

## Associations Between Faculty Vitality and Burnout in the COVID-19 Era: the Experience of One Institution

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### ABSTRACT

**Introduction:** Faculty vitality is the ideal synergy between engaged faculty and mission-driven institutions that generates a fruitful environment for academic productivity, career satisfaction, and fulfillment of shared goals. The COVID-19 pandemic has introduced unprecedented disruptions to faculty vitality, with profound perturbations to individual and institutional support networks. However, the extent of this impact is unclear, as are strategies to mitigate loss of faculty vitality and prevent burnout.

**Methods:** We developed a survey instrument to evaluate the impact of COVID-19 on faculty vitality and burnout at a mid-sized, Midwestern academic institution affiliated with a university hospital. Survey items focused on individual and institutional factors that are predictive of faculty vitality, organized around themes of work-life integration, professional engagement, and institutional support. The survey also evaluated the impact of interventions implemented in response to the pandemic on faculty burnout.

**Results:** One hundred and thirty-eight clinical and basic science faculty participated in the survey. Female faculty are less satisfied with work-life integration since the onset of the pandemic. Almost all (98.2%) faculty respondents experienced detriments to their professional development, and 38% believed their research was affected. Faculty of color experienced more detrimental effects on their professional development. Self-reported burnout increased from 23.6% before to 44.8% after the pandemic. Burnout was associated with lack of career development opportunities, whereas career satisfaction and utilization of university support efforts were protective.

**Conclusion:** Faculty vitality has decreased since the pandemic began, but institutional support can mitigate these detrimental effects. Additional research on the efficacy of interventions to support female faculty, early-career researchers, and under-represented minorities in medicine is needed.

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### INTRODUCTION

Faculty vitality has been defined as “the synergy between high levels of satisfaction, productivity, and engagement that enables faculty to maximize professional success and achieve goals in concert with institutional goals” [1]. Though there is not a single unified model of factors underpinning faculty vitality, most experts agree it is predicated on the interaction of individual factors, such as self-efficacy, feelings of inclusion, and work-life integration; and institutional factors, such as workplace climate, access to promotion resources, and institutional support [1–4]. Ideal interplay between these factors generates a professional environment in which individuals are satisfied, committed, and capable of authentic engagement with their colleagues and their work. Strong faculty vitality is necessary to prevent burnout, loss in productivity, and faculty attrition [5]. However, in times of acute stress, faculty vitality must be consciously nurtured to maintain the integrity of the academic institution.

The COVID-19 pandemic has produced unprecedented

disruptions among academic institutions. The necessity of social distancing has forced changes to educational methods, the traditional office, and delivery of patient care [6, 7]. Due to workplace restrictions, travel bans, and staff furloughs, faculty have lost access to typical resources that are required for academic work and career advancement, such as conferences, research space, and collaborators [8]. These professional disruptions are likely compounded by home disruptions, such as financial stressors, increased caregiving burden, childcare changes, and confinement-related stress [9, 10]. Based on the above stressors and the experience during prior pandemics, the possibility of increased faculty burnout has been raised [11, 12]. However, it is unclear how faculty perceive these disruptions and how their experiences will impact faculty vitality.

As the pandemic has progressed, early evidence suggests that some subgroups of academic faculty have been disproportionately impacted. Potential effects of the pandemic on gender equality for academic faculty were raised early in the pandemic;

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women may be experiencing a disparate impact in their professional development [13, 14]. Junior faculty unable to produce the academic output needed for career advancement are also particularly at risk, which may precipitate an exodus of talent [15–17]. Intersectional impacts must also be considered.

Like other academic centers, our institution has experienced unprecedented disruptions due to the COVID-19 pandemic. In March 2020, our center established a COVID-19 Task Force to identify and mitigate the pandemic's impact on faculty vitality, with the goal of preventing faculty burnout. In response to specific faculty concerns and feedback, numerous support structures were implemented, including Task Force meetings, weekly town hall meetings, expanded mental health resources, free and confidential counseling, and virtual support groups.

We developed this survey as part of the COVID-19 Task Force's mission to preserve faculty vitality at our academic health center. Our goals were to characterize the pandemic's impacts on individual and institutional factors that support faculty vitality, screen for faculty burnout, and help identify potential protective factors for academic faculty. Additionally, we sought to investigate if any faculty group was disproportionately impacted and required additional support.

## METHODS

### Sample and Procedures

This was a cross-sectional, descriptive study conducted at a Midwestern university that evaluated how workplace changes made in response to the COVID-19 pandemic impacted medical school faculty's personal and professional lives. After a review of the literature around barriers to wellness and a discussion of expected challenges during the COVID-19 pandemic, a survey instrument was developed by content experts in physician wellness and faculty development using Nominal Group Technique [18]. Questions were adapted from validated tools that covered similar constructs when appropriate. The survey instrument was reviewed by an expert in survey methodology and trimmed to take approximately 10 minutes to complete prior to being inputted into Qualtrics and optimized for mobile usage. The survey instrument was then pilot tested by faculty representing different subgroups within the target population to test for face validity of the items. Several questions were reworded prior to finalizing the instrument (see **Appendix A** for final survey tool). The study was approved by the Saint Louis University Institutional Review Board, Protocol #31360.

The final survey instrument was distributed by email to the School of Medicine's 630 faculty under the auspices of the Office of Faculty Affairs. The faculty consists of roughly 10% research faculty, 70% white faculty, 251 females, 379 males, 170 full professors, 158 associate professors, and 281 assistant professors. Any member of the faculty was eligible to participate. All survey respondents voluntarily consented to participation, and no compensation was offered to respondents. The survey was distributed by email invitation to all basic and clinical faculty at Saint Louis University between September to November 2020 over an 8-week period, with 3 email reminders sent at 2 weeks, 4 weeks, and 6 weeks.

## Measures

### Work-life Integration Variables

Participants' perception of changes in work-life integration (WLI) since the beginning of the COVID-19 pandemic were assessed using an investigator-created set of six questions answered using a Likert scale. Each item assessed a unique aspect of the participants' work-life integration and were treated as single item measures of the following constructs: satisfaction with work-life balance, guilt about time spent working, guilt about time spent doing housework, productivity at work, feeling on track for promotion, and feeling satisfied with career.

### Time Use Variables

Change in time spent completing five daily living tasks was assessed in participants. Participants indicated on a seven-point Likert scale the amount of change in the hours spent completing daily living tasks since the start of the COVID-19 pandemic. Time change was assessed across five daily tasks which included: sleeping, doing housework, caring for others, working, and in leisure activities. Each task was assessed as an independent construct.

### Professional Development

Participants were provided an investigator-created list of potential areas in their professional development that could have been negatively impacted due to the changes made in the workplace in response to COVID-19. Participants were asked to select all areas that they felt had been detrimentally impacted. Scores were created for each participant by totaling the number of areas they felt were detrimentally impacted, with scores ranging from 0 to 5.

If a participant indicated that they felt that their research/publications had been detrimentally impacted, they were asked to indicate on a second investigator created list all the areas in which they felt their research was negatively impacted. Scores were created for each participant who completed the second list by totaling the number of areas selected, with possible scores ranging from 0-10.

### Support Resources

Participants were provided with a list of university sponsored support resources and were asked to indicate how many they felt were helpful in dealing with the changes caused by COVID-19. Scores were created by totaling the number of resources participants endorsed as helpful, with possible scores ranging from 0-7.

### Burnout

Burnout was assessed using the Single-item Burnout Measure from the Physician Work Life Study [19]. This measure has been shown to have moderate-to-high correlation to the Emotional Exhaustion subscale of the Maslach Burnout Inventory and has been recommended as a validated screening tool for burnout given the low burden on respondents [20-23]. Participants were asked to indicate their pre-Covid 19 and current level of burnout (two separate items) by selecting which one of five responses best described their experience.

## Analysis

All data analysis was conducted in SPSS version 27. Descriptive statistics, chi-square difference and parametric and non-parametric independent sample t-tests were conducted to describe faculty's vitality measures in the face of COVID-19 and to determine whether significant differences emerged based on important demographics. Chi-square difference tests were used to determine differences in burnout based on demographics, and a binary multivariate logistic regression was used to examine which faculty vitality variables were associated with experiencing burnout. Statistical significance was set at  $p < .05$ , and 95% confidence intervals were reported. Missing data were handled using listwise deletion procedures.

## RESULTS

### Participants

The response rate was 21.9%. The final sample for analysis was 138 participants; five participants were excluded due to incomplete data collection. Full sample demographics are listed in **Table 1**. The majority of participants were female (68.1%), identified as White (85.5%), a clinical faculty member (83.3%), and did not have a child currently living with them (60.6%). Age ranges and academic ranks (assistant, associate, or full professor) were well distributed across the sample (Table 1).

Table 1: Sample Demographics

Variable	Frequencies N (%)
<b>Gender</b>	
Female	94 (68.1%)
Male	44 (31.9%)
<b>Race</b>	
White	118 (85.5%)
Black/African American	7 (5.1%)
Asian	8 (5.8%)
Hispanic/Latinx	3 (2.2%)
Other	2 (1.4%)
<b>Age</b>	
20-39	57 (41.3%)
40-49	26 (18.8%)
50-59	32 (23.2%)
60+	23 (16.7%)
<b>Academic rank</b>	
Assistant	59 (43.3%)
Associate	32 (23.5%)
Full	45 (33.1%)
<b>Job Classification</b>	
Clinical	115 (83.3%)
Basic Science	23 (16.7%)
<b>Parental Status</b>	
Parent	54 (39.5%)
Not a parent	83 (60.6%)
<b>Burnout status pre-Covid-19</b>	
Experiencing burnout	94 (76.4%)
Not experiencing burnout	29 (23.6%)
<b>Burnout status currently</b>	
Experiencing burnout	56 (44.8%)
Not experiencing burnout	69 (55.2%)

Note. N (%) = sample size and percentage

Shapiro-Wilk Tests, skewness and kurtosis assumptions were tested within our independent variables (i.e. work-life integration variables, time use variables, professional development, and support resources). A majority of the independent variables did not produce significant skewness or kurtosis. Hours spent sleeping and in caring for others in non-parents demonstrated significant kurtosis (3.09 and 5.64 respectively). Shapiro-Wilks were significant for all independent variables, indicating that they were not normally distributed. Thus, all analyses were conducted both parametrically and non-parametrically.

### Work-Life Integration

The mean scores for the time-use and career satisfaction variables can be found in **Table 2**.

Table 2: Means of Independent Variables

Variable	Frequencies Mean (SD), N (%)
<b>Career satisfaction variables</b>	
Satisfaction with work-life balance	2.51 (0.90)
Guilt about time spent working	3.26 (1.06)
Guilt about time spent doing housework	2.91 (1.16)
Productivity at work	2.58 (0.96)
Feeling on track for promotion	2.42 (0.88)
Feeling satisfied with career	2.54 (0.92)
<b>Time-use variables (Parents)</b>	
Δ Hours spent sleeping	-0.44 (0.75)
Δ Hours spent doing housework	0.44 (1.08)
Δ Hours spent caring for others	0.33 (0.92)
Δ Hours spent working	0.32 (1.23)
Δ Hours spent in leisure activities	-0.87 (1.08)
<b>Time-use variables (Non-parents)</b>	
Δ Hours spent sleeping	0.00 (0.57)
Δ Hours spent doing housework	0.30 (1.11)
Δ Hours spent caring for others	0.10 (0.54)
Δ Hours spent working	0.66 (1.22)
Δ Hours spent in leisure activities	-0.78 (1.27)
<b>Professional Engagement</b>	
Detriments to professional development	2.47 (1.26)
Detriments to research efforts	3.25 (1.67)
<b>Institutional support</b>	
Town Hall listening sessions	35 (25.4%)
Daily huddle	33 (23.9%)
COVID-19 website	24 (17.4%)
Wellness resources	20 (14.5%)
Mental health resources	12 (8.7%)
Professional oversight/Ombudsman	6 (4.3%)
Other	16 (11.6%)

Note. SD = standard deviation

Parametric and non-parametric independent t-tests were conducted to examine differences in time-use and career satisfaction variables based on gender (**Table 3 - next page**). Separate tests were conducted for the time-use variables based on parental status due to parents balancing the additional responsibilities of child rearing. Only one difference was observed when examining career satisfaction variables; males felt more satisfied with their work life balance since COVID-19 compared to females [ $t(df) = -2.01(123)$ ,  $p = 0.05$ ;  $Z = -2.06$ ,  $p = 0.04$ ]. Examining the time-use variables, no differences emerged based on gender among parents, and two emerged among non-parents. For non-parents, females reported working

Table 3: Results of the Independent T-tests Based on Gender

Career Satisfaction Variables										
	Female		Male		T (df)	p-value	CI 95%	Mann-Whitney		
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)				U	Z	p-value
Satisfaction with work-life balance	2.40 (0.93)	2.73 (0.79)	-2.01 (123)	0.05	-0.66, -0.001	1405.5	-2.06	0.04		
Guilt about time spent working	3.27 (1.14)	3.23 (0.89)	0.22 (123)	0.82	-0.35, 0.44	1743.0	-0.21	0.83		
Guilt about time spent doing housework	2.89 (1.21)	2.89 (1.08)	0.01 (123)	0.99	-0.43, 0.44	1786.0	-0.08	0.94		
Productivity at work	2.60 (1.06)	2.55 (0.73)	0.33 (123)	0.74	-0.29, 0.41	1733.0	-0.27	0.79		
Feeling on track for promotion	2.41 (0.88)	2.48 (0.85)	-0.41 (93)	0.67	-0.46, 0.30	925.5	-0.57	0.57		
Feeling satisfied with career	2.54 (1.01)	2.57 (0.70)	-0.15 (123)	0.88	-0.36, 0.31	1689.0	-0.51	0.61		
Time Use Variables (Parents)										
	Female		Male		T (df)	p-value	CI 95%	Mann-Whitney		
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)				U	Z	p-value
Δ Hours spent sleeping	-0.49 (0.63)	-0.28 (1.02)	-1.05 (71)	0.30	-0.62, 0.19	454.5	-0.58	0.56		
Δ Hours spent doing housework	0.38 (1.08)	0.61 (1.09)	-0.78 (71)	0.44	-0.82, 0.36	439.0	-0.76	0.45		
Δ Hours spent caring for others	0.30 (0.91)	0.42 (1.00)	-0.39 (47)	0.70	-0.74, 0.50	218.5	-0.11	0.91		
Δ Hours spent working	0.38 (1.28)	0.11 (1.08)	0.81 (71)	0.42	-0.40, 0.94	484.5	-0.14	0.89		
Δ Hours spent in leisure activities	-0.96 (1.06)	-0.59 (1.12)	-1.25 (68)	0.22	-0.97, 0.22	344.0	-1.54	0.12		
Time Use Variables (Non-parents)										
	Female		Male		T (df)	p-value	CI 95%	Mann-Whitney		
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)				U	Z	p-value
Δ Hours spent sleeping	0.04 (0.59)	-0.04 (0.54)	0.49 (50)	0.63	-0.24, 0.39	324.0	-0.33	0.74		
Δ Hours spent doing housework	0.04 (1.16)	0.68 (1.07)	-2.07 (50)	0.04	-1.27, -0.02	206.0	-2.66	0.01		
Δ Hours spent caring for others	0.00 (0.68)	0.17 (0.38)	-0.88 (30)	0.39	-0.55, 0.22	100.5	-1.42	0.16		
Δ Hours spent working	0.96 (0.85)	0.28 (1.43)	2.11 (50)	0.04	0.03, 1.33	203.5	-2.57	0.01		
Δ Hours spent in leisure activities	-1.11 (1.19)	-0.44 (1.27)	-1.98 (50)	0.05	-1.35, 0.01	233.0	-1.99	0.05		
Impacts on Faculty Vitality										
	Female		Male		T (df)	p-value	CI 95%	Mann-Whitney		
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)				U	Z	p-value
Detriments to professional development	2.54 (1.25)	2.25 (1.31)	1.23 (123)	0.22	-0.18, 0.76	1582.5	-1.06	0.29		
Detriments to research efforts	3.16 (1.64)	3.47 (1.77)	-0.059 (50)	0.56	-1.34, 0.73	254.0	-0.49	0.63		
Institutional support	1.17 (1.17)	1.07 (0.95)	0.51 (123)	0.61	-0.31, 0.49	1762.0	-0.11	0.91		

Note. SD = standard deviation. T = t value. CI95% = 95% Confidence Interval

more hours compared to pre-COVID-19 [ $t(df)=2.11(50), p=.04; Z=-2.66, p=0.01$ ], and males reported spending more time doing housework compared to pre-COVID-19 [ $t(df)=-2.07(50), p=0.04; Z=-2.576, p=0.01$ ].

### Professional Engagement & Institutional Support

The average number of negative professional development determinants accrued was 2.47, with ‘salary decreases’ being the most frequently cited. Of faculty who felt their research was impacted, the average number of research determinants accrued was 3.25, with ‘changes in my family’s needs’ being the most frequently cited (see Table 2). Independent t-tests were conducted to examine differences in faculty vitality variables based on gender and parental status (see Table 3); no differences were found. The average number of university-provided supports utilized was 1.14, with ‘Town Halls’ being the most used support (see Table 2). There were no significant differences in institutional supports utilized based on gender or parental status (Table 3).

### Burnout

Prior to experiencing the workplace changes due to COVID-19, most participants screened negative for burnout (76.4%). After the onset of the pandemic, a majority of participants continued to screen negative for burnout (55.2%) but there was a significant difference between rates of positive screens for burnout prior to COVID-19 and pandemic levels [ $\chi^2(1)=17.46, p<0.001$ ]. Differences in current positive screens for burnout were examined based on demographic variables (see supplemental materials) and the only significant difference emerged based on academic rank [ $\chi^2(2)=6.99, p=0.030$ ]. It appears that most assistant professors were screening positive for burnout (see Table 4), while the majority of associate and full professors were not.

Four multivariate binomial logistic regression models determined significant associations between work-life integration, time-use, and faculty vitality variables, and the odds of the screening positive for burnout (see Table 5 for details). Gender and parental status were not included as moderators due to

Table 4: Rates of Screening Positive for Burnout Stratified by Demographics

Variable	Not experiencing burnout N	Experiencing burnout N	Chi-square (df), p-value
<b>Gender</b>			0.07(1), 0.79
Female	44	37	
Male	25	19	
<b>Age</b>			6.04(3), 0.11
20-39	21	29	
40-49	16	9	
50-59	18	9	
60+	14	9	
<b>Academic rank</b>			6.99(2), 0.03
Assistant	22	30	
Associate	17	14	
Full	28	12	
<b>Job Classification</b>			0.77(1), 0.38
Clinical	55	48	
Basic Science	14	8	
<b>Parental Status</b>			0.00(1), 0.99
Parent	28	23	
Not a parent	40	33	

limited differences within the groups based on the independent samples t-tests results. For the work-life integration variables regression, the model fit was  $\chi^2(6) = 45.10, p < 0.001$ . Each one unit increase in satisfaction with career was associated with a 1.58 times lower odds (CI 95%, 0.002, 0.21) of screening positive for burnout during the pandemic, holding the other variables constant.

For the time-use variables regression, two separate regressions were conducted based on parental status. For parents, the model fit was  $\chi^2(5) = 16.68, p = 0.005$ . Each one unit increase in hours slept was associated with a 1.75 times lower odds (CI 95%, 0.05, 0.64) of screening positive for burnout during the pandemic, holding the other variables constant. Each one unit increase in hours spent working was associated with a 0.66 times higher odds (CI 95%, 0.99, 3.76) of screening positive for burnout during the pandemic, holding the other variables constant. For non-parents, the model fit was insignificant [ $\chi^2(5) = 5.23, p = 0.388$ ] and no significant associations emerged.

For the faculty vitality variables regression, the model fit was  $\chi^2(3) = 12.34, p = 0.006$ . Each additional detriment to research experienced was associated with a 0.45 times higher odds (CI 95%, 1.00, 2.49) of screening positive for burnout during the pandemic, holding the other variables constant. Each additional university-provided support utilized was associated with a 0.78 times lower odds (CI 95%, 0.25, 0.82) of screening positive for burnout during the pandemic, holding the other variables constant.

## DISCUSSION

At our academic center, a survey tool designed to evaluate high-impact factors underpinning faculty vitality found that faculty vitality has diminished in the setting of the COVID-19 pandemic, with negative impacts in the areas of WLI and professional engagement and increased rates of positive screens for burnout. Female academics were less satisfied with their WLI than males, there was no association based on racial identity.

WLI was not associated with parental status in our study, although faculty who felt their research had been impacted most often cited changes in their family needs as a contributing factor. Multiple studies confirm that female physicians continue to bear primary responsibility for childcare and management of the household, which may contribute to dissatisfaction with WLI [24, 25]. Although not specific to female physicians, it appears this discrepancy remains true and has been exacerbated during the pandemic [26]. A 2013 qualitative study of clinician-researchers suggests mentoring, good role models, and institutional support can enhance WLI, but gender stereotypes and stigma associated with utilization of supports continue to be barriers to optimizing WLI [27].

Faculty reported multiple negative impacts on their professional engagement due to the pandemic. Krukowski et al. surveyed faculty in the sciences and found that female faculty and faculty with small children at home reported decreased academic productivity, including manuscripts submitted, peer review of manuscripts, attendance at funding panels, and grants submitted [28]. This trend is validated by studies showing women are underrepresented among authors in articles about the coronavirus pandemic [29, 30]. Decreased academic productivity may impact faculty vitality in the long term, as opportunities for advancement are associated with higher career satisfaction and decreased intention to leave the field [31].

Burnout among faculty increased to 44.8% from 23.6%. Kannampalli et al. found a burnout prevalence of 46.3% among physician trainees with exposure to COVID-19, and several online surveys targeting international healthcare workers have found burnout rates of approximately 50% [32-36]. Frontline workers have higher rates of distress in some studies [32-34, 36-38]. This has not been borne out in other studies, and it has been postulated that a greater sense of control and enhanced personal accomplishment due to providing this service is protective [39-43]. Contrary to prior work suggesting midcareer faculty are at highest risk [44], burnout was higher among faculty at the assistant professor rank in our study. This validates

Table 5: Regression Results Predicting Odds of Screening Positive for Burnout During the Pandemic

Career Satisfaction Regression					
Variable	Beta	SE	Wald	p-value	Exp (B)
Constant	7.02	2.25	9.79	0.002	1122.14
Satisfaction with work-life balance	-0.47	0.39	1.43	0.233	0.63
Guilt about time spent working	-0.01	0.30	0.00	0.99	1.00
Guilt about time spent doing housework	-0.04	0.26	0.02	0.88	0.96
Productivity at work	-0.18	0.37	0.23	0.64	0.84
Feeling on track for promotion	-0.54	0.41	1.73	0.19	0.58
Feeling satisfied with career	-1.58	0.47	11.56	0.001	0.21
Parents Time Use Variables					
Variable	Beta	SE	Wald	p-value	Exp (B)
Constant	-1.21	0.59	4.28	0.04	0.30
Δ Hours spent sleeping	-1.75	0.66	6.98	0.01	0.17
Δ Hours spent doing housework	-0.40	0.37	1.18	0.28	0.67
Δ Hours spent caring for others	0.04	0.52	0.01	0.94	1.04
Δ Hours spent working	0.66	0.34	3.70	0.06	1.93
Δ Hours spent in leisure activities	-0.15	0.43	0.12	0.74	0.30
Non-parents Time Use Variables					
Variable	Beta	SE	Wald	p-value	Exp (B)
Constant	0.21	0.56	0.14	0.71	1.24
Δ Hours spent sleeping	-1.34	1.03	1.69	0.19	0.26
Δ Hours spent doing housework	0.20	0.45	0.21	0.65	1.22
Δ Hours spent caring for others	-1.19	0.84	2.02	0.16	0.30
Δ Hours spent working	0.26	0.35	0.58	0.45	1.30
Δ Hours spent in leisure activities	0.53	0.41	1.67	0.20	1.24
Impacts to Faculty Vitality					
Variable	Beta	SE	Wald	p-value	Exp (B)
Constant	0.96	1.24	0.60	0.44	2.62
Detriments to professional development	-0.39	0.35	1.26	0.26	0.68
Detriments to research efforts	0.45	0.23	3.77	0.05	1.57
Institutional support	-0.78	0.30	6.79	0.01	0.46

Note. SE = standard error

concerns about the impact of the pandemic on early career faculty. Faculty with children were at higher risk if they spent less time sleeping or had increased work hours, risk factors which have been borne out in other studies [45, 46]. Among respondents who felt their research had been impacted, the number of detriments to professional engagement correlated to higher rates of burnout. Career satisfaction and utilization of university supports were protective in our study. Career satisfaction and institutional support have been found to be protective against burnout in multiple quantitative and qualitative studies [47-50], and lack of career development opportunities has previously been correlated to higher rates of burnout [51]. Mindfulness training and cognitive behavioral interventions can improve resilience among faculty, but organizational strategies to reduce burnout are felt to be more effective than individual efforts [52].

In contrast with other work, we did not find significant differences in burnout based on gender or parental status [33, 38]. This was unexpected and bears further investigation. Other studies have found that frontline exposure to COVID-19 and exposure to COVID-19 related deaths have led to increased burnout, with adequate provision of PPE being

protective against burnout in frontline providers [34]. Though we evaluated changes in time spent at work, we did not distinguish between frontline patient care vs non-frontline work in our survey.

Many authors have provided recommendations for mitigating the effect of the pandemic on faculty vitality [14, 28-30, 53]. Common themes include: provision of additional support for early career faculty, including research support and mentoring, active monitoring of gender equity and the impact of changes in policy designed to reduce the gender gap, ensuring equitable distribution of service responsibilities, such as teaching load and mentoring requirements, additional research into intersectional vulnerabilities, flexibility regarding tenure clocks and criteria for promotion, and reduction of non-essential tasks such as curriculum review, teaching assessments and meetings. Other authors suggested that transparency and communication may be important strategies to support faculty in times of crisis [54]; our data provides evidence of the importance of enhanced communication. Our results suggest that institutions and leadership teams can foster faculty vitality with transparency and provision of modest institutional supports.

## LIMITATIONS

There are several limitations to our work. First, we surveyed academic faculty at a single institution in the Midwest. Although we believe the challenges facing academic institutions are similar, results may not be generalizable to other facilities. The evolving state of COVID-19 policies, infections, and hospitalization rates may limit the generalizability of our results, thus the results should be contextualized within the time frame of data collection (September to November 2020). Additionally, because this was a cross-sectional study, survey respondents were subject to recall bias which may place limitations on our results.

Our overall response rate was low at 21.9%. Clinical faculty, faculty without children at home, women and those identifying as white were overrepresented in respondents, and our sample was not powered to evaluate challenges faced by underrepresented minorities and basic science faculty. In addition to the COVID-19 pandemic, the United States was experiencing a more expansive discussion of race, structural and institutional racism, and policing at the same time. These discussions may have uniquely affected faculty of color, and the present survey design was unable to capture the interaction between COVID-19 stress and the stress associated with racial trauma. Future studies should seek to confirm our findings in a larger, more diverse sample and expand the focus to include examination of intersections with other important stressors that occurred during this time period. Future longitudinal studies may be able to provide greater detail into how the COVID-19 pandemic impacts faculty vitality.

## CONCLUSION

The COVID-19 pandemic is increasing burnout and threatening faculty vitality at academic medical centers. Physician wellness was an important focus prior to the pandemic, with initiatives through the National Academy of Medicine, the Accreditation Council for Graduate Medical Education, the American Medical Association, and multiple specialty societies. These initiatives will need to be continued with further study of the effectiveness of interventions during the pandemic.

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## Appendix A

### WIMS FACULTY SURVEY

#### **Goals and Objectives**

##### Goal

To identify the impact of the COVID-19 pandemic on engagement of faculty with work and home, including disproportionate impact on subgroups, such as faculty rank, gender of faculty, or faculty type (clinical vs basic science)

##### Objectives:

In the setting of COVID-19 pandemic, to assess among clinical and basic science faculty:

- New financial concerns
- Redistribution of household and childcare responsibilities
- Work-life balance, i.e. time spent at home vs at work, and how time is allocated
- Difficulty engaging in opportunities for promotion
- New feelings of burnout
- Opportunities for effective faculty interventions in event of another lockdown event

#### **Demographics**

1. What is your job classification? [Multiple choice](#)
  - Basic science faculty
  - Clinical faculty
2. What is your gender identity? [Multiple choice](#)
  - Male
  - Female
  - Other
3. What is your race/ethnicity? [Multiple choice](#)
  - White
  - Black or African American
  - American Indian or Alaska Native
  - Asian
  - Native Hawaiian or Pacific Islander
  - Hispanic
  - Other
4. What is your age? [Multiple choice](#)
  - 20 to 29 years old
  - 30 to 39 years old
  - 40 to 49 years old
  - 50 to 59 years old
  - > 60 years old
5. How many years have you been at SLU? [Multiple choice](#)
  - <5
  - 5-10
  - >10
6. What is your academic rank? [Multiple choice](#)
  - Instructor
  - Assistant professor
  - Associate professor
  - Full professor

## Household

1. How many adults reside in your household, excluding yourself? [Fill in the blank, mandatory whole number](#)
  - Significant other
  - Parents
  - Other family members
  - Roommates or housemates
2. Do you have children 18 years or younger in your household? [Multiple choice](#)
  - Yes -> If yes, complete **children questions**
  - No -> If no, complete **no children questions**
3. How many adults are currently working from home [Fill in the blank, whole number](#)

### If yes, have children

1. How many children do you have? [Fill in the blank, mandatory whole number](#)
  - Under 6 years old
  - Between 6 to 12 years old
  - Over 12 years old

The next few questions will ask you to picture your household prior to the onset of the COVID-19 pandemic (around Feb 2020); compared to the peak of disruption from the COVID-19 pandemic (between March 2020 to the present).

2. I spend the following number of hours each day on these tasks: [Side-by-side, fill in the blank, mandatory number](#)
  - Sleeping
  - Household activities
  - Caring for children
  - Caring for other dependents
  - Work and related activities (during work week)
  - Leisure and sports
3. I spend the following number of hours each day engaging in the following for my children: [Side-by-side, fill in the blank, mandatory number](#)
  - Physical care
  - Reading
  - Playing
  - Education-related activities
  - Sports/ hobbies/ extracurricular activities
  - Transportation
4. In a typical week, my childcare comes from the following sources (in hours): [Side-by-side, fill in the blank, mandatory number](#)
  - Nanny
  - Daycare
  - Myself
  - Another adult in the household
  - An adult outside my household
5. On a scale of 1 to 5, where 1 = “strongly disagree” and 5 = “strongly agree,” please indicate your agreement with the following statements: [Side-by-side, scaled response](#)
  - I am satisfied with the amount of “quality time” I am spending with my children
  - I have enough time to manage my children’s needs
  - I have an adequate amount of childcare
  - I have enough time to manage my household responsibilities
  - I feel that the work distribution in the household is equitable
  - I have enough personal time to decompress and relax
6. I estimate my share of the household responsibility as follows: [side-by-side, scaled response](#)
  - 0-25%
  - 26-50%
  - 51-75%
  - 76-100%

### If no, no children

The next few questions will ask you to picture your household prior to the onset of the COVID-19 pandemic (around Feb 2020); compared to the peak of disruption from the COVID-19 pandemic (between March 2020 to the present).

1. I spend the following number of hours each day on these tasks: **Side-by-side, fill in the blank, mandatory number**
  - Sleeping
  - Household activities
  - Caring for non-children dependents
  - Working and related activities
  - Leisure and sports
2. I estimate my share of the household responsibility as follows: **Side-by-side, slider**
  - 0-25%
  - 26-50%
  - 51-75%
  - 76-100%
3. On a scale of 1 to 5, where 1 = "strongly disagree" and 5 = "strongly agree," please indicate your agreement with the following statements: **Side-by-side, scaled response**
  - I have enough time to manage my household responsibilities
  - I feel that the work distribution in the household is equitable
  - I have enough personal time to decompress and relax

### Work

1. Due to the COVID-19 pandemic, I experienced the following financial impacts: **Multiple choice**
  - Salary decrease
  - Furlough
  - Layoff
  - Loss of employer retirement contribution (e.g. 401k match)
  - I did not experience a financial impact
2. Due to the COVID-19 pandemic, another adult in my household experienced the following financial impact: **Multiple choice**
  - Salary decrease
  - Furlough
  - Loss of employer retirement contribution (e.g. 401k match)
  - Layoff
  - Other adults in my household did not experience a financial impact
3. I expect an absolute decrease in my household income in the 2020-2021 academic year as follows: **Multiple choice**
  - <10%
  - Between 10-20%
  - Between 20-30%
  - >30%
  - My household will not experience a decrease in income
4. **Question only for clinical faculty** In addition to my regular clinical duties, I have a FTE ("buydown") for the following activities. (Please specify what the buydown is.) **Fill in the blank**
  - Education
  - Administrative duties
  - Research
  - Unpaid reduction
5. Due to the COVID-19 pandemic, I experienced setbacks in the following professional opportunities: **Multiple choice**
  - Research / publication
  - Professional development activity, such as seminar or workshop
  - Conference attendance
  - Local or national presentation
  - Other \_\_\_\_\_ (fill in the blank)

6. If you feel that you have been set back in a research endeavor or publication, please tell us why: [Multiple choice](#)
- Loss of funding
  - Loss of laboratory access or other physical space
  - Loss of laboratory materials, such as cell cultures or animal colonies
  - Loss of support personnel, such as secretaries, grant professionals, lab personnel, or research assistants
  - Loss of collaborators or mentorship
  - Inflexibility of work hours
  - Changes in child care
  - Changes to my family's needs
  - Inability to focus on work
  - Other \_\_\_\_\_ (fill in the blank)

The next few questions will ask you to picture your work prior to the onset of the COVID-19 pandemic (around Feb 2020); compared to the peak of disruption from the COVID-19 pandemic (between March 2020 to the present).

1. My work time is allocated as follows (in percentages): [Side-by-side, ?sum total 100](#)  
([unsure if Qualtrics allows this in side-by-side, will investigate](#))
- Direct patient care
  - Basic science research
  - Clinical research
  - Administrative duties
  - Clinical bedside teaching
  - Non-bedside teaching
2. I spend my time at work in the following settings: [Side-by-side, scaled response](#)
- Direct patient care
  - Inpatient setting, such as hospital or clinic
  - Tele-health setting
  - Research lab setting
  - In-person educational setting
  - Virtual educational setting
  - Office at Saint Louis University
  - Working from home
3. I employ the following strategies to balance between my work and home responsibilities  
[Side-by-side, scaled response](#)
- Working more than five days per week
  - Working during the evenings
  - "Splitting" the workday
  - Alternate "working times" with other people in my workspace
4. Overall, based on your definition of burnout, how would you rate your level of burnout since the start of the COVID pandemic?

[Side by side, multiple choice](#)

- I enjoy my work and do not have symptoms of burnout
- Occasionally I am under stress, and I don't always have as much energy as I once did, but I don't feel burned out
- I am definitely burning out and have one or more symptoms of burnout, such as physical and mental exhaustion
- The symptoms of burnout that I am experiencing won't go away. I think about frustration at work a lot
- I feel completely burned out and often wonder if I can go on. I am at the point where I may need some changes or may need to seek some sort of help

5. On a scale of 1 to 5, where 1 = “strongly disagree” and 5 = “strongly agree,” please indicate your agreement with the following statements: [Side-by-side, scaled response](#)
- I am satisfied with my work-life balance
  - I feel guilty about the amount of time I spend at work
  - I know how to be productive during the time I am working
  - I have difficult separating my work from home time from other household responsibilities
  - I am on track to progress towards academic promotion
  - My gender has affected my perceived success in working from home
  - My race has affected my perceived success in working from home
  - My gender has affected my ability to seek out feedback and approach my supervisor about work from home challenges
  - My race has affected my ability to seek out feedback and approach my supervisor about work from home challenges
  - I am satisfied with my overall career
  - I am satisfied with my ability to balance work and home duties during WFH

#### **Institutional Interventions**

1. Were the following support services helpful to you? ([yes/no](#))
  - Town Hall sessions
  - Daily Huddle updates
  - COVID-19 website
  - Faculty Catch-Up weekly Zoom
  - Juggling Work-Life Zoom
  - Wellness resources
  - Mental health resources
  - Office of Professional Oversight / ombudsman
2. How do you feel SLU SOM has supported you during the COVID-19 pandemic? ([free text](#))
3. What could SLU SOM have done differently to support you? ([free text](#))
4. What would you like SLU to provide in the future, if a “work from home” order is reinstated? ([free text](#))

Resources for reducing burnout can be found at:

<https://sites.google.com/slu.edu/sluCovid19/supportresources/wellness-and-mental-health?authuser=0>  
[https://rise.articulate.com/share/M5cuU7Fn1hISZ-rB4naNjY5iaPhXC6Jc#/#/](https://rise.articulate.com/share/M5cuU7Fn1hISZ-rB4naNjY5iaPhXC6Jc#/)