

Positive Leadership within Breast Imaging: Impact on Burnout, Intent to Leave, and Engagement

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Background: High rates of provider burnout and turnover, as well as staffing shortages, are creating crises within radiology departments. Identifying ways to support health care workers, such as the Positively Energizing Leadership program, is important during these ongoing crises.

Purpose: To identify the relationship between leadership behaviors and workplace climate and health care worker outcomes (ie, burnout, intent to leave, and engagement) and to determine whether the positive leadership program could improve workplace climate and health care worker outcomes.

Materials and Methods: This prospective study involved two parts. First, a web-based survey was administered to faculty and staff in a breast imaging unit of a large academic medical center in February 2021 to identify relationships between leadership behaviors and workplace climate and health care worker outcomes. Second, a web-based survey was administered in February 2023, following the implementation of a positive leadership program, to determine improvement in engagement and reduction of burnout and intent to leave since 2021. Multiple regression, the Sobel test, Pearson correlation, and the *t* test were used, with a conservative significance level of $P < .001$.

Results: The sample consisted of 88 respondents (response rate, 95%) in 2021 and 85 respondents (response rate, 92%) in 2023. Leadership communication was associated with a positive workplace climate ($\beta = 0.76$, $P < .001$) and a positive workplace climate was associated with improved engagement ($\beta = 0.53$, $P < .001$), reduction in burnout ($\beta = -0.42$, $P < .001$), and reduction in intent to leave ($\beta = -0.49$, $P < .001$). Following a 2-year positive leadership program, improved perceptions were observed for leadership communication (pretest mean, 4.59 ± 1.51 [SD]; posttest mean, 5.80 ± 1.01 ; $t = 5.97$, $P < .001$), workplace climate (pretest mean, 5.09 ± 1.43 ; posttest mean, 5.77 ± 1.11 ; $t = 3.35$, $P < .001$), and engagement (pretest mean, 5.27 ± 1.20 , posttest mean, 5.68 ± 0.96 ; $t = 2.50$, $P < .01$), with a reduction in burnout (pretest mean, 2.69 ± 0.94 ; posttest mean, 2.18 ± 0.74 ; $t = 3.50$, $P < .001$) and intent to leave (pretest mean, 3.12 ± 2.23 ; posttest mean, 2.56 ± 1.84 ; $t = 1.78$, $P < .05$).

Conclusion: After implementation of a positive leadership program in a radiology department breast imaging unit, burnout and intention to leave decreased among health care workers, while engagement increased.

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The U.S. Surgeon General has indicated that the high rates of burnout, turnover, and staffing shortages in the health care industry jeopardize the stability of the entire health care infrastructure (1). Even before the COVID-19 pandemic, health care providers reported high rates of burnout, broadly defined as emotional exhaustion, depersonalization, and low sense of accomplishment at work (2). In 2018, 27% of physicians reported burnout, and this figure jumped dramatically to 47% in 2021 and 53% in 2022 (2,3). Identifying immediately actionable ways to support health care providers is of utmost importance to the survival of the U.S. health care system during this ongoing crisis.

This work draws on the study of organizational resilience to critically evaluate a strategy for workforce fortification during times of organizational crisis characterized by high stress, limited resources, and uncertainty (4–6). Organizational resilience is defined as the capacity to maintain desirable functions and outcomes under an unusually high strain on the organization and its members (6). Relational

reserves, defined as the density and quality of social connections in an organization, have been identified as one of the most critical organizational assets needed to survive, and these are independent of financial resources (6–9). Relational reserves facilitate rapid adaptation to the day-to-day disruptions that occur during organizational crises and fortify the workforce by buffering against emotional exhaustion and feelings of low workplace accomplishment (6,8,10,11). Evidence-based strategies for building relational reserves have been identified, and creating a positive workplace climate is one of the most promising such strategies (6,12–14). Previous research has demonstrated that effective communication between leadership and employees improves workplace climate, increases engagement, minimizes emotional exhaustion, and amplifies positive emotions (15–21).

This study explored whether a leadership training program that focuses on communication could improve engagement and reduce burnout and turnover. Positively Energizing Leadership is a previously validated training

Summary

Implementing a positive leadership program among health care workers in a radiology department breast imaging unit led to 2-year improvements in leadership and workplace climate perception, engagement, burnout, and intent to leave.

Key Results

- In this prospective study of health care workers in a radiology department breast imaging unit, a web-based survey administered in 2021 (response rate, 95%; 88 respondents of 93 invited) and 2023 (response rate, 92%; 85 respondents of 92 invited) demonstrated reduced burnout (pretest mean, 2.69 ± 0.94 [SD]; posttest mean, 2.18 ± 0.74 ; $t = 3.50$, $P < .001$) and intent to leave (pretest mean, 3.12 ± 2.23 ; posttest mean, 2.56 ± 1.84 ; $t = 1.78$, $P < .05$) and improved engagement (pretest mean, 5.27 ± 1.20 ; posttest mean, 5.68 ± 0.96 ; $t = 2.50$, $P < .01$) following a positive leadership development program emphasizing communication.
- Path analyses of the 2021 survey data demonstrated leadership communication was associated with a positive workplace climate ($\beta = 0.76$, $P < .001$), which subsequently was associated with engagement ($\beta = 0.53$, $P < .001$), burnout ($\beta = -0.42$, $P < .001$), and intent to leave ($\beta = -0.49$, $P < .001$).

program that instructs leaders on the key principles of leading to engage, elevate, and energize their employees. Leaders who demonstrate these positive leadership principles are more likely to have direct reports with higher levels of engagement, performance, and commitment to the organization.

We hypothesized that positive leadership communication will lead to improved workplace climate; furthermore, positive workplace climate will lead to decreased provider burnout and intent to leave, as well as increased associated engagement. We also hypothesized that there will be a substantial improvement in leadership communication and positive workplace climate and outcomes based on a comparison of scores before and after the positive leadership program. Thus, the purpose of this study was two-fold. The first aim was to determine the relationships between leadership communication, workplace climate, and health care worker outcomes (ie, burnout, intent to leave, and engagement). The second aim was to determine whether the positive leadership program could improve workplace climate and health care worker outcomes.

Materials and Methods

Study Design

This institutional review board–approved prospective study was conducted from February 2021 to February 2023 within the Division of Breast Imaging of the Department of Radiology at Michigan Medicine, the academic medical center for University of Michigan. Two cross-sectional web-based surveys were used to collect data from all faculty and staff in the breast imaging unit. Respondents were instructed that completing the survey provided informed consent. The first objective of the study was accomplished through analyses of data collected in 2021. The second objective was accomplished through a comparison of the two cross-sectional data collections that were performed in 2021 (hereafter, pretest) and 2023 (hereafter, posttest).

Context and Intervention

The study took place during the COVID-19 pandemic when the academic medical center was experiencing extreme financial challenges, resource and staffing shortages, and the need for quick adjustments to patient care and unit protocols and practices. An evidence-based leadership development program called Positively Energizing Leadership was introduced, created, and implemented over a 2-year period (from 2021 to 2023) when the rates of burnout and turnover among health care workers increased dramatically (2).

The training program provides leaders with a description of each leadership principle, research demonstrating the impact, and examples of how each of the five principles has been translated into specific practices appropriate to their leadership needs and organizational context (Table 1). The program helps leaders develop workplace practices appropriate to their needs and context, while maintaining fidelity to the underlying principles of positive leadership. Balancing flexibility with program fidelity increases the likelihood of sustainability over time. The positive leadership program was implemented in three distinct phases. In the first phase, faculty and physician leaders and staff leaders in the department were introduced to the concept of positive energizing leadership. Each leader was provided the book *Positively Energizing Leadership* (22) with the expectation that it be read in the month prior to a virtual 1-hour author presentation in December 2021. In the second phase, 10-minute PowerPoint (Microsoft) presentations on each of the 15 attributes of positive leadership were presented to a smaller group of faculty and high-level staff leaders (approximately 15 per session) during the first part of the standing weekly leadership meeting. The content for these presentations was curated by three faculty members, including the faculty director of the Center for Positive Organizations Consortium (A.M.Y.) and the breast imaging division director (K.A.G.), and was supported by a grant from the Michigan Medicine Wellness Office. The third phase was implemented in the breast imaging unit with daily mentoring, coaching, and modeling of these positive leadership principles by the division director during the majority of the study period from December 2021 to June 2022. Table 1 lists five of the program principles and the specific practices leaders developed and applied during the 2-year period. Additional details about the program are available upon request (15,16,22). The Positively Energizing Leadership program used in this study is available on the Michigan Medicine Wellness Office website and is free to all leaders within the organization and to the public.

Survey Collection and Outcome Measures

Surveys were administered to all breast imaging faculty and staff (technologists, nurses, clerical staff) within the breast imaging division in February 2021 and February 2023. The leadership team consisted of the physician division director ($n = 1$), technologist manager and supervisor ($n = 2$), nurse managers ($n = 2$), clerical coordinator ($n = 1$), and informatics supervisor ($n = 1$). The unit director sent email invitations to all faculty and staff that emphasized the importance of the survey. There were additional follow-up efforts by all leaders in the division

Table 1: Positive Leadership Principles and Associated Training Modules and Practices

Principle	Training Module	Specific Practices Identified by Leaders to Address Principle
1	Module 10: See Opportunities Module 11: Inspire Others	Provide positive and specific feedback to faculty and staff promptly after positive interactions Start each faculty and staff meeting and monthly department newsletter with “kudos” Hold a weekly virtual case conference and other educational opportunities to demonstrate impact on patients
2	Module 4: Smile Frequently Module 6: Invest in Relationships Module 8: Listen with Empathy Module 12: Be Trustworthy	Consistently follow through on commitments; provide explanations when items could not be achieved Publish meeting notes to all faculty and staff Obtain input from all faculty through anonymous polling to support group decision-making on challenging topics
3	Module 5: Forgive Weaknesses Module 13: Be Authentic	Sponsor group lunches and social events across work roles to celebrate events and encourage team building Walk through workspaces in “listening rounds” daily to personally connect and seek input from faculty and staff Move isolated nursing stations to be closer to technologists and clerical staff to improve communication and teamwork
3	Module 9: Solve Problems Module 14: Motivate Others	Initiate a quality committee to review selected cases and report quarterly to entire department on exceptional work Identify and implement strategies to improve patient safety and workflow; highlight and celebrate successes
5	Module 1: Help Others Flourish Module 2: Be Humble Module 3: Instill Confidence in Others Module 7: Recognize Others Module 15: Mobilize Energizers	Recognize employees’ strengths and success stories in huddles or meetings Explicitly express appreciation for employees’ commitment to exceptional patient care or supporting coworkers Encourage faculty and staff interested in building a positive work environment to initiate and lead inclusive social activities

Note.—The principles are defined as follows: 1, inspire and provide meaning by highlighting the larger impact of employees’ work; 2, demonstrate trustworthiness and trust of others; 3, engage with others in an authentic, genuine, and accessible way; 4, expect and foster high standards in clinical work, scholarship, and citizenship; and 5, gather and encourage the involvement of employees who elevate and support others.

during weekly meetings to ensure a high response rate. The scales were constructed with selected items from validated instruments for leadership communication (23), positive workplace climate (24), burnout (25), and engagement (26) to minimize the length of the survey and burden on respondents while still being able to capture the key constructs to be tested. The scales and items included in the analyses are outlined in Table 2.

Statistical Analysis

All analyses were conducted using IBM SPSS (version 29.0.0; IBM). Skewedness and kurtosis were examined for all variables before analysis to confirm normality of distributions prior to hypothesis testing. Inter-item reliability tests were conducted with all scales, with the exception of single-item variables (Table 2). To address the first objective of the study, data collected in 2021 were examined first with Pearson correlations of leadership communication, positive workplace climate, engagement, burnout, and intent to leave followed by a series of multiple regressions for each of the dependent variables (Figure). Multicollinearity diagnostics were conducted to confirm adequate independence among independent variables, and the Sobel test was used to confirm mediation. To address the second objective of the study, the independent samples *t* test was used to determine whether there were group differences in all key variables in the model from

pretest to posttest. Differences among role groups were not conducted due to small group sizes for some of the subgroups. As the survey data were anonymous, it was not possible to match survey responses to compare pre- and posttest data at the individual respondent level. A significance level of $P < .001$ was used based on a one-sided *P* value, with Bonferroni correction to adjust for the number of tests conducted. Power analyses indicated adequate sample size for both the multiple regression and *t* test analyses. Regression analyses using the 88 cases from the pretest data were adequate to measure a small effect size ($f^2 = 0.20$), with a power level of 0.95 with three independent variables and $P < .001$. *T* tests using the 88 pretest cases and 85 posttest cases were adequate to measure a medium effect size (Cohen $d = 0.60$), with a power level of 0.80 and $P = .001$. Statistical analysis was performed by an author (A.M.Y.).

Results

Respondent Characteristics

The sample consisted of 88 respondents of 93 invited (response rate, 95%) in 2021 and 85 respondents of 92 invited (response rate, 92%) in 2023. Respondents included technologists (50% in 2021, 55% in 2023), clerical staff (22% in 2021, 22% in 2023), physicians (11% in 2021, 15% in

Table 2: Survey Items and Inter-Item Reliability of the Scales Used in the Analyses

Construct	Alpha Coefficient	Items
Leadership communication*	0.90	Communication from the leadership team is honest and transparent. Communication from the leadership team occurs on a regular and consistent basis. I feel the leadership team encourages us to ask questions and offer them suggestions.
Positive workplace climate*	0.97	We treat everyone with dignity, kindness, and respect. We promote a culture of creativity, flexibility, and curiosity. We foster an environment where every individual has a sense of belonging. We adhere to the highest ethical standards. We work together with a shared purpose rooted in equity and fairness. We promote the well-being of ourselves and others. We try to inspire new ideas and ways of thinking, behaving, and improving the world. We make sure everyone's voice is heard. We consider how everyone can have an opportunity to achieve and thrive. We try to demonstrate courage, truth, and transparency in our words and actions. We work to celebrate, respect, and value diversity.
Engagement*	0.73	I look forward to going to work every day. I put my heart into my job. I dedicate a lot of energy to my work, but it doesn't feel like a burden.
Burnout [†]	...	Overall, based on your definition of burnout, how would you rate your level of burnout?
Intent to leave [‡]	...	How likely are you to look for work elsewhere in the next 12 months?

Note.—The scales were constructed with selected items from validated instruments for leadership communication (23), positive workplace climate (24), burnout (25), and engagement (26). Inter-item reliability could not be conducted for single-item constructs, including burnout and intent to leave.

* Scale: 1 = strongly disagree, 7 = strongly agree.

[†] Scale: 1 = I enjoy work. I have no symptoms. 2 = Occasionally I am under stress and don't always have as much energy as I once did. 3 = I am definitely burning out and have one or more symptoms. 4 = The symptoms I am experiencing won't go away. 5 = I feel completely burned out and often wonder if I can go on.

[‡] Scale: 1 = not as likely, 7 = highly likely.

2023), nursing staff (9% in 2021, 5% in 2023), and unit leaders (8% in 2021, 3% in 2023). According to the central medical center database, there was a 4.6% increase in full-time equivalent employees (from 126 to 134) between the pretest and 2-year posttest time points. These numbers include employees (33 in 2021, 42 in 2023) located at a satellite site that did not partake in the intervention because the database aggregates full-time equivalent employees for the medical center and the satellite site.

Part 1 Analyses

Table 3 provides the correlation matrix for all variables included in the pretest model, and the Figure shows the path model with final β coefficients and R^2 values from the multiple regression analysis. Leadership communication was associated with positive workplace climate ($\beta = 0.76$, $P < .001$), indicating that respondents who perceived leaders' communication to be transparent, consistent, and bidirectional were more likely to perceive a positive workplace climate. Likewise, a positive workplace climate was associated with increased engagement ($\beta = 0.53$, $P < .001$) and decreased burnout ($\beta = -0.42$, $P < .001$) and intent to leave ($\beta = -0.49$, $P < .001$).

Part 2 Analyses

Table 4 provides the pretest and 2-year posttest comparisons and demonstrates a statistically significant change in the

hypothesized direction for variables in the model. Over the 2-year period, there was an improvement in leadership communication (pretest mean, 4.59 ± 1.51 [SD]; posttest mean, 5.80 ± 1.01 ; $t = 5.97$; $P < .001$) and positive workplace climate (pretest mean, 5.09 ± 1.43 ; posttest mean, 5.77 ± 1.11 ; $t = 3.35$; $P < .001$). There was a decrease in burnout (pretest mean, 2.69 ± 0.94 ; posttest mean, 2.18 ± 0.74 ; $t = 3.50$; $P < .001$) and intent to leave (pretest mean, 3.12 ± 2.23 ; posttest mean, 2.56 ± 1.84 ; $t = 1.78$; $P < .05$) and an increase in engagement (pretest mean, 5.27 ± 1.20 ; posttest mean, 5.68 ± 0.96 ; $t = 2.50$; $P < .01$) when comparing pre- and posttest scores.

Discussion

Radiology departments and the larger health care infrastructure are currently facing an ongoing crisis due to high rates of provider burnout and turnover, as well as staffing shortages. The objective of this study was to determine whether a leadership program could improve the workplace climate and subsequently minimize provider burnout and turnover while maximizing engagement. Pretest and 2-year posttest comparisons demonstrated a significant increase in providers' perception of leadership communication, workplace climate, and engagement and a significant decrease in their burnout and intent to leave.

Research from the field of organizational resilience can inform health care leaders of effective strategies for managing

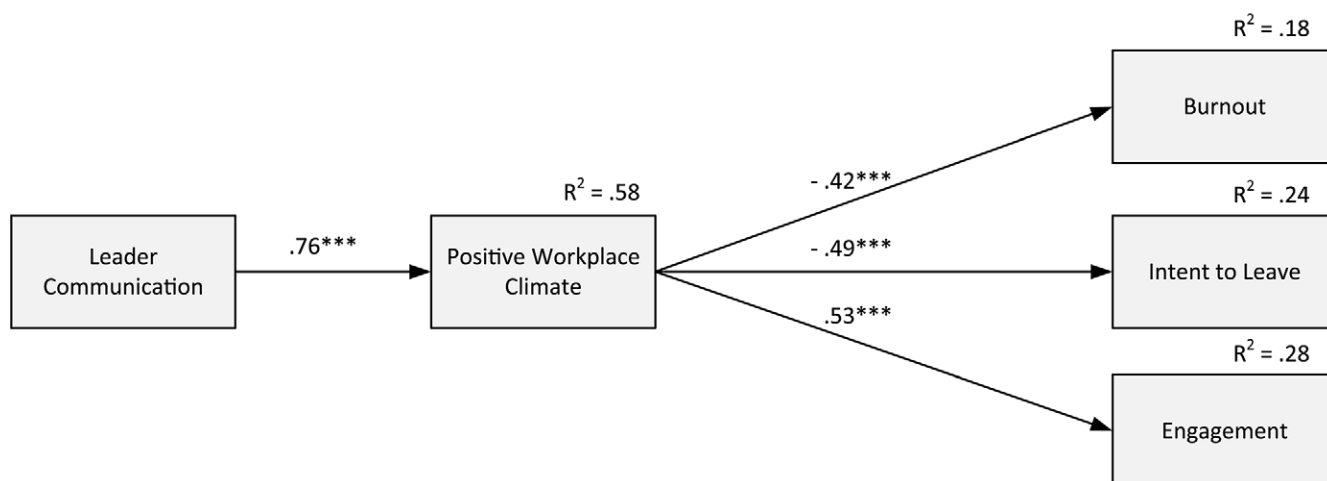


Diagram shows the path model, including final β coefficients and R^2 values from the multiple regression analysis. *** = $P < .001$

Table 3: Pearson Correlation for All Variables Included in the Path Analysis

Correlation Pair	Pearson Correlation Coefficient	Two-tailed P Value
Leadership communication vs positive workplace climate	0.76	<.001
Leadership communication vs engagement	0.39	<.001
Leadership communication vs burnout	-0.15	.17
Leadership communication vs intent to leave	-0.34	.002
Positive workplace climate vs engagement	0.53	<.001
Positive workplace climate vs burnout	-0.42	<.001
Positive workplace climate vs intent to leave	-0.49	<.001
Engagement vs burnout	-0.62	<.001
Engagement vs intent to leave	-0.47	<.001
Burnout vs intent to leave	0.61	<.001

the current crisis facing health care (4,18). Relational reserves are instrumental for organizational functioning during times of crises because they facilitate rapid adaptation to day-to-day disruptions that occur during organizational crises, and also fortify the workforce by buffering against emotional exhaustion and feelings of low workplace accomplishment (5,6). Evidence-based strategies to build relational reserves have been identified, and creating a positive workplace climate is one of the most promising strategies (15,16,22,24). Our study advances these findings by demonstrating the importance of a positive workplace climate—a form of relational reserve—in minimizing health care worker burnout and intent to leave that could stop the exodus of health care workers. In our study, we found that a workplace climate was negatively correlated with burnout ($\beta = -0.42$, $P < .001$) and intent to leave ($\beta = -0.49$,

$P < .001$) and positively correlated with engagement ($\beta = 0.53$, $P < .001$). High workplace engagement is critical during organizational crises, as much of the management of a crisis falls on the frontline where health care workers are called to adapt to limited resources, brainstorm workarounds, and coordinate the execution of a new plan.

The challenges of a changing workplace climate led to the second objective of our study, which demonstrated that a leadership training program could improve the workplace climate (pretest mean, 5.09 ± 1.43 [SD]; posttest mean, 5.77 ± 1.11 ; $t = 3.35$; $P < .001$) and engagement (pretest mean, 5.27 ± 1.20 ; posttest mean, 5.68 ± 0.96 ; $t = 2.50$; $P < .01$), and reduce health care provider burnout (pretest mean, 2.69 ± 0.94 ; posttest mean, 2.18 ± 0.74 ; $t = 3.50$; $P < .001$). Leadership that is characterized by clear communication, active listening, and empathetic and compassionate problem solving has been associated with improved outcomes among health care providers (27).

In our study, we found that implementing a positive leadership program improved perceptions of leaders' communication in terms of being more transparent, frequent, and consistent; asking questions; and engaging in effective listening. There was also a significant improvement in health care providers' perception of workplace climate (pretest mean, 5.09 ± 1.43 ; posttest mean, 5.77 ± 1.11 ; $t = 3.35$; $P < .001$) and engagement (pretest mean, 5.27 ± 1.20 ; posttest mean, 5.68 ± 0.96 ; $t = 2.50$; $P < .01$). We also observed a significant decrease in burnout, which was particularly noteworthy as the national rate of burnout increased dramatically during this time period (2). Moreover, there was a reduction in intent to leave that was significant at the $P < .051$ level, although this did not meet our conservative cutoff point of $P < .001$. These findings suggest that modifying leadership practices and workplace norms can build resilience at the organizational level, which subsequently supports the workforce. Unlike most resilience programs, such as stress management or mindfulness training programs, which occur outside of work hours and have a low success rate of 30% (28), changing workplace climates can promote resilience without requiring additional time and effort outside of the workday (28).

Table 4: Differences in Means and SDs of Key Variables from Pretest to Posttest

Variable	Pretest		Posttest		T Value	P Value
	Mean	SD	Mean	SD		
Leadership communication	4.59	1.51	5.80	1.01	5.97	<.001
Positive workplace climate	5.09	1.43	5.77	1.11	3.35	<.001
Engagement	5.27	1.20	5.68	0.96	2.50	<.01
Burnout	2.69	0.94	2.18	0.74	3.50	<.001
Intent to leave	3.12	2.23	2.56	1.84	1.78	<.05

Note.—Cross-sectional data were collected in 2021 (pretest) and 2023 (posttest). Statistical significance was set at $P < .001$ based on a one-tailed probability and Bonferroni correction due to multiple tests.

Our study had several limitations. First, this study is based on a single division of a department in an academic medical center. Additional studies are needed to validate these findings across subspecialties, different types of health care facilities, and demographic characteristics. Second, confounding factors within the department, institution, and overall health care system at the time of the study may exist, precluding clear connection of cause and effect. This includes the possibility that the health system emerged from the COVID-19 pandemic with the workplace improved; a possibility that we cannot assess with available data. Third, no control group was created and studied in parallel to allow a more direct mapping of cause and effect. Unfortunately, opportunities for highly controlled studies about workplace climate are extremely limited to nonexistent, which contributes to the paucity of research on interventions to improve organizational context. As a result, we are unable to rule out the possibility that extraneous factors affected the results. While our findings advance our understanding of viable options for addressing burnout and turnover, we caution readers that these findings are preliminary. Fourth, there are limitations associated with the survey and the nature of the data. The data were anonymous such that changes between the surveys were examined at the aggregate level rather than the individual level. However, there was high overlap in participation in the two surveys given that the entire unit was sampled and that there were exceptionally high response rates and low turnover between the data collections. Finally, we were limited in terms of survey length, which resulted in the use of single-item questions for some of the key constructs in this study. The use of single-item questions for some of the outcome variables and allowing respondents to define burnout in their own terms limits our ability to draw conclusions about the impact of the program and prompts additional studies to confirm the findings reported here.

Despite these limitations, we believe our research advances our understanding of strategies to improve workplace climate given that so few studies on this topic exist. The strength of this study was the demonstration of a viable approach that can be used by health care units to partially address burnout within the

group. Future research is needed to validate the findings from this pilot and should be conducted with a control group, but these initial findings offer an approach that leaders can use to sustain their workforce during the ongoing health care crisis as broader industry solutions are identified.

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