

# Resident burnout in USA and European urology residents: an international concern

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## Objective

To describe the prevalence and predictors of burnout in USA and European urology residents, as although the rate of burnout in urologists is high and associated with severe negative sequelae, the extent and predictors of burnout in urology trainees remains poorly understood.

## Subjects and methods

An anonymous 32-question survey of urology trainees across the USA and four European countries, analysing personal, programme, and institutional factors, was conducted. Burnout was assessed using the validated abridged Maslach Burnout Inventory. Univariate analysis and multivariable logistic regression models assessed drivers of burnout in the two cohorts.

## Results

Overall, 40% of participants met the criteria for burnout as follows: Portugal (68%), Italy (49%), USA (38%), Belgium (36%), and France (26%). Response rates were: USA, 20.9%; Italy, 45.2%; Portugal, 30.5%; France, 12.5%; and Belgium, 9.4%. Burnout was not associated with gender or level of training. In both cohorts, work–life balance (WLB)

dissatisfaction was associated with increased burnout (odds ratio [OR] 4.5,  $P < 0.001$ ), whilst non-medical reading (OR 0.6,  $P = 0.001$ ) and structured mentorship (OR 0.4,  $P = 0.002$ ) were associated with decreased burnout risk. Lack of access to mental health services was associated with burnout in the USA only (OR 3.5,  $P = 0.006$ ), whilst more weekends on-call was associated with burnout in Europe only (OR 8.3,  $P = 0.033$ ). In both cohorts, burned out residents were more likely to not choose a career in urology again (USA 54% vs 19%,  $P < 0.001$ ; Europe 43% vs 25%,  $P = 0.047$ ).

## Conclusion

In this study of USA and European urology residents, we found high rates of burnout on both continents. Despite regional differences in the predictors of burnout, awareness of the unique institutional drivers may help inform directions of future interventions.

## Keywords

burnout, European Union, job satisfaction, medical education, residency, well-being

## Introduction

Burnout is an occupational hazard, defined as a syndrome of depersonalisation, emotional exhaustion, and reduced feelings of personal accomplishment [1]. Increasing attention is being focused on physician burnout due to its negative effects on both providers and their patients, as burnout is associated with depression suicidality, decreased patient satisfaction, increased risk of medical errors, and higher costs to the healthcare system [2–7].

Physician burnout is rising in all specialties, with some of the highest rates reported for urologists [8,9]. From 2011 to 2014,

burnout amongst practicing urologists increased from 41.2% to 63.6% [8]. Similarly, an AUA survey of 1126 practicing urologists demonstrated burnout in 41.3% of urologists aged <65 years [9]. In that cohort, younger age and increased working hours were associated with higher rates of burnout. Meanwhile, a recent national study of burnout in 4732 USA residents found the rate of burnout in urology trainees to be 63.8%, the highest of any specialty surveyed [10].

Although institutional factors were previously shown to be predictive of burnout in USA surgical residents [11], few similar studies have been conducted on European trainees. Given the cultural and structural differences in surgical

training and practice in Europe, it is unclear whether the same institutional drivers would be seen. Several studies have explored urology resident burnout in certain European countries. Roumiguie *et al.* [12] reported severe burnout in 24% of French urology residents, associated with increased working hours, younger age and seniority, although no institutional specifics were assessed. A study of residents from the Netherlands found that burnout was associated with quality of learning environment; however, specific institutional factors predicting burnout were similarly not explored [13].

To our knowledge, the present study is the first to investigate the prevalence and predictors of burnout experienced by urology residents on an international scale.

## Subjects and methods

### Survey characteristics

A 32-question survey was developed to study the prevalence and predictors of burnout in urology trainees. Burnout was assessed as the primary outcome through the validated two single-item measures of the Maslach Burnout Inventory (MBI), as well as the full MBI instrument in the USA for validation purposes. In accordance to convention, burnout was assessed as a binary variable with those reporting 'once a week' or 'more', on either the emotional exhaustion or depersonalisation domains considered as meeting the criteria for burnout [8,14,15]. Fatigue was assessed using a linear 10-point scale using a single item with an answer of  $\geq 7$  corresponding to fatigue associated with impairment [16]. Quality of life (QoL) was measured using linear analogue self-assessment on a 5-point Likert scale, in accordance with prior studies [17].

In all, 30 questions were included to assess sociodemographic, programme-specific and personal characteristics, as well as sequelae of training on life. Resident characteristics included: country of origin, gender, relationship status, and resident training level. Individual characteristics assessed were satisfaction with work–life balance (WLB) and regularly employed relaxation techniques. Programme characteristics included work hours, night and weekend on-call schedule, access to structured mentorship, and access to mental health services. Sequelae assessed included QoL, fellowship and career plans after training, satisfaction with career choice, caffeinated and alcoholic drink consumption, and difficulty with managing daily activities.

### Participants

All residents enrolled in an academic urology residency training programme were eligible to participate in the study. The survey was distributed via e-mail to each USA

programme director and programme coordinator, as well as leaders of local trainee associations in four European Countries (Italy, France, Belgium, and Portugal) to be distributed to their residents. E-mails were sent out in May 2018, with a single reminder sent 2 weeks after initial contact. The survey was closed in June to avoid capturing data of different academic years. Family structure and programme-specific data were not collected to protect programme and individual anonymity. The data were collected into a de-identified database using Research Electronic Data Capture (REDCap) tools hosted at the MedStar Health Research Institute (Hyattsville, MD, USA). Exemption was granted by the Institutional Review Board prior to study initiation.

### Statistical analysis

We summarised patient, hospital, and surgical characteristics with descriptive statistics. Categorical variables were compared with the Fisher's exact test, and the number of books read/month was compared with a chi-squared test of linear trend. Univariate analysis of burnout drivers and sequelae was conducted using Fisher's exact test stratified by burnout and location. A multivariable logistic regression model was built using clinically relevant variables found to be significant in a univariable screen. Due to sample size limitation, the novelty of burnout research without prior known associations, and because this study was largely hypothesis generating, a backward elimination method of model building was used. After removing covariates with a  $P < 0.2$  to avoid overfitting the model, the final model included weekends on-call, satisfaction with WLB, accessibility of mental health services, structured mentorship, and non-medical reading. Model goodness-of-fit was assessed using the method developed by Lemeshow and Hosmer [18]. Using our multivariable models, the predicted probability of burnout and non-medical reading was evaluated using marginal effects. The validity of the two-question MBI was assessed using non-parametric receiver operating characteristic (ROC) curves [19]. Statistical analysis was performed using Stata, version 14.2 (StataCorp, College Station, TX, USA).

## Results

In all, 211 USA and 158 European urology trainees completed the survey. The response rates were: USA, 20.9%; Italy, 45.2%; Portugal, 30.5%; France, 12.5%; and Belgium, 9.4%. The full MBI was administered to the USA cohort, and there was excellent performance of the two-question MBI (area under the ROC curve 0.79, 95% CI 0.74–0.82). **Overall, burnout was observed in 149 residents (40%); USA 38% and Europe 44%.** Portuguese residents had the highest rate of burnout of the European countries at 68%, followed by Italy (49%), Belgium (36%), and France (26%) ( $P = 0.003$ ).

Throughout the following sections, we refer to the cohort of these four European countries as 'European' results.

The gender distribution was similar in the USA and the four European countries (37% female in both). On univariate analysis (Table 1), residents with three on-call weekends/month had higher rates of burnout (USA 71%,  $P = 0.034$ ; Europe 81%,  $P = 0.003$ ). Residents who exhibited burnout were more likely to report dissatisfaction with their WLB (USA 68% vs 30%,  $P < 0.001$ ; Europe 80% vs 37%,  $P < 0.001$ ) and fatigue causing impairment (USA 58% vs 38%,  $P < 0.001$ ; Europe 84% vs 66%;  $P < 0.001$ ). A dose-response relationship was seen between the number of non-medical books read/month and decreased rates of burnout. Residents who read no non-medical books each month were more likely to experience burnout (46% USA, 57% Europe) compared to those who read part of a book (33% USA, 33% Europe) an entire book (25% USA, 32% Europe) or two books each month (13% USA,  $P = 0.004$ ; 33% Europe,  $P = 0.003$ ).

In the USA cohort only, urology residents exhibiting burnout reported higher rates of working >80 h/week (44% vs 24%,  $P = 0.014$ ). Burnout was significantly lower amongst residents who reported availability of structured mentorship programmes (25% vs 75%,  $P < 0.001$ ) and readily available access to mental health services (16% vs 84%,  $P < 0.001$ ). European residents reporting the use of exercise or yoga for relaxation had lower rates of burnout (36% vs 64%,  $P = 0.036$ ).

In a multivariable model, the presence of a structured mentorship programme, non-medical reading, and satisfaction with WLB were associated with lower burnout risk, whilst lack of access to mental health services and working three or more weekends a month were associated with higher burnout risk (Table 2). Dissatisfaction with WLB was associated with increased burnout (odds ratio [OR] 4.5, 95% CI 2.1–9.6;  $P < 0.001$ ). Structured mentorship programmes and the number of non-medical books read/month were associated with decreased burnout risk (OR 0.4, 95% CI 0.2–0.7,  $P = 0.002$ ; and OR 0.6, 95% CI 0.4–0.8,  $P = 0.001$ , respectively). Residents who read part of a book, a single book or two books each month had a decreased predicted probability of burnout in the USA (43%, 35%, 27%, and 20%, respectively;  $P = 0.004$ ) and Europe (51%, 38%, 26%, and 17%, respectively;  $P = 0.003$ ; Fig. 1).

Lack of access to mental health services remained a predictor of burnout, and the odds of burnout was higher amongst USA residents who had difficulty accessing mental health services or they were unavailable (OR 3.2, 95% CI 1.2–8.1,  $P = 0.017$ ; and OR 3.5, 95% CI 1.4–8.6,  $P = 0.006$ , respectively). In the European cohort only, working three weekends on-call/month had higher odds of burnout (OR 8.3, 95% CI 1.2–57.9;  $P = 0.033$ ), whilst exercise and/or yoga remained protective against burnout (OR 0.3, 95% CI 0.1–0.8;  $P = 0.017$ ).

## Sequelae of burnout

Univariate analysis demonstrated that QoL was significantly lower for USA and European residents meeting the criteria for burnout ( $P < 0.001$ , USA and EU). Both European and USA residents experiencing burnout reported greater difficulty engaging in all self-care activities (Table 3). Comparing residents with and without burnout, 46% vs 81% of USA trainees and 57% vs 75% of European trainees would choose urology again, whilst 41% vs 13% of USA trainees ( $P < 0.001$ ) and 25% vs 15% of European trainees ( $P = 0.047$ ) reported that they would not go into medicine again. In the USA, residents with burnout were less likely to pursue an academic career (10% vs 27%,  $P = 0.013$ ). Burnout was not significantly associated with plans for fellowship.

## Discussion

The present study is the first comprehensive study of burnout in urology trainees and the first to perform a comparative analysis of burnout drivers and sequelae in European vs USA residents. In our present study, the rate of resident burnout was similarly high in the two cohorts and the overall rate of burnout in the four European countries was not significantly different from the USA on adjusted analysis.

While there are few prior studies of resident burnout in Europe, it is important to note the variability amongst the various countries. Portuguese residents, for example, had the highest prevalence of burnout in our present study at 68%. French urology residents in our present study reported the lowest prevalence of burnout at 26%, consistent with prior reports [12]. The rate of USA resident burnout in the present study was lower with the use of the abridged vs the full MBI, a finding consistent with previous observations [20].

Our present study reveals the importance of institutional drivers of burnout. Structured mentorship programmes, for example, were associated with lower burnout risk for USA and European residents. This is consistent with previous studies demonstrating the effectiveness of mentorship programmes in reducing burnout in surgical training programmes [21]. These programmes were only available for 44% and 23% of USA and European residents, respectively. Although our question was modelled after the previously established convention for assessing the presence of such programmes [21], it is possible that what a mentorship programme represents could be interpreted differently in the USA and in Europe.

Individual factors such as gender or postgraduate year associated with non-urological-surgeon burnout in other studies were not predictive of burnout in our present analysis [21–24]. A prior study of burnout in practicing urologists similarly revealed no association between gender and burnout

**Table 1** Resident characteristics stratified by the presence of burnout and regional cohort.

	USA N = 211			Europe N = 158		
	No burnout n = 131	Burnout n = 80	P	No burnout n = 89	Burnout n = 69	P
Country of residency, n (%)						
USA	131 (62.1)	80 (37.9)				<b>0.003</b>
Belgium				9 (64.3)	5 (35.7)	
France				37 (74)	13 (26)	
Italy				35 (50.7)	34 (49.3)	
Portugal				8 (32)	17 (68)	
Gender, n (%)						
Male	96 (66.2)	49 (33.8)	0.09	62 (62)	38 (38)	0.07
Female	35 (53)	31 (47)		27 (46.6)	31 (53.4)	
Relationship status, n (%)						
Single	32 (60.4)	21 (39.6)	0.87	26 (51)	25 (49)	0.39
Not single	99 (62.7)	59 (37.3)		63 (58.9)	44 (41.1)	
Number of residents/year, n (%)						
1	6 (75)	2 (25)	0.82	9 (37.5)	15 (62.5)	0.22
2	41 (64.1)	23 (35.9)		22 (59.5)	15 (40.5)	
3	61 (61.6)	38 (38.4)		21 (55.3)	17 (44.7)	
≥4	23 (57.5)	17 (42.5)		35 (62.5)	21 (37.5)	
Training level, n (%)						
Intern	11 (45.8)	13 (54.2)	0.19	13 (72.2)	5 (27.8)	0.44
Junior	54 (63.5)	31 (36.5)		16 (55.2)	13 (44.8)	
Senior	66 (66)	34 (34)		58 (55.8)	46 (44.2)	
Work h/week, n (%)						
<60 h	11 (64.7)	6 (35.3)	<b>0.014</b>	37 (58.7)	26 (41.3)	0.29
60–80 h	88 (69.3)	39 (30.7)		45 (59.2)	31 (40.8)	
>80 h	32 (47.8)	35 (52.2)		7 (38.9)	11 (61.1)	
Night on-call/week, n (%)						
1	42 (58.3)	30 (41.7)	0.28	46 (55.4)	37 (44.6)	0.5
2	41 (64.1)	23 (35.9)		26 (63.4)	15 (36.6)	
3	29 (67.4)	14 (32.6)		5 (71.4)	2 (28.6)	
4	8 (61.5)	5 (38.5)		77 (98.7)	1 (1.3)	
≥5	3 (30)	7 (70)		0 (0)	55 (100)	
Weekends on-call/month, n (%)						
1	60 (62.5)	36 (37.5)	<b>0.034</b>	58 (63.7)	33 (36.3)	<b>0.003</b>
2	61 (65.6)	32 (34.4)		23 (56.1)	18 (43.9)	
3	4 (28.6)	10 (71.4)		3 (18.8)	13 (81.3)	
Satisfaction between your personal and professional life						
Dissatisfied	39 (41.9)	54 (58.1)	<b>&lt;0.001</b>	33 (37.5)	55 (62.5)	<b>&lt;0.001</b>
Neutral	29 (78.4)	8 (21.6)		27 (73)	10 (27)	
Satisfied	63 (77.8)	18 (22.2)		29 (87.9)	4 (12.1)	
Fatigue						
No fatigue	81 (70.4)	34 (29.6)	<b>0.007</b>	30 (73.2)	11 (26.8)	<b>0.017</b>
Fatigued	50 (52.1)	46 (47.9)		59 (50.4)	58 (49.6)	
Structured mentorship programme, n (%)						
No or do not know	61 (51.7)	57 (48.3)	<b>&lt;0.001</b>	65 (53.3)	57 (46.7)	0.18
Yes	70 (75.3)	23 (24.7)		24 (66.7)	12 (33.3)	
Access to mental health services, n (%)						
Readily available	66 (83.5)	13 (16.5)	<b>&lt;0.001</b>	6 (66.7)	3 (33.3)	0.63
Available, but difficult to access	32 (50)	32 (50)		17 (60.7)	11 (39.3)	
Not available or do not know	33 (48.5)	35 (51.5)		61 (53)	54 (47)	
Non-medical books read/month, n (%)						
0	62 (54.4)	52 (45.6)	<b>0.004*</b>	32 (43.2)	42 (56.8)	<b>0.003*</b>
Part of a book	45 (67.2)	22 (32.8)		40 (66.7)	20 (33.3)	
1	15 (75)	5 (25)		13 (68.4)	6 (31.6)	
2	7 (87.5)	1 (12.5)		2 (66.7)	1 (33.3)	
3	2 (2.4)	0 (0)		2 (2.8)	0 (0)	
Meditation for relaxation, n (%)						
No	124 (62)	76 (38)	1	86 (57.3)	64 (42.7)	0.3
Yes	7 (63.6)	4 (36.4)		3 (37.5)	5 (62.5)	
Exercise and/or yoga for relaxation, n (%)						
No	58 (59.8)	39 (40.2)	0.57	33 (46.5)	38 (53.5)	<b>0.036</b>
Yes	73 (64)	41 (36)		56 (64.4)	31 (35.6)	
TV/movies for relaxation, n (%)						
No	26 (57.8)	19 (42.2)	0.6	31 (58.5)	22 (41.5)	0.74
Yes	105 (63.3)	61 (36.7)		58 (55.2)	47 (44.8)	



Table 1 (continued)

	USA N = 211			Europe N = 158		
	No burnout n = 131	Burnout n = 80	P	No burnout n = 89	Burnout n = 69	P
Spend time with friends/family for relaxation, n (%)						
No	22 (52.4)	20 (47.6)	0.16	21 (45.7)	25 (54.3)	0.11
Yes	109 (64.5)	60 (35.5)		68 (60.7)	44 (39.3)	

\*P value reflects a chi-squared test of linear trend. All other P values in the table are from a Fisher's exact test. P values in bold statistically significant.

[9]. We believe that this may be secondary to a deliberate effort of the profession to address gender inequity in urology.

Given many structural differences between the USA and European training programmes and health systems, it is important to understand not only the similarities but also the differences in burnout drivers in these cohorts. Dissatisfaction with WLB was reported by 39% of USA vs 56% of European residents. While increased resident work hours are a known burnout driver [9,12], our present study demonstrated this to be true only in the USA cohort; this significance disappeared on multivariable analysis. This is probably due to differing training practices. European residents overall tended to work fewer weekly hours than USA residents: 31.8% of the USA and 11.4% of European residents worked >80 h/week, whilst only 8% of USA and 37.2% of European residents worked <60 h/week. Meanwhile, weekends on-call was predictive of burnout on multivariable analysis only for the European cohort. This finding is consistent with a prior study showing a greater level of dissatisfaction with working weekends by European compared to North American faculty surgeons [24].

Another important distinction is the strong association of readily available access to mental health services and decreased burnout in the USA cohort, which was not found in the European cohort. This finding is probably explained by the cultural differences in approaches to mental health. Only 6% of European vs 37% of USA residents reported access to mental health services in our present study. Previous studies of surgical residents have reported value in psychological counselling sessions, although their impact on burnout has not been explicitly demonstrated [25,26]. In this way, the role of mental health services in burnout may not be directly causative, and may instead serve as a surrogate for the overall institutional culture of resident support. Nevertheless, given the association with burnout, psychological distress, depression, and suicidal ideation, provision of accessible mental health services should be prioritised by resident training institutions, especially in the USA [23,27].

In all, 46% of USA and 53% of European residents read at least part of a non-medical book each month, a trend consistent with recent data revealing that 51.6% of the USA population reads at

least a part of a book/month [28]. In our present study, the amount of non-medical reading done by residents of both USA and European cohorts was a significant predictor against burnout, even when adjusted for all other individual and institutional factors including work-hours. These findings are consistent with previously reported studies on the protective effects of non-medical reading on provider burnout [29]. Leisure reading has an established role in the context of medical student education, where it is thought to reduce stress while fostering empathy and creativity [30,31]. These findings help make a case for institutional curricular offerings for non-medical reading in graduate medical education.

It remains important to note that the directionality of this association is impossible to determine in a cross-sectional study. For example, it is possible that residents who are less burned out may also be residents who have extra time for reading. It is also possible that reading is itself protective given its association with decreased burnout risk, an association not seen for other self-care activities. With various programmes already in place around the country (e.g., Pegasus Physician Writers group at Stanford Health [32], the Narrative Medicine Program at Columbia University [33]), continued research into the effects of such programmes on burnout will be important in helping us understand this relationship better.

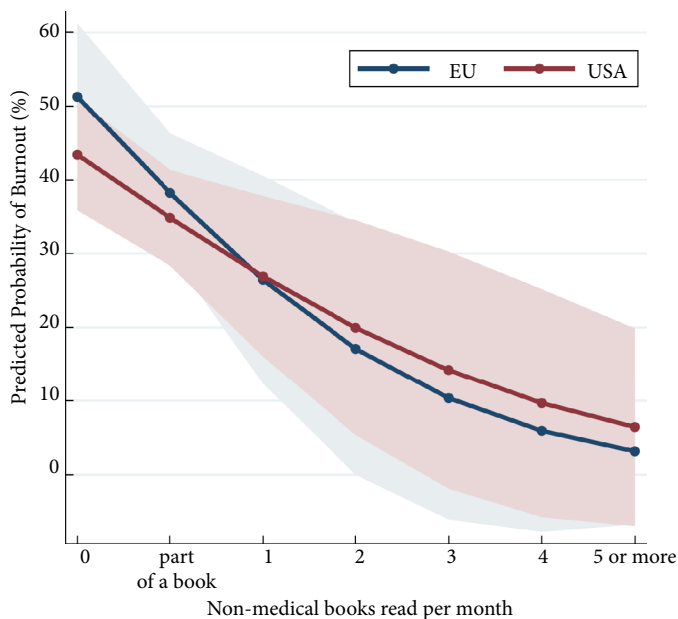
Finally, the negative impact of resident burnout can be seen in both USA and European residents, one-third of whom would not choose urology again if given the choice. Many residents appear trapped in a vicious cycle of burnout, poor QoL, difficulty seeing a doctor, exercising, caring for themselves, and maintaining relationships, which, in turn, can lead to more burnout [34]. At the same time, burnout appears to have a negative impact on the field of academic urology by decreased trainees' desire to choose urology, or medicine on the whole, again as a career. Importantly, significantly fewer USA residents experiencing burnout intended to pursue a job in academic medicine. Elmore et al. [21] reports a similar finding in general surgery residents experiencing burnout, attributing this to 'systematic differences in personality characteristics, lifestyle, or coping strategies' in which residents who are attracted to the flexibility of private practice are more severely impacted by the lack of control over their own schedules during residency.

**Table 2** Multivariable logistic regression model of the association of resident and programme characteristics with burnout.

	USA and European Cohort N = 369			USA Cohort n = 211			European Cohort n = 158		
Weekends on-call/month									
1		Ref.			Ref.			Ref.	
2	0.9	(0.5–1.5)	0.67	0.7	(0.3–1.4)	0.31	1.2	(0.5–3)	0.65
3	4.7	(1.7–13.4)	<b>0.004</b>	3.3	(0.8–12.9)	0.09	6.8	(1.3–36.3)	<b>0.024</b>
Satisfaction between your personal and professional life									
Dissatisfied	4.6	(2.3–9.3)	<b>&lt;0.001</b>	4	(1.5–10.9)	<b>0.006</b>	5.1	(1.9–13.7)	<b>0.001</b>
Neutral		Ref.			Ref.			Ref.	
Satisfied	1	(0.5–2.4)	0.92	1.2	(0.4–3.7)	0.71	0.4	(0.1–1.8)	0.24
Access to mental health services									
Readily available		Ref.			Ref.			Ref.	
Available, but difficult to access	2.5	(1.1–5.5)	<b>0.027</b>	3.4	(1.4–8.4)	<b>0.008</b>	0.6	(0.1–4.7)	0.67
Not available or do not know	2.5	(1.2–5.2)	<b>0.011</b>	3.9	(1.6–9.1)	<b>0.002</b>	0.7	(0.1–4.4)	0.71
Structured mentorship programme									
No or do not know		Ref.			Ref.			Ref.	
Yes	0.4	(0.2–0.7)	<b>0.001</b>	0.4	(0.2–0.8)	<b>0.01</b>	0.3	(0.1–1)	<b>0.045</b>
Non-medical books read/month	0.5	(0.4–0.8)	<b>0.001</b>	0.6	(0.4–0.9)	<b>0.017</b>	0.5	(0.3–0.8)	<b>0.01</b>

P values in bold statistically significant.

**Fig. 1** The predicted probability of burnout in residents stratified by non-medical reading.



The present study results highlight several important points. High overall burnout rates in urology trainees once again serve as a call for increased attention to this important matter within the specialty. The results also demonstrated important low-cost and easy-to-implement institutional changes that can be undertaken to lower the risk of burnout in residents. The creation of structured mentorship opportunities within training programmes has the potential to not only decrease burnout but improve department culture. Increased resident control over scheduling can improve WLB by allowing for increased flexibility. Finally, as increased attention is paid to widespread physician suicide and mental health services

become available on an organisational level, programmes would benefit from encouraging resident utilisation of such services and decreasing departmental stigma associated with reaching out for help.

### Limitations

Our present study is based on survey data potentially limited by sampling and selection bias, and cross-sectional design. Our present study is descriptive in nature and hypothesis generating, and it is not appropriately powered to compare the USA and European cohorts [35]. As such, we were unable to assess the directionality of our associations and to control for confounders not included in our survey. Parameters such as family structure and training programme specifics were not assessed to protect anonymity. This precludes us from being able to study these potentially important and confounding burnout drivers. Other confounders not assessed include varying living conditions in different countries which, in addition to resident salary, could affect overall QoL and, in turn, burnout rates.

The overall low response rate increases the risk of selection bias. The response rate varied between cohorts, which could impact the findings from Belgium and France in particular, where response rates were lower. Although it is unclear why response rates were lower in these countries, one possibility is the recent administration of a burnout survey to French trainees and resultant survey fatigue. Although response rates vary greatly in health science survey research, surveys without incentives tend to achieve response rates <30% [36]. Low response rates are concerning as they increase the risk of nonresponse (sampling) bias.

Interestingly, higher burnout rates were seen in countries with higher response rates, indicating the potential for under-

**Table 3** QoL characteristics stratified by presence of burnout and regional cohort.

	USA			Europe		
	N = 211			N = 158		
	No burnout n = 131	Burnout n = 80	P	No burnout n = 89	Burnout n = 69	P
Self-reported QoL, n (%)						
As bad as it can be	1 (0.8)	5 (6.3)	<b>&lt;0.001</b>	1 (1.1)	10 (14.5)	<b>&lt;0.001</b>
Somewhat bad	15 (11.5)	32 (40.5)		14 (15.7)	37 (53.6)	
Neutral	28 (21.4)	16 (20.3)		24 (27)	12 (17.4)	
Somewhat good	66 (50.4)	24 (30.4)		44 (49.4)	7 (10.1)	
As good as it can be	21 (16)	2 (2.5)		6 (6.7)	3 (4.4)	
Difficulty scheduling doctor visits, n (%)						
No	16 (12.2)	1 (1.3)	<b>0.003</b>	56 (62.9)	31 (44.9)	<b>0.036</b>
Yes	115 (87.8)	79 (98.8)		33 (37.1)	38 (55.1)	
Difficulty seeing friends and family, n (%)						
No	39 (29.8)	8 (10)	<b>&lt;0.001</b>	27 (30.3)	13 (18.8)	0.1
Yes	92 (70.2)	72 (90)		62 (69.7)	56 (81.2)	
Difficulty exercising, n (%)						
No	30 (22.9)	8 (10)	<b>0.026</b>	32 (36)	9 (13)	<b>0.002</b>
Yes	101 (77.1)	72 (90)		57 (64)	60 (87)	
Difficulty engaging in self-care activities, n (%)						
No	39 (29.8)	7 (8.8)	<b>&lt;0.001</b>	35 (39.3)	9 (13)	<b>&lt;0.001</b>
Yes	92 (70.2)	73 (91.3)		54 (60.7)	60 (87)	
Difficulty maintaining a relationship, n (%)						
No	90 (68.7)	36 (45)	<b>&lt;0.001</b>	58 (65.2)	32 (46.4)	<b>0.023</b>
Yes	41 (31.3)	44 (55)		31 (34.8)	37 (53.6)	
Career choice, n (%)						
I would choose to become a urologist again	105 (81.4)	37 (46.3)	<b>&lt;0.001</b>	66 (75)	39 (56.5)	<b>0.047</b>
I would choose to go into medicine, but a different surgical field	5 (3.9)	5 (6.3)		1 (1.1)	5 (7.3)	
I would choose to go into medicine, but a non-surgical field	2 (1.6)	5 (6.3)		8 (9.1)	8 (11.6)	
I would not choose to go into medicine again	17 (13.2)	33 (41.3)		13 (14.8)	17 (24.6)	
Fellowship, n (%)						
Yes	66 (50.4)	29 (36.3)	0.1	52 (58.4)	35 (51.5)	0.7
No	29 (22.1)	21 (26.3)		20 (22.5)	17 (25)	
Unsure	36 (27.5)	30 (37.5)		17 (19.1)	16 (23.5)	
Plans after training, n (%)						
Job in academic medicine	35 (26.7)	8 (10.1)	<b>0.013</b>	20 (22.7)	16 (23.5)	0.8
Job in private practice	45 (34.4)	33 (41.8)		20 (22.7)	14 (20.6)	
Job in hybrid private/academic medicine	51 (38.9)	38 (48.1)		48 (54.6)	37 (54.4)	
Coffee or energy drinks consumed/day, n (%)						
None	15 (11.5)	11 (13.8)	0.5	14 (15.7)	11 (15.9)	1
1–2	87 (66.4)	50 (62.5)		27 (30.3)	18 (26.1)	
3–4	27 (20.6)	15 (18.8)		34 (38.2)	28 (40.6)	
≥5	2 (1.5)	4 (5)		14 (15.7)	12 (17.4)	
Alcoholic drinks consumed/week, n (%)						
None	24 (18.5)	10 (12.7)	0.36	5 (5.7)	10 (14.9)	<b>0.006</b>
1–4	62 (47.7)	33 (41.8)		51 (58)	41 (61.2)	
5–8	33 (25.4)	26 (32.9)		29 (33)	9 (13.4)	
≥9	11 (8.5)	10 (12.7)		3 (3.4)	7 (10.5)	

P values in bold statistically significant.

sampling in the French and Belgian cohorts. It is further possible that residents experiencing burnout may be either more or less likely than their peers to return completed surveys. Individual programme directors' and regional leaders' pre-existing concern for burnout may also influence the distribution pattern of the surveys.

## Conclusion

Our present study demonstrated that there is a high prevalence of burnout in both American and European

urology residents. These findings are important because residents experiencing burnout are likely to have significant personal sequelae, exhibit career regret, and plan to leave academic medicine. While some associations with burnout, such as structured mentorship and non-medical reading, were preserved, certain burnout drivers were distinct for the European and USA cohorts. Our present findings demonstrate the importance of understanding how regional and international differences contribute to burnout and to tailor interventions accordingly.

## Funding Sources

None.

## Conflict of Interest

None.

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**Abbreviations:** MBI, Maslach Burnout Inventory; OR, odds ratio; QoL, quality of life; ROC, receiver operating characteristic; WLB, work–life balance.