

## The Association of Hobbies and Leisure Activities with Physician Burnout and Disengagement

Yan Li, MD<sup>1</sup>, Cindy Y. Lai, MD, PhD<sup>2</sup>, Bill Friedrich, MA<sup>3</sup>, Chenxing Liu, PhD<sup>4</sup>, Joel Popkin, MD<sup>2\*</sup>

### ABSTRACT

**Introduction:** Burnout among physicians is a worldwide burden. While many causes of physician stress have been reported, we have found few quantitative studies of associations between burnout and participation in hobbies and interests outside of medicine. Our objective was to determine if health care professional burnout/disengagement could be mitigated by incorporating leisure interests and to characterize which specific interests, if any, are most significantly related.

**Methods:** We conducted an online survey of 2,563 US-based physicians and 512 residents/fellows and queried their participation in a list of 117 individual hobbies, which we then further categorized into three perceived levels of social interactivity: 36 as “social,” 47 “isolated,” and 34 “indeterminate.” We utilized the Oldenburg Burnout Inventory to quantitate burnout and disengagement.

In each of our 15 major categories of hobbies, burnout was significantly lower in those who were active in that category compared with those who were not ( $p \leq 0.02$ ) or who had given up certain hobbies ( $p \leq 0.03$ ). The highest levels of burnout were associated with discontinuance of hobbies, directly proportional to the number of hobbies given up. Across all demographic groups, lower burnout and disengagement levels were associated with a higher number of active hobbies and leisure activities. The least burnout and disengagement were associated with the subsets we defined as the most “social.” Specifically, despite being among the favorite hobbies by the majority of respondents, listening to music, home-based watching of TV and movies, and use of internet and video games were associated with the highest level of exhaustion.

**Results:** Significant differences were seen across age groups, genders, and physician specialties in the level of burnout ( $p < 0.01$ ,  $p < 0.01$ ,  $p = 0.02$ , respectively) and job disengagement ( $p < 0.01$ ,  $p = 0.02$ ,  $p < 0.01$ , respectively). Younger providers (age < 60) and women had higher levels of burnout. Trainees had higher levels of burnout than full time, part time or retired physicians. North American graduates reported a slightly higher rate of burnout and disengagement than international graduates. 93.9% of physicians viewed outside interests as a substantial mitigation factor for burnout and disengagement.

**Conclusion:** Our study identified associations rather than causality. Nevertheless, emphasizing hobbies and non-medical outside interests might well prove useful to temper epidemic burnout among healthcare professionals. We especially encourage those hobbies with stronger social underpinnings.

<https://doi.org/10.55504/2578-9333.1160>

Received Date: July 30, 2022  
Revised Date: Jan 19, 2023  
Accepted Date: June 6, 2023  
Publication Date: Aug 8, 2023

Website: <https://ir.library.louisville.edu/jwellness/>

Recommended Citation: Li, Yan; Lai, Cindy Y.; Friedrich, Bill; Liu, Chenxing; and Popkin, Joel (2023) "The Association of Hobbies and Leisure Activities with Physician Burnout and Disengagement," *Journal of Wellness*: Vol. 5: Iss. 1, Article 8.

Affiliations: <sup>1</sup>Cheshire Medical Center, Dept. of Rheumatology, <sup>2</sup>St. Vincent Hospital, Dept. of Medicine, <sup>3</sup>Mondo International, LLC, <sup>4</sup>University of Pittsburgh, Department of Human Genetics



*“Do not become too deeply absorbed in your profession to exclude all outside interests. No matter what it is, have an outside hobby. When tired of anatomy refresh your minds with Holmes, Keats, Shelley or Shakespeare [1].”*

– Sir William Osler

### INTRODUCTION

Clinician burnout dramatically impairs physicians and secondarily extends to their patients, peers, students, staff, and organizations [2–7]. The definition of burnout itself is

problematic; it has been variably characterized as emotional exhaustion, cynicism and detachment from work, as well as a sense of low personal achievement [8, 9]. Burnout is now internationally recognized in the ICD-11 (International Classification of Diseases, Eleventh Revision) as a condition “resulting from chronic workplace stress” and encompassing a constellation of exhaustion, cynicism, and reduced effectiveness [10].” The cost of this epidemic is in the billions of dollars [11], with an overall prevalence reported between 40–75%, even before COVID-19 universally devastated hospitals and private practices. In China the incidence of burnout is even higher, with a total prevalence of over 80% [12], while a report from India places that number at > 90% [13].

\*Correspondence To: Joel Popkin  
Email: [jpopkin6244@gmail.com](mailto:jpopkin6244@gmail.com)

Copyright: © 2023 The author(s). This is an open access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

In our study of the positive association of the effects of hobbies and leisure time on burnout, we found a subset of particular interest – the effect of socially oriented activities compared to more isolated leisure activities.

Although chronic stress is certainly a factor, burnout is not synonymous with stress. In a recent survey among 19,348 American College of Cardiology members, the number of cardiologists who reported feeling stressed actually declined from 49.5% in 2015 to 43.9% in 2019, but the number reporting burnout increased from 26.8% to 32% in that same period [14]. Much of the etiology has resulted from accelerating workloads enabled by progressive technology-based demands (e.g., the electronic health record) and the resulting distancing from patients, in addition to ever increasing bureaucratic tasks, regulation, information overload, long hours, lack of respect from administrators, and so on [2, 5, 7, 15–22].

While the majority of burnout research and proposals is devoted to systemic change, some investigators have also written about development of hobbies and interests for mitigating burnout and enhancing engagement [2, 22–31]—yet most have not focused on this potential form of relief. Sargent et al. [32], found that 58% of their respondents reported that devoting time at least weekly or more to hobbies and leisure activities resulted in less psychiatric morbidity, better marital relations, and, for faculty, less emotional exhaustion and improved levels of personal achievement. Oskrochi et al. [4] placed making time for hobbies on a list of “protective factors” for surgical residents. Sang Hee Kang et al. [21] reported that having hobbies significantly related to lower occupational stress for Korean surgeons, and Zwack and Schweitzer [33] characterized leisure-time activities in a study of 200 German physicians as among the major strategies that maintain resilience. These citations point to both the universality of burnout and the value of hobbies.

Extraordinary French philosopher, mathematician, physicist, inventor, and theologian, Blaise Pascal famously said: “All of humanity’s problems stem from man’s inability to sit quietly in a room alone. Pascal’s uncannily prescient statement, written in the 1600s, surely applies to the isolation forced upon us by COVID-19. In pre-COVID 2018 Surgeon General Vivek Murthy had already described a “loneliness epidemic [34],” in which nearly a quarter of physicians reported suicidal thoughts or even attempts [35]. During the COVID-19 era, with an intensely proliferated risk of seclusion to its psychosocial/medical/economic aspects [36–42], we ask: When in modern times has humanity ever been this globally isolated?

We are aware of only one major research work on the specific effect of a wide-ranging variety of hobbies and interests: in 2011 McManus et al. [43] conducted an exhaustive UK study. They concluded that avocation (leisure activities) positively correlated with engagement and vocation, but did not correlate with burnout. With the escalating crush of burnout, we are revisiting – a decade later and from across the pond – the relationship between burnout and engagement vs. hobbies/interests. We use the terms burnout and exhaustion interchangeably. Likewise, despite minor differences, we equate hobbies, non-work interests, and leisure time.

## METHODS

### Study Population

From June to August 2018, an online questionnaire was sent to 23,316 practicing physicians and 2,065 residents and fellows; medical students were not included in this study. Participants were unpaid US-based members of the M3 Global Research healthcare practitioner panel. All panel members are validated yearly and have opted in to participate in market research studies. Participants were randomly selected, with recipients receiving a reminder email in the weeks following the original email.

Aside from hobby-related information, demographic data is presented in **Table 1 (next page)**, including age, gender, practicing position, specialties, household settings, and job satisfaction.

### Ethical Considerations

The MetroWest Medical Center IRB deemed this study exempt from IRB oversight.

### Measurement of Burnout

Historically there have been multiple instruments developed for the assessment of burnout, with the Maslach Burnout Inventory the most widely used [44–51]. It is based on three dimensions of burnout – namely, emotional exhaustion, depersonalization and (reduced) personal accomplishment. However, some have raised concerns about similarities in the subscales as being framed in the same direction, criticized as possibly inferior to scales with both positively and negatively worded items [44–46, 49–51]. The Copenhagen Burnout Inventory has been only used in small samples of physicians and other health care providers, primarily outside of the United States [44, 51]. The Mayo Clinic Well Being Index does not assess engagement [44].

We employed the Oldenburg Burnout Inventory (OLBI) for our study (see Supplement Table 1, q8), which has been validated among diverse occupational groups in different continents as an alternative measurement of burnout [44–51]. With 16 questions, it assesses the two core dimensions of burnout—exhaustion and disengagement (from work) [44–46, 49–51] – utilizing both positively and negatively framed items. As exhaustion and engagement are two distinct aspects within the spectrum of burnout, a low level of exhaustion does not necessarily correlate with positive engagement at work. Thus, it is more advantageous to assess both aspects with the single instrument. The OLBI is also freely accessed online.

### Hobbies and Leisure Activities

Based on previous relevant studies, newsletters, surveys and internal discussions, we grouped 117 hobbies (Supplement Table 3, q16-32) into 15 major “categories” of activities (Supplement Table 3, q14). Examples of “categories” included team sports, individual sports, playing musical instruments, reading for pleasure, writing, and visual arts.

Respondents were asked to describe their personal activity status for each of the 15 categories in the last six months as “currently active,” “formerly active,” or “rarely/never participated.” Respondents then answered questions about individual hobbies within their selected categories. To minimize respondent

Table 1: Demographics

Sub-groups	N	Mean Exhaustion Score	p*	Mean Disengagement Score	P
<b>Age</b>			<0.01		<0.01
20 to 39 years	1312	2.42±0.44		2.25±0.45	
40 to 59 years	1254	2.42±0.47		2.32±0.48	
60 to 69 years	419	2.29±0.47		2.18±0.50	
≥70 years	90	2.05±0.50		1.97±0.44	
<b>Gender</b>			<0.01		0.02
Male	1966	2.34±0.46		2.25±0.49	
Female	1098	2.49±0.45		2.29±0.45	
<b>Ethnicity</b>			0.32		0.27
African-American	81	2.42±0.46		2.30±0.47	
Asian-American	554	2.39±0.46		2.29±0.45	
Caucasian	1978	2.38±0.47		2.25±0.48	
Hispanic/Latino/Latina	110	2.42±0.49		2.25±0.48	
Native American/ Alaskan Native	8	2.47±0.35		2.41±0.35	
Native Hawaiian/ Pacific Islander	12	2.56±0.36		2.45±0.36	
Multiracial	59	2.49±0.45		2.33±0.48	
<b>Marriage</b>			<0.01		0.03
Single	406	2.48±0.49		2.32±0.49	
Married	2317	2.37±0.46		2.25±0.47	
Unmarried/long-term relationship	139	2.46±0.46		2.28±0.51	
Divorced/separated	146	2.45±0.48		2.30±0.51	
Widowed	16	2.09±0.57		2.02±0.44	
Rather not state	51	2.37±0.38		2.22±0.44	
<b>Current Medical Position</b>			0.02		0.01
Full time	2295	2.39±0.46		2.28±0.47	
Part time/retired/administrative	268	2.35±0.48		2.26±0.47	
Resident/fellow	512	2.44±0.46		2.20±0.48	
<b>Medical School</b>			0.19		0.01
U.S./Canada	2653	2.40±0.46		2.27±0.47	
International	422	2.36±0.49		2.21±0.50	
<b>Current Practice Settings</b>			0.70		0.08
Private practice	1260	2.38±0.48		2.28±0.48	
Academic/teaching hospital	615	2.39±0.45		2.24±0.47	
Community hospital	430	2.41±0.45		2.31±0.46	
Public/community-based clinic	123	2.39±0.45		2.29±0.47	
Urgent care facility	37	2.41±0.47		2.36±0.46	
<b>Religion</b>			<0.01		<0.01
Yes	1420	2.35±0.47		2.23±0.49	
No	1655	2.42±0.46		2.29±0.46	
<b>Volunteer activities</b>			<0.01		<0.01
Yes	1474	2.33±0.47		2.21±0.48	
No	1601	2.44±0.45		2.31±0.47	

\* P value represents variation among all subgroups of each demographic feature

wear-out and keep the survey length to a manageable duration, each respondent answered questions about individual hobbies in only up to five of their currently active categories. Topics included the frequency of participation for individual hobbies. We also examined “high frequency participation” ( $\geq$  a few times per week) vs. “low frequency participation” ( $\leq$  a few times per month) to assess if participation frequency had an impact on work exhaustion or disengagement. Additionally, we asked those respondents who were no longer active in a hobby for the reasons for discontinued participation (Fig.6).

### Statistical analysis

The associations of demographic features and hobbies with exhaustion and disengagement were examined. The OLB score was analyzed as a continuous variable, with the mean exhaustion and disengagement scores calculated respectively. To enable interpretation of data from the bi-directional items, all positively phrased OLB questions were reverse-coded

for analysis. Thus, in our study every question with a higher Likert Scale (1-4) score relates to more exhaustion or more disengagement.

The differences of mean exhaustion and disengagement scores among variables were conducted by one-way analysis of variance (ANOVA). The differences of mean exhaustion and disengagement scores between each hobby (currently active, formerly active, rarely/never participated) were examined by a t-test, with  $p < 0.05$  considered statistically significant. All statistical analyses were performed with IBM SPSS statistics 22.0 software.

## RESULTS

A total of 2,563 physicians (11%) and 512 trainees (24.8%) returned the questionnaire. Respondents were geographically distributed roughly evenly from the Northeast, South, Midwest and West regions of the United States.

Table 2: Exhaustion and Disengagement Score Among Different Specialties

Rank Order based on Exhaustion	Specialty	N	Mean Exhaustion score	Rank Order based on Disengagement	Mean Disengagement score
1	Radiology	78	2.50	3	2.41
2	Nephrology	67	2.49	10	2.34
3	Rheumatology	25	2.49	9	2.34
4	Internal Medicine	164	2.47	5	2.38
5	Physiatry/Sports Medicine	56	2.46	2	2.49
6	Cardiothoracic surgery	16	2.45	20	2.23
7	Family/General Practice	208	2.45	8	2.34
8	Urology	66	2.42	4	2.40
9	Emergency Medicine	156	2.42	7	2.34
10	Neurology	56	2.42	18	2.24
11	Endocrinology	73	2.42	13	2.28
12	Anesthesiology	143	2.42	6	2.35
13	Ophthalmology	87	2.37	12	2.29
14	Pulmonology	70	2.37	26	2.18
15	Gastroenterology	108	2.36	15	2.24
16	Cardiology	94	2.36	21	2.23
17	Allergy	63	2.35	14	2.25
18	Obstetrics/Gynecology	132	2.35	17	2.24
19	Hematology/Oncology	19	2.35	16	2.24
20	Others	82	2.35	28	2.17
21	Infectious Disease	55	2.35	24	2.20
22	Neurosurgery	11	2.34	30	2.14
23	General Surgery	93	2.32	25	2.18
24	ENT	96	2.32	22	2.22
25	Pediatrics	159	2.32	29	2.17
26	Orthopedic Surgery	91	2.32	11	2.31
27	Psychiatry	88	2.30	19	2.24
28	Dermatology	82	2.28	23	2.20
29	Pathology	54	2.28	27	2.17
30	Critical care	40	2.26	31	2.07
31	Pediatric surgery	1	2.25	1	2.63

## Demographics

Exhaustion and disengagement levels showed significant differences among different age groups, genders and practicing positions ( $p < 0.01$ ,  $p < 0.01$ ,  $p = 0.02$ , respectively). By decade, trainees and physicians aged 20-59 had similar levels of exhaustion, higher than physicians 60-69, and in turn higher than those  $\geq 70$ . Female physicians had higher levels of exhaustion and minimally higher disengagement than males. International graduates reported slightly lower burnout and disengagement than US/Canadian graduates. Exhaustion and disengagement levels were similar among various cultural backgrounds. Religious/spiritual groups and volunteer activities, either medically or non-medically related, were associated with reduced exhaustion and disengagement.

Physicians in various practice settings reported similar exhaustion and disengagement levels, but they differed significantly among specialties ( $p = 0.02$ ). The five specialties associated with highest exhaustion level in our survey were Radiology, Nephrology, Rheumatology, Internal Medicine, and Physiatry/Sports Medicine; the five specialties associated with highest disengagement level were Physiatry/Sports Medicine, Radiology, Urology, Internal Medicine and Family/General Practice.

Subgroups having less than 10 respondents were excluded from analysis (Table 2).

## Physicians' Job-related Attitudes vs. Burnout and Disengagement (Fig. 1)

Physicians who had more frequent positive perspective of their jobs reported less exhaustion and disengagement, while 61.0% would likely choose medicine if they were to re-choose a career. The majority of physicians (93.9%) considered it as important or extremely important to have outside interests; 84.3% felt that outside interests helped relieve stress and prevent exhaustion at least to some extent, while 65.6% felt that outside interests enabled better engagement in their career.

## Time Spent With Family (Fig. 2)

Of the total respondents, 1,585 (51.5%) were able to spend daily quality time with family in the household and 1,323 (43.0%) reported spending quality time with friends and family outside the household a few times a month. The more quality time physicians spent with their family and friends, the less exhaustion and disengagement they reported.

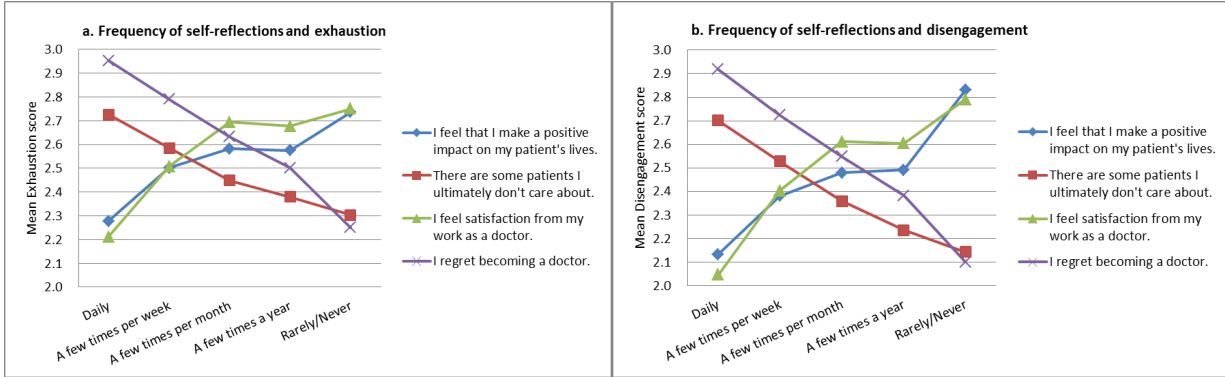


Figure 1: Frequency of Self-Reflections Re: Physician Attitudes

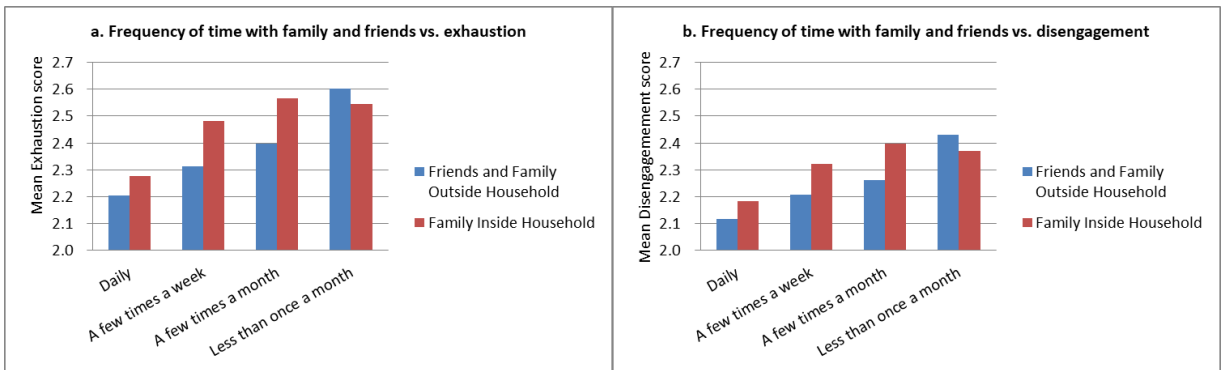


Figure 2: Exhaustion and Disengagement vs. Family Time

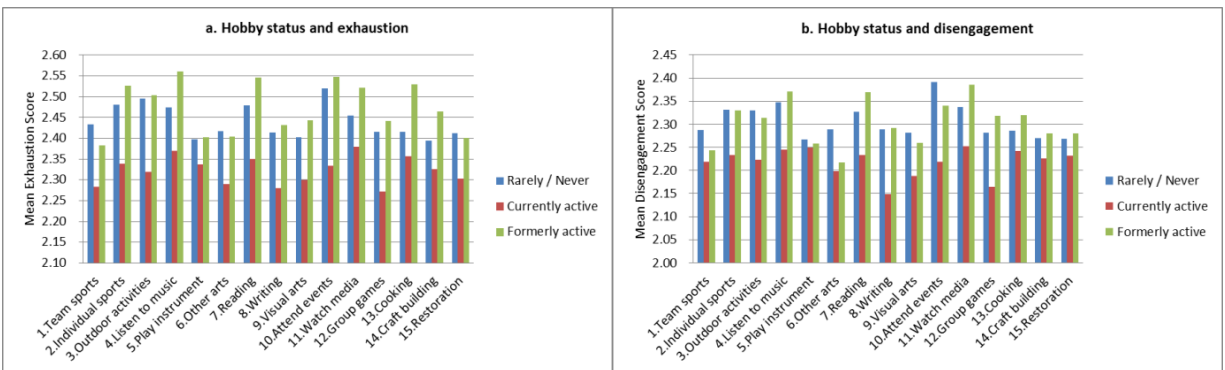


Figure 3: Activity Categories vs. Exhaustion and Disengagement

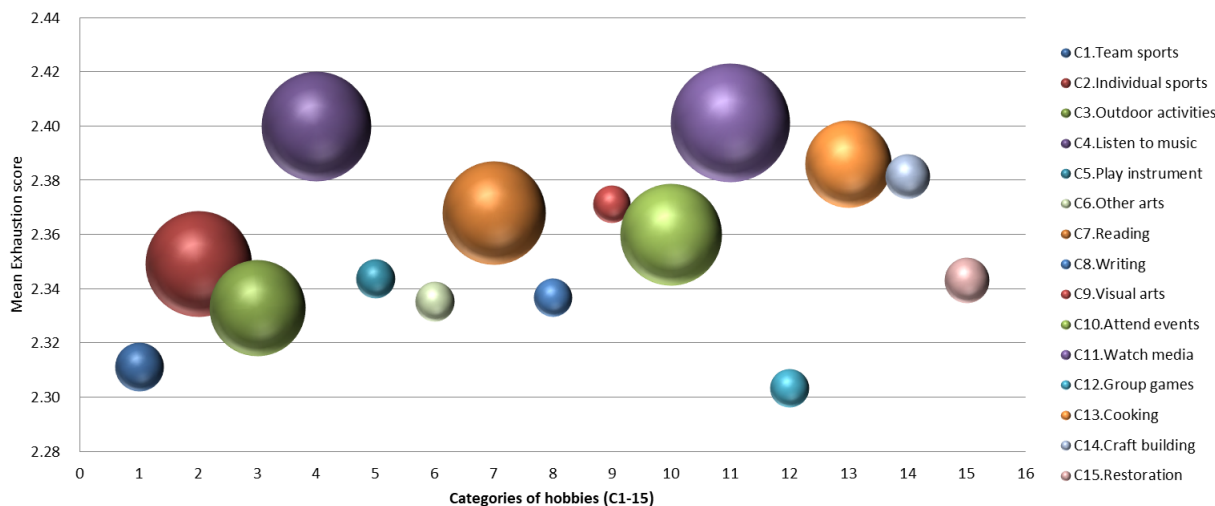


Figure 4: Association of Exhaustion and Active Hobby Categories

\*The bubble colors correspond to hobby categories, while the height represents burnout level (mean exhaustion score), and the size of the bubbles represents reported hobby frequency.

## Hobbies

### A. Status of hobbies associated with exhaustion and disengagement level (Fig. 3)

Across the 15 major categories of hobbies, exhaustion was significantly lower in physicians who had active hobbies compared with those who had no hobbies or had given up certain hobbies ( $p \leq 0.02$ ,  $p \leq 0.03$ , respectively). A similar trend was found in disengagement levels.

### B. Favorite hobbies and exhaustion level (Fig. 4)

Despite being among favorite hobbies by the majority of respondents, listening to music (C4) and watching TV, movies, internet, video games or other media at home (C11) are associated with the highest level of exhaustion. On the other hand, participating in team sports (C1) and group games/role play (C12) are associated with the lowest level of exhaustion.

### C. Numbers of active hobbies associated with exhaustion and disengagement level (Fig. 5)

With increasing numbers of active hobbies, respondents reported decreasing levels of exhaustion and disengagement. Conversely, the more hobbies given up, the higher levels of exhaustion and disengagement were reported. Similar trends were found in all demographic groups.

### D. Time spent on hobbies

Among 117 individual hobbies, more participants practiced their interests/hobbies a few times per month or less. An average of 64% practiced individual hobbies at low frequency ( $\leq$  a few times per month), while 32% practiced individual hobbies at high frequency ( $\geq$  a few times per week). The frequency of practicing hobbies did not impact on burnout or disengagement.

### E. Reasons for giving up hobbies (Fig. 6)

Among the 15 major categories of hobbies, participating in team sports ( $n = 683$ ), playing a musical instrument ( $n = 518$ ), outdoor activities ( $n = 399$ ) and playing individual sports or exercise ( $n = 390$ ) were the top hobbies previously enjoyed the most, but had given up. No longer having time was the dominant reason to give up hobbies.

## DISCUSSION

Despite well-grounded uncertainties about the prevalence of burnout due to the heterogeneity of definitions and assessment [9], concerns about physician burnout in one form or another have been articulated in the literature from more than 50 nations [2, 9, 12, 13, 15, 20, 21, 51, 33, 52–62].

We have examined the association of a set of physician hobby categories and subcategories with burnout and engagement. These two areas differ from each other, and indeed, McManus et al. [43] found that leisure activities correlated positively with engagement, although not so with burnout. As opposed to that work, however, our own findings show that both engagement and burnout are improved in association with hobbies and interests. But the variables are complex, and hobby categories are dissimilar across studies [13, 19, 63]. We found that women reported higher levels of burnout and disengagement than men, consistent with many reports globally [2–4, 6, 23]. We found, too, that trainees and physicians aged 20–59 experienced similar exhaustion, more pronounced than in physicians aged 60–69, and higher still than those  $\geq 70$ . But here the literature becomes much murkier, with descriptions of the greatest burnout among the youngest physicians  $\leq 40$  [21] or those 45–54 [5], or the lowest burnout (among women, at least) at age 50 [6]. An

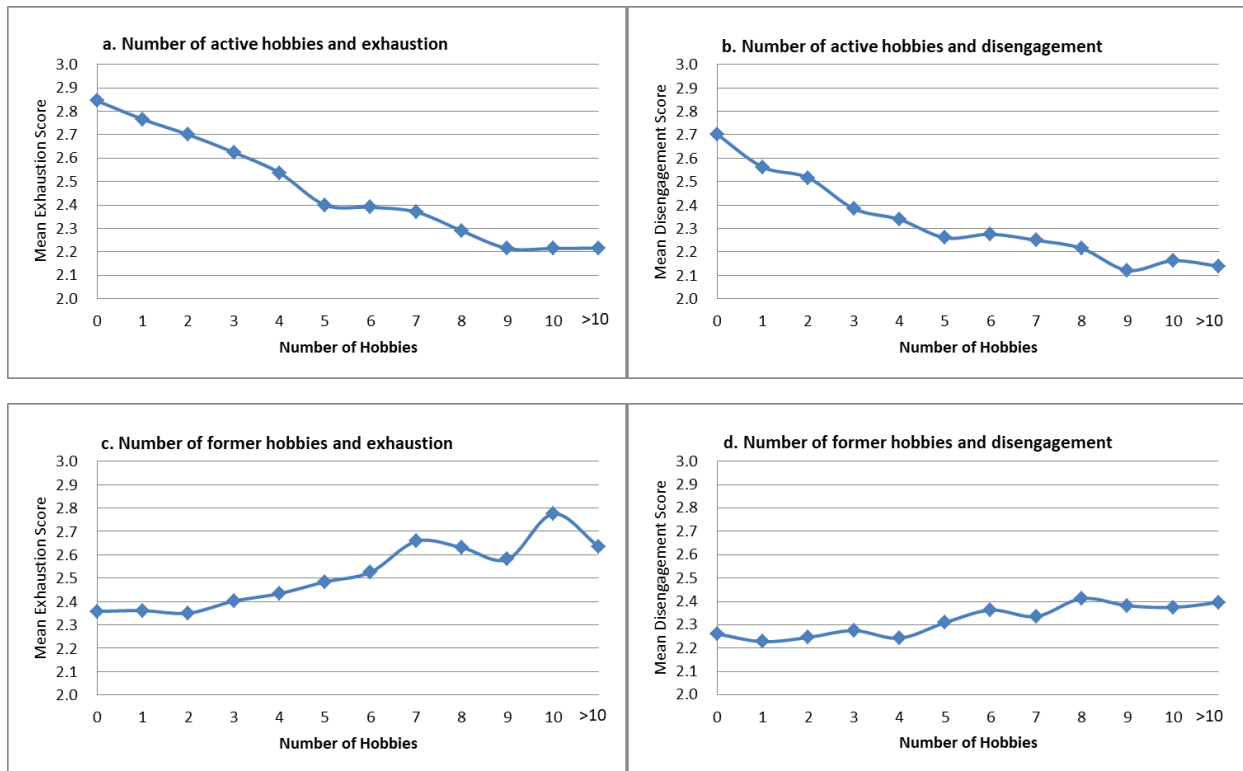


Figure 5: Association of Number of Active and Former Hobbies With Exhaustion and Disengagement

\* 5a and 5b: the burnout level and disengagement levels were negatively associated with the number of active hobbies.

\* 5c and 5d: the burnout level and disengagement levels were positively associated with the number of former (given-up) hobbies.

extensive meta-analysis of 182 studies of nearly 110,000 individuals in 45 countries concluded burnout by age simply cannot be reliably determined [9].

Additionally, we found the five highest levels of burnout in Radiology, Nephrology, Rheumatology, Internal Medicine, and Psychiatry/Sports Medicine. Three of those same specialties (Psychiatry/Sports Medicine, Radiology, Internal Medicine), were also among the highest levels of disengagement (Table 2). As for predictors of burnout, decreased leisure time and fewer years of practice were among the strongest factors among 209 transplant surgeons [27], while orthopedic surgeons reported hobbies were associated with less burnout [17]. It is unknown if there are specialty-specific factors that lead to higher rates of disengagement or burnout.

Our study results are consistent with many self-help articles that focus on positive attitudes as a major influence on happiness and energy. We found that a more positive work outlook correlates with both lower burnout and disengagement. Additionally, nearly 94% of physicians felt it was important or extremely important to have outside interests, 84% identified them as a stress reliever, and 66% as associated with better work-based engagement. Time spent with family and friends similarly lessens burnout and disengagement.

Among our 15 activity categories, physicians with ongoing active hobbies reported the least stress, with more stress associated with an absence of hobbies, and the most stress among those with discontinued hobbies. We found that the number

of active hobbies is inversely associated with exhaustion and disengagement, while increasingly giving up hobbies is directly associated – findings similar in all demographic groups (Fig 5). We also examined the amount of time spent on individual hobbies. Surprisingly, we found no difference in the association of hobby activity frequency with burnout and disengagement. The reasons for giving up hobbies (Fig. 6) were what one would expect—lack of time and loss of interest were the most frequent reasons cited. The time component would be consistent with busy professionals, and loss of interest may be due to time constraints or higher priority demands.

In addition to the previously described association of hobbies and leisure time with less burnout and less disengagement, when we assigned each of the 117 hobbies into categories of “social,” “isolated,” and “indeterminate,” we found that the average burnout with social hobbies was lower than either isolated or indeterminate hobbies, regardless of frequency. Music listening and home media entertainment (e.g., TV, Video games, internet, etc.) registered highest on the burnout scale of associated hobbies, but perhaps these findings reflect more of a compensatory mechanism secondary to levels of stress that initially led to the pursuits. Recent articles have addressed the potentially isolating nature of these passive digital-based activities [64]. Socialization in hobbies was not associated with disengagement.

Socialization is a remarkably powerful factor in mental and physical health, with loneliness and isolation linked to heart

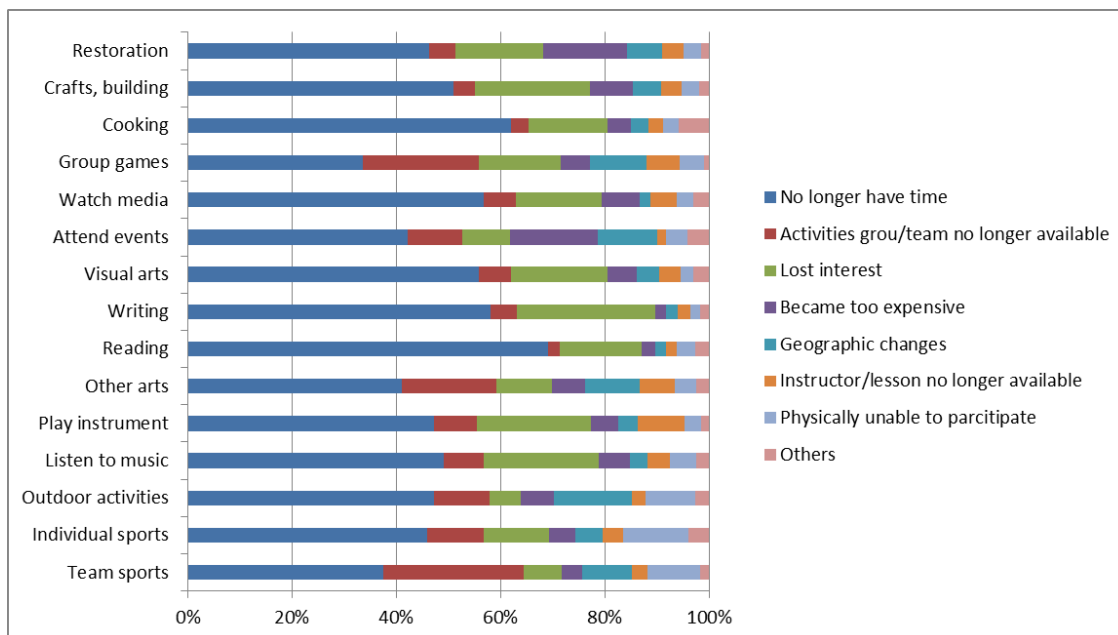


Figure 6: Reasons for Giving Up Hobbies and Leisure Activities

disease, cancer, depression, diabetes and suicide [53, 55, 62, 64–66]. In the supplement we have provided considerable background commentary and data regarding the importance of the socialization component of leisure interests in the mitigation of burnout [22, 33, 56, 58–60, 62, 67–70]. We discuss the history of burnout and fundamental concepts [71] and mechanisms of caring for the provider as well as the complex relationships between depression and burnout [1, 24, 72–75]. We caution administrators who might excuse systemic causes of burnout as due to lack of focus on the kinds of self-care that hobbies and leisure interests can enhance. Finally, we point out some potential downsides of leisure interests, when excess pursuit of “balance” in life and intense involvement in hobbies can itself become a contributing factor to burnout [76].

Regarding physician burnout, Drs. Fralick and Flegel ask, “Who will protect us from ourselves [77]?” With the recommendation from Fancourt et al. for “social prescribing [62],” it seems time to seriously reflect on the benefits of social involvement and constructive hobbies.

## LIMITATIONS

The usual limitations imposed by cohort studies apply to this work, so the issue of causality vs. association is something we cannot avoid. Likewise, the determination of clinical significance in light of modest statistical significance is a frequent source of ambiguity. While on an individual basis our data may not necessarily seem clinically meaningful, considering that burnout and disengagement are epidemic in medicine, conclusions applied to this large population should be considered seriously, but may be restricted in application. Although some of the lay population studies require extrapolation to physicians, we think there is no reason to regard physicians as significantly different in psychosocial needs and risks. An obvious concern

in attempting to extract the effect of socialization and burnout is the determination/definition of social vs. isolated activities and any crossover. Another is the striking disparity of burnout in different geographic and ethnic groups. A relatively low response rate to the survey raises concern for generalizability, as do potential biases in online surveys, but we think that the relatively large absolute number of respondents confers support to our conclusions. Finally, limiting the itemizing of hobbies to a maximum of five, done to avoid the risk of a wearying survey, could potentially dilute the strength of conclusions.

## CONCLUSION

Observationally we have demonstrated that hobbies are proportionately associated with physician satisfaction, desire to stay in medicine, and the propensity to re-choose medicine as a career. In fact, the more hobbies the better, as our study shows an inverse relationship between number of activities and burnout/disengagement, and a direct relationship with number of hobbies given up.

In this study we further compartmentalized hobbies and leisure activities, so as to independently examine the association of those with social emphasis. We found that whether these activities are practiced at low or high frequency, social activity is associated with less burnout than more isolated pursuits. We did not find a significant additive socialization effect on disengagement, except for quality time spent with family and friends, which is inversely related to both burnout and disengagement.

Development of new hobbies is expected to be more difficult with aging, so we advocate exploring any potentially intriguing interests at the very first opportunity, as challenging as that might be. We believe that a prospective study of the effect of leisure activities among healthcare professionals is worthy of consideration and may show similar improvements in burnout



and disengagement that our cohort study suggests. Similarly designed investigations might well have application to other occupations.

As to our comments about the importance of hobbies and interests, we add this recommendation: Share them with family and friends.

**Acknowledgements:** The authors thank M3 Global Research, which generously donated the staff time to develop the questionnaire, field the study, and provide data and crosstab formatted for analysis. We also appreciate the considerate and sage editing advice from Anthony L. Esposito, MD, FACP, Department of Medicine, St. Vincent Hospital.

**Funding Source:** The author(s) received no specific funding for this work

**Conflicts of Interest:** The author(s) have no conflict of interest to declare for this work.

## REFERENCES

1. Reiling J. The Hobbies of Physicians. *JAMA* 100 Years Ago 2008; 300(9):1088.
2. National Academies Press (US). *Taking Action Against Clinician Burnout: A Systems Approach to Professional Well-Being*. Washington (DC); 2019.
3. Medscape National Physician Burnout. *Depression & Suicide Report 2019*. Medscape; 2019 [cited 2020 Mar 15]. Available from: URL: [www.medscape.com/slideshow/2019-lifestyle-burnoutdepression-6011056](http://www.medscape.com/slideshow/2019-lifestyle-burnoutdepression-6011056)
4. Oskrochi Y, Maruthappu M, Henriksson M, Davies AH, Shalhoub J. Beyond the body: A systematic review of the nonphysical effects of a surgical career. *Surgery*. 2016 Feb;159(2):650–64. <https://doi.org/10.1016/j.surg.2015.08.017> PMID:26431813
5. Yates SW. Physician Stress and Burnout. *Am J Med*. 2020 Feb;133(2):160–4. <https://doi.org/10.1016/j.amjmed.2019.08.034> PMID:31520624
6. Puffer JC, Knight HC, O'Neill TR, Rassolian M, Bazemore AW, Peterson LE, et al. Prevalence of Burnout in Board Certified Family Physicians. *J Am Board Fam Med*. 2017;30(2):125–6. <https://doi.org/10.3122/jabfm.2017.02.160295> PMID:28379817
7. Smith RP. Burnout in Obstetricians and Gynecologists. *Clin Obstet Gynecol*. 2019 Sep;62(3):405–12. <https://doi.org/10.1097/GRF.0000000000000441> PMID:30921003
8. Eckleberry-Hunt J, Kirkpatrick H, Barbera T. The Problems With Burnout Research. *Acad Med*. 2018 Mar;93(3):367–70. <https://doi.org/10.1097/ACM.0000000000001890> PMID:28817432
9. Rotenstein LS, Torre M, Ramos MA, Rosales RC, Guille C, Sen S, et al. Prevalence of Burnout Among Physicians: A Systematic Review. *JAMA*. 2018 Sep;320(11):1131–50. <https://doi.org/10.1001/jama.2018.12777> PMID:30326495
10. ICD-11 for Mortality and Morbidity Statistics. Available from: URL: <https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/129180281> [cited 2020 Mar 15].
11. Han S, Shanafelt TD, Sinsky CA, Awad KM, Dyrbye LN, Fiscus LC, et al. Estimating the Attributable Cost of Physician Burnout in the United States. *Ann Intern Med*. 2019 Jun;170(11):784–90. <https://doi.org/10.7326/M18-1422> PMID:31132791
12. Zheng Q, Yang K, Wang X, Ou Z, Su X, Zhang J, et al. Burnout among doctors in China through 2018: A protocol of systematic review and meta-analysis. *Medicine (Baltimore)*. 2019 Sep;98(37):e17117. <https://doi.org/10.1097/MD.00000000000017117> PMID:31517849
13. Grover S, Sahoo S, Bhalla A, Avasthi A. Psychological problems and burnout among medical professionals of a tertiary care hospital of North India: A cross-sectional study. *Indian J Psychiatry*. 2018;60(2):175–88. [https://doi.org/10.4103/psychiatry.IndianJPsychiatry\\_254\\_17](https://doi.org/10.4103/psychiatry.IndianJPsychiatry_254_17) PMID:30166673
14. Wendling P. More Than 1 in 3 Cardiologists Burned Out, Many Ready to Bolt. *Medscape*; 2020 [cited 2020 Mar 29]. Available from: URL: [https://www.medscape.com/viewarticle/927715#vp\\_2](https://www.medscape.com/viewarticle/927715#vp_2)
15. Kuhn CM, Flanagan EM. Self-care as a professional imperative: physician burnout, depression, and suicide. *Can J Anaesth*. 2017 Feb;64(2):158–68. <https://doi.org/10.1007/s12630-016-0781-0> PMID:27910035
16. Kroth PJ, Morioka-Douglas N, Veres S, Babbott S, Poplau S, Qeadan F, et al. Association of Electronic Health Record Design and Use Factors With Clinician Stress and Burnout. *JAMA Netw Open*. 2019 Aug;2(8):e199609. <https://doi.org/10.1001/jamanetworkopen.2019.9609> PMID:31418810
17. Sargent MC, Sotile W, Sotile MO, Rubash H, Barrack RL. Stress and coping among orthopaedic surgery residents and faculty. *J Bone Joint Surg Am*. 2004 Jul;86(7):1579–86. <https://doi.org/10.2106/00004623-200407000-00032> PMID:15252111
18. Schwenk TL. Physician Well-being and the Regenerative Power of Caring. *JAMA*. 2018 Apr;319(15):1543–4. <https://doi.org/10.1001/jama.2018.1539> PMID:29596590
19. Peckham C. *Medscape Physician Lifestyle Report 2015*. Medscape; 2015 [cited 2020 Mar 13]. Available from: URL: <https://www.medscape.com/slideshow/lifestyle-2015-overview-6006535#2>
20. Park C, Lee YJ, Hong M, Jung CH, Synn Y, Kwack YS, et al. A Multicenter Study Investigating Empathy and Burnout Characteristics in Medical Residents with Various Specialties. *J Korean Med Sci*. 2016 Apr;31(4):590–7. <https://doi.org/10.3346/jkms.2016.31.4.590> PMID:27051244
21. Kang SH, Boo YJ, Lee JS, Han HJ, Jung CW, Kim CS. High occupational stress and low career satisfaction of Korean surgeons. *J Korean Med Sci*. 2015 Feb;30(2):133–9. <https://doi.org/10.3346/jkms.2015.30.2.133> PMID:25653482
22. *Physician Burnout: The Root of the Problem and the Path to Solutions.*: A collection of original content from NEJM Catalyst. 2017.
23. Shanafelt TD, Noseworthy JH. Executive Leadership and Physician Well-being: Nine Organizational Strategies to Promote Engagement and Reduce Burnout. *Mayo Clin Proc*. 2017 Jan;92(1):129–46. <https://doi.org/10.1016/j.mayocp.2016.10.004> PMID:27871627
24. Smith RP. Throw Out a Lifeline, Someone Is Drifting

- Away: It Takes a Village to Combat Burnout. *Obstet Gynecol.* 2017 Oct;130(4):862–4. <https://doi.org/10.1097/AOG.0000000000002206> PMID:28885432
25. Rothenberger DA. Physician Burnout and Well-Being: A Systematic Review and Framework for Action. *Dis Colon Rectum.* 2017 Jun;60(6):567–76. <https://doi.org/10.1097/DCR.0000000000000844> PMID:28481850
  26. Miyasaki JM, Rheaume C, Gulya L, Ellenstein A, Schwarz HB, Vidic TR, et al. Qualitative study of burnout, career satisfaction, and well-being among US neurologists in 2016. *Neurology.* 2017 Oct;89(16):1730–8. <https://doi.org/10.1212/WNL.0000000000004526> PMID:28931640
  27. Bertges Yost W, Eshelman A, Raoufi M, Abouljoud MS. A national study of burnout among American transplant surgeons. *Transplant Proc.* 2005 Mar;37(2):1399–401. <https://doi.org/10.1016/j.transproceed.2005.01.055> PMID:15848732
  28. Meldrum H. Exemplary physicians' strategies for avoiding burnout. *Health Care Manag (Frederick).* 2010;29(4):324–31. <https://doi.org/10.1097/HCM.0b013e3181fa037a> PMID:21045584
  29. Ratanawongsa N, Wright SM, Carrese JA. Well-being in residency: a time for temporary imbalance? *Med Educ.* 2007 Mar;41(3):273–80. <https://doi.org/10.1111/j.1365-2929.2007.02687.x> PMID:17316212
  30. LaFaver K, Miyasaki JM, Keran CM, Rheaume C, Gulya L, Levin KH, et al. Age and sex differences in burnout, career satisfaction, and well-being in US neurologists. *Neurology.* 2018 Nov;91(20):e1928–41. <https://doi.org/10.1212/WNL.0000000000006497> PMID:30305448
  31. Perez GK, Haime V, Jackson V, Chittenden E, Mehta DH, Park ER. Promoting resiliency among palliative care clinicians: stressors, coping strategies, and training needs. *J Palliat Med.* 2015 Apr;18(4):332–7. <https://doi.org/10.1089/jpm.2014.0221> PMID:25715108
  32. Sargent MC, Sotile W, Sotile MO, Rubash H, Barrack RL. Quality of life during orthopaedic training and academic practice. Part 1: orthopaedic surgery residents and faculty. *J Bone Joint Surg Am.* 2009 Oct;91(10):2395–405. <https://doi.org/10.2106/JBJS.H.00665> PMID:19797575
  33. Zwack J, Schweitzer J. If every fifth physician is affected by burnout, what about the other four? Resilience strategies of experienced physicians. *Acad Med.* 2013 Mar;88(3):382–9. <https://doi.org/10.1097/ACM.0b013e318281696b> PMID:23348093
  34. Schawbel D. Vivek Murthy: How To Solve The Work Loneliness Epidemic. *Forbes* 2017 Oct 7 [cited 2020 Mar 12]. Available from: URL: <https://www.forbes.com/sites/danschawbel/2017/10/07/vivek-murthy-how-to-solve-the-work-loneliness-epidemic-at-work/?sh=748ae2997172>
  35. Kane L. Medscape National Physician Burnout & Suicide Report 2020: The Generational Divide. *Medscape*; 2020 [cited 2020 Mar 15]. Available from: URL: <https://www.medscape.com/slideshow/2020-lifestyle-burnout-6012460#1>
  36. Banerjee D, Rai M. Social isolation in Covid-19: the impact of loneliness. *Int J Soc Psychiatry.* 2020 Sep;66(6):525–7. <https://doi.org/10.1177/0020764020922269> PMID:32349580
  37. Killgore WD, Cloonan SA, Taylor EC, Dailey NS. Loneliness: A signature mental health concern in the era of COVID-19. *Psychiatry Res.* 2020 Aug;290:113117. <https://doi.org/10.1016/j.psychres.2020.113117> PMID:32480121
  38. Brooke J, Jackson D. Older people and COVID-19: Isolation, risk and ageism. *J Clin Nurs.* 2020 Jul;29(13-14):2044–6. <https://doi.org/10.1111/jocn.15274> PMID:32239784
  39. Sepúlveda-Loyola W, Rodríguez-Sánchez I, Pérez-Rodríguez P, Ganz F, Torralba R, Oliveira DV, et al. Impact of Social Isolation Due to COVID-19 on Health in Older People: Mental and Physical Effects and Recommendations. *J Nutr Health Aging.* 2020;24(9):938–47. <https://doi.org/10.1007/s12603-020-1500-7> PMID:33155618
  40. Berg-Weger M, Morley JE. Editorial: Loneliness and Social Isolation in Older Adults during the COVID-19 Pandemic: Implications for Gerontological Social Work. *J Nutr Health Aging.* 2020;24(5):456–8. <https://doi.org/10.1007/s12603-020-1366-8> PMID:32346678
  41. Nicola M, Alsaifi Z, Sohrabi C, Kerwan A, Al-Jabir A, Iosifidis C, et al. The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *Int J Surg.* 2020 Jun;78:185–93. <https://doi.org/10.1016/j.ijssu.2020.04.018> PMID:32305533
  42. Peçanha T, Goessler KF, Roschel H, Gualano B. Social isolation during the COVID-19 pandemic can increase physical inactivity and the global burden of cardiovascular disease. *Am J Physiol Heart Circ Physiol.* 2020 Jun;318(6):H1441–6. <https://doi.org/10.1152/ajpheart.00268.2020> PMID:32412779
  43. McManus IC, Jonvik H, Richards P, Paice E. Vocation and avocation: leisure activities correlate with professional engagement, but not burnout, in a cross-sectional survey of UK doctors. *BMC Med.* 2011 Aug;9(1):100. <https://doi.org/10.1186/1741-7015-9-100> PMID:21878123
  44. Valid and Reliable Survey Instruments to Measure Burnout, Well-Being, and Other Work-Related Dimension. National Academy of Medicine [cited 2020 Mar 22]. Available from: URL: <https://nam.edu/valid-reliable-survey-instruments-measure-burnout-well-work-related-dimensions/>
  45. Demerouti E, Bakker A. The Oldenburg Burnout Inventory: A good alternative to measure burnout and engagement; 2008.
  46. Sinalva J, Queirós C, Pasian S, Marôco J. Transcultural Adaptation of the Oldenburg Burnout Inventory (OLBI) for Brazil and Portugal. *Front Psychol.* 2019 Mar;10:338. <https://doi.org/10.3389/fpsyg.2019.00338> PMID:30914985
  47. Dolan ED, Mohr D, Lempa M, Joos S, Fihn SD, Nelson KM, et al. Using a single item to measure burnout in primary care staff: a psychometric evaluation. *J Gen Intern Med.* 2015 May;30(5):582–7. <https://doi.org/10.1007/s11606-014-3112-6> PMID:25451989
  48. Seppälä P, Mauno S, Feldt T, Hakanen JJ, Kinnunen U, Tolvanen A, et al. The Construct Validity of the Utrecht Work Engagement Scale: Multisample and Longitudinal Evidence. *J Happiness Stud.* 2009;10(4):459–81. <https://doi.org/10.1007/s10902-008-9100-y>.

49. Demerouti E, Mostert K, Bakker AB. Burnout and work engagement: a thorough investigation of the independence of both constructs. *J Occup Health Psychol.* 2010 Jul;15(3):209–22. <https://doi.org/10.1037/a0019408> PMID:20604629
50. Dyrbye LN, Meyers D, Ripp J, Dalal N, Bird SB, Sen S. A Pragmatic Approach for Organizations to Measure Health Care Professional Well-Being. *National Academy of Medicine*; 2018. <https://doi.org/10.31478/201810b>.
51. Lee YY, Medford AR, Halim AS. Burnout in physicians. *J R Coll Physicians Edinb.* 2015;45(2):104–7. <https://doi.org/10.4997/JRCPE.2015.203> PMID:26181523
52. Fancourt D, Finn S. What is the evidence on the role of the arts in improving health and well-being? A scoping review. *Copenhagen*; 2019.
53. Merom D, Ding D, Stamatakis E. Dancing Participation and Cardiovascular Disease Mortality: A Pooled Analysis of 11 Population-Based British Cohorts. *Am J Prev Med.* 2016 Jun;50(6):756–60. <https://doi.org/10.1016/j.amepre.2016.01.004> PMID:26944521
54. Peckham C. *Medscape Lifestyle Report 2017: Race and Ethnicity, Bias and Burnout.* Medscape; 2017 [cited 2019 Mar 15]. Available from: URL: <https://www.medscape.com/features/slideshow/lifestyle/2017/overview>
55. Schnohr P, O’Keefe JH, Holtermann A, Lavie CJ, Lange P, Jensen GB, et al. Various Leisure-Time Physical Activities Associated With Widely Divergent Life Expectancies: The Copenhagen City Heart Study. *Mayo Clin Proc.* 2018 Dec;93(12):1775–85. <https://doi.org/10.1016/j.mayocp.2018.06.025> PMID:30193744
56. Kanamori S, Kai Y, Aida J, Kondo K, Kawachi I, Hirai H, et al.; JAGES Group. Social participation and the prevention of functional disability in older Japanese: the JAGES cohort study. *PLoS One.* 2014 Jun;9(6):e99638. <https://doi.org/10.1371/journal.pone.0099638> PMID:24923270
57. Tomioka K, Kurumatani N, Saeki K. The differential effects of type and frequency of social participation on IADL declines of older people. *PLoS One.* 2018 Nov;13(11):e0207426. <https://doi.org/10.1371/journal.pone.0207426> PMID:30462711
58. Hirosaki M, Ishimoto Y, Kasahara Y, Kimura Y, Konno A, Sakamoto R, et al. Community-dwelling elderly Japanese people with hobbies are healthier than those lacking hobbies. *J Am Geriatr Soc.* 2009 Jun;57(6):1132–3. <https://doi.org/10.1111/j.1532-5415.2009.02291.x> PMID:19490259
59. Tomioka K, Kurumatani N, Hosoi H. Relationship of Having Hobbies and a Purpose in Life With Mortality, Activities of Daily Living, and Instrumental Activities of Daily Living Among Community-Dwelling Elderly Adults. *J Epidemiol.* 2016 Jul;26(7):361–70. <https://doi.org/10.2188/jea.JE20150153> PMID:26947954
60. Theorell T, Nyberg A. Cultural activity at work: reciprocal associations with depressive symptoms in employees. *Int Arch Occup Environ Health.* 2019 Nov;92(8):1131–7. <https://doi.org/10.1007/s00420-019-01452-1> PMID:31187202
61. Bianchi R, Schonfeld IS, Laurent E. Burnout-depression overlap: a review. *Clin Psychol Rev.* 2015 Mar;36:28–41. <https://doi.org/10.1016/j.cpr.2015.01.004> PMID:25638755
62. Fancourt D, Opher S, de Oliveira C. Fixed-Effects Analyses of Time-Varying Associations between Hobbies and Depression in a Longitudinal Cohort Study: Support for Social Prescribing? *Psychother Psychosom.* 2020;89(2):111–3. <https://doi.org/10.1159/000503571> PMID:31658464
63. 2014 Work/Life Profiles of Today’s U.S. Physician. AMA Insurance Agency; 2014 [cited 2019 Mar 20]. Available from: URL: <https://www.amainsure.com/physicians-in-focus/report-work-life-profiles/>
64. Klinenberg E. Is Loneliness a Health Epidemic? *The New York Times* February 9, 2018 [cited 2019 Mar 20]. Available from: URL: <https://www.nytimes.com/2018/02/09/opinion/sunday/loneliness-health.html>
65. Holt-Lunstad J, Smith TB, Baker M, Harris T, Stephenson D. Loneliness and social isolation as risk factors for mortality: a meta-analytic review. *Perspect Psychol Sci.* 2015 Mar;10(2):227–37. <https://doi.org/10.1177/1745691614568352> PMID:25910392
66. Southwick SM, Southwick FS. The Loss of Social Connectedness as a Major Contributor to Physician Burnout: Applying Organizational and Teamwork Principles for Prevention and Recovery. *JAMA Psychiatry.* 2020 May;77(5):449–50. <https://doi.org/10.1001/jamapsychiatry.2019.4800> PMID:32074385
67. Løkken B. Are playing instruments, singing or creating theatre good for health? Associations with self-related health and all-cause mortality in the HUNT3 Study (2006–08), Norway: bente Løkken. *Eur J Public Health.* 2017;27(3 suppl\_3). <https://doi.org/10.1093/eurpub/ckx187.543>.
68. Gold KJ, Sen A, Schwenk TL. Details on suicide among US physicians: data from the National Violent Death Reporting System. *Gen Hosp Psychiatry.* 2013;35(1):45–9. <https://doi.org/10.1016/j.genhosppsy.2012.08.005> PMID:23123101
69. Freudenberger HJ. The staff burn-out syndrome in alternative institutions. *Psychotherapy (Chic).* 1975;12(1):73–82. <https://doi.org/10.1037/h0086411>.
70. Epstein RM, Privitera MR. Physician burnout is better conceptualised as depression - Authors’ reply. *Lancet.* 2017 Apr;389(10077):1398. [https://doi.org/10.1016/S0140-6736\(17\)30898-X](https://doi.org/10.1016/S0140-6736(17)30898-X) PMID:28402824
71. Dean W, Dean AC, Talbot SG. Why ‘Burnout’ Is the Wrong Term for Physician Suffering. *Medscape*; 2019. Available from: URL: <https://www.medscape.com/viewarticle/915097>
72. Wu T. In Praise of Mediocrity.: The pursuit of excellence has infiltrated and corrupted the world of leisure. *The New York Times* 2018 Sep 30 [cited 2019 Mar 20]. Available from: URL: <https://www.nytimes.com/2018/09/29/opinion/sunday/in-praise-of-mediocrity.html>
73. Stulberg B. Maybe We All Need a Little Less Balance. *The New York Times.* *The New York Times* 2017 Aug 22 [cited 2019 Mar 20]. Available from: URL: <https://www.nytimes.com/2017/08/22/well/mind/maybe-we-all-need-a-little-less-balance.html>
74. Silverman E. Sharing and Healing Through Storytelling in Medicine. *JAMA Intern Med.* 2017 Oct;177(10):1409–10. <https://doi.org/10.1001/jamainternmed.2017.2996> PMID:28828470

75. Alfonso F 3rd. The long lost hobbies people around the world are revisiting during the coronavirus pandemic. CNN 2020 Apr 5 [cited 2020 Apr 5]. Available from: URL: <https://www.cnn.com/2020/04/05/world/old-hobbies-quarantine-coronavirus-wellness-trnd/index.html>
76. Schnohr P, O'Keefe JH, Marott JL, Lange P, Jensen GB. Dose of jogging and long-term mortality: the Copenhagen City Heart Study. *J Am Coll Cardiol*. 2015 Feb;65(5):411–9. <https://doi.org/10.1016/j.jacc.2014.11.023> PMID:25660917
77. Fralick M, Flegel K. Physician burnout: who will protect us from ourselves? *CMAJ*. 2014 Jul;186(10):731. <https://doi.org/10.1503/cmaj.140588> PMID:24890102

## Socialization and Leisure Interests: Extended Commentary

Dr. Vivek Murthy reports that loneliness and social isolation are “associated with a reduction in lifespan similar to that caused by smoking 15 cigarettes a day and even greater than that associated with obesity [34].” It should not be surprising, then, that mortality is 29% greater for those who feel socially isolated [64]. Much is known about the neurobiology of burnout as well, confirming that the loss of connectedness is directly connected to burnout[66]. It is unlikely coincidental that the systemic factors previously discussed – e.g., the universally present EHR, increasing work hours, productivity demands, colleague and patient meetings in digital format – are related to ever more isolation. Dafne et al. reported that moderate-intensity dancing reduced cardiovascular mortality more than light-intensity dancing or walking [53] but could not separate the psychosocial aspects. Schnohr et al. have found that various sports are associated with strikingly different associations with longevity, with the highest lifespans in sports with more social interactions [55].

These results, of course, require active participation and involvement. In the NEJM Catalyst event *Leadership: Translating Challenge to Success*, Tait Shanafelt talks about building firewalls to protect the needs in one’s personal life, including hobbies. “You have to have those spaces in the personal life where, no matter what, work will not intrude on it [22].” This was, in fact, addressed in the earlier noted study from Germany, in which 200 physicians were interviewed about hobbies as resilience strategies. In what could be a reply to the many physicians who report having no time for hobbies: “Respondents did not simply pursue hobbies when they had time to do so. Rather, they made sure to find the time they needed to pursue the hobbies that were important to them [33].”

Kanamori et al. prospectively studied 12,951 individuals  $\geq$  age 65 for 4 years, whose social participation was sorted into 8 categories[56]. They confirmed past studies that demonstrated the risk of functional disability declined significantly with social participation, and in their study, particularly in hobby, community, and sports groups, the risk declined proportionally to the number of groups in which the subjects took part.

From the Japanese literature we have also taken the liberty to utilize noteworthy measures of happiness among the lay public as surrogates for burnout in physicians. In a prospective study of “active aging,” Hirosaki et al. examined in the elderly population the effects of hobbies on ADLs, depression, and

quality of life [58]. They found that the 43% of the elderly Japanese population without hobbies had significantly higher scores in all categories of depression and lower scores in every category of ADLs, as well as frequency of laughter. Tomioka et al. prospectively confirmed prior work determining that the absence of hobbies and purpose in life was strikingly associated with increased mortality (hazard ratio 2.08) and declines in ADLs (OR 1.89)[59]. Having no hobbies may be an even more potent risk factor than the absence of purpose in life.

Prospective studies have shown that regular participation in cultural activities in the non-medical world may be protective against worsening depression and could reduce morbidity and mortality [60]. Theorell and Nyberg also write that depression in its own right can cause decreased cultural activity, and speculated that if this leads to lower levels of hobby activity, it could signal a self-perpetuating and interwoven problem. Indeed, Løkken has demonstrated that music, singing and theater participation increases self-rated health in women and decreases all-cause mortality for men [67]. It seems reasonable to surmise that physicians would achieve similar benefits from nonwork-related activities.

Depression as a surrogate indicator of burnout has long evoked controversy. There are many difficulties in even diagnosing depression and burnout among physicians, and the many barriers in treatment of physician mental health include the stigmata particularly dreaded by this group [68]. Overlap with depression has been debated since the construct of burnout was introduced in the 70s by Freudenberg [61, 69], and although some authorities feel that depression and burnout are the same, it now seems clear that overlap is indeed the case [70]. There is a more practical aspect to considering the overlap between depression and burnout as well. Undoubtedly, physicians will likely be more willing to request help to handle an institutional problem if they are not to be stigmatized with the label of mental illness. [70]

Granting validity of a crossover between depression and burnout as well as basic psychosocial similarities between the population at large and physicians in particular, Fancourt et al. provide us prospective data for our recommendation. They have recently published a fascinating and uniquely dynamic study of hobbies and depression of 8,780 adults aged 52-99 [62]. Their work details the effects of changes of hobby pursuits

over time, by having created an intervention simulation of participants who did not have a hobby. For those free of baseline depression, taking up a hobby was associated with 32% lower odds (OR 0.68, 95% CI 0.56-0.83) of developing it. For those with baseline depression, taking up a hobby was associated with 272% higher odds of recovering (OR 2.72, 95% CI 2.09-3.53), although their data did not include use of antidepressants and, unfortunately, was limited to nearly 98% whites [63].

Are there potential downsides to taking up hobbies and interests? Tim Wu's 2018 intriguing piece in *The New York Times* discusses maiming by leisure activities because of ever increasing pressures to achieve. [72]

*"Our 'hobbies,' if that's even the word for them anymore, have become too serious, too demanding, too much an occasion to become anxious about whether you are really the person you claim to be."* To which we might add, who but physicians could be more susceptible to misconstruing the very motive for hobbies?

Likewise, Brad Stulberg addresses the sometimes seemingly endless pursuits to be "balanced [73]," reminding us that "devoting equal proportions of time and energy to other areas of [our] life [could] have detracted from the formative experiences."

We are cautioned by The Copenhagen City Heart Study [76] that too much of a good thing may be detrimental. A prospective investigation followed 1098 healthy joggers and 3950 healthy non-joggers and found the lowest mortality among light joggers and a higher mortality of moderate and strenuous

joggers. In our study, at least, we did not find more time spent on hobbies to be associated with higher burnout or disengagement rates.

In a creative look at caring for the provider, Silverman describes a passion for storytelling: "The greater risk, however, is for the health care professional to appear superhuman by pretending to not feel grief, suffer from moral distress, laugh at work, or need rest. These emotions should be explored, not concealed... In this environment of physician burnout, storytelling may actually help to humanize the physician [74]."

Music has long been part of the caring process. From an anonymous article in 1908:

*"Billroth was a superb pianist; Strümpell is a clever violinist; many among our colleagues are excellent performers on musical instruments, and are all the better surgeons and physicians, for their genial and humanizing accomplishments, all the better qualified to comprehend the sufferings they must alleviate. [1]"*

Finally, it should be stated that administrators need to be especially mindful to avoid placing blame on providers for "inadequate" coping skills that invite burnout. Dean et al. [71] so wisely point out that this pseudo-culpability may be likened to "gaslighting" – i.e., system-induced self-doubt, rather than the system-inflicted "moral injury" that is truly responsible for these crises. In other words, hobbies and social interactions may help, but are not the solutions.