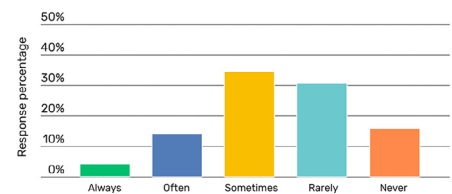


# Well-being of Cardiothoracic Surgeons in the Time of COVID-19: A Survey by the Wellness Committee of the American Association for Thoracic Surgery

Ross M. Bremner, MD, PhD,<sup>\*,†</sup> Ross M. Ungerleider, MD,<sup>‡</sup> Jamie Ungerleider, MSW-LCSW, PhD,<sup>‡</sup> Andrea S. Wolf, MD,<sup>§</sup> Cherie P. Erkmén, MD,<sup>¶</sup> Jessica G.Y. Luc, MD,<sup>||</sup> Virginia R. Litle, MD,<sup>#</sup> Robert J. Cerfolio, MD,<sup>\*\*</sup> and David T. Cooke, MD<sup>††</sup> the Wellness Committee of the American Association for Thoracic Surgery<sup>a</sup>

The prevalence of burnout among physicians has been increasing over the last decade, but data on burnout in the specialty of cardiothoracic surgery are lacking. We aimed to study this topic through a well-being survey. A 54-question well-being survey was developed by the Wellness Committee of the American Association for Thoracic Surgery (AATS) and sent by email from January through March of 2021 to AATS members and participants of the 2021 annual meeting. The 5-item Likert-scale survey questions were dichotomized, and associations were determined by Chi-square tests or independent samples t-tests, as appropriate. The results from 871 respondents (17% women) were analyzed. Many respondents reported at least moderately experiencing: 1) a sense of dread coming to work (50%), 2) physical exhaustion at work (58%), 3) a lack of enthusiasm at work (46%), and 4) emotional exhaustion at work (50%). Most respondents (70%) felt that burnout affected their personal relationships at least “some of the time,” and many (43%) experienced a great deal of work-related stress. Importantly, most respondents (62%) reported little to no access to workplace resources for emotional support, but those who reported access reported less burnout. Most respondents (57%) felt that the COVID-19 pandemic has negatively affected their well-being. On a positive note, 80% felt their career was fulfilling and enjoyed their day-to-day job at least “most of the time.” Cardiothoracic surgeons experience high levels of burnout, similar to that of other medical professionals. Interventions aimed at mitigating burnout in this profession are discussed.

Do you think that burnout has affected your ability to provide optimal care and be most effective at work?



Cardiovascular surgeons report that burnout affects patient care and effectiveness.

## Central Message

Cardiothoracic surgeons, similar to those in other specialties, reported high levels of work-related stress and burnout, exacerbated by the COVID-19 pandemic.

## Perspective Statement

For healthcare professionals, work-related stress can lead to burnout, negatively affecting

**Abbreviations:** AATS, American Association for Thoracic Surgery; xxxxx, xxx

<sup>\*</sup>Norton Thoracic Institute, St. Joseph’s Hospital and Medical Center, Phoenix, Arizona

<sup>†</sup>Phoenix Regional Campus, Creighton University School of Medicine, Phoenix, Arizona

<sup>‡</sup>Institute for Integrated Life Skills, LLC, Bermuda Run, North Carolina

<sup>§</sup>Department of Thoracic Surgery, The Icahn School of Medicine at Mount Sinai, New York, New York

<sup>¶</sup>Department of Thoracic Surgery, Temple University Health Systems, Philadelphia, Pennsylvania

<sup>||</sup>Division of Cardiovascular Surgery, Department of Surgery, University of British Columbia, Vancouver, BC, Canada

<sup>#</sup>Thoracic Surgery and Cardiovascular Surgery, Intermountain Healthcare, Murray, Utah

<sup>\*\*</sup>Department of Cardiothoracic Surgery, New York University Langone Health, New York, New York

<sup>††</sup>Division of General Thoracic Surgery, University of California, Davis Health, Sacramento, California

**Funding:** This research was not supported by any external funding.

**Disclosures:** The authors have nothing to disclose with regard to commercial support.

**Previous Presentation:** Preliminary results of this study were presented by Dr. Ross Bremner during the Wellness Session at the 2022 Annual Meeting of the American Association for Thoracic Surgery.

<sup>a</sup>Collaborators: Michael Maddaus, MD; Kathy Bremner, RN; Cynthia Moon, AHCNS; Cynthia Herrington, MD; Thomas A. D’Amico, MD

Address reprint requests to Ross M. Bremner, MD, PhD, Norton Thoracic Institute; St. Joseph’s Hospital and Medical Center, 500 W. Thomas Road, Ste. 500, Phoenix, AZ 85013. E-mail: [ross.bremner@dignityhealth.org](mailto:ross.bremner@dignityhealth.org)

**Semin Thoracic Surg** ■■■:■■■–■■■ © 2022 Elsevier Inc. All rights reserved.

**Keywords:** Cardiothoracic surgeon, Thoracic surgeon, Cardiac surgeon, Well-being, Wellness, Burnout, Survey

patient care as well as provider turnover and healthcare costs. This survey focused specifically on the profession of cardiovascular surgery. High levels of work-related stress and burnout were reported; contributing as well as mitigating factors were identified. Interventions to decrease burnout are discussed.

## INTRODUCTION

The prevalence of burnout among physicians has been increasing over the last decade, and although the problem appears to be similar between surgeons and those in other specialties,<sup>1</sup> there is a lack of data specifically on burnout in the specialty of cardiothoracic surgery. Burnout has been characterized by Christina Maslach as emotional exhaustion, cynicism, depersonalization, and a decreased sense of personal accomplishment.<sup>2</sup> It has been associated with rudeness in the operating room and disruptive behavior as well as poorer patient outcomes and an increase in medical errors and malpractice lawsuits.<sup>1,3-9</sup> Further, the financial cost of burnout of an individual to an institution has been estimated to exceed \$500,000.<sup>10,11</sup> Clearly, the problem is pervasive in the medical world and has a high cost associated with it. The American Association for Thoracic Surgery (AATS) Wellness Committee was recently created to address wellness issues related to our specialty by exploring how they affect us and how wellness in cardiothoracic surgery can be optimized. In an effort to understand these questions among cardiothoracic surgeons, the Wellness Committee conducted a survey of its members and all registrants of the 2021 meeting (members and non-members). As the survey was conducted in the middle of the COVID-19 pandemic, the Committee elected to ask some questions regarding the effects of the pandemic on well-being and the ability to provide optimal care to patients. This report summarizes the results of that survey.

## METHODS

The Committee agreed on 54 questions related to wellness and burnout; some of these questions specifically addressed the effects of the COVID-19 pandemic on well-being and the prevalence of physical ailments common to cardiothoracic surgeons, such as neck and back problems (Supplementary File 1). The questions were sent via email to all AATS members and all registrants of the 2021 virtual meeting. The email was sent between January and March of 2021 at 4 different times to help maximize the response rate.

For data analysis, the 5-item Likert scale survey questions were dichotomized by grouping the top 2 answers and the bottom 3 answers. For example, the categories “strongly agree” and “agree” were coded as “1,” and the categories “unsure,” “disagree,” and “strongly disagree” were coded as “0.” Gender responses were also dichotomized with “1” representing “female” and “other,” and “0” representing “male.” Chi-square tests and independent samples t-tests were conducted to test for associations between the demographic measures and question responses, as appropriate. Stata version MP15 was used for the analyses.

## RESULTS

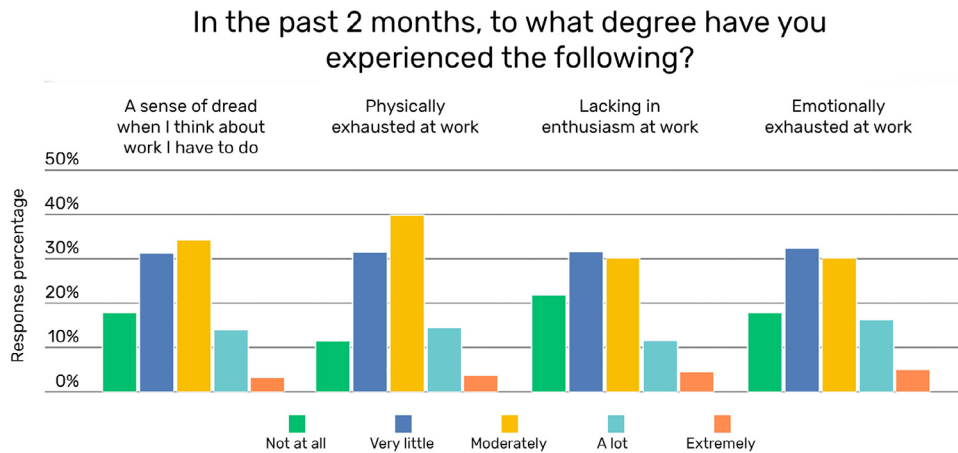
There were 887 respondents, although some did not answer every question. Retirees ( $n = 16$ ) were excluded, thus data from 871 respondents were analyzed. Most respondents (573 [65%]) completed 95% of the questions, and 547 respondents (62%) completed every question in the survey.

### Demographics

The vast majority of included respondents were cardiothoracic surgeons (82%), and the remaining respondents were students or residents in training (8%), non-cardiothoracic surgeons (6%), or other (4%). Most respondents (66%) were not members of AATS. Only 17% of the respondents were female, and female respondents were significantly younger than male respondents (mean age: 46.7 years vs 52.3 years,  $P < 0.001$ ). Most participants (64%) worked in an academic medical center at the time of the survey. Although almost 83% of all respondents were parents, only 46% of the female respondents were parents ( $P < 0.001$ ).

### Burnout and Work–Life Balance

Overall, the markers of burnout were high among respondents (Fig. 1). Respondents reported at least moderately experiencing: (1) a sense of dread coming to work (50%), (2) physical exhaustion at work (58%), (3) a lack of enthusiasm at work (46%), and (4) emotional exhaustion at work (50%). Women were significantly more emotionally exhausted at work (either “a lot” or “extremely”) than men (27.7% vs 18.5%,  $P = 0.022$ ). Almost 44% of respondents felt that they “seldom” or “never” have adequate time to spend with family or friends. Female respondents were more pressed for time than their male counterparts, being less likely to “always” or “often” feel that they have adequate time to spend with family or friends (16.8% vs 25.4%,  $P = 0.047$ ). Older recipients were significantly more likely than their younger counterparts to report that they have adequate time; respondents who “always” or “often” felt that they have adequate time to spend with family and friends had a mean age of 55 years, whereas the mean age of the remaining respondents was 50 years ( $P < 0.001$ ). Respondents with children under the age of 19 were more likely than those without to think that burnout has affected their ability to provide optimal care to their patients and be most effective at work (20.9% vs 10.9%,  $P < 0.001$ ). As their age increased, respondents were less likely to report that burnout has affected their ability to provide optimal care and be most effective at work ( $P < 0.001$ ). Overall, 52% of respondents felt that burnout at least “sometimes” affects their ability to provide optimal care for their patients (Fig. 2).



**Figure 1.** Markers of burnout reported by respondents of the American Association for Thoracic Surgery well-being survey administered January through March of 2021.

**Relationships**

Almost 70% of respondents felt that burnout affected their relationships at home and with friends at least “some of the time.” As their age increased, respondents were less likely to have burnout affect their relationships. Having a spouse or partner was significantly protective against being affected by burnout as 23.8% of those with a spouse or partner “always” or “usually” feel that burnout affects their relationships at home and with friends, compared to 39% of those without a partner ( $P = 0.004$ ).

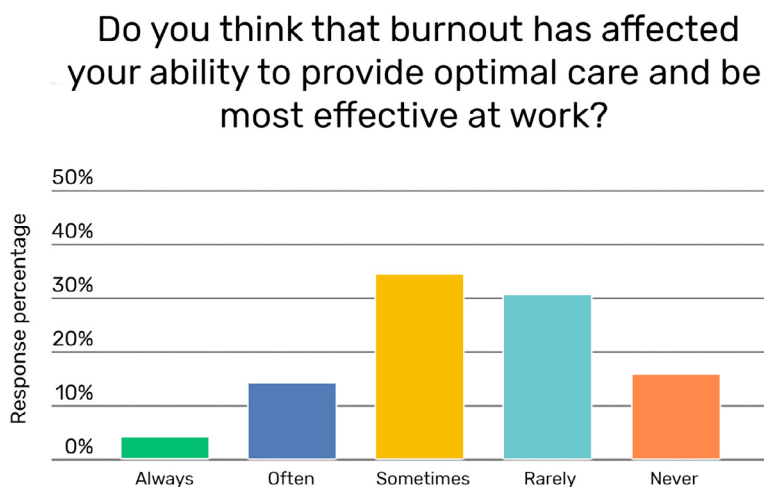
**Stress**

Many respondents (43%) “agreed” or “strongly agreed” that they experience a great deal of stress because of their job. Younger respondents (mean age: 49.8 years vs 52.4 years,  $P = 0.003$ ) and those with children under the age of 19 (43.1% vs 25.4%,  $P < 0.001$ ) were significantly more likely to “agree”

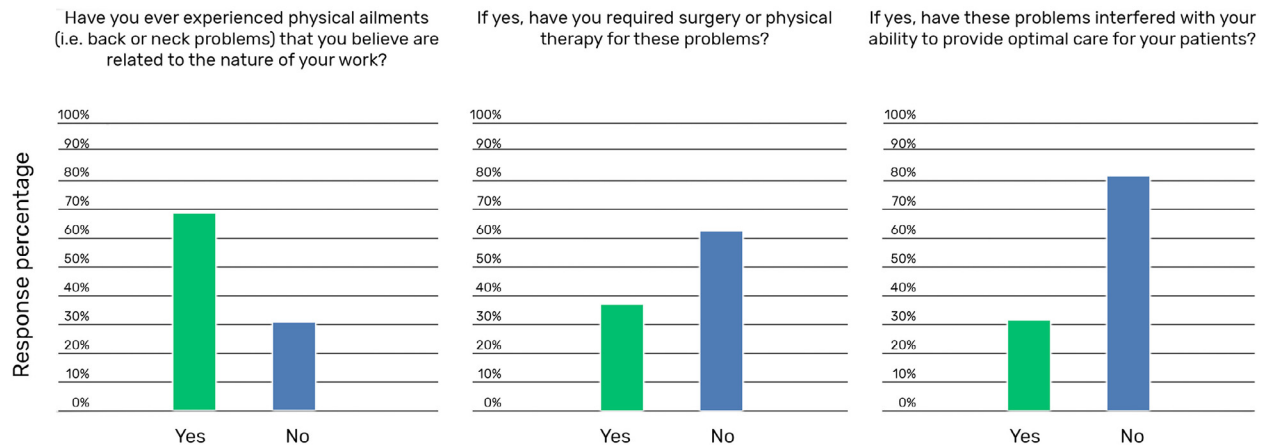
or “strongly agree” that they feel a great deal of stress because of their job than other groups.

**Physical Exercise and Ailments**

Only around half of all respondents (54%) noted that they were able to exercise as much as they usually recommend to their patients. On average, respondents who felt they were able to exercise regularly were almost 4 years older than other respondents (mean age: 53.5 years vs 49.8 years,  $P < 0.001$ ). Most respondents (70%) reported that they have suffered physical ailments (eg back or neck problems) that they attribute to the nature of their work. Female respondents were more likely to experience both physical ailments (80.7% vs 67.4%,  $P = 0.004$ ) and ailments that required surgery or physical therapy (49.4% vs 35%,  $P = 0.012$ ) than their male counterparts. Interestingly, despite this high incidence of ailments, only 27%



**Figure 2.** Effect of burnout on ability to provide patient care reported by respondents of the American Association for Thoracic Surgery well-being survey administered January through March of 2021.



**Figure 3.** Prevalence and consequences of physical ailments reported by respondents of the American Association for Thoracic Surgery well-being survey administered January through March of 2021.

of those with ailments felt that they had interfered with their ability to provide optimal care for their patients (Fig. 3).

**Resources**

Most respondents (62%) noted that they have only scarce or no resources at their institution to provide emotional support to themselves or to a partner. Those who did report access to resources were somewhat protected against burnout. For example, compared to respondents without access to resources, those with access to resources were significantly less likely to experience a sense of dread when they think about work (8.9% vs 14.3%,  $P = 0.026$ ), to think burnout has affected their ability to provide optimal care (9.9% vs 16.4%,  $P = 0.016$ ), and to think burnout affects their relationships at home and with friends (14% vs 21.6%,  $P = 0.012$ ) as well as significantly more likely to feel they have adequate time to spend with family and friends (32.6% vs 12.9%,  $P < 0.001$ ).

**Markers of Purpose/Motivation**

Most respondents (63%) “agreed” or “strongly agreed” to being satisfied with their job. Female respondents were significantly less likely to be satisfied with their current job than their male counterparts (50.4% vs 65.9%,  $P = 0.001$ ). Older respondents (mean age: 52.5 vs 49.3,  $P < 0.001$ ) and those with a partner (65.1% vs 52%,  $P = 0.025$ ) were significantly more likely to be satisfied with their current job. Overall, 80% of respondents felt that their job was fulfilling and that they enjoyed their day-to-day job at least “most of the time.” Most respondents (76%) were likely to again pursue a career in cardiothoracic surgery if given the opportunity.

**Effect of COVID-19**

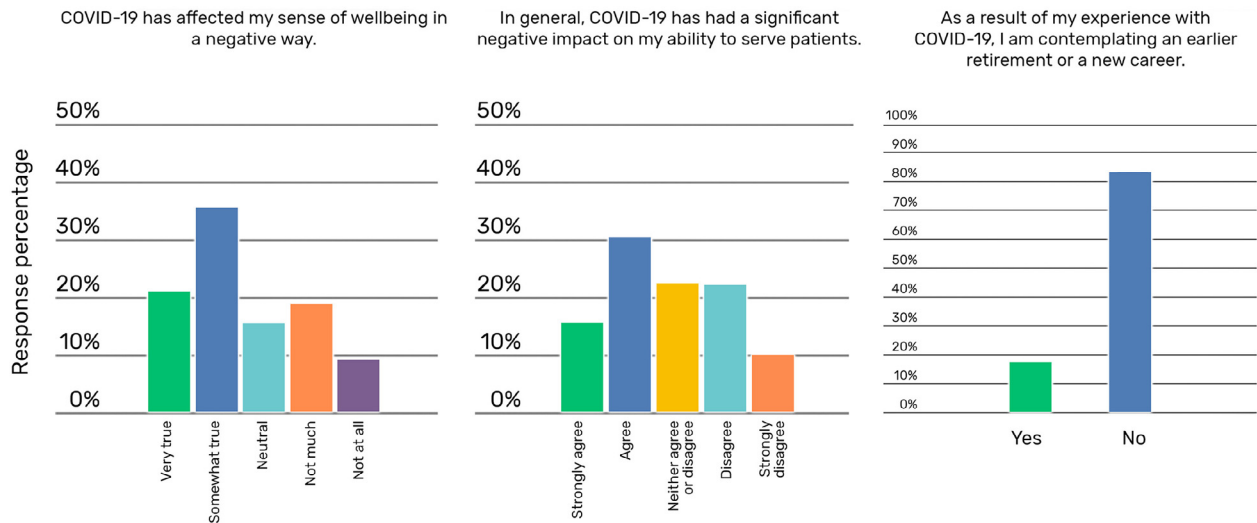
At the time of the survey, many respondents had witnessed at least the first or second wave of COVID-19; however, most had not yet seen the third wave. Nearly 57% felt that the COVID-19 pandemic had negatively affected their sense of well-being, and 46% felt that the pandemic had a negative

impact on the ability to serve their patients. Many (46%) felt that the pandemic had made them feel more burnout as a healthcare worker, and 16% of respondents noted that they were considering an earlier retirement or a new career as a result of COVID-19 (Fig. 4).

**DISCUSSION**

This is one of the first studies to investigate burnout among cardiothoracic surgeons, and one of the first to assess some of the impact of the COVID-19 pandemic on the well-being in our specialty. Before the pandemic, the incidence of burnout among medical professionals was increasing.<sup>12-15</sup> We know that the pandemic caused unprecedented stress on our physicians and nurses, and early data now emerging suggest that burnout may be at an all-time high.<sup>12</sup> As this study and others have demonstrated, burnout has a profoundly negative impact on the ability of medical professionals to provide optimal care for patients and is at the core of the increasing number of healthcare professionals leaving the arena altogether.<sup>16,17</sup> It is alarming, given the high levels of burnout and distress experienced by cardiothoracic surgeons in training<sup>18</sup> and the projected shortfall of cardiothoracic surgeons in the future,<sup>19,20</sup> that the COVID-19 pandemic has a further 16% of us considering earlier retirement.

Like surveys in other specialties, markers of burnout among the cardiothoracic surgeons in this survey are high. In a 2022 Medscape survey, 47% of all physicians and 44% of surgeons had symptoms of burnout.<sup>12</sup> In the current study, around half of respondents experience, at least moderately, a sense of dread coming to work, physical or emotional exhaustion, or a lack of enthusiasm at work (Fig. 1). These are distressing numbers but are in keeping with published data in other specialties. As expected, 46% of cardiothoracic surgeons feel that the pandemic has made them feel more burned out. (In the 2022 Medscape survey, 50% of men and 60% of women reported being more burned out from the pandemic.<sup>12</sup>) Importantly, 52% of respondents noted that burnout has negatively affected their



**Figure 4.** Influence of the COVID-19 pandemic on well-being, ability to serve patients, and consideration of early retirement reported by respondents of the American Association for Thoracic Surgery wellness survey administered January through March of 2021.

ability to take optimal care of their patients. Clearly, cardiothoracic surgeons are not exempt from the problem of burnout, and noticeably, it is preventing them from providing the quality care that they hope to provide.

This inability to provide care consistent with deeply held values has contributed to the syndrome of burnout now being characterized by numerous experts in the field as *moral injury*.<sup>21,22</sup> It is an important term as it infers that “burnout” does not exist within the individual and helps explain how burnout is in part created by the environment. A lack of resources on top of physical and emotional depletion during the pandemic may help explain why many cardiothoracic surgeons who are deeply committed to their profession and find it meaningful are nevertheless struggling with symptoms of burnout.

It is important to note that younger respondents, especially those with young children, and women had higher burnout indices. Similarly, other surveys have drawn attention to the higher levels of burnout among women.<sup>12,13</sup> The stress of the early career and the increased stress of women in our specialty give us a starting point for identifying those at the highest risk of burnout and an opportunity to address this risk before it becomes more significant. The fact that having resources mitigated somewhat against burnout is a critical finding. Although the specific resources or how these resources were accessed was not addressed in this study, departments and institutions have an opportunity to provide some type of resources to begin to overcome this problem. It is indeed very distressing that 62% of our respondents felt that their institutions do not provide resources for emotional support. A great starting point for our institutions may be to actively seek to provide resources for their surgeons. Some specific interventions that have been tested in other organizations include peer support programs (eg the Authentic Connection program at the Mayo Clinic, supporting physician mothers<sup>23</sup>), providing child care

and family care support, and self-facilitated small group support meetings.<sup>7</sup> Having areas in the hospital for connecting to peers (eg a doctor’s lounge or dining room) as well as areas where physicians can escape for a moment of quiet or a place to exercise have also been well received.<sup>24,25</sup> There has also been increasing acceptance of the value of coaching and education by trained experts (some who are specifically attuned to the challenges of cardiothoracic surgeons) in helping today’s clinicians learn how to develop their internal resources to better manage the demands of their personal and professional lives.<sup>16,26</sup>

One of the recurring themes regarding physicians and burnout relates to time poverty and work–life balance. Many of our respondents (43%) felt that they seldom or never have adequate time to spend with family or friends. In studies of human contentment and happiness, connection with families and friends has long been recognized as a critically important factor.<sup>27</sup> This is a complex topic since cardiothoracic surgeons not only work long hours but are also frequently preoccupied with the problems of their patients when outside of the hospital.<sup>28</sup> Being present to family and friends is often challenging. “Too many hours at work” has been recognized as a significant contributor to burnout by others<sup>12</sup> and appears to be a major contributor in this survey. There are clearly opportunities in this arena. Current topics of study include how to extract oneself from the stressors of work when away from the workplace and teaching physicians how to be more mindful and present when they are with friends and family.<sup>16,26,29</sup>

A surprising number of respondents experience physical ailments such as neck and back pain, often requiring intervention or surgery. The physical strain that cardiothoracic surgeons experience during surgery has long been overlooked, and it clearly takes a high toll and likely has significant financial implications for both physicians and their institutions.<sup>30</sup> With

more surgeons becoming employed, this is something that employers may want to emphasize in the future with programs to help physicians develop exercises to prevent neck and back injury and to provide the equipment and an environment designed to minimize orthopedic injury (soft pads to stand on, lightweight headlights, etc.) as well as easy access (perhaps on-site) to physical therapy to mitigate specific neck and back problems when they do occur. Sitting at the console of a robot may protect somewhat from the neck and back problems that are experienced by surgeons who are hunched over a patient's chest, sometimes for hours at a time, but sitting for long periods may bring its own set of physical ailments. The AATS Wellness Committee is planning a series of well-being webinars to address some of these issues.

On the positive side, there remains a high degree of career satisfaction among our respondents. Cardiothoracic surgery, although physically and emotionally demanding, remains very fulfilling. A large percentage of our respondents (76%) would again choose cardiothoracic surgery if given the opportunity, and 80% of our respondents find their career fulfilling overall and enjoy their day-to-day work a good percentage of the time. Although most of the responses on career satisfaction were positive, there is still room for improvement. In his study of motivation, Daniel Pink notes that autonomy, mastery, and purpose are key to self or intrinsic motivation.<sup>31</sup> Some reports have noted that decreasing autonomy contributes to burnout and that changes in the medical bureaucratic system in the US have contributed to a decrease in physician perception of autonomy.<sup>13</sup> Indeed, a 2022 Medscape survey reported the top contributors to burnout among all physicians were: (1) too many bureaucratic tasks (60% of respondents), (2) lack of respect from administrators/employers (39%), (3) too many hours at work (34%), (4) lack of autonomy (32%), and (5) insufficient compensation (28%).<sup>12</sup> These challenges may increase in the future and will require further attention by those working to address the burnout phenomenon.<sup>32</sup>

This report has several limitations and weaknesses. Standardized questionnaires for burnout are still being developed and the questions in this survey were adapted from available sources by the Committee to be a "best fit" for our specialty; however, these questions have not all been validated. We wanted to include questions on physical well-being (eg neck and back ailments) and the effects of the COVID-19 pandemic on burnout, and we were unable to find validated instruments for these. Further, we recognize that there were geographic differences in the experience of the COVID-19 pandemic, and that some areas were experiencing a surge while others were experiencing a decline at the time of the survey, all of which may have impacted the responses to the survey. As the highest incidence and mortality rates in the U.S. occurred after this survey was conducted in January 2022, it is possible that the responses regarding the effect of the pandemic underestimate its overall impact on well-being.

Like many surveys, there may be a bias in those that chose to participate. Since the AATS 2021 meeting was free and virtual and exact records were not collected, we do not know the total

number of surveys that were sent. Also, some respondents did not answer all of the questions, although 65% of respondents who completed the demographic portion completed at least 95% of the entire questionnaire. Nonetheless, we did have a large number of responses, and the ability to make meaningful interpretations from survey data when the surveyed group is reasonably homogeneous has been previously reported for cardiothoracic surgeons.<sup>33</sup> Of note, there was a disproportionate number of respondents in academic practice, likely reflecting the members and attendees of the AATS annual meeting, but we believe the data is valid for much of our specialty. There are approximately 3620 practicing cardiothoracic surgeons in the U. S. today, so with 547 respondents completing the entire survey, there is a 3.5% margin of error at a 95% confidence level that our sample represents the whole (determined using the `svy-sampsi` command in Stata 17), indicating good representation.

This is one of the first well-being surveys to focus specifically on the specialty of cardiothoracic surgery. Similar to other specialties and healthcare professionals in general, cardiothoracic surgeons are experiencing high levels of burnout, with some markers reported more often by younger recipients, those with children under the age of 19 years, and women. Not surprisingly, respondents reported that the COVID-19 pandemic has negatively affected their well-being and that the pandemic as well as burnout in general negatively affects their ability to provide quality care. Of note, our survey emphasizes the importance of relationships in helping to protect against the impact of burnout, since having a spouse or a partner seemed to be protective. This is consistent with research on the importance of relationships in lessening our allostatic load (the cumulative burden of chronic stress and life events).<sup>34</sup> Our survey also shows that having workplace resources to support emotional well-being somewhat mitigates burnout, pointing to an opportunity for improvement since so few cardiothoracic surgeons believe they have access to resources. As more cardiothoracic surgeons become employed,<sup>35</sup> hospitals and other healthcare organizations may play a key role in addressing some of these issues and should address leadership's role in contributing to a disconnect between expressed goals and resources provided by the institution and the deeply held yearnings and perceived needs of their clinical providers.

Indeed, there is a shift of focus in the pursuit of physician well-being from individual resilience, where the onus has been on the individual, to the culture of institutions and efficiency of practice. The AATS Wellness Committee is currently concentrating on these aspects of well-being and will address them at the upcoming annual meeting. The National Academy of Medicine as well as the American Medical Association have recently been addressing the issue of burnout and opportunities to address this issue in organizations.<sup>36,37</sup> The American Medical Association has created the Joy Award for organizations that strive to improve physician well-being (<https://www.ama-assn.org/system/files/2020-10/joy-award-brochure.pdf>) and the Coalition for Physician Well-Being formally recognizes "hospitals and healthcare institutions that demonstrate significant, purposeful,

ongoing commitment to the well-being of physicians” with the annual Medica Integra Award (<https://www.forphysicianwellbeing.org/medicus-integra>).

On a further positive note, most cardiothoracic surgeons are satisfied with their career choice and would again choose this career if provided the opportunity. To protect against the major causes of burnout and maintain, or even improve, this job satisfaction metric, it is imperative that hospitals and healthcare organizations engage physicians in decision making, recognize physicians as a valued resource, and ensure that physicians maintain significant autonomy in how they conduct the art of medicine. For in the end, autonomy, mastery, and purpose will continue to be the motivational drivers of our specialty. There is much work to be done, but at least we can now have a serious conversation and a benchmark upon which we can improve.

**ACKNOWLEDGMENTS**

The authors thank Melissa S. Kovacs for statistical analyses, Jill Colsch for critical review of the manuscript and assistance with the AATS Wellness Committee, Marco Marchionni for graphic design, and Kristine Nally for her expert editorial assistance.

**SUPPLEMENTARY MATERIAL**

Scanning this QR code will take you to the article title page to access supplementary material.



**REFERENCES**

1. Shanafelt TD, Balch CM, Bechamps G, et al: Burnout and medical errors among American surgeons. *Ann Surg* 251:995–1000, 2010
2. Maslach C, Jackson S, Leiter M: *The Maslach Burnout Inventory Manual*, 3. Palo Alto, California, Consulting Psychologists Press; 1997, pp 191–218
3. Dyrbye LN, West CP, Hunderfund AL, et al: Relationship between burnout, professional behaviors, and cost-conscious attitudes among US physicians. *J Gen Intern Med* 35:1465–1476, 2020
4. Halbesleben JR, Rathert C: Linking physician burnout and patient outcomes: Exploring the dyadic relationship between physicians and patients. *Health Care Manage Rev* 33:29–39, 2008
5. Tawfik DS, Scheid A, Profit J, et al: Evidence relating health care provider burnout and quality of care: A systematic review and meta-analysis. *Ann Intern Med* 171:555–567, 2019
6. Welp A, Meier LL, Manser T: Emotional exhaustion and workload predict clinician-rated and objective patient safety. *Front Psychol* 5:1573, 2014
7. West CP, Dyrbye LN, Satele DV, Shanafelt TD: Colleagues meeting to promote and sustain satisfaction (COMPASS) groups for physician well-being: a randomized clinical trial. *Mayo Clin Proc* 96(10):2606–2614, 2021
8. Williams ES, Manwell LB, Konrad TR, Linzer M: The relationship of organizational culture, stress, satisfaction, and burnout with physician-reported

- error and suboptimal patient care: Results from the MEMO study. *Health Care Manage Rev* 32:203–212, 2007
9. Windover AK, Martinez K, Mercer MB, et al: Correlates and outcomes of physician burnout within a large academic medical center. *JAMA Intern Med* 178:856–858, 2018
10. Hamidi MS, Bohman B, Sandborg C, et al: Estimating institutional physician turnover attributable to self-reported burnout and associated financial burden: A case study. *BMC Health Serv Res* 18:851, 2018
11. Han S, Shanafelt TD, Sinsky CA, et al: Estimating the attributable cost of physician burnout in the United States. *Ann Intern Med* 170:784–790, 2019
12. Kane L. Medscape physician burnout & depression report 2022: Stress, anxiety, and anger. Medscape. Available at: <https://www.medscape.com/slideshow/2022-lifestyle-burnout-6014664>. Published 2022. Accessed May 2, 2022.
13. Peckham C. Medscape National Physician Burnout & Depression Report 2018. Medscape. Available at: <https://www.medscape.com/slideshow/2018-lifestyle-burnout-depression-6009235>. Published 2018 Jan 17. Accessed May 2, 2022.
14. Shanafelt TD, Boone S, Tan L, et al: Burnout and satisfaction with work-life balance among US physicians relative to the general US population. *Arch Intern Med* 172:1377–1385, 2012
15. Shanafelt TD, West CP, Sinsky C, et al: Changes in burnout and satisfaction with work-life integration in physicians and the general US working population between 2011 and 2017. *Mayo Clin Proc* 94:1681–1694, 2019
16. Dickey J, Ungerleider R: Managing the demands of professional life. *Cardiol Young* 17(Suppl 2):138–144, 2007
17. Ungerleider R, Ungerleider J, Ungerleider G: Occupational Wellness for the Surgical Workforce in Surgical Patient Safety. Switzerland, Springer; 2017, pp 205–224
18. Chow OS, Sudarshan M, Maxfield MW, et al: National survey of burnout and distress among cardiothoracic surgery trainees. *Ann Thorac Surg* 111:2066–2071, 2021
19. Grover A, Gorman K, Dall TM, et al: Shortage of cardiothoracic surgeons is likely by 2020. *Circulation* 120:488–494, 2009
20. Moffatt-Bruce S, Crestanello J, Way DP, Williams TE Jr: Providing cardiothoracic services in 2035: Signs of trouble ahead. *J Thorac Cardiovasc Surg* 155:824–829, 2018
21. Dean W, Talbot SG, Caplan A: Clarifying the language of clinician distress. *JAMA* 323:923–924, 2020
22. Shanafelt TD: Physician well-being 2.0: Where are we and where are we going? *Mayo Clin Proc* 96:2682–2693, 2021
23. Chesak S: A study to evaluate the effects of the authentic connections program on resilience, psychological distress, depression, self-compassion, parenting stress, and burnout in nurse leaders. Mayo Clinic 2022. Available at <https://www.mayo.edu/research/clinical-trials/cls-20478771>. Accessed May 2
24. Albert Henry T: A Boost for Doctors’ Well-Being? Bring Back the Physician Lounge. American Medical Association; 2022. Available at <https://www.ama-assn.org/practice-management/physician-health/boost-doctors-well-being-bring-back-physician-lounge> Published 2022. Accessed May 3
25. Roberts L. Banner University Medical Center Phoenix Opens Wellness Center to Combat Physician Burnout. The University of Arizona, College of Medicine Phoenix. Available at: <https://phoenixmed.arizona.edu/about/news/banner-university-medical-center-phoenix-opens-wellness-center-combat-physician-burnout>. Published 2019 July 30. Accessed May 3, 2022.
26. Ungerleider R, Ungerleider J, Strand A: *Discovering Your Mindful Heart: An Explorer’s Guide. Developing Your Internal Resources to Manage Life’s Demands*. Indianapolis, Balboa Press; 2020
27. Hudson NW, Lucas RE, Donnellan MB: Are we happier with others? An investigation of the links between spending time with others and subjective well-being. *J Pers Soc Psychol* 119:672–694, 2020
28. Gabbard GO: The role of compulsiveness in the normal physician. *JAMA* 254:2926–2929, 1985
29. Scheepers RA, Emke H, Epstein RM, Lombarts K: The impact of mindfulness-based interventions on doctors’ well-being and performance: A systematic review. *Med Educ* 54:138–149, 2020

30. Dairywala MI, Gupta S, Salna M, Nguyen TC: Surgeon strength: Ergonomics and strength training in cardiothoracic surgery. *Semin Thorac Cardiovasc Surg* 2021. Sep 29:S1043-0679(21)00430-5
31. Pink DH: Drive. New York, Riverhead Books; 2011
32. West CP, Dyrbye LN, Shanafelt TD: Physician burnout: Contributors, consequences and solutions. *J Intern Med* 283:516–529, 2018
33. Ungerleider R, Verghese G, Ririe D, Ungerleider J. Selection, Training and Mentoring of Cardiac Surgeons. In: Barach P, Jacobs J, Lipshultz S, Laussen P, eds. *Pediatric and Congenital Cardiac Care: Improvement and Patient Safety*. 2. London: Springer-Verlag; 2015:9-38.
34. Coan JA, Schaefer HS, Davidson RJ: Lending a hand: Social regulation of the neural response to threat. *Psychol Sci* 17:1032–1039, 2006
35. Kane CK: Policy Research Perspectives. Updated Data on Physician Practice Arrangements: For the First Time, Fewer Physicians are Owners Than Employees. American Medical Association; 2019. Available at <https://www.ama-assn.org/system/files/2019-07/prp-fewer-owners-benchmark-survey-2018.pdf> Accessed May 2 2022
36. AMA launches STEPS Forward to address physician burnout. American Medical Association; 2022. Available at <https://www.ama-assn.org/press-center/press-releases/ama-launches-steps-forward-address-physician-burnout> Accessed September 8
37. National Academy of Medicine: *Taking Action Against Clinician Burnout: A Systems Approach to Professional Well-Being*. Washington, DC, The National Academies Press; 2019