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# A Multinational Study of The Impact of Covid-19 On Urologic Surgery Residency and Wellbeing

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<b>OBJECTIVE</b>	To assess changes to the experiences and wellbeing of urology trainees in the United States (US) and European Union (EU) during the COVID-19 pandemic.
<b>METHODS</b>	A 72-item anonymous online survey was distributed September 2020 to urology residents of Italy, France, Portugal, and the US. The survey assessed burnout, professional fulfillment, loneliness, depression and anxiety as well as 38 COVID specific questions.
<b>RESULTS</b>	Two hundred twenty-three urology residents responded to the survey. Surgical exposure was the main educational concern for 81% of US and 48% of EU residents. E-learning was utilized by 100% of US and 57% of EU residents with two-thirds finding it equally or more useful than traditional didactics. No significant differences were seen comparing burnout, professional fulfillment, depression, anxiety, or loneliness among US or EU residents, 73% of US and 71% of EU residents reported good to excellent quality of life during the pandemic. In the US and EU, significantly less time was spent in the hospital, clinic, and operating room ( $P < .001$ ) and residents spent more time using telehealth and working from home during the pandemic and on research projects, didactic lectures, non-medical hobbies and reading. The majority of residents reported benefit from more schedule flexibility, improved work life balance, and increased time for family, hobbies, education, and research.
<b>CONCLUSION</b>	The COVID-19 pandemic has resulted in significant restructuring of residents' educational experience around the globe. Preservation of beneficial changes such as reduction of work hours and online learning should be pursued within this pandemic and beyond it. UROLOGY 166: 87–94, 2022. © 2022 Elsevier Inc.

**B**urnout and resident well-being have recently become a focus in urology, especially in resident education. This topic is particularly important in the setting of the coronavirus disease 2019 (COVID-19) pandemic. While the initial peak of the

pandemic hit various countries and regions at different times, it has required system wide changes to be continually re-visited as communities adapt to subsequent waves. In response to the extreme pressures of caring for patients during the pandemic, urology residency training programs around the world made modifications to their approach to graduate medical education.<sup>1-7</sup> However, the impact of these modifications has not been yet assessed.

The psychological risk to healthcare providers has been raised across all specialties involved in the care of COVID-19 patients.<sup>8-10</sup> New stressors in caring for COVID patients including environmental factors and social isolation increase the burden on physicians.<sup>8-11</sup> Access to PPE, training concerns in treating this new patient population, and the impact on one's household were raised as risk factors for burnout and worsened well-being.<sup>4,10,12-13</sup> Furthermore, due to the reduction of elective surgeries and clinic activities, urology residents experienced a significant impact on their education.<sup>2-7</sup> Often cited as bringing about a whole other set of anxieties regarding clinical exposure and surgical training during this time,<sup>2-3,6,12-14</sup> the educational experience of urology

**Financial Disclosure:** The authors have no relevant financial or non-financial interests to disclose. Our study was reviewed by the MedStar Health Research Institute's Institutional Review Board (IRB) and was approved under exempt status (No 00002790) for human subject's research. The study was approved as exempt given its process as an anonymous de-identified survey study. All participants complete a consent form at time of survey which was approved by our institutions IRB explaining the purpose of the study and intent to publish results.

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Submitted: July 11, 2021, accepted (with revisions): January 2, 2022

residents worldwide has changed rapidly. However, the reduction in clinical duties has been a double edged sword, with resident staffing and work hours restructured, in person meetings moved online, and many programs redefining their focus on resident wellness and mental health.<sup>4,12,15-17</sup>

The purpose of this study was to evaluate the changes in clinical and nonclinical activities experienced by urology residents in the United States (US) and 3 European countries (EU) as a result of the COVID-19 pandemic while assessing burnout and professional fulfillment. We hypothesized while the pandemic may introduce new stressors, the necessitated modifications to resident schedules may allow for increased flexibility, allowing for residents to spend more time on family, hobbies, and research activities protective against burnout.<sup>17</sup>

## MATERIALS AND METHODS

Eligible participants for the survey included current residents of academic urologic surgery training programs in Italy, France, Portugal, and the US. The countries selected had previously participated in a prior study of burnout among urology residents.<sup>18</sup> The survey was distributed directly to residents via email to local trainees in Italy, France, and Portugal via national resident associations, faculty, and senior residents. In the US, a representative sample of programs was targeted. All academic urology residency programs were loaded into an online randomizer, with one-third (47 programs) selected for inclusion in the study. The survey was distributed to the program directors, coordinators, and faculty to be completed by their residents.

The survey was sent out and opened for completion during the month of September 2020, after resolution of the initial peak of COVID cases in the included countries. Anonymous survey data was collected into a de-identified REDCap Database hosted by MedStar Health Research Institute. Prior to initiation of the study, IRB exemption was obtained at the MedStar Health Research Institute.

The 72-item survey was developed to assess urology residents' burnout and professional fulfillment, as well as perceptions and experiences of their training and its changes during the COVID-19 pandemic. No incentive was provided for survey participation, nor was there a mandated time allotment for survey completion. The survey included 10 demographic questions including country of residence, age, marital status, and presence of children or adults greater than 50 years of age in the home. Program details, including year of training and number of residents per year, were captured. The 16-item Personal Fulfillment Index (PFI) was used to assess burnout and professional fulfillment.<sup>19</sup> Depression and anxiety were assessed using the 2 item Patient Health Questionnaire (PHQ-2) for depression, the 2 item Generalized Anxiety Disorder scale (GAD-2) subscale.<sup>20</sup> Loneliness was assessed for using the 6 item De Jong Gierveld Loneliness scale<sup>21</sup> Quality of life was assessed using the single item Linear analog scale assessment (LASA) on a 5 point Likert scale. The survey also included 38 novel COVID-specific questions, exploring exposure and re-deployment experiences in the pandemic, personal and educational concerns, PPE availability, perceived benefit of schedule changes, and self-reported time spent on clinical and educational activities before and during the peak of the pandemic.

Survey data were summarized for the overall sample and for US and EU which were compared using 2-sample *t*-tests and Chi-square tests as appropriate. Participants' responses to prior and during COVID-19 pandemic were compared using paired *t*-tests. Statistical analyses were conducted using Stata 15.<sup>22</sup> A *P*-value  $\leq .05$  was considered statistically significant.

## RESULTS

Overall, 223 urology residents responded to the survey (Table 1). Response rates were: US 41 of 243 (16.9%), France 85 of 420 (14.4%), Italy 83 of 589 (14.1%), Portugal 14 of 85 (16.5%) with an overall response rate of 16.7%. No demographic differences were observed between US and EU urology residents. The median age of trainees was 29 years (range 22-39). Thirty-two percent of EU urology residents felt they had sufficient personal protective equipment (PPE) to care for patients, significantly less than 76% in the US ( $P < .001$ ). While surgical exposure was selected as the largest educational concern by both European and US residents (81% and 48% respectively), EU residents were more concerned with seeing clinic patients (33% vs 12%) and didactics (19% vs 7%) than their counterparts in the US ( $P = .008$ ). A gap was noted regarding e-learning that was more commonly utilized by US residency programs (100% vs 57%  $P < .001$ ). One quarter of all residents found virtual didactics more useful than traditional didactics. However, the majority of both EU and US residents found telemedicine beneficial though this trend was significantly higher among US residents (88% vs 60% ( $P = .001$ )).

Seventy-three percent of US residents and 71% of EU residents ranked their quality of life as "somewhat good" or as "good as it can be." However, professional fulfillment was only endorsed by 26% of US and 11% of EU residents ( $P = .06$ ). No differences in US or EU residents were seen in burnout (44% vs 55%  $P = .33$ ), depression (17% vs 18%  $P = .97$ ), anxiety (26% vs 19%  $P = .43$ ) or loneliness (mean 2.5 vs 2.6  $P = .71$ ). These trends remained insignificant when comparing individual countries. Among the EU, by country the rates of professional fulfillment and burnout were as follows respectively: Italy 6%, 61%; France 18%, 51%; Portugal 0%, 38%.

We evaluated the amount of time residents devoted to various clinical and nonclinical activities before and during the peak of the pandemic (Table 2). Both US and EU Urology residents experienced significant schedule changes as a result of the pandemic (Table 3). US residents spent reported a greater proportion of time in the OR while EU residents reports a greater proportion of time in the clinic before the pandemic, and respectively had a greater reduction in these activities as a result of the pandemic (Supplemental Table 1).

The majority of residents reported perceived benefit from increased time for family, hobbies, research activities, increased schedule flexibility, and work life balance (Fig. 1). Overall, 59% of residents benefited from more time with their family with this trend particularly pronounced among US residents (75% vs 55.63%  $P = .026$ ). This trend extended to time spent on hobbies (52.9% overall, 72.5% US vs 47.68% EU  $P = .005$ ). Both US and EU residents reported similar rates of perceived benefit from increased time on educational activities (63% overall, 67.5% US 62.5% EU  $P = .540$ ) and research activities (56.5% overall, 45% US, 59.6% EU  $P = .098$ ). Increased schedule flexibility was endorsed by 61.78% of residents (60% US 62.5% EU  $P = .784$ ). These behavioral changes resulted in an improvement of the

**Table 1.** US and EU resident demographics, experiences and concerns due to the pandemic, and measures of well being

Variables	Mean (SD) or N (%)	Mean (SD) or N (%)		P-val
		US	EU	
Country	All	US	EU	
	N = 223	N = 41	N = 182	
US	41 (18)			
Italy	83 (37)			
France	85 (38)			
Portugal	14 (6)			
Year of training				.36
1	37 (17)	10 (24)	27 (15)	
2	34 (15)	6 (15)	28 (16)	
3	42 (19)	4 (10)	38 (21)	
4	38 (17)	9 (22)	29 (16)	
5	48 (22)	11 (27)	37 (20)	
6	15 (7)	1 (2)	14 (8)	
7	4 (2)	0	4 (2)	
8	4 (2)	0	4 (2)	
Age	29 (3)	29 (2)	29 (3)	.90
	N = 220			
Number of children	1.2 (0.4)	1.1 (0.4)	1.2 (0.4)	.81
	N = 23	N = 7	N = 16	
Relationship status	N = 220			.35
Single	51 (23)	7 (17)	44 (25)	
In a Relationship/living alone	62 (28)	10 (24)	52 (29)	
In a Relationship/living with partner	107(49)	24 (59)	83 (46)	
Family member over 50	37 (17)	6 (15)	31 (17)	.70
	N = 222			
Tested COVID +	7 (4)	1 (2)	6 (4)	1.00
	N = 192			
Experienced COVID symptoms	7 (4)	1 (2)	6 (4)	
Hospitalized for COVID (N = 192)	0/192	0	0	
Quarantined (yes)	38 (20)	8 (20)	30 (20)	1.00
	N = 192			
Household member COVID +	12 (6)	1 (2)	11 (7)	.23
	N = 192			
Redeployed to outside specialty unit	27(14)	3 (7)	24 (16)	.16
	N = 192			
PPE sufficient	79 (41)	31 (76)	48 (32)	<.001
	N = 192			
Biggest education concern	N = 190			.001
Surgical Exposure	105 (55)	33 (81)	72 (48)	
Didactics	31 (16)	3 (7)	28 (19)	
Seeing clinic patients	54 (28)	5 (12)	49 (33)	
Biggest concern	N = 192			.008
Urology training	48 (25)	3 (7)	45 (30)	
Keeping myself safe	13(7)	4 (10)	9 (6)	
Keeping my family safe	82 (43)	26 (63)	56 (37)	
My well-being	12 (6)	1 (2)	11 (7)	
General uncertainty about the future	37(19)	7 (17)	30 (20)	
E-learning (Yes)	127 (66)	41 (100)	86 (57)	<.001
	N = 192			
Useful relative to . . .	N = 127	N = 41	N = 86	.12
More useful	30 (24)	10 (24)	20 (23)	
Equally useful	64 (50)	16 (39)	48 (56)	
Less useful	33 (26)	15 (37)	18 (21)	
Telemedicine helpful (Yes)	125 (66)	36 (88)	89 (60)	.001
	N = 189			
Quality of Life	N = 125	N = 22	N = 103	.18
As bad as it can be	2 (2)	1 (5)	1 (1)	
Somewhat bad	16 (13)	4 (18)	12 (12)	
Neutral	18 (14)	1 (5)	17 (17)	
Somewhat good	73(58)	11 (50)	62 (60)	
As good as it can be	16 (13)	5 (23)	11 (11)	
	All	US	Other	
Professional Fulfillment Present	18/131 (14)	6/23 (26)	12/108 (11)	.06
Burnout	69/131 (53)	10 /23(44)	59/108 (55)	.33
Depression	23/130 (18)	4/23 (17)	19/107 (18)	.97
Generalized Anxiety Disorder	26/129 (20)	6/23 (26)	20/106 (19)	.43
Mean Loneliness Score (0-6)	2.6 (1.9)	2.5 (2.1)	2.6 (1.8)	.71

**Table 2.** Comparison of US and EU resident activities prior to and during the peak of the pandemic

COVID Specific Related Questions - Activities (Prior) US vs Other Countries	Prior to the Pandemic			During the Peak of the Pandemic		
	Mean (SD)		P value	Mean (SD)		P-Val
	US N = 31	EU N = 139		US N = 22	EU N = 115	
How many days per week did you spend in the hospital?	6.8 (1.8)	6.1 (2.0)	.07	5.2 (2.9)	4.8 (1.8)	.35
How many days per week did you spend in the operating room?	3.2 (1.3)	2.5 (1.3)	.01	1.9 (1.3)	1.8 (1.0)	.68
How many days per week did you spend participating in clinic visits?	1.3 (0.5)	3.7 (1.7)	<.001	1.5 (1.2)	2.9 (1.6)	<.001
How many hours per week did you spend on research projects?	2.9 (2.0)	4.8 (6.1)	.08	4.2 (4.9)	6.8 (7.0)	.10
How many hours per week did you spend in didactic lectures (in person or online)?	4.8 (5.3)	2.1 (2.3)	<.001	4.3 (3.0)	3.4 (3.2)	.23
How many hours per week did you spend on non-medically-related hobbies or activities (eg.: hiking, sports, reading, movies, etc.)?	7.1 (6.7)	5.5 (5.8)	.16	9.6 (7.6)	8.0 (7.2)	.36
How many hours per week had you worked from home?	4.1 (6.3)	3.4 (6.2)	.59	10.1 (9.3)	6.1 (8.3)	.04
How many hours per week had you cared for patients using telehealth video visits?	0.7 (3.6)	0.7 (2.9)	.96	4.0 (7.1)	1.6 (3.6)	.02
How many days per month were you on call or working overnight?	5.7 (5.0)	4.6 (4.9)	.24	5.7 (4.7)	4.3 (5.2)	.23
How many non-medical books did you read per month	1.7 (0.9)	2.3 (1.4)	.03	2.3 (1.6)	3.1 (1.7)	.04

work life balance for 50% of the residents surveyed (42.5% US vs 52% EU  $P = .286$ ).

## DISCUSSION

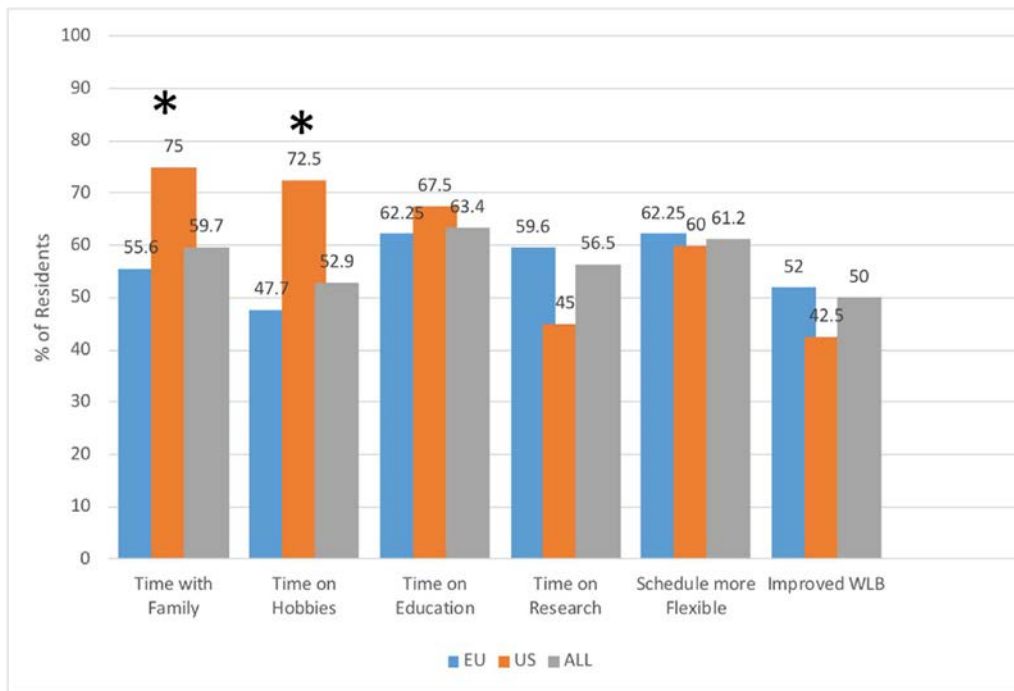
To our knowledge this survey study is the first international study to assess the impact of the COVID-19 pandemic and the resulting modifications to urology training on resident well-being. Previous surveys have demonstrated that COVID-19 has had a large impact on resident surgical education in the US<sup>4,12</sup> Italy,<sup>3,16,23-24</sup> France,<sup>6,25</sup>

and Portugal.<sup>26</sup> However, despite the differences in baseline residency characteristics, governmental responses to the pandemic, and timing of peak caseloads, no studies to our knowledge have directly assessed how these changes have impacted residents across the globe.<sup>1,27</sup> Of note, the surveyed countries are all categorized as high income countries heavily affected by the early initial peak in COVID-19 cases.<sup>10</sup>

Consistent with previously reported studies, residents endorsed significant schedule changes with reduced clinic and OR time and increased usage of telehealth or virtual

**Table 3.** Changes in resident activities overall prior to and during the peak of the pandemic

Prior Activities vs Present Activities (All)	Prior	Present	Difference	P-val
How many days per week did you spend in the hospital?	6.4 (1.9)	4.8 (2.0)	1.6 (2.0) N = 135	<.001
How many days per week did you spend in the operating room?	2.7 (1.4)	1.8 (1.1)	0.96(1.33) N = 127	<.001
How many days per week did you spend participating in clinic visits?	3.4 (1.8)	2.7 (1.6)	0.7 (1.6) N = 132	<.001
How many hours per week did you spend on research projects?	4.3 (5.4)	6.4 (6.8)	-2.1 (5.1) N = 134	<.001
How many hours per week did you spend in didactic lectures (in person or online)?	2.2 (3.0)	3.6 (3.2)	-1.4 (3.7) N = 133	<.001
How many hours per week did you spend on non-medically-related hobbies or activities (eg.: hiking, sports, reading, movies, etc.)?	5.2 (5.0)	8.3 (7.3)	-3.1 (6.7) N = 135	<.001
How many hours per week had you worked from home?	2.7 (4.6)	6.6 (0.7)	-4.0 (7.4) N = 133	<.001
How many hours per week had you cared for patients using telehealth video visits?	0.5 (2.1)	1.9 (4.5)	-1.4 (4.5) N = 135	.003
How many days per month were you on call or working overnight?	4.9 (4.9)	4.5 (5.2)	0.4 (4.1) N = 135	.22
How many non-medical books did you read per month	2.2 (1.4)	3.0 (1.7)	-0.8 (1.4) N = 135	<.001



**Figure 1.** Benefit of increased time for activities among US and EU urology residents (Color version available online).

didactics.<sup>4,12</sup> Work hours were decreased an average of 1.6 days in the hospital per week. Similar results have been reported by the Society of Academic Urology with 83% of programs reporting decreased work hours.<sup>4</sup> As a result of these decreased clinical responsibilities and formal work hours, residents in our study were able to spend more time and perceived receiving benefit from research activities, nonclinical activities and hobbies, more time at home with family, and read more non-medical books.

Interestingly, significantly more US residents felt they “benefited from more time for hobbies” despite no significant differences in time spent on these activities as a result of the pandemic. Previous survey results have shown that US residents on average work a greater number of hours per week than EU residents, and it is possible that the decrease in working hours was therefore more significant to US residents.<sup>28</sup> Half of US and EU residents reported improved work life balance as a result of the pandemic, a trend contrary to the experiences of many other frontline specialties actively involved in treating COVID patients.<sup>8-10</sup>

While the perceived improvement in work life balance and flexibility could actually be protective against burnout, anxiety, and depression, we did see a variation in burnout levels relative to previously reported rates. In our survey administered directly following COVID surges, burnout was seen in US (44%) and EU (55%) residents. Pre-pandemic rates were reported at 38% in the US and 44% in EU.<sup>28</sup>

Overall, despite a number of stressors present in the post pandemic environment, including concern about loved ones and impact of the pandemic on surgical cases and education, our study did not demonstrate a significant

rise in burnout or depression. There are several possible explanations for this: flexibility in one’s schedule,<sup>1,17,29-30</sup> satisfaction with work life balance, and non-medical reading<sup>28</sup> have been previously identified as protectors against burnout related to urology residency, all of which improved during the pandemic. There is likely a “sweet spot” between preserving this time for residents while still allowing optimal patient care and educational activities in the workplace, however the exact breakdown of where those returns diminish is so far not well understood. Furthermore, many programs prioritized wellness initiatives in response to the pandemic, including more frequent check ins with faculty, increasing academic time, additional free time, mental health availability and opportunities for wellness.<sup>4</sup>

The reductions in surgical case volumes resulting from the pandemic remained a significant concern for trainees, and similarly are expressed as the main educational concern by US and EU residents in our study.<sup>3-4,14,31,31</sup> However the pandemic led to a global leap forward in the utilization of telemedicine and e-learning and has restructured the day to day clinical lives of trainees.<sup>2,5</sup> All US residents surveyed were using e-learning in some capacity, and a 75% of all residents found it “equally or more useful than traditional didactics.” Allowing increased scheduling flexibility, more work and educational time from home, and time for hobbies and family should be preserved as hospitals “get back to normal” as their lasting effects on burnout may be even more significant when the stressors of the pandemic resolve.

Our study has several major limitations. It is a retrospective survey, which asks respondents to remember their duty hours prior to and during the pandemic subject to



recall bias and response bias. Our study is also limited by its response rate of 16.7% compared to previously published large national surveys on burnout often report response rates of 20%-25%.<sup>13,28,30</sup> This survey was limited by its length and no incentives were provided which may have contributed to survey fatigue. Nonresponse rates for individual items were variable as indicated in Tables 1-3. While the response rate was similar across countries fewer total respondents were from the US compared to the EU. Additionally, this study included PGY-1 residents from the included countries. The start date of these residents is variable depending on country of origin (eg, June or July in the US vs January in Portugal) and therefore their pre-pandemic involvement in OR and clinical activities may have been limited by their start date, potentially impacting our results. However, despite these limitations, we believe this survey offers an important global cross section of trainees during a pivotal time in the pandemic that offers insight in how we can best adapt going forward.

## CONCLUSION

As the promise of a post-pandemic world comes, it is important to remember the lessons learned during this time. For urology trainees, despite the stress associated with the pandemic, the emergence of e-learning and telehealth, as well as increased flexibility that allowed for increased time for loved ones, hobbies, and research opportunities have had an important and positive effect based on the results of this survey. Using these lessons to create lasting changes to urology training will be important as we continue to explore ways to improve trainee wellbeing though further research is needed to ensure competency is maintained.

## SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found in the online version at <https://doi.org/10.1016/j.urology.2022.01.069>.

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## EDITORIAL COMMENT



The initial and subsequent waves of the COVID-19 pandemic have required medical and surgical training institutions to pivot to alternative teaching and learning techniques. As such, clinical and surgical experiences have been affected in many institutions globally. Despite these changes, surgical residents are tasked with competently reaching milestones required to progress through training. Effectively managing these changes while navigating the challenges of the pandemic itself can be a daunting task for residents, potentially impacting their overall quality of life.

This online survey-based study evaluated the clinical and non-clinical experiences of urology residents in the US and 3 European countries (Italy, France, and Portugal [EU]) to assess the impact of these pedagogical changes on everyday life, particularly with respect to well-being. A 72-item survey was developed to assess burnout, anxiety, depression, loneliness, quality of life, and professional fulfillment using validated instruments, and included 38 novel pandemic-specific questions. The survey, activated in September 2020, was retrospective, as it asked residents to compare experiences prior to and after the initial peak of the pandemic. The same author group conducted a study on urology resident burnout in US and EU urology residents (2019),<sup>1</sup> and the same residency program contacts were used for the current survey's distribution; however, the current study included only one-third of all US programs. The response rate was low (16.7%) with missing data for multiple questions, decreasing the sample size for some analyses. With lengthy surveys, this is not

uncommon, as survey fatigue can play a role.<sup>2,3</sup> Importantly, as the authors note, respondents included PGY-1 residents (n = 37; 17%) who may not have been able to adequately answer some of the questions due to inexperience.

Several findings were inconsistent with previously reported studies. Respondents spent significantly fewer days per week in the hospital (1.6) and the operating room (0.96). Ammann and colleagues (2022) reported a significant pandemic-related decrease in general surgery major cases between residents in 2019 and 2020 of 1.5% fewer cases (P = .011), which was magnified during the chief year with 8.4% fewer cases (P < .001).<sup>4</sup> It would be interesting to see the current study's data stratified by year of training, which could provide a clearer picture of residents' experiences. As the authors hypothesized, there was no significant rise in burnout or depression, potentially due to many programs reporting increased physical health and wellness supports.<sup>5</sup> While these are encouraging data, it is important to consider that each country represented experienced different pandemic-related circumstances, including lockdowns and other restrictions. These may have varied significantly depending upon the location within the country, especially in the US where restrictions were largely mandated by state and local governments, which could potentially influence these findings. Future research on the impact of the COVID-19 pandemic on the well-being of urology residents' worldwide will be important, especially as the pandemic continues. There is much to learn about how training modifications affect many of the variables observed in this study, and the more data we have, the more equipped we will be to adapt our curricula to better train our residents.

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<https://doi.org/10.1016/j.urology.2022.01.071>  
UROLOGY 166: 93, 2022. © 2022 Elsevier Inc.

## AUTHOR REPLY

We are grateful for the comment on our article “A multinational study of the impact of COVID-19 on Urology surgery residency and wellbeing.” Dr. Hoogenes raises excellent points in





evaluating the results of our study and appreciating the context of participants' year of training and home region. We agree that regional variability in pandemic-related experiences can be significant relative to volume, leadership response, and community perspective. This varied both among countries and within countries on regional and institutional levels. Part of our goal within the United States was to ensure we appropriately assessed regional variability by sampling one third of randomly chosen programs. Contextual factors are influential in mediating COVID-19 related occupational stressors and their resulting psychological distress.<sup>1</sup> Interval reports of burnout, trauma, post-traumatic stress and the mental health sequelae resulting from the pandemic reinforce the need to focus on mitigating this risk for our future providers.<sup>1-2</sup>

Blanchard et al's 2-year survey of over 500 residents at University of Chicago showed stable burnout rates in spite of the pandemic.<sup>2</sup> While limited to 1 institution, these results are consistent with ours. Despite Chicago experiencing a high COVID-19 case load, the authors hypothesized that the institution's response to the pandemic by reducing work hours and prioritizing mental health care and well-being. This is in line with the model proposed by Hendrickson et al in their conclusion that risk of COVID-19 itself was not the sole mitigator of occupational stress or mental health symptoms of healthcare providers during the pandemic.<sup>1</sup> They present an explanation of direct and contextual factors for occupational stressors, as well as strategies that programs can employ to reduce their effect on healthcare providers. Using this framework, one can think of our study as primarily an examination of how direct volume dependent factors changed for urology residents during the pandemic.

Of critical importance is the 12% of healthcare workers in Hendrickson's study who expressed thoughts of suicide or self-harm. This is in line with a growing body of data demonstrating high rates of distress and post-traumatic stress among healthcare providers around the world. Post-traumatic stress disorder symptoms (PTSD) were not fully evaluated in our study; however, as many as one half of healthcare providers reported acute stress or PTSD in surveys of Turkey<sup>3</sup>, New York<sup>4</sup>, and Italy<sup>5</sup> during the respective peaks of their pandemics. However, this data is cross-sectional, and the pandemic continues to carry on. The long-term impact of the acute stress and its evolution into PTSD is

highly concerning.<sup>3-5</sup> Rising post-traumatic stress, anxiety and depression appear to represent a "second wave" of the pandemic that we anticipate will have a significant impact on future healthcare providers. Institutions must not only focus on burnout and environmental stressors, but should proactively initiate interventions to support physicians and their mental health. The long-term impact of traumatic stress and mental distress on urology residents are critical for programs to understand and address as the pandemic continues.

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