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Title	Burnout and distress among physicians in a cardiovascular centre at a quaternary hospital: a survey
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Reviewer 1	Matthew Patel
Institution	Faculty of Medicine and Health Sciences, Royal College of Surgeons in Ireland, Dublin, Ireland
General comments (author response in bold)	Does the background accurately represent current knowledge in this field? 1. The manuscript does a good job outlining the impact of burn-out and the survey instruments used to measure burnout. It would be nice to read more about discovery/first identification of burnout amongst physicians. 2. The authors should expand on why they decided to look at "physicians' gender, years in practice, type of specialty, satisfaction with hospital electronic medical record, perception of the adequacy of staffing levels, being treated fairly in the workplace, work-life integration and meaning in work", were these factors investigated in other studies, anecdotal evidence suggesting these would be implicated… **The is a significant literature that identifies relationships between physician gender, years in practice, type of specialty, satisfaction with hospital electronic medical record, perception of the adequacy of staffing levels, being treated fairly in the workplace, work-life integration and meaning in work. We reference many of these studies in the manuscript.** 3. The manuscript mentions that the responses were compared to physicians in practice at academic health science centers in the U.S, they should give a brief background on this study and the reason why they want to compare results. **Our rationale for comparing burnout and overall distress scores between physicians in practice in the PMCC and in academic health science centres in the United States is explained in the following paragraph from the Interpretation section:** **"Policy-level system factors may play a role in physician burnout and other dimensions of distress. Our interest in understanding similarities and differences in burnout across the US-Canada border stems in part from the fact that the two countries have very different health care systems, and led us to compare distress scores endorsed by physicians in the PMCC with their counterparts in AHSCs in the United States. We postulated that levels of burnout and overall distress scores between these groups of physicians would be similar, and that issues inherent to health care work in these different settings would drive physician burnout and distress."** **We were surprised that burnout and overall distress levels were higher among physicians in practice in the PMCC than in academic health science centres in the United States, and offer potential explanations for this observation in the Interpretation section of the manuscript.** 4. Do the authors explain why they conducted the study? **No, this is not touched on and needs to be included into the introduction.** **The introduction explains the prevalence of burnout and distress among physicians, and the adverse impact of burnout and distress on the care that physicians provide.**

	5. Is there a clear research question? **Yes.** 6. Is the study design appropriate? **Yes.** 7. Are the methods described in enough detail? Did you find anything confusing? Reviewer comment: The authors should expand why the survey was sent to 151 physicians, were there only 151 physicians that practice in the Peter Munk Cardiac Centre? **There are 151 physicians in the PMCC.** Reviewer comment: Were resident physicians included in the study? **No.** Reviewer comment: The criteria to receive an invitation to participate in the survey should be included. The authors should address the issue that staff who might be experiencing burn-out would have less interest/motivation in filling out a survey which could be viewed as "additional work." **As noted in the Methods section of the manuscript, "The survey was open to all 151 PMCC physicians between December 1, 2018 and January 31, 2019." We added the following sentence to the Limitations section of the manuscript:** **"While we cannot exclude the possibility that physicians experiencing burnout may be less likely to fill out a survey that could be viewed as additional work, the majority of physicians participating in this survey answered all survey questions."** Reviewer comment: Participants who scored a high WBI were given contact information for resources that provide assistance management elements of distress, did you collect data on how many participants reached out to these resources? **Yes. This data is reported in Figure 2 of the manuscript.** Is their evidence that the inclusion of these resources leads to improved WBI? **This study identified the prevalence of burnout and distress among physicians in practice in the PMCC. We are currently planning intervention studies to determine if addressing concerns about fair treatment in the workplace or staffing levels will decrease burnout and distress among PMCC physicians.** 8. Are the results reasonable? Interesting? Surprising? The results are reasonable and are not particularly shocking, but they are still interesting and provide evidence to what may have previously presumed. They touch on the differences between their results and the results of the US study, but this is one of the most interesting points of the paper and should be expanded. **We postulate possible explanations for the differences in burnout and distress rates between physicians in the PMCC and in the United States in the Interpretation section of the manuscript, as follows:** **"Policy-level system factors may play a role in physician burnout and other dimensions of distress. Our interest in understanding similarities and**

differences in burnout across the US-Canada border stems in part from the fact that the two countries have very different health care systems, and led us to compare distress scores endorsed by physicians in the PMCC with their counterparts in AHSCs in the United States. We postulated that levels of burnout and overall distress scores between these groups of physicians would be similar, and that issues inherent to health care work in these different settings would drive physician burnout and distress.

We found that PMCC physicians had a higher prevalence of burnout, higher overall WBI scores, and a greater percentage of WBI scores consistent with high or severe distress than physicians in practice at AHSCs in the United States (Table 3). The reasons for these unexpected results are not clear, but could be due to higher physician burnout and distress rates at the PMCC than at other AHSCs in our regional environment. This conclusion is not supported by the results of the Voice of the Faculty survey conducted by the Department of Medicine at the University of Toronto in 2019, which included the 10 AHSCs in the greater Toronto area. Of the physicians at the University of Toronto survey that responded to the question “Thinking about the past 12 months, how often did you feel burned out?” 17.9% (54/301) at Toronto General Hospital and Toronto Western Hospital and 17.1% (192/1,121) at the other 8 AHSCS in Toronto responded “almost always/daily” or “almost always”. Therefore, burnout does not appear to be more prevalent among physicians at Toronto General Hospital and Toronto Western Hospital than among physicians in practice at other AHSCs in Toronto.

Another possible explanation for the higher burnout and overall distress scores endorsed by PMCC in comparison with US physicians in practice at AHSCs could relate to intrinsic differences in the health care systems in Canada and the United States. For example, while the number of physicians per 1,000 population (2.48 vs. 2.55) and hospital beds per 10,000 population (27 vs. 28) in the Canadian and United States health care systems are similar, significantly more physicians in the United States than in Canada are specialists (88.2% vs. 52.8%), and average specialist physician income is lower in Canada than the United States ($230,292 vs. $265,000 CAD, respectively).[31]

Challenges related to differences in the volume of patients requiring management could also partially explain the disparities we observed in the prevalence of burnout and overall distress levels between physicians in practice in the PMCC and in AHSCs in the United States, because the proportion of patients reporting difficulty accessing after-hours care (64% vs. 51%), waiting > 2 months for specialist appointment (30% vs. 6%) and waiting > 4 months for elective surgery (18% vs. 4%) are all higher in Canada than the United States.31 In addition, the percent occupancy of acute care beds is consistently higher in Canada than in the United States (91.2% vs. 63.9% in 2000, 91.6% vs. 62.8% in 2015, respectively).32 Longer wait times due to limitations of resources, less availability of specialist physicians, differences in the volume of clinical activity and workload, more crowded hospital environments and greater personal financial pressures might have contributed to the differences in the prevalence of burnout and higher distress scores among physicians in the PMCC than among physicians in practice at AHSCs in the United States that we observed.

Despite endorsing higher overall burnout and distress scores, physicians in

	the PMCC were more likely to endorse a positive response to the statement "the work the work I do is meaningful to me" than their counterparts in AHSCs in the United States. Additional studies are required to determine if differences in the prevalence of burnout, level of distress and meaning in work exist between physicians in practice in Canada and United States, and to identify the drivers of those differences." 9. Is the interpretation supported by data in the results? **Yes.** 10. Do tables and figures accurately represent the data? Would some other visual be more helpful? **The figures are clear and easy to understand.** 11. Are any important limitations not mentioned? As mentioned above, "The authors should address the issue that staff who might be experiencing burn-out would have less interest/motivation in filling out a survey which could be viewed as "additional work." **We added the following sentence to the limitations section of the manuscript:** **"While we cannot exclude the possibility that physicians experiencing burnout may be less likely to fill out a survey that could be viewed as additional work, the majority of physicians participating in this survey answered all survey questions."** 12. Did you spot any fatal flaws? That is, errors you do not believe the authors could overcome. Please explain clearly. **No there were no "fatal flaws"** 13. For whom are these findings relevant? These findings seem to be most relevant to hospital administrators/those who have control over the factors associated with burnout. The authors should address initiatives that could be undertaken to decrease the level of burnout amongst physicians and should place importance on identifying modifiable factors which can be changed to reduce burnout. **The following paragraph from the Interpretation section references interventions that have been used to decrease physician burnout and distress. This is the subject of ongoing research at the PMCC.** **"Multiple interventions have focused on improving the mental health of physicians, including individual-focused approaches such as mindfulness training, stress management, and small group discussions.33 Structural or organizational strategies, such as changes in work schedules, fostering communication between members of health care teams, and cultivating a sense of teamwork and job control,34, 35 as well as professional coaching sessions36 could also be implemented to decrease physician burnout and distress. The high prevalence of distress scores above the threshold at which physicians are at risk for significant mental health issues and for providing suboptimal patient care that we identified emphasizes the need to direct efforts and resources towards intervention strategies that have been shown to decrease clinician burnout.20, 33, 35, 36 Our baseline data can be**

	used to plan and assess the impact of these interventions at regular intervals." 14. Do the authors place their findings in the context of the literature? To a small extent that authors have placed their findings in the context of the literature, this could be expanded upon, however. The authors commented that the results could be used as a baseline for future studies, are follow-up studies planned? They should comment on how the results will/if impact practice at the Peter Munk Centre. The authors should include evidence based approaches to improving WBI at other centers and evaluate the feasibility of these measures to be implemented at their centre. **Please see the response to Reviewer comment 13.**
Reviewer 2	Diane Aubin
Institution	School of Public Health, University of Alberta, Edmonton, Alta.
General comments (author response in bold)	Although this is a worthwhile and well-written article, I have several concerns, including: 1. The overall goal of the study - what prompted you to do this study, and why just a focus on CV physicians? **We became aware of a large and evolving literature related to the impact of burnout and the other dimensions of distress on the mental health of health care workers, including physicians, on the care they provide. This is referenced in the first paragraph of the Introduction. The relative lack of data on the prevalence of burnout and distress, using a validated tool like the WBI survey prompted us to do this study. among Canadian** **In separate manuscripts, we report the outcome of the WBI survey on nurses and allied health staff in the PMCC. The allied health manuscript has been accepted for publication by CMAJ Open; the nurses manuscript is under revision at CMAJ Open.** 2. The focus of the study is on burnout and distress, where the WBI is a measure of distress, with only one dimension being burnout. **We agree, and have clarified this important point by adding the following sentence to the Introduction section of the manuscript.** **"In addition to burnout, the clinically relevant dimensions of distress include meaning in work, severe fatigue, work-life integration, quality of life, and suicidal ideation.[10]"** 3. There is no explanation of why the additional questions were asked about EMR, satisfaction and "being treated fairly"...this last question was concerning as there was no explanation of what this meant, or how/whether it was defined for participants. **We asked survey participants to respond to statements designed to assess work culture so that we could evaluate the relationship between these responses and other questions in the WBI survey. We clarified the way the responses were defined for participants in the following text, which has been added to the Methods section of the manuscript.** **"Responses to the three additional statements designed to assess work culture , including "please rate your satisfaction with your electronic health record (EHR)", "the staffing levels in this work setting are sufficient to handle the number of patients", and "I am treated fairly in the workplace"**

	were based on a 5-point scale, where 1 = strongly disagree, and 5 = strongly agree." 4. It was not clear to me why it was important to compare this study with studies in the US. **Our rationale for comparing burnout and overall distress scores between physicians in practice in the PMCC and in academic health science centres in the United States is explained in the following paragraph from the Interpretation section:** **"Policy-level system factors may play a role in physician burnout and other dimensions of distress. Our interest in understanding similarities and differences in burnout across the US-Canada border stems in part from the fact that the two countries have very different health care systems, and led us to compare distress scores endorsed by physicians in the PMCC with their counterparts in AHSCs in the United States. We postulated that levels of burnout and overall distress scores between these groups of physicians would be similar, and that issues inherent to health care work in these different settings would drive physician burnout and distress."** **We were surprised that burnout and overall distress levels were higher among physicians in practice in the PMCC than in academic health science centres in the United States, and offer potential explanations for this observation in the Interpretation section of the manuscript.** 5. The Interpretation section was weak, as it was mostly a reiteration of the results and background. **The Interpretation section of the manuscript has been revised, and now includes the following paragraph.** **"There is a clear association between burnout and distress and an increased risk of medical errors, serious safety events, malpractice proceedings, reduced patient satisfaction and worse patient outcomes.[3, 4, 6-8, 22] Health care workers are at high risk for the development of significant mental health issues, including anxiety, depression, and suicide.[23, 24] In this study, we sought to understand if institutional factors affect the prevalence of burnout and distress among physicians that practice in the PMCC."** **We also redrafted the Limitations section of the Interpretation, which is reproduced below.** **"This study has multiple significant limitations. Despite the high response rate (85%), the relatively modest number of physician respondents (127) could limit study validity, made type 2 statistical errors more likely, and preluded multivariable analysis of the PMCC physician WBI survey data. The fact that this is a two-institution study could limit the ability to generalize our results. The previously described supplemental survey questions related to perception of the adequacy of staffing levels, fair treatment in the workplace, and satisfaction with the electronic health record were not subject to pilot evaluation in this study. While we cannot exclude the possibility that physicians experiencing burnout may be less likely to fill out a survey that could be viewed as additional work, the majority of physicians participating in this survey answered all survey questions. Comparison of the prevalence of burnout and WBI scores between physicians in practice in the PMCC and AHSCs in the United States may have a gender bias, because the percentage**

	of male respondents was relatively higher in the PMCC than the United States physician sample. Importantly, survey participants in this study only included physicians that practice in the area of cardiovascular medicine and surgery, which may limit the ability to directly compare the prevalence of burnout and distress with physicians that practice across the full spectrum of specialties in AHSCs in the United States that have responded to the WBI survey." 6. The conclusion, which should summarize why this study was valuable and what you learned from it, did not address either of these points. It would be helpful to expand on "strategies to decrease distress among physicians" - this is vague, and something we have known for a very long while. **The following paragraph has been included in the Interpretation section of the manuscript.** **"Multiple interventions have focused on improving the mental health of physicians, including individual-focused approaches such as mindfulness training, stress management, and small group discussions.[33] Structural or organizational strategies, such as changes in work schedules, fostering communication between members of health care teams, and cultivating a sense of teamwork and job control,[34, 35] as well as professional coaching sessions[36] could also be implemented to decrease physician burnout and distress. The high prevalence of distress scores above the threshold at which physicians are at risk for significant mental health issues and for providing suboptimal patient care that we identified emphasizes the need to direct efforts and resources towards intervention strategies that have been shown to decrease clinician burnout.[20, 33, 35, 36] Our baseline data can be used to plan and assess the impact of these interventions at regular intervals."** **The Conclusion now states:** **"Conclusions. The perception of inadequate staffing levels and unfair treatment in the workplace correlate with higher levels of overall distress among physicians in the PMCC. Initiatives that focus on addressing these institutional factors could lower distress levels among PMCC physicians and improve their work experience and patient outcomes."**