance abuse and suicide are more common among physicians altogether, not just surgeons, who suffer from emotional exhaustion, and those so affected are more likely to commit medical errors and provide inferior medical care to their patients. I have three questions with regard to the interpretation of the numbers you presented and two that relate to strategies to solve the problem. With respect to interpretation, you measured quality of life in two dimensions, the mental and the physical, and you stated that you found that the mental dimension was abnormal but just below the norm in 30% of the individuals, whereas it was only 10% of the physical domain. Can you elaborate on the reasons for these contrasting findings? Second, while you mentioned that three-quarters of the surgeons said they would choose surgery again, I was surprised to see that only half of them would recommend surgery as a career for their offspring. Why is that? Third, you found age to be a risk factor in the development of burnout, with the risk falling on the younger population. Knowing that members of Generation X, that is, those born between '62 and '82 who value their free time to a greater extent than those of us in the baby boomer generation, is it possible that their expectations rather than their youth may be the risk factor? Can you comment on this potential confounding effect? With regards to the strategy, my first question relates to the specificity with which emotional exhaustion and depression affects surgeons. As you noted, and you showed with those 1,300 individuals in European family practice, similar rates of this problem have also been reported among critical care physicians in this country and abroad – Canada, with a 41% burnout rate and family care physicians in Europe. Do you think this is a problem that relates to medicine at-large and not just surgery? And if so, why not unite and use our combined strength to develop more universal solutions rather than solutions applicable to surgeons? Lastly, I was confused by the finding that work hours did not appear to bear any weight on the issue of burnout. As you know, the American Council of Graduate Medical Education at the turn of the century convened the workforce that led to the 80-hour-week development. Paul Friedman, who was the chair, Tim Flynn and I were the three surgeon members of this organization who were on that workforce. I was and I remain convinced that this initiative was necessary, was appropriate, and in fact was healthy as it promotes wellness and the ability to pursue personal interest. In your discussion you mentioned Dr. Whittemore's address yesterday, and placed importance on the pursuit of personal interests as an element in preventing the development of the burnout syndrome. Yet most surgeons in this country continue to oppose the 80 hour per week work limit either overtly or covertly. Can you tell us what your position is? What can you infer from your study? I take it as a given that if, as you and the president have expressed, pursuing your personal interests is important, you need to allocate time for that. Where do you get that time if you have no limit on your work hours?

DR. CHARLES M. BALCH (BALTIMORE, MARYLAND): Quality of life (QOL) questions involve very specific issues that have to do with physical limitations versus issues relating to mental quality of life, and we compared each of these to population-based norms in the United States. Of the two, surgeons address their physical QOL issues, or do not perceive that their physical quality of life is much different than that perceived by other people in the country. On the other hand, the fact that mental quality of life answers deviated from the norm by three-fold does mean this is an issue that we should address more both as a profession within our departments and

personally. Your point is well taken whether there is a cause and effect relationship, which we do not know yet. Age is a very important influence on burnout. In this and almost all studies that were done before, age is an important factor and younger people are at greater risk. Addressing these issues proactively is going to be important for our younger colleagues, whether it is because of their expectations, or other stressors, real or perceived. We should be proactive about preventing and mitigating this in the first half of their careers so that they might not experience the adverse consequences of burnout in the last half of their careers. How the incidence of burnout for surgeons compares to other medical specialties is important and again, we do not have direct comparative data. One of the conclusions we made in the paper is the internal medicine, anesthesia and other specialties should conduct more of these studies, so that we would be able to sort out whether these are unique to our role as physicians or whether certain aspects are unique to our role as surgeons. We do not have this data. Regarding work hours, I intuitively thought there would be more of a relationship between hours worked and burnout incidence. Survey results indicate that it is not as simple as limiting work hours, for there are other features that cause stress, such as nights on call, that may need to be addressed. It is not to say that we shouldn't use common sense in what we do. I think the difference between residents and those in practice is that the residents are very directed in their work with other physicians, whereas those of us who work long hours do so for the most part because we choose to.

DR. MURRAY F. BRENNAN (NEW YORK, NEW YORK): The problem is the association with burnout of your subspecialty choice, your billing compensation proportional to billing, your teenage children at home, your working wife and years in practice. There is very little I can do about that. The teenage children leave, but they might come back, so that does not solve anything. Your spouse can leave, but that creates a serious different set of problems. I must retreat to the satisfaction index, but again, there is not much I can do about it. I cannot change my rank. I cannot change my subspecialty. My age is inextricably moving onwards. The only thing I can do is change my time in the O.R. and I am working on that. This is not about the causes of burnout; the associations with burnout. It is how we cope with them. I would have liked to have seen some questions that asked what allows us to cope, the privilege of looking after a seriously ill patient, the joy of watching a resident or a fellow or a faculty member mature. Those kinds of issues would be wonderful if we could bring those out in your next survey. I hope you will follow it up. I hope you will allow the fact that just identifying associations does not mean they are causative, it is the way in which we cope with them that is important.

DR. CHARLES M. BALCH (BALTIMORE, MARYLAND): A primary purpose of this study is to define baseline incidence and to raise awareness about the potential impact of burnout on our professional career. We were actually surprised at the 40% incidence. We all go through stresses and strains throughout the seasons of our surgical career. If there is any one message here, it is that we should be proactive to avoid the small but meaningful percentage of surgeons who get into real trouble with addictive behavior, with early retirement, with suicide, and with adverse patient events. Overall, the statistics would indicate that about 10% to 15% of physicians actually opt out of their career early because of some of these consequences I described. It does not mean that each and every one of us do not go through stresses and strains during our career... it is how we adapt to them that will influence our emotional health, our productivity and the quality of our patient care. And those who exhibit maladaptive behavior can find

themselves with serious problems that could affect them personally and professionally, such as addictive behavior that could affect their license and credentialing, or their patient care.

DR. LEIGH ANNE NEUMAYER (SALT LAKE CITY): I have two questions: Did you look at interactions between any of the significant variables and gender? Also, did you look for any interaction between type of income (salaried positions versus compensation) and the number of cases done?

DR. CHARLES M. BALCH (BALTIMORE, MARYLAND): Dr. Freischlag and I and several other people will be leading an analysis that was just recently completed by the Mayo Clinic Survey Center on 1043 women surgeons, which is the largest that has ever been conducted. There will be a series of sub-analyses among these specific groups including analyses according to specialties, which I think will help us more specifically target the uniqueness of each of these factors, especially those unique to women surgeons.

DR. CHRISTOPHER C. BAKER (NEW ORLEANS, LOUISIANA): My question relates to the population. I heard you say "associates". Did you have members of the candidate group, i.e., residents or people who are not fellows, in this study?

DR. CHARLES M. BALCH (BALTIMORE, MARYLAND): Yes, those are associates. Those were young people who were candidates. They constituted 10% of this study.

DR. CHRISTOPHER C. BAKER (NEW ORLEANS, LOUISIANA): Did you notice any differences in your analysis?

DR. CHARLES M. BALCH (BALTIMORE, MARYLAND): We have not done that analysis yet, but we will.

DR. DARRELL A. CAMPBELL, JR. (ANN ARBOR, MICHIGAN): I have a comment and a question. My comment is that when Drs. Eckhauser and Greenfield and I wrote about this a few years ago, we found that the emotional exhaustion rate was exactly the same as what you described, 32%. That was seven or eight years ago. We are not getting worse but we are not getting better either.

On a different subject, we surveyed the members of the Michigan State Medical Society, not just surgeons but everybody in the group, to ask about burnout, using the Maslach Burnout Inventory. I was very surprised to find that surgeons were sort of average with an emotional exhaustion level of 32%, but the group with the highest burnout, and it was very high, and this was what was so surprising, was radiologists. I subsequently spoke at the Michigan State Radiological Society meeting, and they give a lot of validity to that finding. I asked them why, and they said that nobody ever gives them any feedback, they do not tell them if they made the right diagnosis, they never know who the patients are, and it is downright depressing. Therefore, I wonder if in your survey you got any sense of this issue of positive feedback as an antidote to burnout. This has been written about in the family medicine literature, and I was just wondering if you have any sense about this subject.

DR. CHARLES M. BALCH (BALTIMORE, MARYLAND): There will hopefully be a great deal of follow-up on this subject by the Governor's Committee on Physician Health and Competence. One of the outcomes I hope we will see is that other major specialties, such as anesthesiology and internal medicine, who will also conduct similar surveys of their members so that we can begin to understand the various causes of extreme burnout and calibrate those to specific career circumstances.