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# Providing feedback following Leadership WalkRounds is associated with better patient safety culture, higher employee engagement and lower burnout

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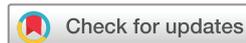
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## ABSTRACT

**Background** There is a poorly understood relationship between Leadership WalkRounds (WR) and domains such as safety culture, employee engagement, burnout and work-life balance.

**Methods** This cross-sectional survey study evaluated associations between receiving feedback about actions taken as a result of WR and healthcare worker assessments of patient safety culture, employee engagement, burnout and work-life balance, across 829 work settings.

**Results** 16 797 of 23 853 administered surveys were returned (70.4%). 5497 (32.7% of total) reported that they had participated in WR, and 4074 (24.3%) reported that they participated in WR with feedback. Work settings reporting more WR with feedback had substantially higher safety culture domain scores (first vs fourth quartile Cohen's d range: 0.34–0.84; % increase range: 15–27) and significantly higher engagement scores for four of its six domains (first vs fourth quartile Cohen's d range: 0.02–0.76; % increase range: 0.48–0.70).

**Conclusion** This WR study of patient safety and organisational outcomes tested relationships with a comprehensive set of safety culture and engagement metrics in the largest sample of hospitals and respondents to date. Beyond measuring simply whether WRs occur, we examine WR with feedback, as WR being done well. We suggest that when WRs are conducted, acted on, and the results are fed back to those involved, the work setting is a better place to deliver and receive care as assessed across a broad range of metrics, including teamwork, safety, leadership, growth opportunities, participation in decision-making and the emotional exhaustion component of burnout. Whether WR with feedback is a manifestation of better norms, or a cause of these norms, is unknown, but the link is demonstrably potent.

## INTRODUCTION

A common practice associated with patient safety is for leaders to engage in

WalkRounds (WR),<sup>1</sup> where front-line healthcare workers (HCW) are encouraged by leadership to identify and resolve issues related to the safe delivery of care. Fundamentally, WRs are a form of observable leadership engagement with quality that can be an empowering resource for HCW,<sup>2</sup> at a time when resources are scarce. Contemporary healthcare delivery is increasingly complex, as new demands for efficacy, transparency, regulation and technology combine with patients who are sicker, and a workforce that is leaner than ever before.

Since 2001, the Job Demands-Resources Model has accurately and repeatedly demonstrated that increasing demands while decreasing resources creates strain on the workforce.<sup>3,4</sup> This strain has been called burnout, emotional exhaustion, low engagement, compassion fatigue, low safety culture and other similar monikers. Strain can be alleviated by either decreasing demands, or increasing the resources. Fortunately, 'resources' are not limited to staffing and budgets, but also include a broad range of physical, psychological, social and organisational aspects of one's job.<sup>5</sup> For example, they include aspects of the job that reduce demands, are functional in achieving work goals, and/or stimulate personal growth, learning and development.

As a deliberate organisational strategy to target and enhance resources, WRs create a predictable ritual for dialogue between leaders and HCWs by identifying opportunities to improve care processes

leading to better patient safety outcomes.<sup>6</sup> The WRs themselves are an organisational resource, but they also facilitate other resources for organisations and HCW by streamlining processes, encouraging engagement in quality improvement, growth opportunities and a meaningful sense of efficacy and autonomy when HCWs see their ideas turned into improvements in care quality. When WRs are predictably routine, they reassure HCWs that although their concerns may not be heard today, they will have future opportunities to be heard by participating in WR.

Leadership WRs are resource rich when they include appropriate follow-up actions to the issues surfaced using the leader's position to make things happen at hierarchical levels above individual work settings. The term 'work settings' in this study describes work groups, including clinical units like emergency rooms, intensive care units and general medicine units, as well as non-clinical work groups like labs, patient safety, quality improvement and billing. Accordingly, providing feedback to the HCW about actions taken as a result of these WRs is essential to keep momentum and build trust in the collective ability to find, fix and report back the solutions to patient safety problems. For instance, following WR, work setting managers and patient safety officers keep track of planned initiatives at the work setting or departmental level as well as any updates, and communicate follow-up information back to HCW and senior leadership to supply accurate feedback and ensure completion of improvement tasks.<sup>6,7</sup>

Unfortunately, when untrained leaders attempt to do WR, it can result in surfacing issues without addressing them or failing to feedback progress that has been made. Whacking the hornets' nest in this way appears to be counterproductive to improving perceptions of patient safety.<sup>4,7,8</sup> To measure the extent to which WRs are being done well, the presence of WR with feedback can be assessed as a brief item on a safety culture or engagement survey. Indeed, researchers have demonstrated that a simple metric to assess WR impact is the extent to which staff report having personally received feedback about actions taken to reduce patient safety risks as a result of WR in their work setting.<sup>9</sup>

WRs vary widely in format, setting and data collection practices, but WR programmes most likely to confer useful resources require three critical factors: (1) WRs are occurring on regular, ongoing basis in a specific work setting; (2) safety issues are being surfaced and resolved through the WR sessions; and (3) patient safety risks reduced through WR are being fed back to staff in the work setting, closing the loop and demonstrating the efficacy of the WR sessions.<sup>8</sup>

The HCW perceptions of resources and demands in a given work setting can be assessed through psychometrically valid surveys with representative response rates. Accrediting bodies such as the Joint Commission have required that hospitals use valid and reliable

questionnaires to evaluate work setting norms, and provide HCW with opportunities to participate in patient safety and quality initiatives like WR (see Joint Commission Standard LD.03.01.01LD.03.01.01).<sup>9</sup>

Previous studies have shown that the use of WR was associated with better work setting norms, as assessed through the Safety Attitudes Questionnaire (SAQ).<sup>1,8,10</sup> The SAQ has been refined and combined with new work setting norms like HCW engagement and norms of resilience like work-life balance and burnout. This new survey, SCORE (Safety, Communication, Operational Reliability, and Engagement), like culture surveys that came before it, measures the consensus view of workplace norms within a group of people. The psychometric validity of the SCORE has been reported elsewhere,<sup>11</sup> and relevant psychometric information for the current study is included in online supplementary appendix. For the purposes of the current study, we are replicating a WR analysis that has been used when the SAQ was the measure of HCW resources, in this study we are using the SCORE with a new large data set. Surveys such as SCORE are consensus views of norms in a work setting. Positive norms, such as high marks for leadership and teamwork, are resources for the HCW; however, negative norms may result in creating workplace demands.<sup>12,13</sup>

Few studies have addressed how WR processes are linked to HCW assessments of work setting norms.<sup>1</sup> WRs with feedback are thought to be a mechanism to increase resources that would be reflected in better work setting norms. Therefore, the hypothesis is that work settings with higher rates of WR with feedback will also report more positive norms.

## METHODS

### Overview

This cross-sectional survey was administered to a convenience sample of 31 hospitals through the Michigan Health and Hospital Association MHA Keystone Center as part of their routine safety culture and engagement assessment. We used SCORE results to investigate associations between WR with feedback and healthcare work setting norms. Analyses, feedback and recommendations based on survey results were offered to 31 hospitals, all of which accepted. The survey was administered during a 2-month period in 2015.

Out of the 31 hospitals, 5 (16%) were academic teaching centres. Seventeen of the hospitals (55%) had 99 or fewer licensed beds. Five of the hospitals (16%) had between 100 and 199 licensed beds, 6 (19%) hospitals had 200–299 licensed beds, 2 hospitals had 300–399 licensed beds and 2 (6%) hospitals had more than 400 licensed beds.

All work settings across all hospitals were invited to complete the survey. Staff with 0.5 full time equivalent (FTE) or greater for at least four consecutive weeks prior to survey administration were invited to

participate in this web-based survey, which was emailed to each potential respondent as a link through hospital listservs. Participants were told that their responses were confidential; however, it did include open-ended questions in which respondents could choose to identify themselves through their answers. There was no incentive to participate in the survey, but it was framed as informing future safety culture and engagement improvements in their hospital. Administration of the survey was executed by Safe and Reliable Healthcare and a deidentified data set was transmitted to JBS, KCA and BM for analysis. The study was approved by the Institutional Review Board at Duke University Medical Center (Pro00033155).

### Measures

The questionnaire used to assess work setting norms was a collection of subscale survey measures of safety culture, workforce engagement and burnout. There are 12 domains on the full version of SCORE, with 73 items on subscales ranging in length from 3 to 8 items. The survey also included select items on participation in and exposure to Leadership WR,<sup>18</sup> the teamwork and safety climate scales from the SAQ,<sup>14</sup> workforce engagement-related scales from the Job Demands-Resources Questionnaire,<sup>4 12 13</sup> work-life balance behaviours from the work-life climate scale<sup>15 16</sup> and derivatives of the emotional exhaustion scale from the Maslach Burnout Inventory.<sup>17</sup> SCORE is an assessment of the consensus view of norms in a given work setting, with norms grouped loosely into three related but distinct categories: safety culture, resilience and job demands versus resources. In addition, there are individual (unscaled) items that assess WR exposure. The factor structure of SCORE is included in the online supplementary appendix, and the appropriateness of using SCORE domains as metrics of group norms is included in the Results section.

### Safety culture domains

SCORE uses teamwork climate, safety climate, improvement readiness, local leadership, personal burnout and burnout climate for the safety culture domains. Teamwork and safety climate are associated with clinical outcomes like hand hygiene or bloodstream infections,<sup>18-21</sup> and have good psychometric properties.<sup>14</sup> The response scale ranged from 1 (strongly disagree) to 5 (strongly agree), such that higher scores reflect more positive work setting norms for each construct.

*Teamwork climate* (seven items) is the extent to which norms of local interactions are effective, such as speaking up, resolving conflicts and asking questions to clarify ambiguities. A sample item is, 'It is easy for personnel here to ask questions when there is something that they do not understand.' *Safety climate* (seven items) is the extent to which local patient safety norms are proactive and positive, such as discussing, handling

and learning from errors. A sample item is, 'I would feel safe being treated here as a patient.' *Improvement readiness* (five items, also known as Learning Environment) is the extent to which quality improvement is supported within a work setting through continuous learning about both strengths and deficits in quality. This domain uses the anchor 'The environment in this work setting,' followed by a set of brief phrases such as: 'effectively fixes defects to improve the quality of what we do,' or 'allows us to gain important insights into what we do well.' *Local leadership* (five items) is the extent to which leaders communicate with and are available to HCWs. This domain uses the anchor, 'In this work setting local management,' once, followed by a set of brief phrases such as: 'is available at predictable times,' or 'provides useful feedback about my performance.'

*Personal burnout*, also known as *personal exhaustion* (five items), was assessed through a subset of the emotional exhaustion scale items,<sup>17</sup> which we have shown to be reliable and valid in previous work.<sup>22 23</sup> Example items include, 'I feel frustrated by my job,' and 'Events in this work setting affect my life in an emotionally unhealthy way.' The response scale for both burnout domains ranged from 1 (strongly disagree) to 5 (strongly agree), such that higher scores reflect higher levels of burnout. In parallel, *burnout climate*, also known as *exhaustion climate* (five items), elicits the same concepts but rather than assessing personal feelings, it is an assessment of the group, for example, 'People in this work setting feel frustrated by their jobs,' or 'Events in this work setting affect the lives of people here in an emotionally unhealthy way.' Using a published technique, the personal burnout and burnout climate scores were calculated as the 'percent concerning' by using the per cent of respondents within a work setting that had a mean equivalent across all items of 'neutral or higher'.<sup>1 22 23</sup>

*Work-life climate* (eight items) is the extent to which work-life infractions are common in the past week, aggregated at the work setting level. The scale asks, 'During the past week, how often did this occur?' followed by phrases such as: 'Skipped a meal, had difficulty sleeping, or arrived home late from work.' The response scale for the work-life climate items ranges from: Rarely or none of the time (less than 1 day); Some or a little of the time (1-2 days); Occasionally or a moderate amount of time (3-4 days); All of the time (5-7 days); and Not Applicable. Work settings with infrequent work-life climate problems (lower scores) have HCWs with better work-life balance.

### Job demands versus resources as engagement

The construct of engagement can be assessed in a variety of valid ways,<sup>24</sup> but we like the large and growing body of evidence behind the Job Demands-Resources Model. To this end, HCW demands versus resources norms were assessed using five scales from the Job Demands-Resources Questionnaire: *advancement*,

growth opportunities, participation in decision-making, workload and job uncertainty.<sup>4 12 13</sup> Each domain used the response scale of 1 (strongly disagree) to 5 (strongly agree), such that higher scores reflect more positive norms of advancement, growth opportunities and participation in decision-making, but higher scores reflect worse norms of workload and job uncertainty.

*Advancement* uses seven items with the anchor phrase: 'With respect to advancement in this organization' with follow-up phrases such as 'I have opportunities to be promoted,' and 'I can live comfortably on my pay.' *Growth opportunities* is a 6-item scale that uses the anchor: 'With respect to the growth opportunities in this work setting I have,' followed by phrases such as 'opportunities for independent thought and action' and 'freedom in carrying out work activities.' *Participation in decision-making* (six items) uses the anchor, 'With respect to the participation in decision making that I experience here,' followed by phrases such as 'the decision making process is clear to me,' or 'it is clear to whom I should address specific problems.' *Workload* (five items) uses the anchor, 'With respect to the workload in this work setting I have,' followed by phrases such as 'too much work to do,' or 'to work under time pressure.' *Job uncertainty* (three items) includes 'I will still be working here in one year's time,' and 'I would like to find a better job.'

#### Leadership WR exposure variables

WR exposure was assessed with two questions: (1) Does this work setting use Patient Safety Leadership WalkRounds to discuss with senior leaders any issues that could harm patients or undermine the safe delivery of care? (Yes; No; Not Sure) and (2) Did you receive feedback about patient safety risks that were reduced as a result of WalkRounds? (Yes; No; Not Sure). This second item was our self-reported HCW assessment of WR with feedback. Previous research has found that both items yield similar patterns of results,<sup>1</sup> but in particular, the extent to which participants had received feedback about actions taken to reduce risks as a result of WR exhibited the strongest link to safety culture and burnout outcomes, and therefore demonstrated a critical component of a WR exposure variable.

#### Respondent characteristics

This survey also captures respondent characteristics including job position, years in specialty and predominant work shift. Job positions included attending physicians, pharmacists, registered nurses, technicians, technologists, administrative support, other, and so on (see table 1).

#### Statistical analysis

We used descriptive analyses such as frequencies, percentages, means ( $\pm$ SD) and graphs to describe respondent characteristics, exposure to Leadership WR with feedback, safety culture, resilience and

engagement scales. Scale reliability was assessed via Cronbach's alphas. Given that WRs with feedback occur at the work setting level, the primary unit of analysis for this manuscript is the work setting level. A series of random effects analyses of variance (ANOVA) were run to partition the variance in each score domain into its within-work versus between-work setting components. Intraclass correlations (ICC) were computed to assess the proportion of the total variance in each SCORE domain accounted for by clustering at the work setting level and to assess whether work setting level analyses were warranted.<sup>25</sup> In addition to the work setting level results, we also replicated the analyses using simple t-tests at the respondent level in the online supplementary appendix part IV.

*Leadership WR* and *WR with feedback exposure* variables were aggregated at the work setting level by calculating the percentage of respondents within a work setting who reported 'yes' to the two WR items. Participating in at least one instance of WR was categorised as a 'yes'.

Using the standard published technique, *safety culture domain scale scores* were also aggregated at the work setting level, and were calculated by taking individual respondents' average of the scaled items, and then calculating the percentage of respondents within a work setting who reported positively (ie, proportion of those who, overall, agreed slightly or strongly).<sup>26</sup>

*Personal burnout* and *burnout climate* were computed using the same process as safety culture scores, but because of the valence of the burnout items, one must disagree with the items for burnout to be low. Using a published technique,<sup>16</sup> we used the average of scaled items for each respondent, then calculated the percentage of respondents within a work setting who were *not* positive (ie, proportion of those who, overall, were neutral, agreed slightly or agreed strongly). We call this the 'percentage reporting burnout'. The inclusion of 'neutral' in the score is also in keeping with the Maslach scoring of emotional exhaustion, which equates to a mean score of neutral as 'mild burnout', a mean score of slightly agree as 'moderate burnout' and a mean score of strongly agree as 'severe burnout'.

Using the published technique, *work-life climate* responses were aggregated at the work setting level using the per cent of respondents reporting a mean score equivalent of 2 or less (ie, some or a little of the time (1–2 days) or less), reflecting fewer problems with work-life balance.

Independent samples t-tests were used at the work setting level to examine whether quartile (first vs fourth) of exposure to WR with feedback significantly predicted differences in the proportion of people endorsing slightly or strongly agree in the scale scores. The same analysis was conducted at the respondent level using independent samples t-tests to examine if reporting exposure to WR with feedback predicted mean differences in scale scores (see

**Table 1** Respondent characteristics

		N	% of total
Healthcare worker role	Role missing	481	2.9
	Administrative support (clerk/secretary/receptionist)	1977	11.8
	Clinical social worker	150	0.9
	Clinical support (medical assistant, EMT, and so on)	692	4.1
	Dietitian/nutritionist	108	0.6
	Environmental support (housekeeper)	348	2.1
	Nurse	4548	27.1
	Nurse aide	672	4.0
	Other (please specify)	2918	17.4
	Other manager (eg, clinic manager, supervisor)	1290	7.7
	Pharmacist	240	1.4
	Physician assistant	117	0.7
	Physician: attending/staff	392	2.3
	Physician: non-employed	28	0.2
	Physician: resident	42	0.3
	Technician (eg, PCT, surgical, laboratory, EKG, radiology)	939	5.6
	Technologist (eg, surgical, laboratory, radiological)	1134	6.8
	Therapist (RT, PT, OT, speech)	721	4.3
	Missing	481	2.9
	Total	16 797	100.0
Shift length	8 hours	8515	50.7
	10 hours	1359	8.1
	12 hours	4334	25.8
	Flexible	978	5.8
	Other	1372	8.2
	Missing	239	1.4
	Total	16 797	100
Shift	Days	11 753	70.0
	Nights	2458	14.6
	Swing	885	5.3
	Other	1371	8.2
	Missing	330	2.0
	Total	16 797	100
Years in specialty	Less than 6 months	665	4.0
	6–11 months	875	5.2
	1–2 years	1789	10.7
	3–4 years	2069	12.3
	5–10 years	3650	21.7
	11–20 years	3993	23.8
	21 or more years	3472	20.7
	Missing	284	1.7
Total	16 797	100	

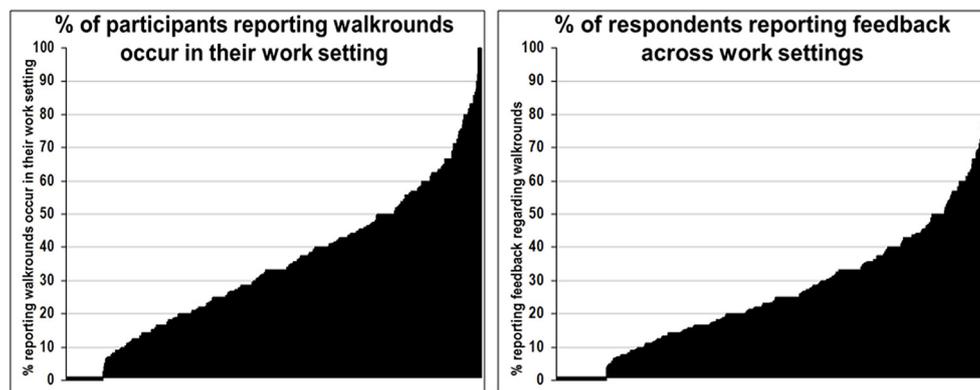
EMT, emergency medical technician; OT, occupational therapist; PCT, patient care technician; PT, physical therapist; RT, respiratory therapist.

online supplementary appendix part IV). A series of two-tailed bivariate correlations examined associations between WR (WR exposure as well as WR with feedback) and scale scores. To examine whether associations between WR with feedback and our dependant measures were stronger than the associations between WR exposure and the dependant measures, a series of dependent correlations were run (see online supplementary appendix parts II and III). All analyses were performed using IBM SPSS Statistics (V.20; IBM).

## Results

### Sample

A total of 839 work settings across 31 hospitals in Michigan, USA, participated in this study through the MHA Keystone Center. Of 23 853 administered surveys, 16 797 were returned for an overall response rate of 70.4%. The mean (SD) number of respondents per work setting was 19.2 (18.3), ranging from 5 to 183 respondents. [Table 1](#) lists respondent characteristics. Of the 16 797 respondents, 9048 (53.9%)



**Figure 1** WalkRounds (WR) exposure and WR feedback across work settings

reported at least 10 years in their specialty. There were 1540 (9.2%) respondents who reported less than 1 year in their specialty. Nurses were the largest HCW role (27.1%).

### Descriptives and psychometrics

#### Leadership WR exposure and WR with feedback

Results of percentages of HCWs in each work setting reporting WR exposure and WR with feedback are shown in [figure 1](#). Both WR exposure and WR with feedback ranged from 0% to 100% across work settings. The mean (SD) percentage of people reporting WRs occur in their work setting is 34.46 (22.04). The mean (SD) percentage of people reporting WRs with feedback occur in their work setting is 26.68 (19.18). Rates of WR and WR with feedback exposure can be found in the online supplementary appendix. Overall, 34.8% of respondents reported exposure to WR, and 25.8% reported exposure to WR with feedback. A majority of HCWs (10127; 64.50%) gave the same response to both questions (eg, 'yes' and 'yes', or 'no' and 'no'); however, 8.7% reported that they had experienced only one type of WRs. A notable number of respondents, 4571 (27.21%), reported that they were 'not sure' if they had been exposed to either WR or WR with feedback.

#### Safety culture, resilience and engagement scale scores

We found good internal reliability for all of the scales, which ranged from a low of  $\alpha=0.82$  to a high of  $\alpha=0.94$ . Correlations among the assessment domains can be found in [table 2](#).

#### Assessing the clustering of respondents within work settings using RE-ANOVAs and ICCs

Random Effects ANOVAs revealed that both between-work and within-work setting variance for all SCORE domains was statistically significant, all  $p<0.001$ . ICCs ranged from 0.07 to 0.26 (see [table 2](#) for ICCs for all domains). The ICCs indicate that 7%–26% of the total variability in the SCORE domain scores was due to between-work setting differences, reflecting clustering. Previous research suggests values of 5% reflect a small

to medium group membership effect, and values of 25% reflect a large group membership effect.<sup>25</sup> Therefore, the ICCs indicate a non-trivial amount of shared variance at the work setting level; observations within a particular work setting are correlated anywhere between 0.07 and 0.26. Due to the non-independence of observations within work settings, aggregating data at this level is appropriate.

### Hypothesis testing

#### Scale scores by quartiles of exposure to WR with feedback

Up to 795 of the 829 (96%) work settings had five or more respondents answer the item on WR with feedback. The quartiles were first (38.1%–100% of respondents within units reporting 'yes' to WR with feedback, mean=52.99); second (23.9%–37.5% reporting 'yes' to WR with feedback, mean=30.28); third (13.6%–23.8% reporting 'yes' to WR with feedback, mean=18.4); and fourth (0%–13.3% reporting 'yes' to WR with feedback, mean=5.01). A Bonferroni correction for multiple comparisons was applied (ie,  $0.05/12$ =new  $p$  value threshold of  $p<0.004$ ).<sup>27</sup> Comparison of the first and fourth WRs with feedback quartiles yielded significant differences in all of the safety culture domains, two of the three resilience domains and in four of the five engagement domains; see [figure 2](#) for t-tests and Cohen's  $d$  effect sizes. In other words, 10 of the 12 domains assessed were different in work settings in the first versus fourth quartile of WR with feedback, in line with our hypothesis. Furthermore, the same 10 domains were significantly different between the first and all other quartiles, such that work settings that report the highest rates of WR with feedback reported significantly better workplace norms.

Contrary to our hypothesis that work settings with more WRs with feedback would have more positive norms, comparisons of the first and fourth WRs with feedback quartiles on work-life climate and workload were not significant. Nor did they trend in the direction of the other 10 domain scores where more WRs with feedback indicated better workplace norms.

**Table 2** Work setting level correlation matrix of safety culture and engagement domains across 829 work settings (Cronbach's alphas and ICCs in the diagonal)

Score domain	1	2	3	4	5	6	7	8	9	10	11	12
1. Improvement readiness	0.92, 0.16											
2. Local leadership	0.74	0.94, 0.17										
3. Teamwork climate	0.67	0.57	0.82, 0.19									
4. Safety climate	0.80	0.75	0.73	0.87, 0.17								
5. Personal burnout	-0.619	-0.59	-0.58	-0.64	0.92, 0.15							
6. Burnout climate	-0.62	-0.55	-0.67	-0.67	0.80	0.90, 0.26						
7. Advancement	0.39	0.35	0.34	0.40	-0.28	-0.27	0.89, 0.14					
8. Growth opportunities	0.70	0.62	0.58	0.71	-0.56	-0.56	0.49	0.92, 0.10				
9. Job uncertainty	-0.29	-0.30	-0.19	-0.27	0.33	0.29	-0.13	-0.30	0.88, 0.08			
10. Participation in decision-making	0.70	0.67	0.56	0.75	-0.61	-0.60	0.45	0.70	-0.29	0.88, 0.13		
11. Work-life climate	0.33	0.28	0.35	0.38	-0.51	-0.53	0.09	0.23	-0.23	0.31	0.82, 0.11	
12. Workload	-0.24	-0.26	-0.28	-0.27	0.56	0.53	-0.04	-0.20	0.15	-0.27	-0.50	0.84, 0.12

All correlations are significant at the  $p < 0.01$  level, except the correlations between Advancement and Workload ( $r = -0.04$ ,  $p = 0.27$ ) and Advancement and Work-life climate ( $r = 0.09$ ,  $p = 0.02$ ). ICC, intraclass correlations.

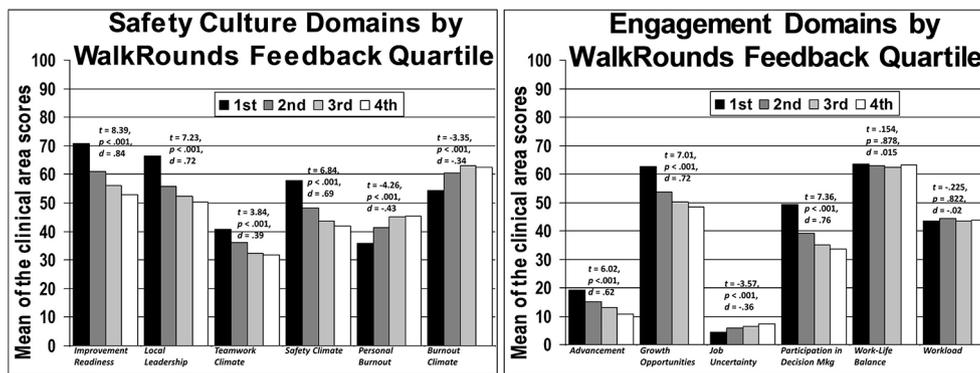


Figure 2 SCORE (Safety, Communication, Operational Reliability, and Engagement) domains displayed by WalkRounds feedback quartiles.

## DISCUSSION

We found a strong pattern of results at the respondent and work setting levels that WRs with feedback were associated with better assessments of safety culture, higher workforce engagement and lower burnout. Consistent with previous work linking WR with better safety culture (particularly safety climate),<sup>1 8 10</sup> we found that the new safety culture domains of improvement readiness and local leadership were substantially higher in work settings where WRs were conducted with feedback.

We found that personal burnout and burnout climate clustered at the work setting level, such that burnout is not just an individual level difference, but also a group level difference. *Personal burnout* and *burnout climate* were lowest in work settings that had the highest rates of WR with feedback. Feeling like you have a modicum of control over care quality through WR may reduce burnout perceptions, for example, that you are working too hard or feeling frustrated by your job. These findings indicate that WR with feedback may afford a significant and meaningful opportunity to reduce burnout. Krasner's widely cited physician mindfulness training,<sup>28</sup> which involves approximately 27 hours of training over 8 weeks, demonstrated a Cohen's *d* effect size of 0.62 for burnout (emotional exhaustion) reduction. Comparatively, we found an effect size of 0.43 between the first and fourth quartiles for WR with feedback, suggesting that instances of WR with feedback could be relatively brief burnout interventions.

We expanded upon previous WR research by demonstrating that workforce engagement is higher in work settings that have WR with feedback. In particular, work settings with the highest rates of WR with feedback also had highest scores in *participation in decision-making* and *growth opportunities*, suggesting that WRs with feedback are getting HCW involved in and feeling connected to quality improvement. This harkens back to the concept of 'small wins,' put forth by psychologist Karl Weick.<sup>29</sup> He suggested that a pattern of small wins is a series of concrete outcomes of moderate importance, which attracts allies and

deters opponents. Weick might call the stronger *participation in decision-making* and *growth opportunities* 'small wins' insofar as it reduces perceived demands and raises perceived skill levels so that busy HCWs believe 'well, I can do that, at least,' providing a foundation of efficacy upon which other meaningful progress could be built.

The per cent of respondents in a work setting reporting WR with feedback had the strongest relationships with higher scores for *participation in decision-making* and with *improvement readiness*. Given the content of these two domains, it appears to be the case that participating and learning in ways that relate to quality may be a WR with feedback mechanism through which HCWs have enhanced efficacy, purpose and meaning. This may merit further refinement to bring out even more potential for WR with feedback to enhance efficacy, purpose and meaning by eliciting these themes more directly during WR.

Analysis of the safety culture, resilience and engagement domain results for work settings by WR with feedback quartiles revealed that even first versus second quartile t-tests were significantly different. Previously, we have suggested a threshold of targeting at least 60% of the HCWs in a particular work setting for exposure to WR so that conducting WR implies reaching a majority of potential targets.<sup>8</sup> Note that the 60% threshold falls in the first quartile of the current study, so that comparisons between the first and any other quartile yield the same results. What is new is that the threshold appears to also hold for burnout and engagement domains.

This study also shows a similar pattern of results across safety culture, engagement and burnout scales as they relate to WR, WR with feedback and to each other. These three types of surveys are usually administered, analysed and fed back separately, and often results are even responded to through independent action plans. The use of SCORE in the current study provides support for the combination of these different scales into a single survey to all HCWs, including safety culture, burnout and engagement. To this end, health systems can reduce time, money and

survey fatigue that result from multiple administrations of similar surveys to the same workforce. The SCORE survey had good internal reliability for each of the 12 scales, and they were correlated in the expected directions across safety culture, resilience and engagement. Personal burnout, burnout climate and work-life balance were moderately to highly associated with safety culture domains, in addition to growth opportunity and participation in decision-making domains of engagement.

We found that a fourth of all respondents reported that they were 'not sure' if they had been exposed to either WR or WR with feedback. Perhaps this is one of the barriers to WR utilisation and optimisation, that some HCWs are not sure if WRs are occurring, or what WRs are. This speaks to the need for greater fidelity in WR delivery more generally.

Contrary to hypotheses, *workload* and *work-life climate* did not vary as a function of WR with feedback quartiles. A closer look at *workload* and *work-life climate* in table 2 reveals that these two domains were most strongly associated with each other and with personal burnout and burnout climate. In other words, HCWs reporting higher *personal burnout* also report feeling busy, having trouble with personal boundaries and that their coworkers have burnout. However, perhaps lower burnout is associated with higher rates of WR with feedback (even though *workload* and *work-life climate* are not) because WR with feedback builds efficacy and perceived influence, capacities known to be relevant for burnout.<sup>30</sup> Higher efficacy might be less relevant to how busy one feels (*workload*) or a lack of personal boundaries (*work-life climate*). Further research is needed, but HCWs with a sense of efficacy, purpose and meaning from WR with feedback may be the same HCWs reporting lower burnout (personal and climate). Future research should include modifications to WR with feedback processes in an attempt to better target HCW efficacy, purpose and meaning.

The limitations of this study need to be viewed in light of its design. Cross-sectional surveys allow observations and associations to be made, whereas causal relationships between WR with feedback and higher safety culture, resilience and engagement domains cannot be established. Perhaps senior leaders charged with conducting WR are biased to select work settings where they feel comfortable rounding, and those work settings happen to have high safety culture, low burnout and healthy workforce engagement. This would suggest that better work setting norms actually lead to more WRs with feedback than the other way around. Nevertheless, previous work has demonstrated that safety culture domains are responsive to WR in pre-post assessments.<sup>10</sup> Additionally, it should be noted that surveys were used to collect all variables, thus common method bias could be inflating the relationships observed. Given

the large sample size, it is important to note that not all statistically significant correlations (eg, SCORE domains with each other in table 2) are practically significant or meaningful, but they have utility when examining the magnitude of the relationships and the patterns. Also, this was a convenience sample collected through a state hospital association, and is not necessarily a representative sample of US hospitals. Over half of the hospitals had fewer than 99 licenced beds, and only 2 had 400 or more licenced beds, which provided a cross section of results that realistically favour smaller hospitals. Given that this was not a representative sample, the external validity of these results is a legitimate limitation.

## CONCLUSION

Across a broad range of metrics, WR with feedback distinguished those work settings which may be better places to receive and deliver care. This is indicative of a workplace where HCWs feel efficacious, safe, supported and prepared to do their work. In particular, the similarity across metrics for safety culture, resilience and workforce engagement suggests that WR with feedback is potentially a potent intervention and should be assessed simultaneously rather than independently.

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**Contributors** MWL, TCF, JP and ASF collected and sent the data set used here to JBS. JBS and KCA analysed the data and drafted the manuscript. SRW, BM, RS, BB and MJ consulted on our analyses and/or presentation of our results. All authors edited and provided feedback on the manuscript.

**Competing interests** JBS has an NIH Grant: R01 HD084679-01; MWL, TCF, JP and ASF each works at Safe and Reliable Healthcare, where they administer, analyse and debrief survey data to healthcare organisations. SCORE is available at no cost for research and quality improvement purposes. Safe and Reliable Healthcare offers SCORE and several other surveys through their online platform. The SCORE survey is a synthesis of validated instruments from safety culture and employee engagement research already published in the peer-reviewed literature. We added items and domains that cover psychological safety and quality improvement readiness in ways that were not already published, but the rest of SCORE involved selecting the best available items and domains. All authors stand by the validity of this instrument and the data set used here.

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