

## PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

This paper was submitted to a another journal from BMJ but declined for publication following peer review. The authors addressed the reviewers' comments and submitted the revised paper to BMJ Open. The paper was subsequently accepted for publication at BMJ Open.

(This paper received three reviews from its previous journal but only two reviewers agreed to published their review.)

## ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	Doctors don't Do-little: A national cross-sectional study of workplace wellbeing of hospital doctors in Ireland
<b>AUTHORS</b>	Hayes, Blánaid; Prihodova, Lucia; Walsh, Gillian; Doyle, Frank; Doherty, Sally

## VERSION 1 – REVIEW

<b>REVIEWER</b>	Melanie Carder University of Manchester, UK
<b>REVIEW RETURNED</b>	05-Sep-2018

<b>GENERAL COMMENTS</b>	<p>This is a very interesting paper about a topical issue. Some comments below:</p> <ol style="list-style-type: none"><li>1) The aims and objectives in the main manuscript could be more clearly/concisely presented. Currently they appear in the last paragraph of the introduction but are combined with other background text i.e. the paragraph starts setting out the aim, then provides a bit more background text and then goes back to the aim/objectives.</li><li>2) You mention in the abstract that you collected information on marital status but then this is not mentioned again throughout the main manuscript (apologies if I missed it). Did you look at this at all?</li><li>3) Work-life balance - did you look to see whether this varied by gender? Given that females may have more responsibility at home (e.g. more childcare)?</li><li>4) You say the response rate varied between 33 and 63% between specialties - that's quite a large variation - it would be interesting to know which had high or low response rates. Did you look at how the results varied by specialty at all? Could it be that doctors in particularly stressful specialties (e.g. A&amp;E?) are over-represented because they are more likely to take part (because they are stressed) or maybe even less likely to take part because they're busy?</li><li>5) This leads into my next comment that one of the limitations discussed should be that the survey is based on self-reports and is therefore subject to potential bias arising from this approach (e.g. response, recollection etc).</li><li>6) There is some cross-over between this and the previously published paper from this survey (reference 28). For example, the workload results are presented in both and in general the two</li></ol>
-------------------------	--

	papers are looking at very similar issues. There should perhaps be more reference to/discussion of the earlier paper in the current discussion?
--	---

<b>REVIEWER</b>	Marylou Murray Department for Human resources for health - policies, norms and standards World health Organization Geneva Switzerland
-----------------	--

<b>REVIEW RETURNED</b>	12-Sep-2018
------------------------	-------------

<b>GENERAL COMMENTS</b>	<p>The authors are to be highly commended for addressing a topic of critical significance to the delivery of high quality health care - the wellbeing of healthcare staff. This paper is well written, timely and addresses a research gap.</p> <p>The limited, and sometimes ambiguous, evidence for work-related wellbeing requires measured interpretation of data. I invite the authors to consider some issues.</p> <p>I suggest that they moderate the language of the introduction: line 1 - the links between work and health are becoming established. An example of the progress made since publication of their cited reference ( Working for a healthier tomorrow) is the Taylor Review of Modern Working Practices. 'Good work' 2017. That there is 'strong' evidence of a 'causative' relationship between effort reward imbalance and poor health requires more robust justification. Burnout literature is replete with debate and controversy. The reference cited to explain that it is a syndrome resulting from chronic occupational stress highlights limitations in the construct. Reported prevalence of burnout varies widely from about 14-80% so selection of one reference for 52% may be considered somewhat arbitrary. The authors are to be commended for subsequently highlighting some of the outstanding methodological issues in burnout research.</p> <p>This survey had several aims and appears to have collected data using 12 outcome measures including GHQ12 for psychological distress. The resultant participant burden may have impacted on response rate however 55% is relatively high for medical surveys. The sampling method is described in the previously published component of the survey that was comprised of 5 outcome measures pertaining to psychological distress (GHQ12), wellbeing and self-stigma. The survey sample size calculation was based on a prevalence of psychological distress of 20%. This was estimated from studies published between 1996 and 2005. The authors are invited to comment on the relevance of this sample size calculation for the outcome measures reported in the current paper. Selection of validated outcome measures facilitated contextualisation of findings and interpretation of data however the authors may wish to consider a few modifications to the presentation of results, discussion and conclusions.</p> <p>Results section: ERI is variously calculated and reported as ratios or categories. This study uses the short form for which there appear to be less comparative evidence limiting contextualising of findings ( whilst decreasing participant burden). The results section reports a ER ratio of 1.4 however the abstract and discussion report that 79% of participants experience workplace stress. This would benefit from clarification including tabulation. The single item measures appear to have been used previously in a very small number of studies therefore moderation in</p>
-------------------------	--

	<p>interpretation is advised. For example the Dutch study cited in respect of work ability had 423 participants, 6% of whom reported burnout. Page 5 line 12 I recommend changing the word 'diagnosing' when referring to burnout as this is not a recognised clinical condition.</p> <p>Results section: Authors could delete one of the '52.3%' in line 30 Page 6. Could include tabulation of ER to describe how the 79% figure was obtained.</p> <p>Discussion Section: Page 7 line 11 would benefit from clarification of the statement 'a group already known to have high levels of psychological distress'. Are they already known from the published findings of this survey or from other research? The latter option requires referencing whilst the former would be challenging to justify as an aim of the current study. Line 13 refers to the interpretation of ER data and requires robust justification and clarification as previously stated. Moderation of language in the interpretation and contextualisation of burnout data is recommended. The introduction cites 53% as a high figure for burnout whilst the discussion attests that levels of burnout in the survey population were high at 30.7%. The authors have not used the most recent data from Shanafelt et al on levels of burnout in the US. Whilst they cite the 2009 and 2012 studies the study published in 2014 showed that there had been an increase in burnout in US physicians from 45.4% in 2011 to 54% in 2014. Therefore lines 26/27 page 7 require amendment. Some transparency about temporality is advised in lines 38/39 of the discussion.</p> <p>Strengths and limitations: Moderation of the claim that use of the single item measures provided scope for international comparison since the evidence base appears to be extremely limited for most of these outcome measures. In light of earlier comments authors may wish to include further limitations in this section.</p> <p>Implications: 'Deeply troubling' are emotive words. 70.8% of this population reported sufficient work ability and 70% expressed a strong/very strong desire to practise medicine. Are the implications 'stark'? Moderation is recommended for the statement that 'four out of five will suffer significant occupational stress'. The evidence from this study and from the current literature on work-related wellbeing in healthcare professionals does not support this statement. Page 9 lines 7/8 pertaining to work ability contradict the reported results.</p> <p>Conclusion: The reported data and current literature do not support the statement that hospital doctors across all grades in Ireland have higher levels of burnout measures than their international peers. The data reported in the study does not support the statement that work life balance contributes to burnout. The comparator used for work ability may not be appropriate.</p> <p>Abstract: This would benefit from amendment to reflect the issues highlighted above.</p>
--	--

## VERSION 1 – AUTHOR RESPONSE

### Reviewer: 1

Reviewer Name: Melanie Carder

Institution and Country: University of Manchester, UK Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below

**R1.1** This is a very interesting paper about a topical issue. Some comments below:

**R1.2** The aims and objectives in the main manuscript could be more clearly/concisely presented. Currently they appear in the last paragraph of the introduction but are combined with other background text i.e. the paragraph starts setting out the aim, then provides a bit more background text and then goes back to the aim/objectives.

**Response:** Thank you for your comment, we have redrafted the paragraph to ensure more clarity.

We have changed the text as follows:

*The prevalence of psychological wellbeing in hospital doctors in Ireland has previously been described and illustrates significant differences between grades, with junior trainee doctors experiencing greater distress than their senior, consultant colleagues(31). Mean hours worked (57 per week) may be a factor with trainees working significantly longer hours than consultants (31). In the context of the challenging psychosocial environment described above, we were also keen to explore workplace wellbeing in this population with a view to identifying work issues affecting workplace wellbeing and helping to guide employers and training bodies towards effective interventions. This study set out to measure parameters of workplace wellbeing, including occupational stress, overcommitment (coping style characterised by excessive work-related commitment), burnout, work life balance, presenteeism (working through illness or injury), workability (balance between work and personal resources) and desire to practise in a population of hospital doctors in Ireland, to explore differences between grades and to discuss the findings in the context of international trends.*

**R1.3** You mention in the abstract that you collected information on marital status but then this is not mentioned again throughout the main manuscript (apologies if I missed it). Did you look at this at all?

**Response:** We would like to apologise for the oversight of including marital status in the abstract, which was included in a previous draft of the manuscript. Due to word count we decided to remove marital status from this manuscript as it warrants more in depth and complex analysis and will be explored separately in a future paper.

We have changed the text as follows:

**Design:** *National cross-sectional study of randomised sample of hospital doctors. Participants provided sociodemographic data (age, sex), work grade (consultant, higher/ basic specialist trainee), specialty, work hours and completed workplace wellbeing questionnaires (Effort Reward Imbalance [ERI] Scale, overcommitment, Maslach Burnout Inventory) and single item measures of work ability, presenteeism, work-life balance and desire to practise.*

**R1.4** Work-life balance - did you look to see whether this varied by gender? Given that females may have more responsibility at home (e.g. more childcare)?

**Response:** Similarly to previous comment, as the purpose of this paper was to provide an overview of consultant vs. trainee workplace wellbeing, we did not perform analysis of individual factors. But, to

answer your question, we ran a comparison of work-life balance for males vs. females. We found that male consultants reported significantly higher work-life balance than their female counterparts, but this was not replicated in trainee doctors. This might be a result of generational changes in men getting more involved in aspects of home life.

We have changed the text as follows:

Discussion (paragraph 7):

*While the aim of this study was to provide an overview of workplace wellbeing of doctors in Ireland, a further analysis of the individual factors and their interplay is needed.*

**R1.5** You say the response rate varied between 33 and 63% between specialties - that's quite a large variation - it would be interesting to know which had high or low response rates. Did you look at how the results varied by specialty at all? Could it be that doctors in particularly stressful specialties (e.g. A&E?) are over-represented because they are more likely to take part (because they are stressed) or maybe even less likely to take part because they're busy?

**Response:** Response rate was indeed highest in those working in emergency medicine. We are currently preparing a manuscript on burnout across all specialties which will elaborate in more detail upon the varying response rates. We have now addressed this recommendation by elaborating under 'strengths and limitations'.

We have changed the text as follows (Strengths and Limitations Para 1):

*As previously reported(31), this study is the first national survey conducted on a cohort of hospital doctors working within the same health system in Republic of Ireland. The results can be taken as largely representative as all but one hospital specialty (radiology) are included. The 55% response rate would be considered high in this population where response rates tend to be low and are declining(51). Those working in emergency medicine are over-represented (response rate 63%) which may reflect their high levels of stress and consequent willingness to participate in order to have their voice heard. Moreover, response rates tend to be lower when questionnaires are long and deal with sensitive topics(52).*

**R1.6** This leads into my next comment that one of the limitations discussed should be that the survey is based on self-reports and is therefore subject to potential bias arising from this approach (e.g. response, recollection etc).

**Response:** Thank you, this is now highlighted in discussion.

We have changed the text as follows (Strengths and limitations Para 4):

*On the other hand, all of the instruments we used solicited self- reports, a methodology which generates subjective views which may be subject to recall bias. The cross-sectional design of the study prevents us from determining the causality or directions of the observed associations. In our sample, the percentage of respondents holding Irish nationality was higher than the number of Irish graduates working in hospitals in a contemporaneous report. This may well reflect the fact that Irish nationals are more likely than their non-Irish colleagues to secure competitive consultant and training posts as we did not survey those in non- training service posts or locums (31). Arguably, were these groups to be included, the prevalence of all negative workplace wellbeing measures might well be higher, as they deal with the same demands as their colleagues but with even less support. Nor did we survey interns, the most junior of trainee doctors in the Irish healthcare system, who have been shown to have high levels of emotional exhaustion(54).*

**R1.7** There is some cross-over between this and the previously published paper from this survey (reference 28). For example, the workload results are presented in both and in general the two papers

are looking at very similar issues. There should perhaps be more reference to/discussion of the earlier paper in the current discussion?

**Response:** the word count limitations constrain us somewhat in referring excessively to our previous paper and we are keen that the reader revert back to the previous paper. We believe that this paper differs substantially from its predecessor in that its focus is workplace as opposed to personal issues. The only workplace issue referred to in the previous paper is long hours which we believed warranted inclusion as a potential personal stressor.

We have changed the text as follows (Para 4 introduction):

*The prevalence of psychological wellbeing in hospital doctors in Ireland has previously been described and illustrates significant differences between grades, with junior trainee doctors experiencing greater distress than their senior, consultant colleagues(31). Mean hours worked (57 per week) may be a factor with trainees working significantly longer hours than consultants (31). In the context of the challenging psychosocial environment described above, we were also keen to explore workplace wellbeing in this population with a view to identifying work issues affecting workplace wellbeing and helping to guide employers and training bodies towards effective interventions. This study set out to measure parameters of workplace wellbeing, including occupational stress, overcommitment (coping style characterised by excessive work-related commitment), burnout, work life balance, presenteeism (working through illness or injury), workability (balance between work and personal resources) and desire to practise in a population of hospital doctors in Ireland, to explore differences between grades and to discuss the findings in the context of international trends.*

**Reviewer: 2**

Reviewer Name: Marylou Murray

Institution and Country: Department for Human resources for health - policies, norms and standards, World health Organization, Geneva, Switzerland Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below

**R2.1** The authors are to be highly commended for addressing a topic of critical significance to the delivery of high quality health care - the wellbeing of healthcare staff. This paper is well written, timely and addresses a research gap.

**R2.2** The limited, and sometimes ambiguous, evidence for work-related wellbeing requires measured interpretation of data. I invite the authors to consider some issues.

**R2.3** I suggest that they moderate the language of the introduction: line 1 - the links between work and health are becoming established. An example of the progress made since publication of their cited reference (Working for a healthier tomorrow) is the Taylor Review of Modern Working Practices. 'Good work' 2017. That there is 'strong' evidence of a 'causative' relationship between effort reward imbalance and poor health requires more robust justification. Burnout literature is replete with debate and controversy. The reference cited to explain that it is a syndrome resulting from chronic occupational stress highlights limitations in the construct. Reported prevalence of burnout varies widely from about 14-80% so selection of one reference for 52% may be considered somewhat arbitrary. The authors are to be commended for subsequently highlighting some of the outstanding methodological issues in burnout research.

**Response:** Thank you for your comments. We acknowledge all of these observations! Indeed, the Rotenstein's systematic review of burnout prevalence in physicians was published shortly after we

submitted our paper and this provides us the opportunity to cite a valuable reference. The Taylor Review is an important additional resource and reference.

We have made changes to the relevant sections of the text as follows (Introduction Paragraphs 1 & 3):

- a) *The links between work and health are becoming established.*
- b) *Reference 2: Taylor, Matthew, Greg Marsh, Diane Nicol, and Paul Broadbent. Good Work: The Taylor Review of Modern Working Practices . London: Great Britain, Department for Business, Energy & Industrial Strategy, 2017. Electronic.*
- c) *Moreover, there is growing evidence that the relationship between effort reward imbalance and poor mental health may be causative (8,9).*
- d) *Reference 9: Rugulies R, Aust B, Madsen IEH. Effort–reward imbalance at work and risk of depressive disorders. A systematic review and meta-analysis of prospective cohort studies. Scand J Work Environ Health. 2017;43(4):294–306. doi:10.5271/sjweh.3632*
- e) *Internationally, reported prevalence of burnout in doctors has been highly variable with comparison challenged by the fact that it has been reported both as a continuous and dichotomous variable(21-23), using different combinations of its constituent domains, variations in specialty and grade composition of the doctor population under study(24-28), and with variable response rates. A recent systematic review found overall burnout prevalence in doctors ranged from 0-80.5%*
- f) *Reference 22: Rotenstein, LS, Torre M, Ramos MA, Rosales RC, Guille C, Sen S, Mata DA. Prevalence of Burnout Among Physicians A Systematic Review. JAMA. 2018;320(11):1131-1150. doi:10.1001/jama.2018.12777*

**R2.4** This survey had several aims and appears to have collected data using 12 outcome measures including GHQ12 for psychological distress. The resultant participant burden may have impacted on response rate however 55% is relatively high for medical surveys. The sampling method is described in the previously published component of the survey that was comprised of 5 outcome measures pertaining to psychological distress (GHQ12), wellbeing and self-stigma. The survey sample size calculation was based on a prevalence of psychological distress of 20%. This was estimated from studies published between 1996 and 2005. The authors are invited to comment on the relevance of this sample size calculation for the outcome measures reported in the current paper. Selection of validated outcome measures facilitated contextualisation of findings and interpretation of data however the authors may wish to consider a few modifications to the presentation of results, discussion and conclusions.

**Response:** The reviewer is correct that numerous measures were used, and that the respondent burden may have affected response rate. It may also be that with several measures used that some of the findings reported are spurious, due to the fact that the study was not initially powered for the outcomes reported in this paper, but also as we have conducted multiple statistical tests. We have added these points to the limitations. We are also aware of the recent publications citing higher prevalence of distress and burnout and that the use of multiple measures poses challenge for estimation of power calculations for each one of them. However considering the response rate of 55% and the +/- 5% margin of error for each outcome, we are confident our findings are representative of the population.

We have changed the text as follows (Strengths and limitations, Para 4):

*We note that with the numerous measures used the respondent burden may have affected response rate. It may also be that with several measures used some of the findings reported are spurious, due not only to the fact that the study was not initially powered for the outcomes reported in this paper, but also as we have conducted multiple statistical tests. We are also aware of the recent publications citing higher prevalence of distress and burnout and that the use of multiple measures poses a challenge for estimation of power calculations for each one of them. However considering the*

response rate of 55% and the +/- 5% margin of error for each outcome, we believe our findings are representative of the population.

**R2.5** Results section: ERI is variously calculated and reported as ratios or categories. This study uses the short form for which there appear to be less comparative evidence limiting contextualising of findings ( whilst decreasing participant burden). The results section reports a ER ratio of 1.4 however the abstract and discussion report that 79% of participants experience workplace stress. This would benefit from clarification including tabulation.

The single item measures appear to have been used previously in a very small number of studies therefore moderation in interpretation is advised. For example the Dutch study cited in respect of work ability had 423 participants, 6% of whom reported burnout. Page 5 line 12 I recommend changing the word 'diagnosing' when referring to burnout as this is not a recognised clinical condition.

**Response:** Thank you for spotting the omission regarding ERI – we have added a section on this in the Methods, Results and Table 2 respectively (a, b, c below) and identified an error in percentage in the process!

We have changed the text as follows:

- a) *The percentage of the population in whom effort was not balanced by reward was calculated to determine a crude estimate of the prevalence of occupational stress, albeit the cut-off for ER does not represent a clinically validated threshold (39,43).*
- b) *Effort reward imbalance (occupational stress) was evident in 81.9% of respondents (Table 2).*
- c) *See Table 2*

Response: we have changed the text regarding single item instruments as follows:

- d) *Bullet 2 Page 2 in 'strengths and limitations': The utilisation of standard instruments previously used elsewhere allows for comparison with other research on doctors*
- e) *Discussion, Para 5: While caution is advised in comparing our results with that much smaller study (n = 423), our findings suggest that the working conditions of hospital doctors in Ireland are less favourable than in the Netherlands.*

Response: we have changed the text regarding 'diagnosing' burnout as follows:

*The 'EE+ 1 rule' has been suggested as the most effective way of identifying burnout i.e. scoring high scores on both EE and DP or high scores in EE combined with low scores on PA(41).*

**R2.6** Results section: Authors could delete one of the '52.3%' in line 30 Page 6. Could include tabulation of ER to describe how the 79% figure was obtained.

**Response:** Thank you, we have changed the text as follows:

#### **Burnout**

*Over half of the respondents had high emotional exhaustion (52.3%) and this was more prevalent in BSTs (61%) and less prevalent in consultants (45.7%) ( $\chi^2=49.07, p<.001$ ).*

**R2.7** Discussion Section: Page 7 line 11 would benefit from clarification of the statement 'a group already known to have high levels of psychological distress'. Are they already known from the published findings of this survey or from other research? The latter option requires referencing whilst the former would be challenging to justify as an aim of the current study.

Response: Indeed, thank you, we have modified the sentence to reflect our findings.

We have changed the text as follows (Discussion Para 1) :

*..... in a group already shown to have high levels of psychological distress (31).*



**R2.8** Line 13 refers to the interpretation of ER data and requires robust justification and clarification as previously stated.

Moderation of language in the interpretation and contextualisation of burnout data is recommended. The introduction cites 53% as a high figure for burnout whilst the discussion attests that levels of burnout in the survey population were high at 30.7%. The authors have not used the most recent data from Shanafelt et al on levels of burnout in the US. Whilst they cite the 2009 and 2012 studies the study published in 2014 showed that there had been an increase in burnout in US physicians from 45.4% in 2011 to 54% in 2014. Therefore lines 26/27 page 7 require amendment. Some transparency about temporality is advised in lines 38/39 of the discussion.

**Response:** We acknowledge the comments on moderation of language on burnout and have amended the text accordingly. However, emotional exhaustion reported in the Shanafelt study of 2015 was 46.9% which is lower than that found in our study. Moreover, Shanafelt's methodology for determination of burnout gives a more inflated prevalence (54.4%) than would be obtained had he used the more conservative EE+1 rule.

We have changed the text as follows (Discussion Para 3):

*The levels of burnout in our population, utilising the conservative methodology described above for its calculation, were also high, evident in nearly a third of respondents and particularly high in trainees. With the limitations in comparability with studies of burnout elsewhere, comparison of levels of emotional exhaustion may be more meaningful. Over 50% of our population had high levels of emotional exhaustion, which is higher than in hospital doctors from the United Kingdom, the United States (US) and Australia (22-25 +1). In our sample, burnout (EE+1) was significantly associated with male sex, lower desire to practise, lower work ability, higher presenteeism, higher ERI ratio and overcommitment, but not with years of experience or workload. In spite of the high prevalence of burnout and work stress, over two thirds of doctors expressed desire to continue in their medical career. However, the desire to practise was rated lower than that reported in British doctors where 81% reported a strong or very strong desire to practise medicine(32).*

We have changed the text as follows (Discussion Para 4):

*While there is no firm evidence that long hours correlate with poor mental health(44), work hours were previously found to be associated with poor personal wellbeing in this population(31) suggesting further exploration of the impact of long hours on personal wellbeing and occupational stress is needed.*

**R2.9** Strengths and limitations: Moderation of the claim that use of the single item measures provided scope for international comparison since the evidence base appears to be extremely limited for most of these outcome measures. In light of earlier comments authors may wish to include **further limitations** in this section.

**Response:** We have included this as proposed.

We have changed the text in Paragraph 2 of 'Strengths and Limitations' as follows:

*The use of single items for measuring presenteeism, work-life balance, work ability and desire to practise also allows for comparison with international studies albeit the number of studies utilising these instruments in doctors is small.*

**R2.10** Implications: 'Deeply troubling' are emotive words. 70.8% of this population reported sufficient work ability and 70% expressed a strong/very strong desire to practise medicine. Are the implications 'stark'? Moderation is recommended for the statement that 'four out of five will suffer significant occupational stress'. The evidence from this study and from the current literature on work-related wellbeing in healthcare professionals does not support this statement. Page 9 lines 7/8 pertaining to work ability contradict the reported results.

**Response:** We are very passionate about wellbeing of healthcare professionals, which sometimes filters out in the language we use to describe our research. Your point on moderation is well made and we have revised the text to reflect this.

We have changed the text as follows:

- *These negative indicators of workplace wellbeing in hospital doctors while a cause for concern are perhaps unsurprising considering the timing of this study, which followed several years of cutbacks in the Irish public sector.*
- *For those who have stayed at home these findings serve as a reminder that medicine, always a challenging profession, is currently in distress. If the status quo is maintained, one in three doctors is likely to experience burnout and four out of five may experience occupational stress. If nearly a third continue to experience insufficient work ability, then many of those who do remain may well retire early or worse, develop health problems, forcing them to leave service prematurely.*

**R2.11 Conclusion:** The reported data and current literature do not support the statement that hospital doctors across all grades in Ireland have higher levels of burnout measures than their international peers. The data reported in the study does not support the statement that work life balance contributes to burnout. The comparator used for work ability may not be appropriate.

**Response:** In light of our comments in 2.8, we contend that the reported data and current literature do in fact support our findings i.e. that hospital doctors across all grades in Ireland have higher levels of burnout measures than their international peers.

We have changed the text and the conclusion to incorporate feedback on burnout and work-life balance as follows:

- Paragraph 3 of Introduction: see 2.3*
- Paragraph 3 of Discussion: see 2.8*
- Conclusion: Hospital doctors in Ireland have higher levels of burnout measures than their international peers. Across all grades, burnout was associated with male sex as was high level of overcommitment. Occupational stress, work ability, presenteeism, work-life balance and desire to practise were variably associated with burnout across grades. Levels of occupational stress were high with effort outweighing reward. One third had insufficient work ability and their work-life balance was unfavourable when compared with doctors in the US, as were levels of presenteeism. Further research is needed on the degree of interplay between individual factors and workplace wellbeing. Levels of burnout and other measures of workplace wellbeing should be monitored as a quality indicator in healthcare with a view to determining whether specific interventions have had a positive impact on their prevalence. Such evidence should inform work-force planning and retention policies to address current service gaps and improve the working lives of all those who provide clinical care.*

**R2.12 Abstract:** This would benefit from amendment to reflect the issues highlighted above.

**Response:** We have reviewed the abstract to incorporate these changes.

We have changed the text as follows:

**Objectives:** *To measure levels of occupational stress, burnout, work-life balance, presenteeism, work ability (balance between work and personal resources) and desire to practise in trainee and consultant hospital doctors in Ireland.*

**Design:** *National cross-sectional study of randomised sample of hospital doctors. Participants provided sociodemographic data (age, sex), work grade (consultant, higher/ basic specialist trainee), specialty, work hours and completed workplace wellbeing questionnaires (Effort Reward Imbalance*

[ERI] Scale, overcommitment, Maslach Burnout Inventory) and single item measures of work ability, presenteeism, work-life balance and desire to practise.

**Setting:** Irish publicly funded hospitals and residential institutions.

**Participants:** 1749 doctors (response rate of 55%). All hospital specialties were represented except radiology.

**Results:** 29% of respondents had insufficient work ability and there was no sex, age or grade difference. 70.6% reported strong or very strong desire to practise medicine, 22% reported good work-life balance, 82% experienced workplace stress, with effort greatly exceeding reward, exacerbated by overcommitment. Burnout was evident in 30.7% and was significantly associated with male sex, lower desire to practise, lower work-ability, higher presenteeism, higher ERI ratio and greater overcommitment. Apart from the measures of work ability and overcommitment, there was no sex or age difference across any variable. However effort-reward imbalance and burnout were significantly lower in consultants than trainees.

**Conclusions:** Hospital doctors across all grades in Ireland had insufficient work ability, low levels of work-life balance, high levels of work stress and almost one third experienced burnout indicating suboptimal work conditions and environment. Yet, most had high desire to practise medicine. Measurement of these indices should become a quality indicator for hospitals and research should focus on the efficacy of a range of individual and organisational interventions for burnout and occupational stress.

#### VERSION 2 – REVIEW

<b>REVIEWER</b>	Melanie carder University of Manchester, Manchester
<b>REVIEW RETURNED</b>	11-Dec-2018
<b>GENERAL COMMENTS</b>	I am happy that the authors have adequately revised the manuscript in light of my previous comments
<b>REVIEWER</b>	Marylou Murray Department of human resources for health policies, norms and standards World Health Organization Geneva Switzerland
<b>REVIEW RETURNED</b>	20-Nov-2018
<b>GENERAL COMMENTS</b>	All the queries raised in my initial review have been addressed satisfactorily. This innovative research makes a significant contribution to medical wellbeing.