



# Self-valuation: Attending to the Most Important Instrument in the Practice of Medicine

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## Abstract

**Objective:** To measure self-valuation, involving constructive prioritization of personal well-being and a growth mindset perspective that seeks to learn and improve as the primary response to errors, in physicians and evaluate its relationship with burnout and sleep-related impairment.

**Methods:** We analyzed cross-sectional survey data collected between July 1, 2016, and October 31, 2017, from 5 academic medical centers in the United States. All faculty and medical-staff physicians at participating organizations were invited to participate. The self-valuation scale included 4 items measured on a 5-point (0-4) Likert scale (summative score range, 0-16). The self-valuation scale was developed and pilot tested in a sample of 250 physicians before inclusion in the multisite wellness survey, which also included validated measures of burnout and sleep-related impairment.

**Results:** Of the 6189 physicians invited to participate, 3899 responded (response rate, 63.0%). Each 1-point score increase in self-valuation was associated with  $-1.10$  point lower burnout score (95% CI,  $-1.16$  to  $-1.05$ ; standardized  $\beta = -0.53$ ;  $P < .001$ ) and  $0.81$  point lower sleep-related impairment score (95% CI,  $-0.85$  to  $-0.76$ ; standardized  $\beta = -0.47$ ;  $P < .001$ ), adjusting for sex and medical specialty. Women had lower self-valuation (Cohen  $d = 0.30$ ) and higher burnout (Cohen  $d = 0.22$ ) than men. Lower self-valuation scores in women accounted for most of the sex difference in burnout.

**Conclusion:** Low self-valuation among physicians is associated with burnout and sleep-related impairment. Further research is warranted to develop and test interventions that increase self-valuation as a mechanism to improve physician well-being.

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There is mounting evidence that physicians often experience collateral damage as they fulfill their calling to care for and alleviate the suffering of others.<sup>1-5</sup> Matriculating medical students report lower burnout and higher than average mental health before beginning medical school.<sup>6</sup> This relative advantage reverses during medical training.<sup>7</sup> Following their training, physicians continue to experience more burnout than do professionals in other fields despite having similar levels of depressive symptoms.<sup>5,8</sup> These findings support the hypothesis that physicians are resilient individuals who nonetheless develop professional burnout at higher than average rates

as a result of high levels of occupational stress.<sup>5</sup>

A significant portion of physicians' occupational stress is attributable to excessive work hours, burdensome documentation requirements, and clerical work related to ever-increasing administrative, legal, and regulatory requirements.<sup>9-11</sup> Excessive work-hour demands during residency contribute to the development of the habit of deferring self-care.<sup>12,13</sup> After residency, practicing physicians continue to work longer hours than most other professionals.<sup>5,14</sup>

The clerical burden that physicians bear has grown significantly in recent years and the electronic health record has become the

primary portal for documenting, monitoring, and enforcing compliance with a staggering number of health care regulations.<sup>9,15,16</sup> The additional time required to meet these demands is often unmeasured and invisible to others and is typically not supported through adapted schedules or modified work expectations, such as lower relative value unit targets. To meet these growing clerical demands without shortchanging the time needed to care for their patients, many physicians defer their own basic human needs, including nutrition,<sup>17</sup> hydration,<sup>18</sup> and sleep.<sup>19,20</sup> Deferring self-care to meet work demands has been shown to decrease cognitive performance,<sup>21-23</sup> which in turn increases risk for errors. When individual clinicians make mistakes, medical training and practice environments often respond with a shaming approach that blames the individual rather than focuses on the factors in the environment of the care delivery system that contributed to the problem.<sup>24</sup>

We propose that one predictor of how physicians fare in such a stressful work environment is the degree to which they are able to appropriately value and care for themselves in the context of their medical practice. Self-valuation is the constructive prioritization of personal well-being coupled with a growth-mindset perspective<sup>25,26</sup> that seeks to learn and improve as the primary response to errors and imperfections. Deferring self-care to meet work demands and having a harsh response to personal imperfections and errors are 2 indicators of low physician self-valuation, which may contribute to burnout.

The objective of this study was to measure self-valuation among practicing physicians and determine its relationship to physician burnout. We also explore the relationship between self-valuation and sleep-related impairment (a potential indicator of inadequate self-care).

## METHODS

### Sample

The Physician Wellness Academic Consortium (PWAC) is a collaborative group of academic institutions started in 2016 to use

common measures to assess physician wellness longitudinally. The present analysis is derived from the first 5 PWAC organizations that included the full Professional Fulfillment Index (PFI) Burnout Scale,<sup>27</sup> the Clinician Self-valuation Scale, and the Patient-Reported Outcomes Measurement Information System (PROMIS) Sleep-Related Impairment Scale<sup>28</sup> in their survey. Survey data from each institution also included respondents' estimates of the average number of hours worked per week. Data for this study were collected between July 1, 2016, and October 31, 2017.

The Institutional Review Board at Stanford University deemed this study using completely deidentified data to be exempt from further human subjects research oversight.

### Measures

**Self-valuation Scale.** The Clinician Self-valuation Scale is a 4-item scale that assesses deferment of self-care to meet work demands and harsh response to personal imperfections and errors (see [Supplemental Table 1](http://www.mayoclinicproceedings.org), available online at <http://www.mayoclinicproceedings.org>). Instructions ask respondents to answer questions about their relevant experience "during the past 2 weeks." Example items are "When I made a mistake, I felt more self-condemnation than self-encouragement to learn from the experience" and "I put off taking care of my own health due to time pressure." Scale items are scored on a 5-point Likert scale (always = 0; never = 4) and reverse scored such that higher scores are more favorable. The scale range is 0 to 16. The first author (M.T.T.) developed initial drafts of the 4-item self-valuation scale and obtained face and content validity feedback from 4 other authors (M.S.H., B.D.B., and T.D.S.) and 2 other physician with several years of experience with endeavors to improve physician well-being. After iterative feedback and improvement of the self-valuation items, the scale was pilot tested in a convenience sample of 250 physicians to evaluate performance before inclusion in the PWAC survey.

**PROMIS Sleep-Related Impairment Scale.** PROMIS provides validated questionnaires to measure several patient-centered outcomes. We used the PROMIS short form v1.0-Sleep-Related Impairment 8a.<sup>28</sup> This scale includes 8 items and assesses perceptions of alertness, sleepiness, tiredness, and perceived functional impairments during waking hours that are associated with sleep problems.<sup>28</sup> The Sleep-Related Impairment Scale items are answered using a 5-point Likert scale indicating intensity, from “not at all” to “very much.” The validity of this PROMIS measure has been demonstrated.<sup>29</sup>

**PFI Burnout Scale.** Burnout and professional fulfillment were measured using the Stanford PFI.<sup>27</sup> The PFI includes 6 items that assess professional fulfillment, 4 items that assess work exhaustion, and 6 items that assess interpersonal disengagement. Items are scored on a 5-point Likert scale from “not at all” to “extremely.” The average item score from the 10 work exhaustion items and interpersonal disengagement items is used to derive an overall burnout score, which has demonstrated acceptable reliability, validity, and sensitivity to change.<sup>27</sup>

A burnout score was calculated if at least 8 of the 10 burnout items were completed. As an aggregate measure of burnout symptoms, we also multiplied the average Burnout Scale item score (range, 0-4) by the number of items (10) to derive a total score with a range from 0 to 40 and a “burnout” cutoff value greater than 13. A positive PFI burnout screen was defined previously as an average item score of 1.33 or higher based on a receiver operating characteristic (ROC) analysis that was part of the study validating the PFI Burnout Scale against other methods for assessing burnout, published previously.<sup>27</sup> The previously identified average item score (range, 0-4) cutoff ( $\geq 1.33$ ) is equivalent to the summative score (range, 0-40) cutoff ( $>13$ ) used in the current study.

### Analysis

We conducted all analyses using IBM SPSS Statistics, version 25. We estimated internal consistency reliability (Cronbach alpha) for

self-valuation, sleep-related impairment, and burnout. Descriptive statistics were computed for each of these 3 variables to demonstrate the mean  $\pm$  SD of scores by medical specialty.

The self-valuation scale includes 2 items assessing harsh response to personal errors and imperfections and 2 items assessing deferment of self-care. We determined bivariate correlations to compare the utility in predicting concurrent burnout and sleep-related impairment of using the 2 subcomponent scores separately vs using overall self-valuation scores.

Recognizing the value of categorizing wellness variables to determine risk categories and the associated development of selective interventions, we conducted an ROC analysis with self-valuation as the test variable and a positive burnout screen (score  $>13$ ) as the state variable. Using the ROC analysis-derived cut-point, we assessed the significance of the relationship between sex and dichotomous categories of self-valuation and burnout using  $\chi^2$  statistics. We also calculated Cohen *d* effect size estimates of the differences in self-valuation and burnout between female and male physicians.

A linear regression model was used to explore the effect of sex on self-valuation before and after adjusting for medical specialty. A second linear regression model was used to determine the effects of self-valuation on burnout and explore the effect of sex on burnout and the degree to which differences in self-valuation may explain sex differences in burnout. To obtain the additional information from this second model to accomplish these aims, we first entered sex alone in the model, then added primary medical specialty and then self-valuation. A third linear regression model was used to determine the effects of self-valuation on sleep-related impairment, controlling for sex and primary medical specialty.

### RESULTS

Among the 6189 physicians invited to participate, 3899 responded and completed at least 8 of 10 items on the burnout scale (response

rate=63.0%). The sex and medical specialty distribution of participants along with mean self-valuation scores are shown in Table 1. Information for participants' race and ethnicity was not available in the completely deidentified data set analyzed for this study.

The distribution of physician self-valuation scores generally followed a bell-shaped distribution with a median score of 8 (Figure 1). Sleep-related impairment mean  $\pm$  SD was  $17.2 \pm 6.46$ , with 3.2% (n=125 of 3837) of respondents scoring the minimum value (score = 8) and 0.2% (n=8 of 3837) of respondents scoring the maximum (highest sleep-related impairment) value (score = 40). The Burnout Scale mean  $\pm$  SD score was  $11.5 \pm 7.84$  on a 40-point scale, with 6.3% (n=246 of 3899) of respondents scoring the minimum value (score = 0) and 0.1% (n=4 of 3899) of respondents scoring the maximum (highest burnout) value (score = 40). Cronbach alpha internal consistency reliability estimates for the self-valuation, burnout, and sleep-related impairment scales were 0.85, 0.94, and 0.91, respectively.

Figures 2 and 3 demonstrate estimated burnout scores and sleep-related impairment scores, respectively, with mean, 95% CI, and median scores at each self-valuation score point.

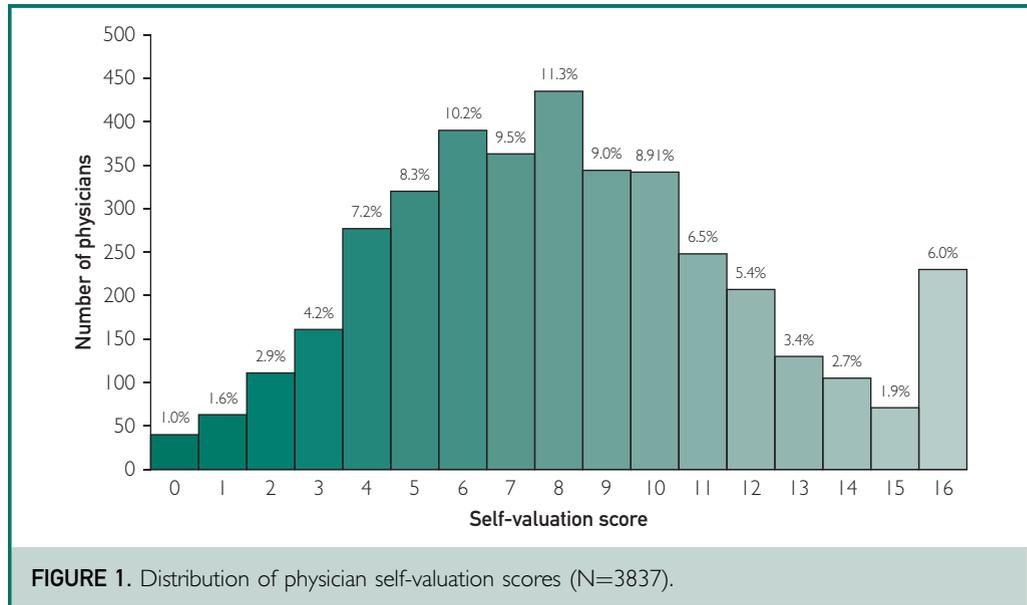
The bivariate correlation between the two 2-item (both reverse scored to reflect increasing self-valuation: always = 0; never = 4) subcomponent scores of the self-valuation scale was 0.60 ( $P < .001$ ). The bivariate correlations of the (growth mindset (versus self-condemning) response to personal errors and imperfections subcomponent (range, 0-8) with burnout and sleep-related impairment were  $-0.44$  ( $P < .001$ ) and  $-0.38$  ( $P < .001$ ), respectively. The bivariate correlations of the self-care subcomponent (range, 0-8) with burnout and sleep-related impairment were  $-0.51$  ( $P < .001$ ) and  $-0.45$  ( $P < .001$ ), respectively. The bivariate correlations of overall self-valuation scores with burnout and sleep-related impairment were  $-0.54$  ( $P < .001$ ) and  $-0.47$  ( $P < .001$ ), respectively. These results favor use of the composite measure.

TABLE 1. Participant Sex and Specialty Distribution and Mean Self-valuation Scores by Sex and Specialty

	N (%)	Self-valuation Score, mean $\pm$ SD (N=3837)
Sex		
Women	1936 (49.7%)	7.68 $\pm$ 3.77
Men	1842 (47.2%)	8.76 $\pm$ 3.73
Other or omitted response	121 (3.1%)	8.08 $\pm$ 4.04
Specialty		
Anesthesiology or Anesthesiology subspecialty	241 (6.2%)	7.68 $\pm$ 3.55
Dermatology	70 (1.8%)	8.62 $\pm$ 3.66
Emergency Medicine	167 (4.3%)	8.45 $\pm$ 3.54
Medicine, Medicine subspecialty, or Family Practice	1218 (31.1%)	8.13 $\pm$ 3.82
Neurology	154 (3.9%)	8.83 $\pm$ 3.94
Obstetrics/Gynecology	171 (4.4%)	7.80 $\pm$ 4.00
Pathology	101 (2.6%)	8.54 $\pm$ 3.75
Pediatrics or Pediatrics subspecialty	539 (13.8%)	7.56 $\pm$ 3.50
Psychiatry	115 (2.9%)	8.71 $\pm$ 3.85
Radiation Oncology	52 (1.3%)	8.14 $\pm$ 2.87
Radiology	240 (6.2%)	8.18 $\pm$ 3.69
"Surgery" or non—Obstetrics/Gynecology/Dermatology Surgery specialty	589 (15.1%)	8.56 $\pm$ 3.96
Department affiliation other than those listed	74 (1.9%)	8.99 $\pm$ 4.04
Elected not to report department affiliation	168 (4.3%)	8.89 $\pm$ 4.09
Total	3899 (100.0%)	8.20 $\pm$ 3.79

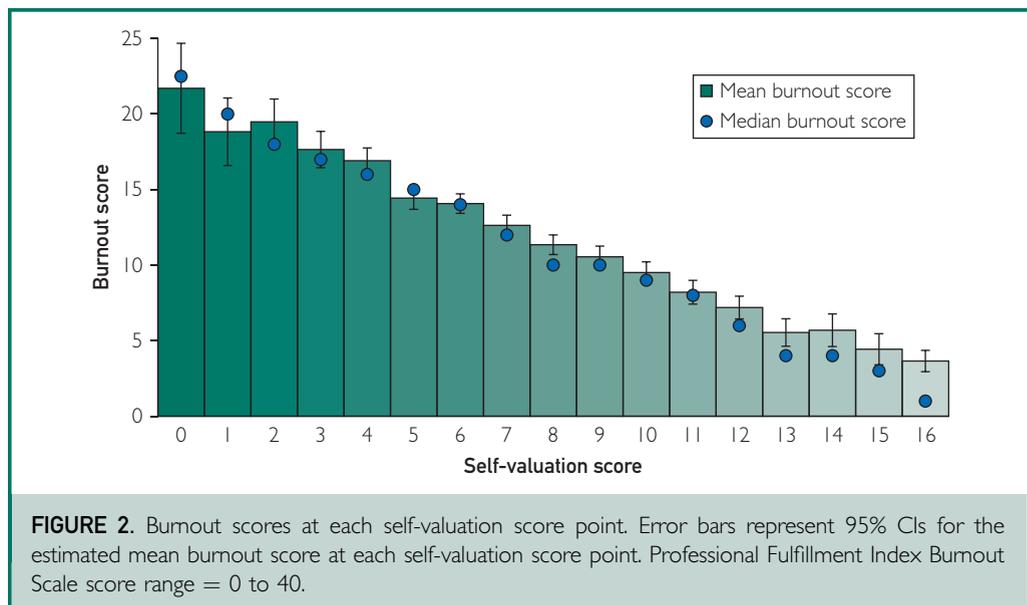
ROC analysis with positive burnout screen (score  $>13$ )<sup>27</sup> as the state variable and self-valuation as the test variable, with lower scores indicating a more positive test result, demonstrated an area under the curve of 0.76 (95% CI, 0.74-0.78;  $P < .001$ ). Using a self-valuation cutoff score of 8 or less predicts a positive burnout screen with 70% sensitivity and 70% specificity. Therefore, we categorized scores of 8 or less as low levels of self-valuation and scores of 9 or more as moderate or high.

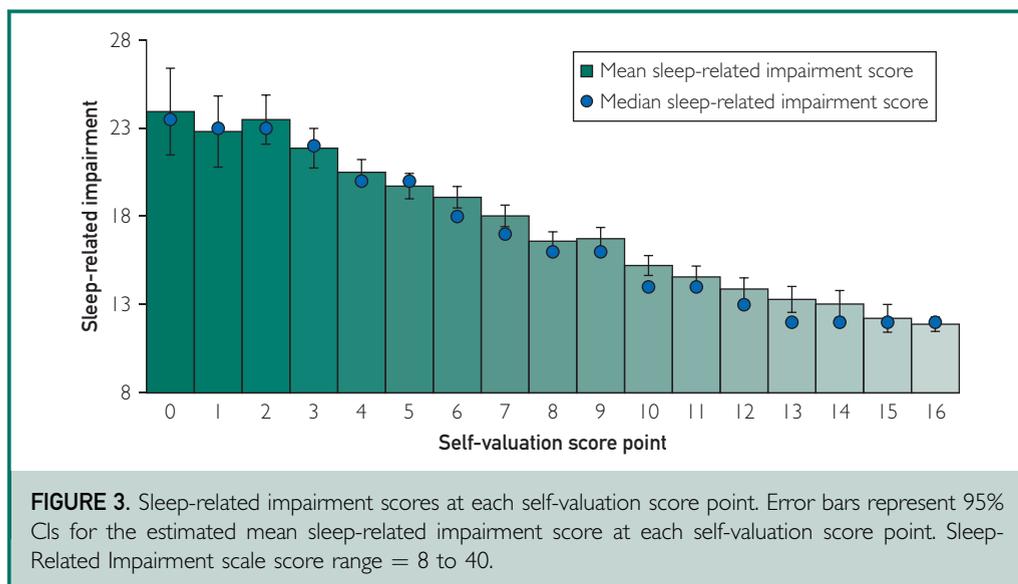
Women were less likely to have moderate to high self-valuation (718/1917 [37.5%] vs 919/1817 [50.6%];  $P < .001$ ) and more likely to have burnout scores above the cutoff value ( $>13$ ) than men (805/1936 [41.6%] vs 590/1842 [32.0%];  $P < .001$ ). Although statistically significant, the portion of variance in self-valuation accounted for by



sex and specialty was small. Sex accounted for 2.3% of variance in self-valuation while primary medical specialty accounted for another 1.2% of variance (model  $R^2=0.035$ ). Female sex was associated with a 1.1-point lower self-valuation score (95% CI,  $-1.3$  to  $-0.88$ ; Cohen  $d=0.29$ ;  $P<.001$ ). The effect of sex on self-valuation remained similar after adjusting for medical specialty ( $-1.1$ ; 95% CI,  $-1.3$  to  $-0.89$ ; Cohen  $d=0.30$ ;  $P<.001$ ).

Female sex was also associated with a 1.7-point (Cohen  $d=0.22$ ) higher burnout score before adjustment for other variables and a 1.9-point increase (95% CI, 1.4-2.4;  $P<.001$ ) after adjusting for medical specialty. After adjusting for self-valuation scores, female sex was associated with only a 0.62-point higher burnout score (95% CI, 0.18-1.06;  $P = .006$ ). Therefore, sex differences in self-valuation account for 67% of the sex difference in burnout, adjusted for





medical specialty. After adjusting for sex and medical specialty (see [Supplemental Table 2](#), available online at <http://www.mayoclinicproceedings.org>), each 1-point increase in self-valuation is associated with a 1.1-point decrease in burnout.

[Table 2](#) demonstrates the final regression model showing effects of sex, medical specialty, and self-valuation on burnout. The model intercept (constant) of 20.7 is the predicted burnout score on a scale of 0 to 40 when all independent variables have a score of zero, which is when self-valuation score = 0 (worst possible score), sex = male, and specialty = internal medicine. Each 1-point score increase in self-valuation was associated with  $-1.10$  point lower burnout, controlling for sex and medical specialty. The standardized  $\beta$  estimate of  $-0.53$  indicates that each 1 SD increase in self-valuation is associated with a 0.53-SD lower burnout score, controlling for sex and medical specialty. Together, sex and medical specialty accounted for less than 3% of variance in burnout (model  $R^2=0.027$ ). Self-valuation accounted for an incremental 27% of variance in burnout (model  $R^2=0.30$ ).

Each 1-point increase in self-valuation was also associated with a 0.81-point lower sleep-related impairment score (95% CI,  $-0.85$  to  $-0.75$ ; standardized

$\beta=-0.47$ ;  $P<.001$ ), adjusting for sex and primary medical specialty. Together, sex and medical specialty accounted for less than 2% of variance in sleep-related impairment (model  $R^2=0.019$ ). Self-valuation accounted for an incremental 22% of variance in self-related impairment (model  $R^2=0.24$ ).

## DISCUSSION

Results of the current multicenter study suggest a **strong association and a clear dose-response relationship between physician self-valuation and burnout and between self-valuation and sleep-related impairment**. Self-valuation accounts for approximately 27% of the variability in physician burnout. If this relationship is causal, improving physician self-valuation could prevent or ameliorate burnout, which has been linked to quality of patient care.<sup>30</sup> Differences in self-valuation also explained the majority of the difference in burnout between male and female physicians. In addition, differences in self-valuation explained a moderately large portion of variability in physician sleep-related impairment, which has been linked to reduced performance in cognitive tasks such as sustained attention, decision making, and affect regulation.<sup>24,31</sup>

One interpretation of these results is that physicians may benefit from learning to

TABLE 2. Effects of Self-valuation on Burnout, Adjusted for Sex and Medical Practice Specialty<sup>a</sup>

	$\beta$ (SE)	95% CI	Standardized $\beta$	P
(Constant)	20.7 (0.33)	20.1 to 21.4		<.001
Self-valuation score	-1.10 (0.03)	-1.16 to -1.05	-0.53	<.001
Sex <sup>b</sup>				
Woman	0.62 (0.22)	0.18 to 1.06	0.04	.006
Other sex or missing	0.69 (0.77)	-0.82 to 2.19	0.01	.37
Department <sup>c</sup>				
Anesthesiology	0.93 (0.48)	-0.00 to 1.87	0.03	.05
Dermatology	-0.20 (0.82)	-1.82 to 1.41	-0.00	.80
Emergency Medicine	0.23 (0.55)	-0.85 to 1.31	0.01	.67
Neurology	-0.28 (0.57)	-1.39 to 0.84	-0.01	.63
Obstetrics/Gynecology	-0.49 (0.55)	-1.56 to 0.58	-0.01	.37
Pathology	-2.52 (0.70)	-3.89 to -1.16	-0.05	<.001
Pediatrics	-1.77 (0.35)	-2.45 to -1.08	-0.08	<.001
Psychiatry	1.27 (0.66)	-0.01 to 2.56	0.03	.05
Radiation Oncology	-1.76 (0.96)	-3.64 to 0.12	-0.02	.07
Radiology	-1.32 (0.48)	-2.25 to -0.39	-0.04	.01
Surgery	-0.22 (0.34)	-0.88 to 0.44	-0.01	.52
Other	-1.01 (0.80)	-2.57 to 0.55	-0.02	.20
Missing department	-1.39 (0.57)	-2.52 to -0.27	-0.04	.02

<sup>a</sup>Abbreviations:  $\beta$  = regression coefficient; SE = standard error.

<sup>b</sup>Comparison category for sex was "man."

<sup>c</sup>Comparison category for department was "medicine or medicine subspecialty."

appropriately value their own well-being and adopting a growth mindset to deal with errors and imperfections. However, this interpretation is incomplete and may lead to narrow intervention strategies that target only individual physicians without also targeting organizational and system-level contributors to physician self-devaluation. Multiple systematic reviews and meta-analyses demonstrate that both approaches are effective and that both should be targeted for maximal improvement.<sup>1,32</sup> Growing work demands, coupled with a medical culture of self-sacrifice and intolerance toward human error, may contribute to physician self-devaluation, which is associated with increased burnout. Burnout is in turn associated with increased medical errors<sup>33,34</sup> and decreased quality of patient care.<sup>35-38</sup>

Physicians experiencing high levels of work-related distress may thus be ensnared in a downward cycle of suboptimal performance, low self-valuation, and burnout. A medical culture that responds to individual error with contempt and shaming<sup>39</sup> adds significantly to physician self-devaluation,

particularly when excessive workload and time pressure increase the likelihood of error.<sup>40,41</sup> Physicians often feel wounded themselves when they make a mistake that can or does hurt a patient, and they are likely to blame themselves.<sup>42-46</sup> A shame-and-blame response to errors by colleagues and leaders is likely to increase self-condemnation rather than promote productive problem solving. Physician burnout may be prevented by efforts that promote self-valuation, including constructive prioritization of personal well-being coupled with a compassionate growth mindset perspective that favors learning and improvement as the primary response to errors and imperfection along with simultaneous efforts to improve the work environment.

The self-valuation construct we propose in part overlaps somewhat with the construct of self-compassion identified by Kirstin Neff,<sup>47</sup> which includes subcomponents of self-kindness, self-judgment, common humanity, isolation, mindfulness, and overidentification. In particular, self-valuation

overlaps to some degree with self-kindness, self-judgment, and overidentification sub-components of the self-compassion scale. **Interventions targeting self-compassion have demonstrated efficacy in health care professionals<sup>48</sup> and other adults.<sup>49</sup>** These interventions typically focus on practical skills training in meditation practices or cognitive therapy approaches.<sup>50,51</sup>

Cognitive therapy teaches participants to replace emotionally volatile negative thoughts related to specific moments of distress with well-reasoned functional thoughts that render greater equanimity. Cognitive therapy approaches designed to improve self-valuation may be particularly promising for physicians. In one study, a brief 4-session online cognitive behavior therapy program led to lower rates of suicidal ideation in medical interns.<sup>52</sup> Cognitive reframing methods may be effectively used in interventions to increase physician self-valuation by replacing self-disparaging thoughts related to errors with a growth mindset focused on learning from mistakes. Cognitive-reframing methods may also help physicians replace thoughts suggesting that self-care is selfish with the understanding that self-care improves clinical performance.

Interventions targeting individual physicians may be effective for those who choose to participate but are likely to be modest in their effect on physician burnout at a population level. **Ultimately, a culture that teaches a physician to undervalue personal well-being is a collective rather than an individual problem and warrants collective solutions.** Improvements in self-valuation among physicians broadly may best be achieved by establishing it as a professional norm, which will require pervasive culture change. Cultural factors likely contribute to the difference in self-valuation that we observed between men and women. Though modest, this difference accounted for most of the sex variance in burnout.

Meta-analysis results demonstrating greater sex inequality in burnout in the United States than in the European Union<sup>53</sup> also point to culture factors, as does a previous report demonstrating greater sex

difference in the United States than in the Netherlands in physicians specifically.<sup>54</sup> It may be that cultural factors, both within the American medical community and in American society at large, contribute to disproportionate self-devaluation among women physicians in the United States. Further research is needed to better understand the drivers of this disparity.

The findings of the current study are limited because we are not able to determine causation with the cross-sectional data. In addition, missing limited demographic variables in the completely deidentified data limit our ability to assess the effects of variables such as age and race. Strengths of the current study include the relatively high response rate and the multicenter design including data from multiple centers, both of which increase confidence in the generalizability of our findings.

## CONCLUSION

Low self-valuation is associated with burnout and sleep-related impairment among physicians. Differences in self-valuation explain a large proportion of the difference in burnout between male and female physicians. Development and experimental design evaluation of interventions aimed at improving physician self-valuation may be an important next step in preventing and treating physician burnout, reducing sex disparities in physician burnout, and improving physician well-being. Potentially effective interventions may target either harsh reactions to personal errors and imperfections or deferment of self-care, or both of these components of self-valuation.

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## SUPPLEMENTAL ONLINE MATERIAL

Supplemental material can be found online at <http://www.mayoclinicproceedings.org>. Supplemental material attached to journal articles has not been edited, and the authors take responsibility for the accuracy of all data.

**Abbreviations and Acronyms:** PFI = Stanford Professional Fulfillment Index; PROMIS = Patient-Reported Outcomes Measurement Information System; PWAC = Physician Wellness Academic Consortium; ROC = receiver operating characteristic

**Potential Competing Interests:** Dr Bohman receives occasional honoraria for talks provided at various health care organizations. Dr Trockel receives occasional honoraria to give talks on physician well-being. Dr Shanafelt is co-inventor of an assessment tool measuring physician well-being and receives royalty income from Mayo Clinic, which holds the copyright to the tool and has licensed it for commercial use; and receives honorarium for presenting grand rounds and lectures and advises health care organizations on physician and health care professional well-being. The other authors report no competing interests.

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