

## Burnout and Career Satisfaction Among Surgical Oncologists Compared with Other Surgical Specialties

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### ABSTRACT

**Introduction.** Little is known regarding the rate of burnout, career satisfaction, and quality of life (QOL) among surgical oncologists compared with other surgical subspecialties.

**Methods.** The American College of Surgeons conducted a survey in 2008 involving 7,905 respondents, of whom 407 were surgical oncologists. Demographic variables, practice characteristics, career satisfaction, burnout, and quality of life (QOL) of surgical oncologists were compared with other surgical subspecialties using validated instruments.

**Results.** Surgical oncologists were younger (mean age 49.9 years), more likely to be female (26%), and had younger children than other surgical subspecialties. With respect to practice characteristics, surgical oncologists had been in practice fewer years and had fewer nights on call per week than other surgical disciplines but worked more hours (mean 62.6/week), were more likely to be in an academic practice (59.5%), were more likely to be paid on a salaried basis (68%), and had more time devoted to non-patient activities (e.g., research). Compared with surgeons from all other specialties, surgical oncologists had similar incidence of burnout (36%), suicide ideation (4.9%), and QOL, but lower incidence of depression (24%), and better indices of career satisfaction.

**Conclusions.** These data provide a frame of reference for valid comparisons of burnout, QOL, and career satisfaction indices for the surgical oncology community relative to all other surgical specialties. Surgical oncologists have higher

career satisfaction and lower risk of depression than surgeons in other surgical disciplines but still experience high rates of burnout.

In 2006, the Society of Surgical Oncology (SSO) Program Committee (chaired by Dr. Henry M. Kuerer) conducted the first survey about burnout and career satisfaction among surgical oncologists, in collaboration with experts from Mayo Clinic.<sup>1</sup> This was an important contribution to the literature and represented the largest survey among surgical specialties that had been conducted at that point in time. The results indicated that 28% of responding members of the SSO met the criteria for burnout, using the validated Maslach Burnout Inventory. The authors concluded that “although surgical oncologists indicated a high level of career satisfaction, nearly a third experienced burnout.”

On the other hand, the overwhelming majority of surgical oncologists participating in the survey had a high sense of personal accomplishment and indicated that they would become a surgical oncologist again if given the choice. An important insight from the 2006 SSO survey was that women were more likely than men to have burnout (37% vs. 26%;  $P = 0.031$ ). This presentation at the 2006 Annual Meeting and subsequent publishing in the *Annals of Surgical Oncology* also included an editorial with a call for personal wellness and a supportive workplace environment.<sup>2</sup>

In 2008, the American College of Surgeons Committee on Physician Health and Competency commissioned the team at Mayo Clinic to conduct a similar survey of its membership using the same validated survey instruments involving burnout, quality of life (QOL), and career satisfaction.<sup>3</sup> This survey had an unprecedented sample size of 7,905 surgeons from all surgical disciplines, age groups, and geographic settings. Collectively, 40% of surgeons

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responding to the 2008 ACS survey met the criteria for burnout, 30% screened positive for depression, and 28% had a mental QOL score at least half a standard deviation below that of the US population.<sup>3</sup> On multivariate analysis, the independent factors that were associated with burnout included: subspecialty [odds ratio (OR) 1.2–16;  $P < 0.013$ ], having children between the ages of 5 and 21 years (OR 1.35–1.41,  $P < 0.002$ ), income entirely based on patient care billing (OR 1.32;  $P < 0.001$ ), hours worked per week (OR 1.02 for each additional hour;  $P < 0.001$ ), and number of nights on call per week (OR 1.06 for each additional night;  $P < 0.001$ ). The absence of burnout and subspecialty choice were among the most important factors associated with career satisfaction.<sup>3</sup> As with the 2006 SSO study, women surgeons had a higher risk of burnout compared with men on univariate analysis, however this difference did not persist on multivariate analysis adjusting for other factors. Work–home conflicts accounted for a substantial contribution to burnout among both women and men, but especially women.<sup>4</sup>

Since surgical subspecialty choice was related to both burnout rates and career satisfaction, we examined the experience of the 407 respondents to the ACS survey who were surgical oncologists relative to those of 7,454 surgeons from other surgical specialties.

## 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 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.<sup>3</sup> Burnout was measured using the Maslach Burnout Inventory (MBI), a validated 22-item questionnaire considered a standard tool for measuring burnout.<sup>5</sup> The MBI

has three subscales to evaluate the three domains of burnout: emotional exhaustion, depersonalization, and low personal accomplishment. We considered surgeons with a high score for medical professionals on the depersonalization and/or emotional exhaustion subscales as having at least one manifestation of professional burnout.<sup>3</sup> Symptoms of depression were identified using the two-item Primary Care Evaluation of Mental Disorders (PRIME MD), a standardized depression screening tool which performs as well as longer instruments.<sup>6,7</sup> 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.<sup>8,9</sup> The average mental and physical QOL summary scores for the US population are 50 (scale 0–100; standard deviation 10).<sup>9</sup>

### *Statistical Analysis*

Prevalence of burnout, a positive depression screen, and mental and physical QOL by sex was compared using chi-square tests or Kruskal–Wallis tests. All tests were two-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 by sex. 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. Bootstrapping validated the final models.<sup>7</sup> 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 non-patient 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

### *Personal Characteristics*

The 407 surgical oncologists who responded to the survey were younger (49 years vs. 51 years;  $P = 0.0006$ )

**TABLE 1** Personal characteristics of oncologic surgeons<sup>a</sup>

|  | Oncologic surgeons<br>( <i>N</i> = 407) | Other surgeons<br>( <i>N</i> = 7,454) | <i>P</i> -value |
|--|---|---------------------------------------|-----------------|
| Age in years                             |   |                                       | 0.0006          |
| <i>N</i>                                 | 405                                     | 7,417                                 |                 |
| Mean (SD)                                | 49.9 (10.13)                            | 51.7 (10.69)                          |                 |
| Median                                   | 49.0                                    | 51.0                                  |                 |
| Q1, Q3                                   | 42.0, 56.0                              | 43.0, 59.0                            |                 |
| Range                                    | (27.0–78.0)                             | (20.0–99.0)                           |                 |
| Gender                                   |   |                                       | <0.0001         |
| Missing                                  | 1                                       | 44                                    |                 |
| Male                                     | 299 (73.6%)                             | 6,478 (87.4%)                         |                 |
| Female                                   | 107 (26.4%)                             | 932 (12.6%)                           |                 |
| Relationship status                      |   |                                       | 0.7463          |
| Missing                                  | 0                                       | 4                                     |                 |
| Single                                   | 37 (9.1%)                               | 637 (8.6%)                            |                 |
| Married                                  | 357 (87.7%)                             | 6,560 (88.1%)                         |                 |
| Partnered                                | 12 (2.9%)                               | 204 (2.7%)                            |                 |
| Widow or widower                         | 1 (0.2%)                                | 49 (0.7%)                             |                 |
| Ever gone through a divorce              |   |                                       | 0.2513          |
| Missing                                  | 1                                       | 56                                    |                 |
| Yes                                      | 77 (19%)                                | 1,580 (21.4%)                         |                 |
| No                                       | 329 (81%)                               | 5,818 (78.6%)                         |                 |
| Partner or spouse works outside the home |   |                                       | 0.0273          |
| Missing                                  | 38                                      | 690                                   |                 |
| Yes                                      | 211 (57.2%)                             | 3,469 (51.3%)                         |                 |
| No                                       | 158 (42.8%)                             | 3,295 (48.7%)                         |                 |
| Partner or spouse current profession     |   |                                       | 0.0003          |
| Missing                                  | 198                                     | 4,025                                 |                 |
| Surgeon                                  | 31 (14.8%)                              | 303 (8.8%)                            |                 |
| Physician but not in surgery             | 47 (22.5%)                              | 781 (22.8%)                           |                 |
| Other health care professional           | 38 (18.2%)                              | 1,018 (29.7%)                         |                 |
| Nonmedical professional                  | 74 (35.4%)                              | 950 (27.7%)                           |                 |
| Other                                    | 19 (9.1%)                               | 377 (11%)                             |                 |
| Have children                            |   |                                       | 0.0420          |
| Missing                                  | 0                                       | 1                                     |                 |
| Yes                                      | 343 (84.3%)                             | 6,536 (87.7%)                         |                 |
| No                                       | 64 (15.7%)                              | 917 (12.3%)                           |                 |
| Age of youngest child <sup>b</sup>       |   |                                       | 0.0102          |
| Missing                                  | 65                                      | 936                                   |                 |
| <5 years                                 | 81 (23.7%)                              | 1,231 (18.9%)                         |                 |
| 5–12 years                               | 93 (27.2%)                              | 1,503 (23.1%)                         |                 |
| 13–18 years                              | 59 (17.3%)                              | 1,141 (17.5%)                         |                 |
| 19–22 years                              | 34 (9.9%)                               | 709 (10.9%)                           |                 |
| >22 years                                | 75 (21.9%)                              | 1,934 (29.7%)                         |                 |

<sup>a</sup> There were 44 respondents who did not designate a surgical specialty and were excluded from the comparative analysis

<sup>b</sup> Only asked of those with children

and more likely to be a woman (26.4% vs. 12.6%;  $P < 0.0001$ ) than surgeons from other surgical specialties (Table 1). Indeed, the proportion of women surgical oncologists is the highest of any surgical specialty when comparing across the 14 specific surgical subspecialties

(data not shown). A higher proportion of surgical oncologists had spouses or domestic partners who worked outside the home (57.2% vs. 51.3%;  $P = 0.0273$ ), and a higher proportion of surgical oncologists were married to another surgeons (14.8% vs. 8.8%) (Table 1)

### *Practice Profile*

Surgical oncologists were more likely to practice in an academic environment (59.5% vs. 27.1%;  $P = 0.0001$ ), to be salaried (68.1% vs. 51.5%;  $P < 0.0001$ ), and to have been in practice a shorter length of time (16.2 vs. 18.6 years;  $P < 0.0001$ ) compared with other surgical specialties (Table 2). Only the surgical specialties of transplantation, trauma, and pediatric surgery had a higher proportion of practicing in an academic setting (data not shown). Responding surgical oncologists worked longer hours compared with the other surgical specialties (62.6 vs. 59.1 h/week;  $P = 0.0001$ ), had less night call (2.1 vs. 2.6 nights/week;  $P < 0.0001$ ), and more time dedicated to non-patient care activities (>20% time in 59.4% vs. 31.4%) compared with other surgical specialties (Table 2).

### *Burnout and Quality of Life Indices*

Surgical oncologists had less distress than their surgical counterparts in many of the responses to the validated survey instruments (Table 3). Thus, the incidence of screening positive for depression was lower (24.3% vs. 30.2%;  $P = 0.0114$ ), while the burnout rate trended lower as well (36.1% vs. 39.8%;  $P = 0.1386$ ). Mental and physical QOL scores were similar between surgical oncologists and other surgical specialties. When the rates of burnout and a positive depression screen were ranked for the 14 defined surgical subspecialties, surgical oncology was in the lower third for prevalence of both burnout and a positive depression screen (data not shown).

Career satisfaction among surgical oncologists was higher than that reported by other surgical specialists as a whole. Thus, more surgical oncologists would choose to become a surgeon again if given the choice to revisit their specialty choice (75.1% vs. 70.3%;  $P = 0.0412$ ), more would choose to become a physician again if given the choice to revisit their career choice (79.4% vs. 73.7%;  $P = 0.0111$ ), and more would recommend to their children that they become a physician or surgeon (59.5% vs. 50.0%;  $P = 0.0006$ ). Despite this satisfaction, a recent conflict between work and personal/family time was reported more frequently (55.2% vs. 50.2%;  $P = 0.0499$ ) and fewer surgical oncologists felt that their schedule left adequate time for personal or family life (30.4% vs. 36.7%;  $P = 0.009$ ).

### *Multivariate Analysis on Career Choice*

On multivariate analysis, the factors independently associated with being a surgical oncologist were: (1) working at an academic center, (2) female gender, (3) having more time devoted to non-patient care activity, (4) having a child age <22 years, (5) having fewer nights on

call per week, and (6) a lower likelihood of screening positive for depression (Table 4).

## **DISCUSSION**

Notable differences between surgical oncologists and other surgical specialists as a group were observed in the 2008 ACS survey. Surgical oncologists were younger, were more likely to be female, had younger children, had been in practice fewer years, had fewer nights on call, worked more hours per week, were more likely to be in an academic practice, were more likely to be paid on a salaried basis, and had more time for non-patient activities. Compared with surgeons from all other specialties, surgical oncologists had similar incidence of burnout and suicide ideation, and mental/physical QOL, but lower incidence of depression, and better indices of career satisfaction. Despite these generally favorable findings, caution flags for surgical oncologists included a schedule leaving less time for personal and family life and higher prevalence of work-home conflicts compared with other surgical specialists.

When the results from surgical oncologists responding to the 2008 ACS survey were compared to the 2006 ACS survey,<sup>1</sup> a higher rate of burnout (36% vs. 28%) and lower average mental QOL score (48.9 vs. 50.4) were observed. Whether these differences represent a worsening in burnout/QOL over the 2 years between these surveys or differences in the surgical oncologists sampled is unknown. Factors associated with higher risk of burnout on multivariate analysis were depression screen positive (odds ratio 4.3,  $P < 0.0001$ ), devoting less than 25% of time to research (OR 2.3,  $P = 0.004$ ), being aged 50 years or younger (OR 1.8,  $P = 0.015$ ), and having lower physical QOL (OR 1.7,  $P = 0.041$ ).<sup>1</sup> It is notable that the vast majority of surgical oncologists in both the 2006 and 2008 surveys had a high sense of personal accomplishment and that  $\geq 75\%$  in both surveys indicated that they would become both a physician and a surgeon again if given the choice.

Two predominate characteristics of surgical oncologists responding to the 2006 and 2008 surveys were their practice setting at an academic location and substantial amounts of non-patient care activities (e.g., research). These characteristics of surgical oncology may very well have influenced the decision to pursue a career in surgical oncology for those selecting this career path. It is notable that, in both the 2006 and 2008 surveys (overall and in surgical oncologists specifically), greater amounts of time devoted to non-patient care activities reduced the likelihood of burnout. Studies on career satisfaction and burnout have emphasized the importance of values alignment and "career fit." For example, a survey study of 2,536

**TABLE 2** Professional characteristics<sup>a</sup>

|                                 | Oncologic surgeons<br>( <i>N</i> = 407) | Other surgeons<br>( <i>N</i> = 7,454) | <i>P</i> -value |
|---------------------------------|---|---------------------------------------|-----------------|
| Years in practice               |   |                                       | <0.0001         |
| <i>N</i>                        | 400                                     | 7,355                                 |                 |
| Mean (SD)                       | 16.2 (11.09)                            | 18.6 (11.03)                          |                 |
| Median                          | 15.0                                    | 18.0                                  |                 |
| Q1, Q3                          | 6.0, 24.0                               | 9.0, 27.0                             |                 |
| Range                           | (0.0–47.0)                              | (0.0–60.0)                            |                 |
| Years of experience             |   |                                       | 0.0003          |
| Missing                         | 7                                       | 99                                    |                 |
| <10                             | 136 (34%)                               | 1,845 (25.1%)                         |                 |
| 10–19                           | 114 (28.5%)                             | 2,085 (28.3%)                         |                 |
| 20–30                           | 105 (26.3%)                             | 2,349 (31.9%)                         |                 |
| >30                             | 45 (11.3%)                              | 1,076 (14.6%)                         |                 |
| Hours worked per week           |   |                                       | 0.0001          |
| <i>N</i>                        | 402                                     | 7,359                                 |                 |
| Mean (SD)                       | 62.6 (16.11)                            | 59.1 (19.08)                          |                 |
| Median                          | 60.0                                    | 60.0                                  |                 |
| Q1, Q3                          | 55.0, 70.0                              | 50.0, 70.0                            |                 |
| Range                           | (0.0–110.0)                             | (0.0–168.0)                           |                 |
| Hours worked per week           |   |                                       | 0.0003          |
| Missing                         | 5                                       | 95                                    |                 |
| <40                             | 21 (5.2%)                               | 640 (8.7%)                            |                 |
| 40–49                           | 27 (6.7%)                               | 768 (10.4%)                           |                 |
| 50–59                           | 60 (14.9%)                              | 1,342 (18.2%)                         |                 |
| 60–69                           | 149 (37.1%)                             | 2,376 (32.3%)                         |                 |
| 70–79                           | 74 (18.4%)                              | 971 (13.2%)                           |                 |
| >80                             | 71 (17.7%)                              | 1,262 (17.1%)                         |                 |
| Hours/week in operating room    |   |                                       | 0.0661          |
| <i>N</i>                        | 399                                     | 7,295                                 |                 |
| Mean (SD)                       | 17.7 (9.13)                             | 17.2 (10.77)                          |                 |
| Median                          | 16.0                                    | 16.0                                  |                 |
| Q1, Q3                          | 12.0, 22.0                              | 10.0, 24.0                            |                 |
| Range                           | (0.0–80.0)                              | (0.0–80.0)                            |                 |
| How many nights are you on call |   |                                       | <0.0001         |
| <i>N</i>                        | 402                                     | 7,307                                 |                 |
| Mean (SD)                       | 2.1 (2.36)                              | 2.6 (2.17)                            |                 |
| Median                          | 1.0                                     | 2.0                                   |                 |
| Q1, Q3                          | 0.0, 3.0                                | 1.0, 4.0                              |                 |
| Range                           | (0.0–7.0)                               | (0.0–7.0)                             |                 |
| Primary practice setting        |   |                                       | <0.0001         |
| Missing                         | 0                                       | 6                                     |                 |
| Private practice                | 113 (27.8%)                             | 4,108 (55.2%)                         |                 |
| Academic medical center         | 242 (59.5%)                             | 2,017 (27.1%)                         |                 |
| Veterans hospital               | 9 (2.2%)                                | 146 (2%)                              |                 |
| Active military practice        | 2 (0.5%)                                | 112 (1.5%)                            |                 |
| Not in practice or retired      | 6 (1.5%)                                | 281 (3.8%)                            |                 |
| Other                           | 35 (8.6%)                               | 784 (10.5%)                           |                 |

TABLE 2 continued

|   | Oncologic surgeons<br>(N = 407) | Other surgeons<br>(N = 7,454) | P-value |
|---|---------------------------------|-------------------------------|---------|
| Current academic rank                         |                                 |                               | 0.2851  |
| Missing                                       | 155                             | 5,312                         |         |
| Instructor                                    | 6 (2.4%)                        | 104 (4.9%)                    |         |
| Assistant professor                           | 79 (31.3%)                      | 655 (30.6%)                   |         |
| Associate professor                           | 76 (30.2%)                      | 585 (27.3%)                   |         |
| Full professor                                | 91 (36.1%)                      | 798 (37.3%)                   |         |
| Primary method determining compensation       |                                 |                               | <0.0001 |
| Missing                                       | 6                               | 165                           |         |
| Salaried position no incentive pay            | 114 (28.4%)                     | 1,551 (21.3%)                 |         |
| Salaried with bonus based on billing          | 159 (39.7%)                     | 2,201 (30.2%)                 |         |
| Incentive pay based entirely on billing       | 93 (23.2%)                      | 2,830 (38.8%)                 |         |
| Other   | 35 (8.7%)                       | 707 (9.7%)                    |         |
| Time dedicated to non-patient care activities |                                 |                               | <0.0001 |
| Missing                                       | 3                               | 50                            |         |
| None  | 6 (1.5%)                        | 375 (5.1%)                    |         |
| <10%  | 51 (12.6%)                      | 2,212 (29.9%)                 |         |
| 10–20%  | 107 (26.5%)                     | 2,420 (32.7%)                 |         |
| 21–30%  | 99 (24.5%)                      | 1,098 (14.8%)                 |         |
| 31–50%  | 87 (21.5%)                      | 715 (9.7%)                    |         |
| >50%  | 54 (13.4%)                      | 584 (7.9%)                    |         |

<sup>a</sup> There were 44 respondents who did not designate a surgical specialty and were excluded from the comparative analysis

Canadian physicians showed that both workload and values congruence contributed significantly to burnout.<sup>10</sup> In another survey of 486 academic internists, the amount of time spent working on the most meaningful activity (i.e., career fit) was strongly related to the risk of burnout, and time spent on the most meaningful activity was the largest predictor of burnout on multivariate analysis (OR 3.26,  $P = 0.0004$ ).<sup>11</sup>

The present analysis also suggests that women surgeons are attracted to the subspecialty of surgical oncology more than any other surgical subspecialty. This observation suggests a greater sensitivity to gender-related aspects of surgical practice, and addressing those aspects should be especially important to leaders in this field. Surveys among surgical oncologists in the USA and in Australia demonstrated higher levels of personal burnout and professional burnout among younger surgeons and among women surgeons.<sup>1,12</sup> Although on univariate analysis in multiple prior studies women surgeons were more likely to experience burnout, the differences in burnout rates by sex did not persist on multivariate analysis adjusting for age and other characteristics, suggesting that other characteristics explain the univariate observations.<sup>1,3,4</sup> Women surgeons experience more work–home conflicts than their male colleagues, and societal expectations for women surgeons appear to remain different from those of their male colleagues despite their training as a surgeon.<sup>4</sup> For example, when asked: “Who was the primary provider for a sick child or

child out of school?”, only 25% of women surgeons relied on their spouse/partner to care for the child, as compared with 70% of men surgeons ( $P < 0.0001$ ).<sup>4</sup> Women surgeons are also more likely to experience work–home conflicts and perceive that child rearing slows their career advancement.<sup>4</sup> Strategies to reduce such conflicts or that provide avenues to resolve conflicts in a manner that meets both work and home responsibilities are important components in reducing surgeon burnout and increasing career satisfaction.<sup>4</sup>

Why should we care about burnout among our surgical colleagues? The most important reason for greater awareness is to avoid the extreme adverse consequences of burnout and depression, such as drug and alcohol addiction, sleep disturbances and fatigue, broken relations and divorce, chronic diseases (especially cardiovascular), early retirement, or suicide.<sup>13,14</sup> There is also increasing evidence suggesting that physician burnout can adversely affect patient safety and quality of patient care, and contribute to medical errors.<sup>15–18</sup> Physician and surgeon burnout and depression can result in poor judgment in patient care decision-making, hostility towards patients, adverse patient events, less compassion, and diminished commitment and dedication to productive, safe, and optimal patient care.<sup>13,15</sup> Based on these findings, prevention or mitigation of burnout is not only important for individual surgeons and their families but is also a critical component of promoting optimal patient care.

**TABLE 3** Career satisfaction, burnout, depression, and QOL among surgical oncologists<sup>a</sup>

|                              | Oncologic surgeons<br>( <i>N</i> = 407) | Other surgeons<br>( <i>N</i> = 7,454) | <i>P</i> -value |
|------------------------------|---|---------------------------------------|-----------------|
| MBI emotional exhaustion     |   |                                       | 0.5254          |
| <i>N</i>                     | 405                                     | 7,326                                 |                 |
| Mean (SD)                    | 21.4 (12.25)                            | 20.9 (12.14)                          |                 |
| Median                       | 20.0                                    | 19.0                                  |                 |
| Q1, Q3                       | 11.0, 31.0                              | 11.0, 30.0                            |                 |
| Range                        | (0.0–54.0)                              | (0.0–54.0)                            |                 |
| MBI EE: categorization       |   |                                       | 0.4552          |
| Missing                      | 2                                       | 128                                   |                 |
| Low burnout: ≤18             | 182 (44.9%)                             | 3,463 (47.3%)                         |                 |
| Avg burnout: 19–26           | 95 (23.5%)                              | 1,536 (21%)                           |                 |
| High burnout: ≥27            | 1 28 (31.6%)                            | 2,327 (31.8%)                         |                 |
| MBI depersonalization        |   |                                       | 0.0035          |
| <i>N</i>                     | 405                                     | 7,311                                 |                 |
| Mean (SD)                    | 5.9 (5.50)                              | 6.7 (5.65)                            |                 |
| Median                       | 4.0                                     | 5.0                                   |                 |
| Q1, Q3                       | 2.0, 8.0                                | 2.0, 10.0                             |                 |
| Range                        | (0.0–29.0)                              | (0.0–30.0)                            |                 |
| MBI DP: categorization       |   |                                       | 0.0073          |
| Missing                      | 2                                       | 143                                   |                 |
| Low burnout: ≤5              | 239 (59%)                               | 3,818 (52.2%)                         |                 |
| Avg burnout: 6–9             | 86 (21.2%)                              | 1,564 (21.4%)                         |                 |
| High burnout: ≥10            | 80 (19.8%)                              | 1,929 (26.4%)                         |                 |
| MBI personal accomplishment  |   |                                       | 0.1457          |
| <i>N</i>                     | 406                                     | 7,259                                 |                 |
| Mean (SD)                    | 41.1 (6.14)                             | 40.6 (6.40)                           |                 |
| Median                       | 43.0                                    | 42.0                                  |                 |
| Q1, Q3                       | 38.0, 46.0                              | 37.0, 45.0                            |                 |
| Range                        | (1.0–48.0)                              | (0.0–48.0)                            |                 |
| MBI PA: categorization       |   |                                       | 0.2654          |
| Missing                      | 1                                       | 206                                   |                 |
| Low burnout: ≥40             | 282 (69.5%)                             | 4,750 (65.5%)                         |                 |
| Avg burnout: 34–39           | 77 (19%)                                | 1,570 (21.7%)                         |                 |
| High burnout: ≤33            | 47 (11.6%)                              | 928 (12.8%)                           |                 |
| Burnout (high EE or high DP) |   |                                       | 0.1386          |
| Missing                      | 0                                       | 116                                   |                 |
| Yes                          | 147 (36.1%)                             | 2,921 (39.8%)                         |                 |
| No                           | 260 (63.9%)                             | 4,417 (60.2%)                         |                 |
| Positive depression screen   |   |                                       | 0.0114          |
| Missing                      | 0                                       | 63                                    |                 |
| Yes                          | 99 (24.3%)                              | 2,234 (30.2%)                         |                 |
| No                           | 308 (75.7%)                             | 5,157 (69.8%)                         |                 |
| Mental QOL score             |   |                                       | 0.9218          |
| <i>N</i>                     | 390                                     | 7,089                                 |                 |
| Mean (SD)                    | 48.9 (9.86)                             | 48.8 (9.94)                           |                 |
| Median                       | 51.6                                    | 51.8                                  |                 |
| Q1, Q3                       | 44.4, 55.9                              | 43.4, 56.0                            |                 |
| Range                        | (12.1–64.3)                             | (9.4–67.8)                            |                 |

TABLE 3 continued

|   | Oncologic surgeons<br>(N = 407) | Other surgeons<br>(N = 7,454) | P-value |
|---|---------------------------------|-------------------------------|---------|
| % with mental QOL score <1/2 SD below population norm   |                                 |                               | 0.3474  |
| Missing   | 17                              | 365                           |         |
| Yes   | 102 (26.2%)                     | 2,010 (28.4%)                 |         |
| No  | 288 (73.8%)                     | 5,079 (71.6%)                 |         |
| Physical QOL score                                      |                                 |                               | 0.7971  |
| N   | 390                             | 7,089                         |         |
| Mean (SD)   | 53.5 (6.70)                     | 53.5 (6.71)                   |         |
| Median  | 55.4                            | 55.5                          |         |
| Q1, Q3  | 51.4, 57.2                      | 51.4, 57.2                    |         |
| Range   | (29.0–65.2)                     | (14.7–66.6)                   |         |
| % with physical QOL score <1/2 SD below population norm |                                 |                               | 0.7260  |
| Missing   | 17                              | 365                           |         |
| Yes   | 43 (11%)                        | 742 (10.5%)                   |         |
| No  | 347 (89%)                       | 6,347 (89.5%)                 |         |
| Would become a physician again (career choice)          |                                 |                               | 0.0111  |
| Missing   | 0                               | 35                            |         |
| No  | 84 (20.6%)                      | 1,952 (26.3%)                 |         |
| Yes   | 323 (79.4%)                     | 5,467 (73.7%)                 |         |
| Would become a surgeon again (specialty choice)         |                                 |                               | 0.0412  |
| Missing   | 2                               | 40                            |         |
| No  | 101 (24.9%)                     | 2,201 (29.7%)                 |         |
| Yes   | 304 (75.1%)                     | 5,213 (70.3%)                 |         |
| Recommend your children become physician or surgeon     |                                 |                               | 0.0006  |
| Missing   | 66                              | 980                           |         |
| Yes   | 203 (59.5%)                     | 3,240 (50%)                   |         |
| No  | 138 (40.5%)                     | 3,234 (50%)                   |         |
| Schedule leaves enough time for personal/family life    |                                 |                               | 0.0242  |
| Missing   | 2                               | 63                            |         |
| Strongly agree  | 22 (5.4%)                       | 717 (9.7%)                    |         |
| Agree   | 101 (24.9%)                     | 1,997 (27%)                   |         |
| Neutral   | 73 (18%)                        | 1,313 (17.8%)                 |         |
| Disagree  | 142 (35.1%)                     | 2,252 (30.5%)                 |         |
| Strongly disagree                                       | 67 (16.5%)                      | 1,112 (15%)                   |         |
| Had thoughts of taking your own life in past 12 months  |                                 |                               | 0.2174  |
| Missing   | 2                               | 76                            |         |
| Yes   | 20 (4.9%)                       | 478 (6.5%)                    |         |
| No  | 385 (95.1%)                     | 6,900 (93.5%)                 |         |
| Conflict between work/personal in last 3 weeks          |                                 |                               | 0.0499  |
| Missing   | 1                               | 56                            |         |
| Yes   | 224 (55.2%)                     | 3,712 (50.2%)                 |         |
| No  | 182 (44.8%)                     | 3,686 (49.8%)                 |         |
| How resolved last work/personal conflict                |                                 |                               | 0.2036  |
| Missing   | 13                              | 278                           |         |
| Resolved in favor of work                               | 141 (35.8%)                     | 2,601 (36.2%)                 |         |
| Resolved in favor of personal                           | 58 (14.7%)                      | 845 (11.8%)                   |         |
| Resolved to meet both responsibilities                  | 195 (49.5%)                     | 3,730 (52%)                   |         |

<sup>a</sup> There were 44 respondents who did not designate a surgical specialty and were excluded from the comparative analysis



**TABLE 4** Factors independently associated with surgical oncologist relative to all other surgical specialties on multivariate analysis

| Factor <sup>a</sup>                                   | Odds ratio <sup>b</sup> | P-value |
|---|-------------------------|---------|
| Practice in academic setting                          | 2.528                   | <0.001  |
| Women   | 2.100                   | <0.001  |
| Youngest child age <22 years                          | 1.353                   | 0.041   |
| Non-patient care activities (relative to <10%)        |                         |         |
| 10–20% of time dedicated to non-patient care activity | 1.604                   | 0.007   |
| 21–30% of time dedicated to non-patient care activity | 2.670                   | <0.001  |
| 31–50% of time dedicated to non-patient care activity | 3.148                   | <0.001  |
| >50% of time dedicated to non-patient care activity   | 2.417                   | <0.001  |
| Nights on call per week                               | 0.899                   | <0.001  |
| Positive depression screen                            | 0.696                   | 0.005   |

<sup>a</sup> Additional factors not independently related to choosing surgical oncology specialty, (1) Age, (2) Youngest child age  $\leq 22$ , (3) Career satisfaction (choose to be physician again/choose to be surgeon again), (4) Retired, (5) Compensation method, (6) Parental status, (7) Hours worked per week, (8) Conflict in last 3 weeks, (9) Recommend career to child, (10) Work leaves enough time for family, (11) Depersonalization

<sup>b</sup> An odds ratio of 1.0 would be an equivalent characteristics compared with all other surgical specialties

Our study is subject to a number of limitations. First, our response rate of 35% is lower than physician surveys in general and could introduce some response bias. 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, such as local practice environments, and alcohol and drug addiction, which are known to influence some of these distress endpoints. Finally, the large sample size creates a statistical power to detect some very small differences of uncertain clinical significance.

On the other hand, our study also has several notable strengths. It is the largest study of physician burnout conducted to date. The survey included standardized instruments that are validated measures of burnout and QOL that can facilitate comparison with prior studies of physicians/surgeons. The survey also included an extensive evaluation of personal and practice characteristics where the large number of survey responders allowed for robust multivariate analysis with sufficient power to dissect complex associations and interactions.<sup>3,4,14,15</sup>

In a separate analysis of this survey material focusing on surgeon workload (hours worked and nights on call/week), we found a strong correlation between hours worked and burnout rate, with the prevalence of burnout ranging from 30.1% for surgeons working < 60 h to 50% for those working >80 h/week.<sup>19</sup> For those surgeons who worked 80 h/week, the prevalence of a positive depression screen was higher, a work–home conflict in the last 3 weeks was more common, and career satisfaction was lower compared with those surgeons who reported that they worked <60 h/week.<sup>19</sup> In this regard, it is interesting to note that surgical

oncologists worked longer hours but had fewer nights on call, most likely reflecting a more “elective” nature of their surgical practice.

These results of the present analysis should stimulate heightened attention to personal wellness and cultivation of supportive workplace environments for all physicians, including those in the surgical oncology community. As we have summarized before: “It is tragic that some of our colleagues, after committing almost a decade of highly specialized training, suffer from burnout at a level that that they progressively become less productive, less efficient, or leave their practice early.”<sup>2</sup> The best prevention for burnout is to actively nurture and protect their personal and professional well-being on all levels: physical, emotional, psychological, and spiritual.<sup>3,20–22</sup> Each of us has our own combination of activities that can be self-renewing and energizing, which no doubt will change as we go through phases of our career and our seasons of life. What is required is a new way of thinking about one’s personal energy: that work is not merely a domain of energy expenditure but also of energy renewal.<sup>23</sup> Being proactive is so much better than reacting to a situation which can spiral into a crisis that damages one’s professional life or personal wellness and may take months or years to repair.

As surgeons, we should set an example of good health for our patients, our colleagues, and the future surgeons we train. To provide the best care for our patients, we need to be alert and healthy. That means doing everything we can to stay as healthy as we want our patients to be. Personal growth and renewal involves optimizing meaning, both at work and in personal life. Strategies that may help increase wellness for individual surgeons include participating in research, continuing educational activities outside of work, and paying particular attention to important personal

relationships, spiritual practices, recognizing the importance of one's work, cultivating personal interests outside of work, and creating a balance between personal and professional life.<sup>20-25</sup> The data provide a frame of reference for valid comparisons of burnout, QOL, and career satisfaction indices for the surgical oncology community relative to all other surgical specialties. Surgical oncologists have higher career satisfaction and lower risk of depression than surgeons in other surgical disciplines, but still experience high rates of burnout. More needs to be done to promote personal wellness and a supportive workplace environment.

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