Burnout and Distress among Nurses in the Peter Munk Cardiac Centre

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Background: Burnout has a negative impact on the mental health of nurses and the care they provide. This study documents burnout and distress levels in cardiovascular nurses at a quaternary referral hospital.

Methods: Nurses were invited to complete the nine-question WellBeing Index (WBI) survey, which measures fatigue, depression, burnout, anxiety/stress, and mental/physical quality of life. Demographics, work culture items and survey responses were compared between and within nursing groups. Multivariable logistic regression identified independent associations between demographics, workplace characteristics and high WBI scores.

Results: 242/493 (49%) of nurses completed the survey. Nurses reporting burnout (79%) were more likely to document insufficient staffing levels (82%, p=0.0005) or being treated unfairly (88%, p=0.0002). Nurses endorsed WBI scores ≥2 (78%) or ≥4 (55%), indicative of high or severe distress, respectively. Nurses endorsed a high WBI score if dissatisfied with the electronic health record (EHR, p=0.0029), or they perceived insufficient staffing levels or unfair treatment (both p<0.0001). Nurses graduating <16 years ago had 2.7-fold higher odds of a high WBI score (95% CI 1.1–6.7, p=0.034), while nurses who perceived adequate staffing levels had an odds ratio for a high WBI score of 0.27 (95% CI 0.11–0.64, p=0.0028).

Interpretation: Perception of inadequate staffing levels and being treated unfairly correlated with nursing burnout. Dissatisfaction with the EHR, insufficient staffing levels, unfair treatment and being on staff less than 16 years were associated with high distress scores. Addressing these institutional factors could decrease burnout and distress among nurses and improve their work experience and patient outcomes.

Introduction

Burnout is a work-related syndrome characterized by emotional exhaustion, a sense of reduced personal accomplishment and depersonalization that may manifest as negativity, cynicism, and the inability to express empathy or grief.(1, 2) Burnout negatively impacts nurses' physical and mental health, increases nursing turnover rates and is associated with poor job performance and threats to patient safety, and is more prevalent in hospitals with a higher number of patients per nurse.(3-5) Over 20% of nurses are at risk of post-traumatic stress disorder as a result of workplace mistreatment, and nearly half of all nurses experience burnout in some form, a rate more than twice that among professionals in other fields.(6) For these reasons, burnout among nurses and other health care professionals is a public health crisis.(2)

Multiple validated survey instruments, including the Maslach Burnout Index(1, 7) and the Well Being Index (WBI) survey(8, 9) can measure burnout and other dimensions of distress in nurses. With the 9-item WBI survey, a WBI score ≥ 2 identifies nurses with high levels of overall distress.(9) The 9-item WBI survey can also identify nurses who are doing well (high overall quality of life, high degree of meaning in work, satisfied with work–life balance), and nurses whose degree of distress increases their risk of adverse professional consequences, such as patient care errors, professional dissatisfaction and intent to leave their job.(9)

We used the WBI survey to assess the prevalence of burnout and overall distress in nurses in the Peter Munk Cardiac Center (PMCC) at Toronto General Hospital and Toronto Western Hospital. The relationship between nurses' responses to individual WBI survey questions and their gender, years in practice, area of practice, satisfaction with the hospitals electronic health record, perception of the adequacy of staffing levels, being treated fairly in the workplace, work-life integration and meaning in work were evaluated, and the demographic and environmental factors that predicted high nurse WBI scores were assessed. Then, we compared responses to the WBI survey endorsed by nurses in the PMCC with nurses in practice at academic health science centers in the United States that have completed this survey.

Methods

After placing posters in multiple areas across the PMCC describing the WBI survey (Appendix 1), an independent third party (Canadian Viewpoint) sent e-mail invitations (Appendix 2) to complete the WBI survey to the 493 nurses that practice in the PMCC. Neither UHN or the study authors had access to individual responses to the WBI survey, which were collected by CWS, 3014 Allegro Park LN SW, Rochester, MN 55902 https://www.mededwebs.com/well-being-index. The 9 questions in the WBI survey, which assigns a range of scores from   2 to + 9 have previously been described.(8, 10) The ability of the WBI survey to measure dimensions of distress, including fatigue, depression, burnout, anxiety/stress, and mental/physical quality of life has been validated in a sample of 812 nurses.(9)

Study participants were also asked to rate how satisfied they are with the electronic health record using a 5-point Likert scale, with "very unsatisfied" yielding a score of -2, and "very

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satisfied" a score of + 2. Participants were also asked to rate the statements "staffing levels in this work setting are sufficient to handle the number of patients" and "I am treated fairly in the workplace", also using a 5-point Likert scale, with "strongly disagree" yielding a score of -2, and "strongly agree" a score of + 2

Upon completion of the survey questions, nurses received instantaneous feedback via e-mail in the form of a dashboard that quantified each dimension of distress, and that compared the results for each individual nurse with all other nurses that have completed the WBI survey. If a high WBI score indicative of distress was identified, i.e. ≥ 2,(9) the e-mail response to individual study participants included the information required to access the local, regional and provincial resources that provide assistance managing stress and resilience, fatigue, emotional concerns, suicidal thoughts, issues related to relationships and work-life balance, and to alcohol or substance abuse.

Statistical analysis. We used standard univariate statistical comparisons using Chi-square or Kruskal-Wallis tests as appropriate to describe this sample of nurses. We compared selected demographics, work culture items and elements of the WBI survey. Multivariable logistic regression was used to identify independent associations between demographic and workplace characteristics and a high WBI survey score, and odds ratios and confidence intervals were calculated for the association of each independent predictor of a high WBI score. We then evaluated univariate associations among WBI data from nurses in practice at academic health science centers (AHSCs) in the United States in comparison to nurses in practice at the PMCC. For this analysis, we defined AHSCs as academic/learning hospitals that deliver basic and clinical research, education to health professionals and clinical care to patients.(11) All analyses were conducted using SAS Version 9.

Ethics. This study was reviewed by the University Health Network Research Ethics Board as a quality improvement study.

Results

WBI survey response rate and demographics. Of the 493 nurses who received a request to complete the WBI survey, 242 (49.1%) responded. We report nurses' gender, years since graduation from nursing school, years working at UHN, primary practice location and employment status in Table 1.

Distribution of nurse WBI scores. The mean WBI score for all nurses was 3.5 ± 0.17 (mean ± SD). Figure 1 shows the proportion of nurses endorsing each WBI score. Overall, 78% of nurses recorded a WBI score ≥2, and 55% of nurses endorsed a WBI score ≥4.

Response to individual questions in the WBI survey. One hundred eighty eight of 242 nurses (78%) responded that they felt burned out from their work, 191/242 (79%) noted they were bothered by emotional problems, and 179/242 (74%) replied that they were worried that work is hardening them emotionally, while 87/242 (36%) of nurses agreed or strongly agreed that

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their work schedule leaves them enough time for their personal life. Responses to the remaining WBI survey questions appear in Table 2.

Next, we evaluated the relationship between nurses' perception of their workplace environment (sufficiency of staffing levels, being treated fairly, and satisfaction with the electronic health record) and their responses to individual questions in the WBI survey (Table 2). Nurses whose response was neutral or who somewhat or strongly disagreed that staffing levels in the work setting are sufficient were more likely to feel burned out (82%, p = 0.0005), be bothered by emotional problems (80%, p = 0.005), worry that work is hardening them emotionally (78%, p = 0.0013), often feel down, depressed, or hopeless (59%, p = 0.012), or feel that things were piling up so high they could not overcome them (51%, p = 0.028), and report that their work schedule leaves enough time for their personal life (50%, p = 0.0013).

Nurses who responded as neutral or who somewhat or strongly disagreed that they are treated fairly in the workplace were more likely to feel burned out from their work (88%, p = 0.0002), be bothered by emotional problems (87%, p = 0.0043), worry that work is hardening them emotionally (84%, p = 0.0012), feel down, depressed, or hopeless (66%, p = 0.0013), feel that things were piling up so high they could not overcome them (60%, p = 0.0002), or report that their work schedule leaves enough time for personal life (55%, p = 0.0082).

Nurses who responded neutral or were somewhat or strongly unsatisfied with the electronic health record were more likely to report that they have been bothered by emotional problems (58%, p = 0.012), and were more likely to disagree or strongly disagree that their work schedule leaves enough time for their personal life (60%, p = 0.0087). The number of times nurses accessed contact information for local, regional or provincial resources that help manage each element of distress is presented in Figure 2.

Predictors of high physician WBI scores. Nurses were more likely to endorse a WBI score of ≥2 if they were dissatisfied with the electronic health record (p = 0.0029), disagreed that staffing levels are sufficient (p < 0.0001), or disagreed that they were treated fairly in the workplace (p <0.0001, Table 3). Conversely, we did not identify any relationship between nurses with a WBI scores ≥2 and their gender, years since graduation from nursing school, years working at UHN, employment status or primary practice location.

Multivariable analysis (Table 3) showed that nurses who graduated <16 years ago were 2.7-fold more likely to have a WBI score ≥2 (95% confidence interval 1.1 – 6.7, p = 0.034), while nurses who thought staffing levels were adequate had an odds ratio for a WBI score ≥2 of 0.27 (95% confidence interval 0.11 – 0.64, p = 0.0028).

Comparison of WBI scores between nurses in practice in the PMCC and at AHSCs in the United States. The average WBI score was higher in the 242 PMCC nurses in this study than the 3,627 nurses in practice at US AHSCs that have completed the WBI survey (3.6 ± 2.61 vs. 2.1 ± 2.58, p < 0.0001, Kruskal-Wallis H test, Table 5). The percentage of nurses with a WBI score of ≥2, indicative of high distress, or a WBI score of ≥4, indicative of severe distress, was higher in the

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PMCC than the comparison cohort of US nurses (79% vs. 57%, p < 0.0001 and 54% vs. 32%, p < 0.0001 respectively, Chi-Square).

Overall, nurses in the PMCC were more likely than nurses in AHSCs in the US cohort to report being bothered by emotional problems (79% vs. 64%, p < 0.0001), feel burned out from work (78% vs. 61%, p < 0.0001), worry that work is hardening them emotionally (74% vs. 47%, p < 0.0001), feel down, depressed, or hopeless (56% vs. 41%, p < 0.0001), feel that things were piling up so high they could not overcome them (48% vs. 41%, p < 0.0001), state their physical health interfered with their ability to do daily work (45% vs. 25%, p < 0.0001) or fall asleep while sitting inactive in a public place (38% vs. 12%, p < 0.0001), and were less likely to agree or strongly agree that their work schedule leaves enough time for their personal life (36% PMCC nurses vs 46% US nurses, p < 0.0001).

Interpretation

We used a validated survey instrument, the WBI score(9) to measure burnout and distress among nurses in practice at the PMCC. In this study, 78% of nurses reported feeling burned out from their work. The perception of inadequate staffing levels and of being treated unfairly in the workplace correlated with burnout among PMCC nurses.

A WBI score ≥2 identifies nurses with high levels of overall distress, because such scores are associated with a 4.4-fold higher likelihood of burnout, 2.4-fold higher likelihood of poor overall quality of life and intent to leave their current position (for reasons other than retirement) in the next 24 months, 2.3-fold higher likelihood of severe fatigue and 2-fold higher likelihood of reporting a recent patient error.(9) We interpreted a WBI score ≥4 to indicate severe distress, because such scores are associated with an 8.1-fold higher likelihood of burnout, 4.6-fold higher likelihood of low quality of life and intent for nurses to leave their current position in the next 24 months, 3.6-fold higher likelihood of recent suicidal ideation, 3.5-fold higher likelihood of extreme fatigue and 2.7-fold higher likelihood of reporting a recent patient care error.(9)

We found that 78% of PMCC nurses endorsed a WBI score ≥2, and 55% of nurses endorsed a WBI score ≥4. Dissatisfaction with the EHR, insufficient staffing levels, unfair treatment and being on staff less than 16 years were associated with high distress scores among PMCC nurses. Graduation from nursing school within the last 15 years was an independent predictor of a high distress, while the perception of adequate staffing levels independently predicted low overall distress levels among nurses. Multiple other studies have confirmed high levels of burnout and distress among nurses, especially in the early phase of their career,(4, 5, 12) and have noted that nurses are 2- to 3-fold more likely to leave their job in their first 5 years of practice.(13) The observation that the well-being of nurses is directly related to the safety and quality of care that nurses provide and the rate of hospital-acquired infections, as well as nurses career satisfaction and turnover emphasizes the importance of these findings.(9, 14-16)

We found that nurses in practice at the PMCC had higher overall WBI scores and a greater percentage of WBI scores indicative of high or severe distress than their counterparts in

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practice at AHSCs in the United States (Table 5). The reasons for this dichotomy are not clear but could relate to differences in the Canadian and US health care systems. For example, while the number of nurses per 1,000 population (10.8 vs. 11.2, respectively) and number of hospital beds per 10,000 population (27 vs. 28) are similar, nursing income ($55,260 vs. $70,610) is lower in Canada than in the US,(17) and the percent occupancy of acute care beds is consistently higher in Canadian than US hospitals (91% vs. 64% in 2000, 92% vs. 63% in 2015).(18) Therefore, personal financial pressures and crowded hospital environments might have contributed to the differences in burnout and distress scores between nurses in practice in the PMCC and in US AHSCs that we observed.

Another possible explanation for the high WBI scores in PMCC nurses is that the work environment in the PMCC is more challenging than in other AHSCs in our region. This hypothesis is not supported by annual nursing turnover data, which shows that less nurses voluntarily left their position in the PMCC (3.9%) than across all of University Health Network[1] (4.4%) or all 17 AHSCs in Ontario (6.5%) in the 2017/2018 fiscal year.[2] All of these rates appear lower than in the rest of Canada, where the mean nursing turnover rate is 19.9%,(5) and the US, where nursing turnover in hospitals with more than 500 beds was 18.6% in 2018.(13)

This study has multiple limitations. Study participants were limited to nurses that practice in the area of cardiovascular medicine in two quaternary referral hospitals, which could limit the ability to generalize our results. Just under 50% of nurses responded to the survey, which could introduce response bias. The relatively modest number of respondents could limit study validity, makes type 2 statistical errors more likely, and decreases the potential for the multivariable logistic regression model to yield statistically significant results. Survey respondents in this study included nurses that practice in the area of cardiovascular medicine and surgery, which limits the ability to directly compare burnout and distress scores with nurses that practice in the Unites States that have completed the WBI survey, as the cohort of nurses from the United States included nurses that practice in all areas of nursing in an AHSC.

The perception of inadequate staffing levels or of being treated unfairly in the workplace correlates with burnout among nurses. Furthermore, dissatisfaction with the EHR, the perception of insufficient staffing levels or unfair treatment, and being on staff less than 16 years were associated with high levels of distress among PMCC nurses. Our finding suggests that strategies to decrease burnout and distress among nurses should be directed at these institutional factors. Specific attention should be focused on nurses in the initial stages of their career, where the risk of burnout and distress are highest. The prevalence of distress scores above the threshold at which nurses are at risk for mental health issues and for providing suboptimal patient care emphasizes the need to direct effort and resources towards intervention strategies that have been shown to decrease burnout among nurses.(19, 20) The

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[1] Includes Toronto General Hospital, Toronto Western Hospital, Princess Margaret Hospital, Toronto Rehabilitation Institute.
[2] Data from the Ontario Hospital Association.

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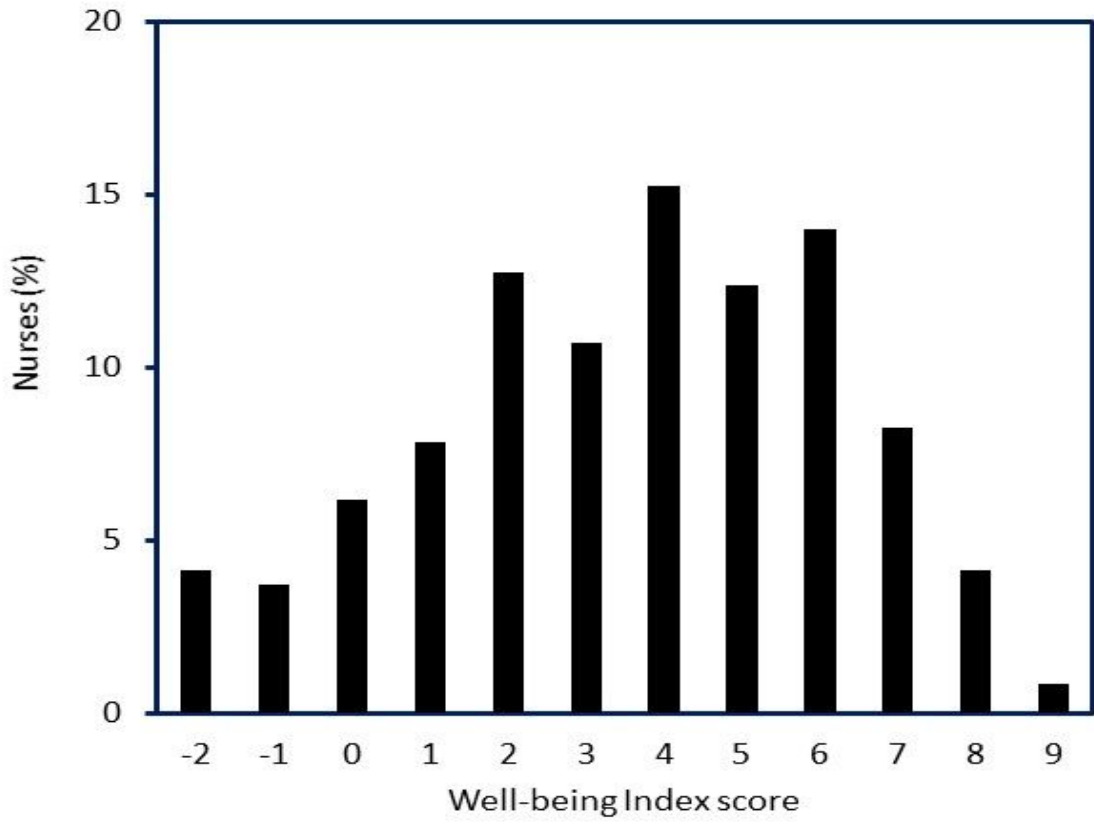49
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level of burnout and distress identified in this study can be used as a baseline to evaluate the efficacy of interventions that are designed to decrease burnout and distress among nurses in the PMCC.

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Figure 1. Distribution of well-being Index scores among 242 nurses in the PMCC.

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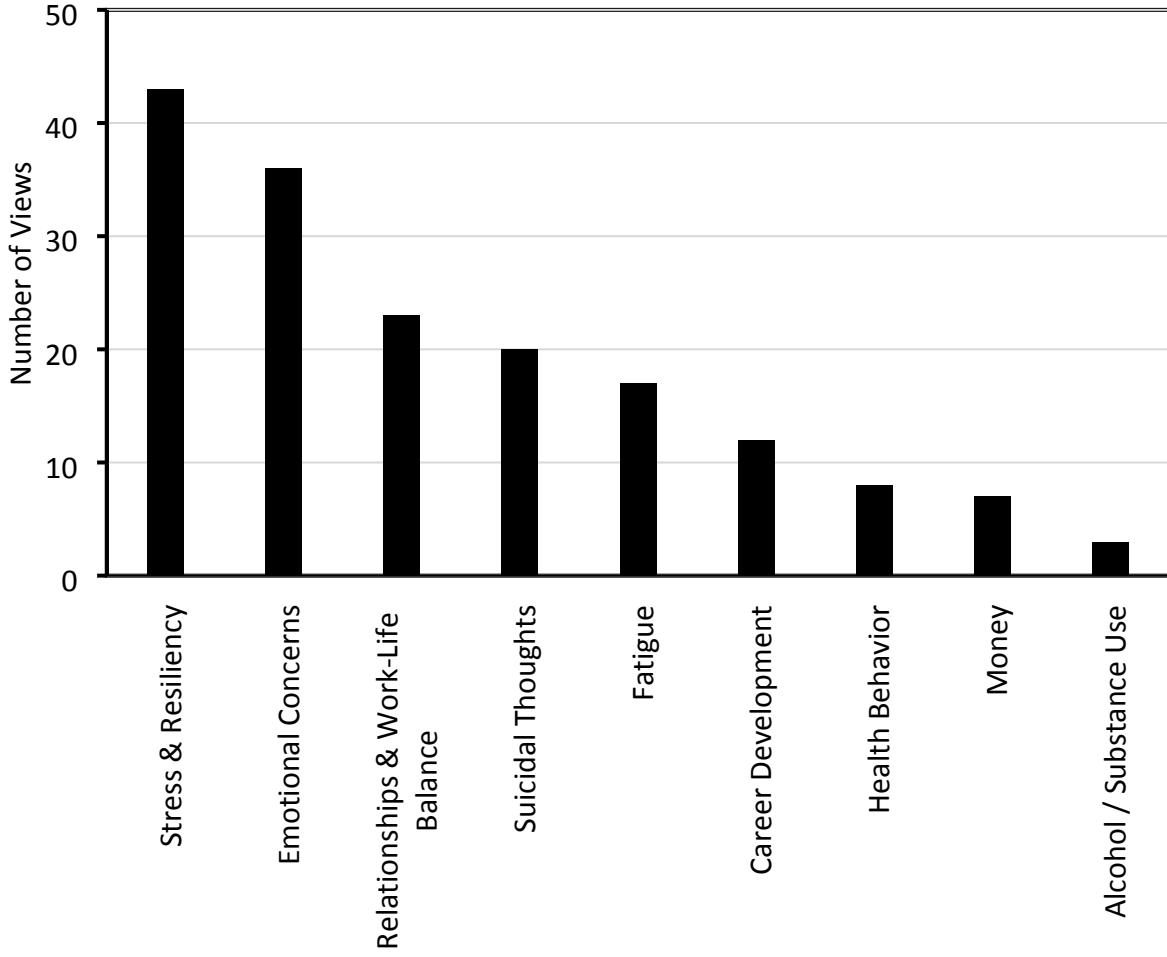
Figure 2. Access to online resources by PMCC 242 nurses. Number of views, by category.

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Appendix 1. Poster describing the WBI survey.

Well-Being Index

Why?

To assess the well-being of clinicians (nurses, allied health, pharmacists, physicians) at the PMCC.

What?

The Well-Being Index is a web-based tool that evaluates multiple dimensions of your well-being.

You will receive your own individual results. Your responses and your dashboard of results are **completely anonymous and confidential.**

PMCC will only receive aggregate anonymous data. This data will help us focus on caring for our caregivers.

When?

You will receive an email invitation from Canadian Viewpoint with the subject line "Invitation to use the Well-Being Index".

The email invitation will have information and instructions that explain how to complete the Well-Being Index.

Thank you for participating in this important survey.

UHN Peter Munk Cardiac Centre

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Appendix 2. E-mail invitation to participate in the Well-Being Index survey.

Email Subject line: **Well-Being Index Survey**

Your well-being is vital to patients' outcomes. Assess your well-being and compare your results.

We are sending this note as an invitation to participate in our very important survey on nurse well-being. We are undertaking this survey because we are committed to supporting the well-being of all our clinicians.

Setting up an account is easy and completing the index takes just a few minutes.

Assess Your Well-Being Online:

https://www.mywellbeingindex.org/signup

Invitation Code: **UHN NURSE**

Download the Well-Being Index Mobile App

What is the Well-Being Index?

The Well-Being Index is a **100 percent anonymous**, web-based tool that evaluates multiple dimensions of your well-being. This tool allows users to compare their scores to clinicians at other hospitals, and to track their own well-being over time. After completing the on-line survey, which takes about 3 minutes, you will immediately receive your **confidential** results in the form of a dashboard. The survey also provides important contact information and resources, should you require further assistance. PMCC will receive aggregate, anonymous data that will help us focus on caring for our caregivers, including developing new ways to improve clinician well-being and decrease clinician burnout.

Confidentiality of Results

It is important to emphasize that your individual responses and your dashboard of results are **completely anonymous and confidential.** It will not be possible for the PMCC, UHN or Canadian Viewpoint, the independent company that is sending you this link to complete the Well-Being

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Index survey, to see or obtain this information. UHN Human Resources and the UHN Digital and Privacy Office have vetted and approved this approach to ensure that your results remain private.

Confidential

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Gender	n (%)	Years since graduation from nursing school	n (%)	Years working at UHN	n (%)	Employment status	n (%)	Work Area	n (%)
Male	31 (13%)	< 2	14 (6%)	< 2	25 (10%)	Full-time, permanent	197 (81%)	Out-patient Clinic	13 (5%)
Female	206 (87%)	2 - 5	32 (13%)	2 - 5	47 (19%)	Part-time, permanent	36 (15%)	In-patient Ward	101 (42%)
Gender Diverse	1 (0.4%)	6 - 10	39 (16%)	6 - 10	28 (12%)	Casual, temp, other	9 (4%)	Critical Care	100 (41%)
Missing	4	11 - 15	34 (14%)	11 - 15	49 (20%)			Cath lab or Int Radiology	19 (8%)
		> 15	123 (51%)	> 15	93 (38%)			Other	9 (4%)

Table 2. Response to individual WBI survey questions

	Have you felt burned out from your work			Have you worried that work is hardening you emotionally			Have you often felt bothered by feeling down, depressed, or hopeless			Have you fallen asleep while sitting inactive in a public place			Have you felt that things were piling up so high you could not overcome them			Have you been bothered by emotional problems			Has physical health interfered with ability to do daily work			Work I do is meaningful to me (categorized)				Work schedule leaves enough time for personal life (categorized)			
	Yes (N=188)	No (N=54)	P-value	Yes (N=179)	No (N=63)	P-value	Yes (N=135)	No (N=107)	P-value	Yes (N=93)	No (N=149)	P-value	Yes (N=115)	No (N=127)	P-value	Yes (N=191)	No (N=51)	P-value	Yes (N=108)	No (N=134)	P-value	1-2 (N=3)	3-5 (N=67)	6-7 (N=172)	P-value	1-2 (N=110)	3 (N=45)	4-5 (N=87)	P-value
Gender, n (%)			0.74			0.74			0.46			0.37			0.56			0.85			0.34				0.40				0.36
Male	23 (74%)	8 (26%)		24 (77%)	7 (22%)		15 (48%)	16 (52%)		15 (48%)	16 (52%)		14 (45%)	17 (55%)		25 (81%)	6 (19%)		16 (52%)	15 (48%)		1 (3%)	12 (39%)	18 (58%)		10 (32.3%)	8 (25.8%)	13 (42%)	
Female	162 (79%)	44 (21%)		151 (73%)	55 (26%)		117 (57%)	89 (43%)		77 (37%)	129 (63%)		98 (48%)	108 (52%)		162 (79%)	44 (21%)		88 (43%)	118 (57%)		2 (1%)	53 (26%)	151 (73%)		97 (47.1%)	36 (17.5%)	73 (35%)	
Gender Diverse	1 (100%)	0 (0%)		1 (100%)	0 (0%)		1 (100%)	0 (0%)		0 (0%)	1 (100%)		1 (10%)	0 (0%)		1 (100%)	0 (0%)		1 (100%)	0 (0%)		0 (0%)	0 (0%)	1 (100%)		0 (0.0%)	0 (0.0%)	1 (100%)	
Missing	2	2		3	1		2	2		1	3		2	2		3	1		3	1		0	2	2		3	1	0	
When did you graduate from nursing school, n (%)			0.25			0.45			0.40			0.011			0.41			0.16			0.89				0.45				0.82
<2 years	9 (64%)	5 (36%)		10 (71%)	4 (29%)		11 (79%)	3 (21%)		10 (71%)	4 (29%)		7 (50%)	7 (50%)		14 (100%)	0 (0%)		6 (43%)	8 (57%)		0 (0%)	3 (21%)	11 (79%)		9 (64%)	2 (14%)	3 (21%)	
2-5 years	28 (88%)	4 (13%)		25 (78%)	7 (22%)		17 (53%)	15 (47%)		17 (53%)	15 (47%)		16 (50%)	16 (50%)		25 (78%)	7 (22%)		16 (50%)	16 (50%)		1 (3%)	11 (34%)	20 (63%)		17 (53%)	6 (19%)	9 (28%)	
6-10 years	31 (80%)	8 (21%)		32 (82%)	7 (18%)		23 (59%)	16 (41%)		15 (39%)	24 (61%)		14 (36%)	25 (64%)		33 (85%)	6 (15%)		16 (41%)	23 (59%)		1 (3%)	14 (36%)	24 (62%)		18 (46%)	7 (18%)	14 (36%)	
11-15 years	29 (85%)	5 (15%)		27 (79%)	7 (21%)		20 (59%)	14 (41%)		14 (41%)	20 (59%)		20 (59%)	14 (41%)		28 (82%)	6 (18%)		17 (50%)	17 (50%)		0 (0%)	12 (35%)	22 (65%)		13 (38%)	8 (24%)	13 (38%)	
16+ years	91 (74%)	32 (26%)		85 (69%)	38 (30.9%)		64 (52%)	59 (48%)		37 (30%)	86 (70%)		58 (47%)	65 (53%)		91 (74%)	32 (26%)		53 (43%)	70 (57%)		1 (1%)	27 (22%)	95 (77%)		53 (43%)	22 (18%)	48 (39%)	
When did you begin working at UHN, n (%)			0.38			0.83			0.92			0.061			0.85			0.59			0.51				0.28				0.84
<2 years	17 (68%)	8 (32%)		18 (72%)	7 (28%)		15 (60%)	10 (40%)		16 (64%)	9 (36%)		12 (48%)	13 (52%)		22 (88%)	3 (12%)		12 (48%)	13 (52%)		0 (0%)	7 (28%)	18 (72%)		13 (52%)	4 (16%)	8 (32%)	
2-5 years	38 (81%)	9 (19%)		37 (79%)	10 (21%)		28 (60%)	19 (40%)		20 (43%)	27 (57%)		20 (43%)	27 (57%)		37 (79%)	10 (21%)		23 (49%)	24 (51%)		2 (4%)	15 (32%)	30 (64%)		26 (55%)	7 (15%)	14 (30%)	
6-10 years	20 (71%)	8 (29%)		20 (71%)	8 (29%)		15 (54%)	13 (46%)		9 (32%)	19 (68%)		12 (43%)	16 (57%)		24 (86%)	4 (14%)		9 (32%)	19 (68%)		0 (0%)	11 (39%)	17 (61%)		13 (46%)	6 (21%)	9 (32%)	
11-15 years	42 (86%)	7 (14%)		38 (78%)	11 (22%)		25 (51%)	24 (49%)		17 (35%)	32 (65%)		26 (53%)	23 (47%)		38 (78%)	11 (22%)		25 (51%)	24 (49%)		0 (0%)	15 (31%)	34 (69%)		19 (39%)	11 (22%)	19 (39%)	
16+ years	71 (76%)	22 (24%)		66 (71%)	27 (29%)		52 (60%)	41 (44%)		31 (33%)	62 (67%)		45 (48%)	48 (52%)		70 (75%)	23 (25%)		39 (42%)	54 (58%)		1 (1%)	19 (20%)	73 (79%)		39 (42%)	17 (18%)	37 (40%)	
Employment status at UNH, n (%)			0.47			0.55			0.052			0.60			0.46			0.64			0.80				0.94				0.81
Full-time permanent	156 (79%)	41 (21%)		148 (75%)	49 (25%)		111 (56%)	86 (44%)		77 (39%)	120 (61%)		91 (46%)	106 (54%)		156 (79%)	41 (20.8%)		87 (44%)	110 (56%)		3 (2%)	54 (27%)	140 (71%)		91 (46%)	36 (18%)	70 (36%)	
Part-time permanent	26 (72%)	10 (28%)		24 (67%)	12 (33%)		16 (44%)	20 (56%)		14 (39%)	22 (61%)		18 (50%)	18 (50%)		27 (75%)	9 (25.0%)		16 (44%)	20 (56%)		0 (0.0%)	10 (28%)	26 (72%)		16 (44%)	6 (17%)	14 (39%)	
Casual, temp, other	6 (67%)	3 (33%)		7 (78%)	2 (22%)		8 (89%)	1 (11%)		2 (22%)	7 (78%)		6 (67%)	3 (33%)		8 (89%)	1 (11.1%)		5 (56%)	4 (44%)		0 (0.0%)	3 (33%)	6 (67%)		3 (33%)	3 (33%)	3 (33%)	
Missing	0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0	0		0	0	0	
Work Area, n (%)			0.08			0.06			0.51			0.51			0.49			0.62			0.087				0.95				0.063
Out-patient Clinic	10 (77%)	3 (23%)		6 (46%)	7 (54%)		6 (46%)	7 (54%)		6 (46%)	7 (54%)		6 (46%)	7 (54%)		9 (69%)	4 (31%)		3 (23%)	10 (77%)		0 (0%)	3 (23%)	10 (77%)		5 (39%)	2 (15%)	6 (46%)	
In-patient Ward	86 (85%)	15 (15%)		79 (78%)	22 (22%)		61 (60%)	40 (40)		42 (42%)	59 (58%)		53 (52%)	48 (48%)		83 (82%)	18 (18%)		48 (48%)	53 (52%)		2 (2%)	28 (28%)	71 (70%)		56 (55%)	11 (11%)	34 (34%)	
Critical Care (CVICU, CICU)	74 (74%)	26 (26%)		76 (76%)	24 (24%)		56 (56%)	44 (44%)		38 (38%)	62 (62%)		45 (45%)	55 (55%)		79 (79%)	21 (21%)		49 (49%)	51 (51%)		1 (1%)	29 (29%)	70 (70%)		36 (36%)	28 (28%)	36 (36%)	
Cath lab or Int Radiology	11 (58%)	8 (42%)		11 (58%)	8 (42%)		8 (42%)	11 (58%)		4 (21%)	15 (79%)		6 (32%)	13 (68%)		13 (68%)	6 (32%)		7 (37%)	12 (63%)		0 (0%)	6 (32%)	13 (68%)		10 (53%)	3 (16%)	6 (32%)	
Other	7 (78%)	2 (22%)		7 (78%)	2 (22%)		4 (44%)	5 (55%)		3 (33%)	6 (67%)		5 (56%)	4 (44%)		7 (78%)	2 (22%)		1 (11%)	8 (89%)		0 (0%)	1 (11%)	8 (89%)		3 (33%)	1 (11%)	5 (57%)	
Missing	0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0	0		0	0	0	
Rate satisfaction with EMR, n (%)			0.16			0.20			0.11			0.56			0.055			0.012			0.23				0.32				0.0087
Very unsatisfied	29 (83%)	6 (17%)		28 (80%)	7 (20%)		25 (71%)	10 (29%)		16 (46%)	19 (54%)		22 (63%)	13 (37%)		33 (94%)	2 (6%)		21 (60%)	14 (40%)		1 (3%)	15 (43%)	19 (54%)		25 (71%)	3 (9%)	7 (20%)	
Somewhat unsatisfied	41 (77%)	12 (23%)		44 (83%)	9 (17%)		29 (55%)	24 (45%)		20 (38%)	33 (62%)		30 (57%)	23 (43%)		42 (79%)	11 (21%)		26 (49%)	27 (51%)		1 (2%)	11 (21%)	41 (77%)		24 (45%)	10 (19%)	19 (36%)	
Neutral	36 (86%)	6 (14%)		29 (69%)	13 (31%)		23 (55%)	19 (45%)		14 (33%)	28 (67%)		14 (33%)	28 (67%)		36 (86%)	6 (14%)		19 (45%)	23 (55%)		0 (0%)	12 (29%)	30 (71%)		17 (41%)	11 (26%)	14 (33%)	
Somewhat satisfied	58 (77%)	17 (23%)		55 (73%)	20 (27%)		41 (55%)	34 (45%)		32 (43%)	43 (57%)		32 (43%)	43 (57%)		55 (73%)	20 (27%)		28 (37%)	47 (63%)		1 (1%)	23 (31%)	51 (68%)		34 (45%)	12 (16%)	29 (39%)	
Very satisfied	15 (60%)	10 (40%)		15 (60%)	10 (40%)		9 (36%)	16 (64%)		7 (28%)	18 (72%)		11 (44%)	14 (56%)		15 (60%)	10 (40%)		10 (40%)	15 (60%)		0 (0%)	4 (16%)	21 (84%)		5 (20%)	4 (16%)	16 (64%)	
Missing	9	3		8	4		8	4		4	8		6	6		10	2		4	8		0	2	10		5	5	2	

Somewhat / very satisfied with EHR (vs. neutral / unsatisfied), n(%)

p-value	0.12		0.19		0.16		0.93		0.24		0.0047		0.054		0.87			0.082		
Yes	73 (73%)	27 (27%)	70 (70%)	30 (30%)	50 (50%)	50 (50%)	39 (39%)	61 (61%)	43 (43%)	57 (57%)	70 (70%)	30 (30%)	38 (38%)	62 (62%)	1 (1%)	27 (27%)	72 (72%)	39 (39%)	16 (16%)	45 (45%)
No	106 (82%)	24 (19%)	101 (78%)	29 (22%)	77 (59%)	53 (401%)	50 (39%)	80 (61%)	66 (51%)	64 (49%)	111 (85%)	19 (15%)	66 (51%)	64 (49%)	2 (2%)	38 (29%)	90 (69%)	66 (51%)	24 (19%)	40 (31%)
Missing	9	3	8	4	8	4	4	8	6	6	10	2	4	8	0	2	10	5	5	2

Staffing levels in this work setting are sufficient, n (%)

p-value	0.0004		0.0097		0.017		0.14		0.0026		0.014		0.075		0.85			<.0001		
Disagree strongly	101 (89%)	13 (11%)	92 (81%)	22 (19%)	75 (66%)	39 (34%)	41 (36%)	73 (64%)	68 (60%)	46 (40%)	97 (85%)	17 (15%)	62 (54%)	52 (46%)	3 (3%)	34 (30%)	77 (68%)	71 (62%)	20 (18%)	23 (20%)
Disagree somewhat	44 (70%)	19 (30%)	45 (71%)	18 (29%)	30 (48%)	33 (52%)	27 (43%)	36 (57%)	21 (33%)	42 (67%)	47 (75%)	16 (25%)	22 (35%)	41 (65%)	0 (0%)	18 (29%)	45 (71%)	22 (35%)	11 (18%)	30 (48%)
Neutral	14 (82%)	3 (18%)	15 (88%)	2 (12%)	9 (53%)	8 (47%)	10 (59%)	7 (41%)	9 (53%)	8 (47%)	15 (88%)	2 (12%)	7 (41%)	10 (59%)	0 (0%)	5 (29%)	12 (71%)	3 (18%)	5 (29%)	9 (53%)
Agree somewhat	17 (55%)	14 (45%)	16 (52%)	15 (48%)	11 (36%)	20 (64%)	11 (36%)	20 (64%)	9 (29%)	22 (71%)	20 (65%)	11 (35%)	12 (39%)	19 (61%)	0 (0%)	7 (23%)	24 (77%)	7 (23%)	4 (13%)	20 (65%)
Agree strongly	3 (60%)	2 (40%)	3 (60%)	2 (40%)	2 (40%)	3 (60%)	0 (0%)	5 (100%)	2 (40%)	3 (60%)	2 (40%)	3 (60%)	1 (20%)	4 (80%)	0 (0%)	1 (20%)	4 (80%)	2 (40%)	0 (0%)	3 (60%)
Missing	9	3	8	4	8	4	4	8	6	6	10	2	4	8	0	2	10	5	5	2

Somewhat/strongly agree staffing levels in work setting are adequate (vs. neutral / disagree), n(%)

p-value	0.0005		0.0013		0.012		0.27		0.028		0.0050		0.23		0.49			0.0013		
Yes	20 (56%)	16 (44%)	19 (53%)	17 (47%)	13 (36%)	23 (64%)	11 (31%)	25 (69%)	11 (31%)	25 (69%)	22 (61%)	14 (39%)	13 (36%)	23 (64%)	0 (0%)	8 (22%)	28 (78%)	9 (25%)	4 (11%)	23 (64%)
No	159 (82%)	35 (18%)	152 (78%)	42 (22%)	114 (59%)	80 (41%)	78 (40%)	116 (60%)	98 (51%)	96 (49%)	159 (82%)	35 (18%)	91 (47%)	103 (53%)	3 (2%)	57 (29%)	134 (69%)	96 (50%)	36 (19%)	62 (32%)
Missing	9	3	8	4	8	4	4	8	6	6	10	2	4	8	0	2	10	5	5	2

I am treated fairly in the workplace, n (%)

p-value	0.0004		0.0001		<.0001		0.44		0.0003		0.0038		0.0004		0.40			<.0001		
Disagree strongly	38 (93%)	3 (7%)	36 (88%)	5 (12%)	32 (78%)	9 (22%)	14 (34%)	27 (66%)	31 (76%)	10 (24%)	39 (95%)	2 (5%)	29 (71%)	12 (29%)	1 (2%)	15 (37%)	25 (61%)	31 (76%)	6 (15%)	4 (10%)
Disagree somewhat	35 (92%)	3 (8%)	35 (92%)	3 (8%)	27 (71%)	11 (29%)	19 (50%)	19 (50%)	20 (53%)	18 (47%)	31 (82%)	7 (18%)	17 (45%)	21 (55%)	1 (3%)	11 (30%)	26 (68%)	17 (45%)	5 (13%)	16 (42%)
Neutral	26 (79%)	7 (21%)	23 (70%)	10 (30%)	15 (46%)	18 (54%)	13 (39%)	20 (61%)	16 (49%)	17 (51%)	27 (82%)	6 (18%)	12 (36%)	21 (64%)	0 (0%)	13 (39%)	20 (60%)	14 (42%)	8 (24%)	11 (33%)
Agree somewhat	57 (73%)	21 (27%)	57 (73%)	21 (27%)	42 (54%)	36 (46%)	31 (40%)	47 (60%)	30 (39%)	48 (61%)	60 (77%)	18 (23%)	37 (47%)	41 (53%)	1 (1%)	19 (24%)	58 (74%)	36 (46%)	15 (19%)	27 (35%)
Agree strongly	23 (58%)	17 (42%)	20 (50%)	20 (50%)	11 (28%)	29 (72%)	12 (30%)	28 (70.%)	12 (30%)	28 (70%)	24 (60%)	16 (40%)	9 (23%)	31 (77%)	0 (0%)	7 (18%)	33 (82%)	7 (18%)	6 (15%)	27 (67%)
Missing	9	3	8	4	8	4	4	8	6	6	10	2	4	8	0	2	10	5	5	2

Somewhat / strongly agree I am treated fairly (vs. neutral / disagree), n (%)

p-value	0.0002		0.0012		0.0013		0.47		0.0002		0.0043		0.051		0.073			0.0082		
Yes	80 (68%)	38 (32%)	77 (65%)	41 (35%)	53 (45%)	65 (55%)	43 (36%)	75 (64%)	42 (36%)	76 (64%)	84 (71%)	34 (29%)	46 (39%)	72 (61%)	1 (1%)	26 (22%)	91 (77%)	43 (36%)	21 (18%)	54 (46%)
No	99 (89%)	13 (11%)	94 (84%)	18 (16%)	74 (66%)	38 (34%)	46 (41%)	66 (59%)	67 (60%)	45 (40%)	97 (87%)	15 (13%)	58 (52%)	54 (48%)	2 (2%)	39 (35%)	71 (63%)	62 (55%)	19 (17%)	31 (28%)
Missing	9	3	8	4	8	4	4	8	6	6	10	2	4	8	0	2	10	5	5	2

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Table 3. Predictors of high nurse WBI scores

	WBI Score ≥ 2, nurses		
	Yes (N=189)	No (N=53)	P-value
Gender, n (%)			0.87
Male	24 (77.4%)	7 (22.6%)	
Female	160 (77.7%)	46 (22.3%)	
Gender Diverse	1 (100.0%)	0 (0.0%)	
Missing	4 (2.1%)	0 (0.0%)	
When did you graduate from nursing school, n (%)			0.37
<2 years	12 (85.7%)	2 (14.3%)	
2-5 years	28 (87.5%)	4 (12.5%)	
6-10 years	31 (79.5%)	8 (20.5%)	
11-15 years	28 (82.4%)	6 (17.6%)	
16+ years	90 (73.2%)	33 (26.8%)	
When did you begin working at UHN, n (%)			0.85
<2 years	21 (84.0%)	4 (16.0%)	
2-5 years	35 (74.5%)	12 (25.5%)	
6-10 years	23 (82.1%)	5 (17.9%)	
11-15 years	39 (79.6%)	10 (20.4%)	
16+ years	71 (76.3%)	22 (23.7%)	
Employment status at UNH, n (%)			0.67
Full-time permanent	154 (78.2%)	43 (21.8%)	
Part-time permanent	27 (75.0%)	9 (25.0%)	
Casual, temp, other	8 (88.9%)	1 (11.1%)	
Work Area, n (%)			0.58
Out-patient Clinic	9 (69.2%)	4 (30.8%)	
In-patient Ward	84 (83.2%)	17 (16.8%)	
Critical Care (CVICU, CICU)	75 (75.0%)	25 (25.0%)	
Cath lab or Int Radiology	14 (73.7%)	5 (26.3%)	
Other	7 (77.8%)	2 (22.2%)	
Rate satisfiaction with EMR, n (%)			0.0029
Very unsatisfied	33 (94.3%)	2 (5.7%)	
Somewhat unsatisfied	41 (77.4%)	12 (22.6%)	
Neutral	35 (83.3%)	7 (16.7%)	
Somewhat satisfied	58 (77.3%)	17 (22.7%)	
Very satisfied	13 (52.0%)	12 (48.0%)	
Missing	9 (4.8%)	3 (1.5%)	

Table 3. Predictors of high nurse WBI scores

	WBI Score ≥ 2, nurses		
	Yes (N=189)	No (N=53)	P-value
Staffing levels in this work setting are sufficient, n (%)			<.0001
Disagree strongly	103 (90.4%)	11 (9.6%)	
Disagree somewhat	44 (69.8%)	19 (30.2%)	
Neutral	14 (82.4%)	3 (17.6%)	
Agree somewhat	16 (51.6%)	15 (48.4%)	
Agree strongly	3 (60.0%)	2 (40.0%)	
Missing	9 (4.8%)	3 (1.5%)	
I am treated fairly in the workplace, n (%)			<.0001
Disagree strongly	37 (90.2%)	4 (9.8%)	
Disagree somewhat	35 (92.1%)	3 (7.9%)	
Neutral	25 (75.8%)	8 (24.2%)	
Agree somewhat	66 (84.6%)	12 (15.4%)	
Agree strongly	17 (42.5%)	23 (57.5%)	
Missing	9 (4.8%)	3 (1.5%)	

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Table 4. Multivariable model for factors associated with a WBI score for nurses ≥ 2

Effect (reference)	Odds Ratio	95% Wald Confidence Limits		P-value
Male (vs. female)	1.17	0.42	3.30	0.77
0-15 years since grad (vs. 16+)	2.69	1.08	6.71	0.035
0-5 years at UHN (vs. 6+)	0.64	0.24	1.66	0.35
Non full-time, permanent (vs. full-time, permanent)	0.87	0.35	2.18	0.77
Work area (vs. all others)				
In-patient Ward	0.89	0.31	2.54	0.77
Critical Care	0.50	0.19	1.34	0.17
Satisfied with EHR (vs. not)	0.63	0.32	1.27	0.20
Treated fairly (vs. not)	0.53	0.25	1.13	0.10
Staffing levels are adequate (vs. not)	0.27	0.12	0.64	0.003

Table 5. Comparison of WBI scores between nurses in practice at the PMCC and at Academic Health Science Centres in the United States

	PMCC Nurses (N=242)	US Nurses (N=3,627)	P-value
Gender, n (%)			0.0043
Male	31 (13.0%)	281 (7.8%)	
Female	206 (86.6%)	3,340 (92.2%)	
Gender Diverse	1 (0.4%)	3 (0.1%)	
Missing	4	3	
Have you felt burned out from your work, n (%)			<.0001
Yes	188 (77.7%)	2,196 (60.5%)	
No	54 (22.3%)	1,431 (39.5%)	
Have you worried that work is hardening you emotionally, n (%)			<.0001
Yes	179 (74.0%)	1,689 (46.6%)	
No	63 (26.0%)	1,938 (53.4%)	
Have you often felt bothered by feeling down, depressed, or hopeless, n (%)			<.0001
Yes	135 (55.8%)	1,497 (41.3%)	
No	107 (44.2%)	2,130 (58.7%)	
Have you fallen asleep while sitting inactive in a public place, n (%)			<.0001
Yes	93 (38.4%)	438 (12.1%)	
No	149 (61.6%)	3,189 (87.9%)	

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Have you felt that things were piling up so high you could not overcome them, n (%)			0.047
Yes	115 (47.5%)	1,488 (41.0%)	
No	127 (52.5%)	2,139 (59.0%)	
Have you been bothered by emotional problems, n (%)			<.0001
Yes	191 (78.9%)	2,326 (64.1%)	
No	51 (21.1%)	1,301 (35.9%)	
Has physical health interfered with ability to do daily work, n (%)			<.0001
Yes	108 (44.6%)	894 (24.6%)	
No	134 (55.4%)	2,733 (75.4%)	
The work I do is meaningful to me (1-7, higher = better)			0.0672
N	242	3627	
Mean (SD)	5.9 (1.14)	5.7 (1.31)	
Median	6	6	
Range	1.0, 7.0	1.0, 7.0	
Work I do is meaningfult to me (categorized), n (%)			0.097
1-2	3 (1.2%)	115 (3.2%)	
3-5	67 (27.7%)	1,130 (31.2%)	
6-7	172 (71.1%)	2,382 (65.7%)	

Work schedule leaves enough time for personal life (1-5, higher = better)   <.0001

N	242	3627
Mean (SD)	2.9 (1.23)	3.3 (1.16)
Median	3	3
Range	1.0, 5.0	1.0, 5.0

Work schedule leaves enough time for personal life (categorized), n (%)   <.0001

1-2	110 (45.5%)	1,055 (29.1%)
3	45 (18.6%)	908 (25.0%)
4-5	87 (36.0%)	1,664 (45.9%)

WBI Score   <.0001

N	242	3,627
Mean (SD)	3.6 (2.61)	2.1 (2.58)
Median	4	2
Range	-2.0, 9.0	-2.0, 9.0

High WBI Score (≥ 2), n(%)   <.0001

Yes	189 (78.1%)	2,069 (57.0%)
No	53 (21.9%)	1,558 (43.0%)

Severe WBI Score (≥ 4), n (%)   <.0001

Yes	132 (54.5%)	1,160 (32.0%)
No	110 (45.5%)	2,467 (68.0%)