

An Organizational Leadership Development Approach to Support Health Worker Mental Health

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Coming at a time when burnout rates were already high,¹ the COVID-19 pandemic physically and mentally further stressed our nation's health care workforce,^{2,3} leading to record levels of burnout, moral distress, and moral injury.⁴ In response, Surgeon General Vivek H. Murthy released an advisory on building a thriving health workforce in 2022 with the specific aim of targeting health worker burnout to improve health and well-being and strengthen the nation's public health infrastructure. Secretary of Health and Human Services Xavier Becerra said, "We owe all health workers—from doctors to hospital custodial staff—an enormous debt. And as we can clearly see and hear throughout this Surgeon General's Advisory, they're telling us what our gratitude needs to look like: real support and systemic change that allows them to continue serving to the best of their abilities."⁵

Even before the pandemic, the 2019 National Academy of Medicine's Consensus Study Report on clinician burnout indicated that the US health care system was changing in ways that profoundly affected the way health care was delivered.⁶ These changes have resulted in mounting workplace stress, contributing to a greater rate of burnout among physicians than the general working population.⁷ Health worker burnout has serious consequences for patients, including increased risk for medical errors⁶ and lower-quality care for patients, in particular those with diverse backgrounds.⁸ It also has serious consequences for health care organizations. Burnout is associated with high turnover rates, absenteeism, and professionalism issues.^{6,9–12} These impacts can ultimately harm patients and result in increased health care costs.^{13,14} However, health care systems have struggled to effectively address health

worker burnout, often utilizing low-yield tactics because of the perceived cost of system-level changes^{15,16} and the glorification of organizational "profits."¹⁷ Research, however, increasingly shows that there are major institutional costs to not appropriately addressing the health worker crisis.⁶ Investing in organizational leaders and leadership practices may be one strategy to facilitate organizational change.¹⁸

Multiple National Academy of Medicine reports on clinician burnout^{6,19} highlight leadership as a key system-level factor that influences health worker burnout and well-being. Cross-sectional and longitudinal studies with thousands of health workers demonstrate that the leadership behaviors of immediate supervisors are associated with well-being, safety climate, teamwork climate, burnout, job satisfaction, and intent to leave.^{20–27} This suggests that leadership development is a possible primary prevention approach to mitigate health worker stress and optimize work environments.^{18,28,29} For this strategy to be successful, there needs to be senior leadership engagement, support, and resource allocation. If leaders are not empowered, trained, and supported, it is unlikely that any of these recommendations will be realized.

THREATS TO SUCCESSFUL HEALTH CARE LEADERSHIP

Health workers are being asked to lead health care systems because they are uniquely poised to understand operational and workforce needs. However, a recent systematic review of the antecedents and mediators of leadership in health care demonstrated a significant gap in our understanding

of what conditions—personal and organizational—are needed to develop and display authentic leadership behaviors in complex health care delivery environments.³⁰

Many people aspire to leadership positions because they offer opportunities for prestige, reputation, and promotion. However, research suggests that some may be reluctant to lead because of perceived risks in leading as well as impacts on their personal well-being.³¹ For example, one study demonstrated that leaders perceive a variety of interpersonal, image, and instrumental risks to displaying leadership skills.³² Badura et al.³³ push us to consider not only the personal traits and motivations of leaders but also the contextual factors that may promote leadership emergence in organizations, such as individual and team attributes, networks, job factors, and organizational and industry characteristics. In a study by Shanafelt et al.,³⁴ physician leaders' own level of burnout, professional fulfillment, and self-valuation independently predicted how those they supervised perceived their leadership behaviors and effectiveness. Studies have also shown that burnout among health care workers is associated with lower scores on national competency examinations, lower cumulative performance scores on simulation scenarios, greater struggles with concentrating at work, and decreased motivation at work.^{35–37} Other health care studies have demonstrated that negative emotions can impede learning, recall, and application of knowledge and skills.³⁷ Additionally, in the nursing literature, contextual factors such as time, workload, and organizational culture have been shown to impede effective leadership behaviors.³⁸ These strains may inhibit acquisition of leadership

knowledge and skills and the display of relational leadership practices in health care environments.

CURRENT HEALTH CARE LEADERSHIP TRAINING STRUCTURE

There are numerous reviews of health care leadership development programs.^{39,40} Typically, these programs include workshops, reading assignments, small group discussions, feedback and assessments, and simulations and role plays, with components focused on active learning being most impactful.^{39,40} Programs focused on individual skill development generally improve individual outcomes such as leader knowledge³⁹ or relational outcomes such as supportive and empowering behaviors toward teams.³⁸ Prior literature reviews support the idea that effective leadership and training transfer in health care requires contextual support such as social and upper management support.⁴¹ Mentoring, coaching, and organizational support strategies, such as senior management support, should be part of the development of health care worker leadership to facilitate the implementation of leadership training in the workplace.⁴²

There is a general consensus that health worker leaders have the potential to influence organizational change, quality of care, and a culture of workforce support.¹⁷ However, few leadership development programs have had a demonstrable impact on organizational outcomes.³⁹ One reason may be that existing leadership development programs are not always founded in conceptual models that explain why and how leadership behaviors affect health systems and those who work and receive care within them. Clinical leaders

influence organizational outcomes when they feel knowledgeable and skilled, have the agency to act, engage stakeholders to identify solutions, take risks, work across organizational silos, and use effective communication skills.⁴³ These competencies require not only training but also training transfer support to help ensure application in complex health care work environments.

RECOMMENDATIONS TO IMPROVE HEALTH CARE LEADERSHIP

Health worker leaders are challenged to pragmatically develop their leadership capabilities, given the multiple competing demands on their time. A review of health care leadership programs by Onyura et al.⁴⁴ concludes that health care leadership development needs to better prepare leaders to tackle health system challenges. There are numerous examples of leadership development programs in health care (e.g., the Health Care Leadership course offered through Harvard Online⁴⁵), but the gap remains in understanding what will help leaders display authentic leadership skills on the job. To meet this need, organizations must reframe how they design leadership development programs. We present a leadership development framework to advance the impact that leadership programs have on health worker, patient, and organizational outcomes. The framework reflects implementation science and the Job Demands–Resources theory to explain why and how health workers may become effective leaders (Figure 1).

First, following implementation science, we consider where leadership development can be implemented to

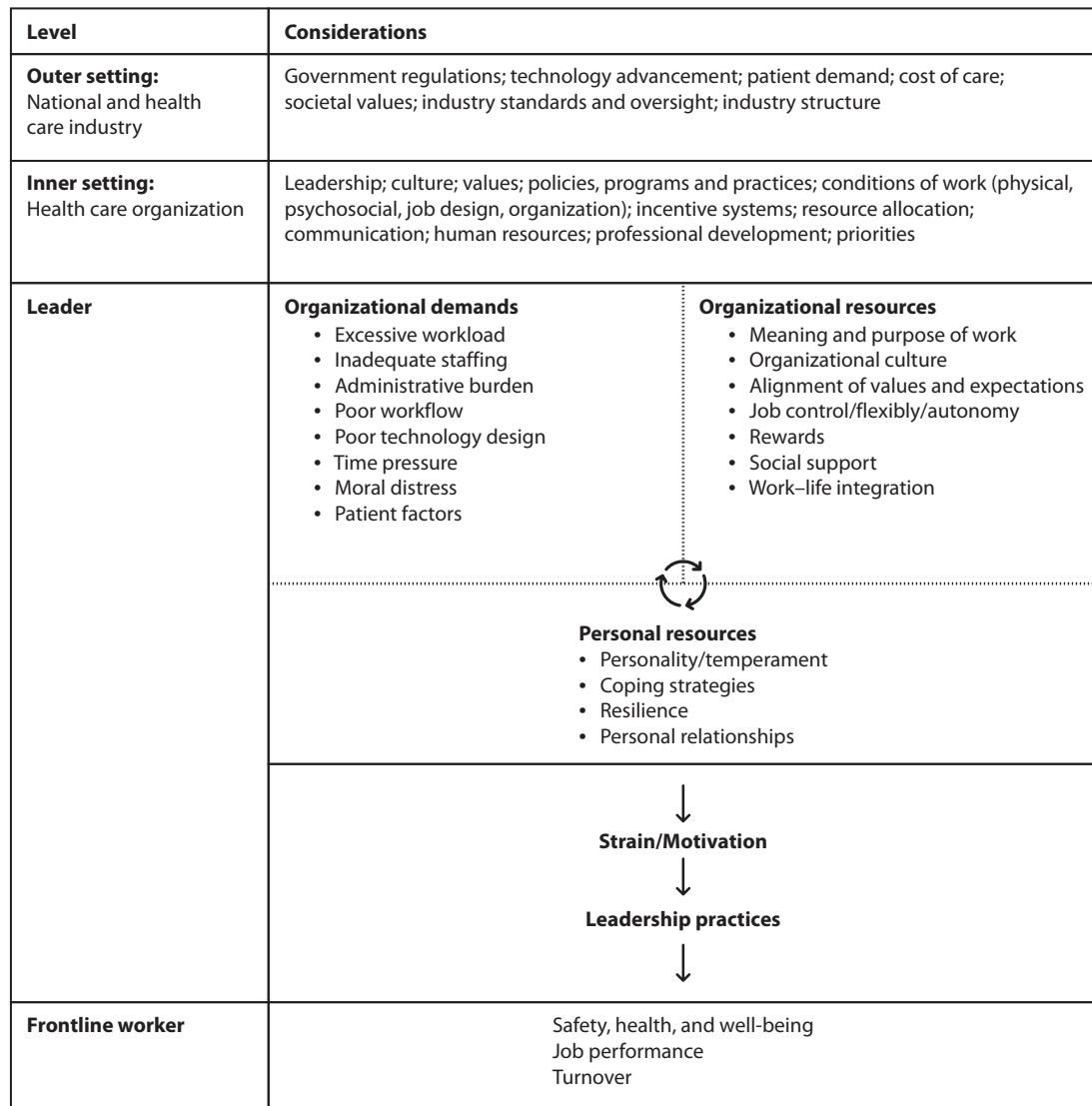


FIGURE 1— A Multilevel Framework for Understanding What May Facilitate or Inhibit Health Care Leadership Development

Note. For more details, see National Academy of Medicine, “Taking Action Against Clinician Burnout: A Systems Approach to Professional Well-Being” (<https://nam.edu/systems-approaches-to-improve-patient-care-by-supporting-clinician-well-being>).

best understand the factors that may influence the adoption and implementation of the programs.⁴⁶ At a national level, the health care environment presents unique challenges for leaders, such as financial and regulatory pressures, rapidly developing technologies, workforce shortages, high demand for services, and an aging population with complex chronic diseases. At an employer level, there are varying policies,

procedures, and practices that may support or hinder individuals as they seek to enact leadership behaviors. Sorensen et al.⁴⁷ note the many ways in which the conditions of work—the physical organization of work, job design, and psychosocial work environment—dictate how work happens. In sum, the environment in which health care workers work may encourage or hinder their interest and

engagement, and the effectiveness of leadership practices.

Second, we ground our framework in the Job Demands–Resources theory⁴⁸ to further understand what may encourage health worker leaders, at an individual level, to engage in leadership training and transfer training to their work environments, or discourage them from doing so. We posit that the imbalance between demands and resources

may inhibit learning, recall, and display of leadership skills as health leaders move toward informal and formal leadership roles. The connection between leadership and Job Demands–Resources theory has a long history,^{48,49} but the focus has always been on how leadership affects the job demands and resources of workers. We posit that the theory can also be useful to help explain leadership development.

Exposure to job demands depletes the mental and physical resources of health worker leaders and thus may inhibit leadership engagement. Job demands are “physical, social, or organizational aspects of the job that require sustained physical or mental effort and are therefore associated with certain physiological and psychological costs (e.g., exhaustion).”^{50(p501)}

On the other hand, access to job resources—relational and organizational—may facilitate leadership engagement. Job resources are “physical, social, or organizational aspects of the job that may do any of the following: (a) be functional in achieving work goals; (b) reduce job demands and the associated physiological and psychological costs; (c) stimulate personal growth and development.”^{50(p501)} Job resources may motivate health worker leaders to lead burnout prevention and well-being promotion strategies as they tap into intrinsic motivations to grow, learn, and develop as well as external motivations to achieve work goals.

Finally, health worker leaders who possess personal resources may have more coping skills and be protected from adverse health outcomes when they encounter stressors at work, which may make use of leadership skills in their jobs less challenging.

We need to pay attention to the organizational demands and resources

health workers experience throughout the process of transitioning from non-leadership to informal leadership and to formal leadership. Certain demands or resources may be important for one stage or all. For example, there are several organizational threats to the sustainability of engaging in leadership practices, which may be driven by organizational culture. Such threats may include a lack of psychological safety or the experience of bullying, including macro- and microaggressions, when aiming to challenge the status quo. Experience of these may differ depending on whether someone is in an informal or formal leadership role. The next step would be to determine how these patterns in health worker leader experiences relate to leaders’ motivation to lead, to engage in leadership development, and to transfer skills to their job, and, ultimately, to burnout, turnover intentions, and well-being among care team members.

Although some organizational demands and resources and personal resources are commonly studied in the literature, they are often studied independently of each other. Moving forward, we need to better understand how these factors interact. One method is to take a person-centered analytical approach that considers the whole of a health worker’s experience at work. This approach would consider the similarities and differences between health workers rather than between variables. Researchers are using person-centered approaches to understand patterns in health worker burnout.⁵¹ However, we advocate for a more holistic view of patterns in health worker leader demands and resources that may precede the experience of burnout and influence their engagement in leadership practices.

Health care organizations should use this framework to develop a pipeline of future leaders who can address systems changes that promote a culture of well-being. Using a person-centered approach to characterize the experiences of health worker leaders at work will help us identify optimal conditions to facilitate leadership growth and impact. For example, leadership development programs may need to be customized to a health worker’s specific organizational resources and demands, as well as personal resources. It is important to note that many of these demands and resources are malleable and may be intervention targets in addition to developing individuals to be leaders. This strategy complements existing recommendations to not prescribe a one-size-fits-all leadership development approach in the health care industry.³⁹ It also is in line with the Total Worker Health approach to address system-level changes that harm workforce well-being.^{52–55} It will be important to empirically evaluate the adoption, implementation, and, ultimately, impact that these custom leadership development programs have on leadership behaviors as well as outcomes related to care teams and institutional outcomes. This approach may help with the education–practice gap and lead to health worker leaders who are better equipped to tackle the “wicked problems” of health systems.⁴⁴

CONCLUSIONS

To achieve the objectives of the National Academy of Medicine’s Consensus Study Report on clinician burnout,⁶ we need to focus on health worker leadership practices. Skilled leaders must be at the helm to drive the complex and challenging conversations about how current organizational practices

contribute to health care worker harm. Our framework represents an important strategy to initiate wide-scale organizational change that improves the well-being of health care workers. **AJPH**

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CONFLICTS OF INTEREST

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REFERENCES

- Shanafelt T, West C, Dyrbye L, Wang H, Carlasare L, Sinsky C. Changes in burnout and satisfaction with work-life integration in physicians during the first 2 years of the COVID-19 pandemic. *Mayo Clin Proc*. 2022;97(12):2248–2258. <https://doi.org/10.1016/j.mayocp.2022.09.002>
- Smallwood N, Harrex W, Rees M, Willis K, Bennett CM. COVID-19 infection and the broader impacts of the pandemic on healthcare workers. *Respirol-ogy*. 2022;27(6):411–426. <https://doi.org/10.1111/resp.14208>
- Shaukat N, Ali DM, Razzak J. Physical and mental health impacts of COVID-19 on healthcare workers: a scoping review. *Int J Emerg Med*. 2020;13(1):40. <https://doi.org/10.1186/s12245-020-00299-5>
- US Surgeon General. Addressing health worker burnout: The US Surgeon General's Advisory on building a thriving health workforce. 2022. Available at: <https://www.hhs.gov/surgeongeneral/priorities/health-worker-burnout/index.html>. Accessed November 18, 2022.
- US Department of Health and Human Services. New Surgeon General Advisory sounds alarm on health worker burnout and resignation. 2020. Available at: <https://www.hhs.gov/about/news/2022/05/23/new-surgeon-general-advisory-sounds-alarm-on-health-worker-burnout-and-resignation.html>. Accessed November 22, 2022.
- National Academy of Medicine. Taking action against clinician burnout: a systems approach to professional well-being. 2019. Available at: <https://nam.edu/systems-approaches-to-improve-patient-care-by-supporting-clinician-well-being>. Accessed December 19, 2022.
- Shanafelt TD, Boone S, Tan L, et al. Burnout and satisfaction with work-life balance among US physicians relative to the general US population. *Arch Intern Med*. 2012;172(18):1377–1385. <https://doi.org/10.1001/archinternmed.2012.3199>
- Dyrbye L, Herrin J, West CP, et al. Association of racial bias with burnout among resident physicians. *JAMA Netw Open*. 2019;2(7):e197457. <https://doi.org/10.1001/jamanetworkopen.2019.7457>
- Dyrbye LN, Varkey P, Boone SL, Satele DV, Sloan JA, Shanafelt TD. Physician satisfaction and burnout at different career stages. *Mayo Clin Proc*. 2013;88(12):1358–1367. <https://doi.org/10.1016/j.mayocp.2013.07.016>
- Hamidi MS, Bohman B, Sandborg C, et al. Estimating institutional physician turnover attributable to self-reported burnout and associated financial burden: a case study. *BMC Health Serv Res*. 2018;18(1):851. <https://doi.org/10.1186/s12913-018-3663-z>
- Willard-Grace R, Knox M, Huang B, Hammer H, Kivlahan C, Grumbach K. Burnout and health care workforce turnover. *Ann Fam Med*. 2019;17(1):36–41. <https://doi.org/10.1370/afm.2338>
- Windover A, Martinez M, Mercer M, Neuendorf A, Boissy A, Rothberg M. Correlates and outcomes of physician burnout within a large academic medical center. *JAMA Intern Med*. 2018;178(6):856–858. <https://doi.org/10.1001/jamainternmed.2018.0019>
- Han S, Shanafelt T, Sinsky C. Estimating the attributable cost of physician burnout in the United States. *Ann Intern Med*. 2019;170(11):784–790. <https://doi.org/10.7326/M18-1422>
- West C, Dyrbye L, Shanafelt T. Physician burnout: contributors, consequences and solutions. *J Intern Med*. 2018;283(6):516–529. <https://doi.org/10.1111/joim.12752>
- Arogyaswamy S, Vukovic N, Keniston A, et al. The impact of hospital capacity strain: a qualitative analysis of experience and solutions at 13 academic medical centers. *J Gen Intern Med*. 2022;37(6):1463–1474. <https://doi.org/10.1007/s11606-021-07106-8>
- Aiken LH, Lasater KB, Sloane DM, et al. Physician and nurse well-being and preferred interventions to address burnout in hospital practice. *JAMA Health Forum*. 2023;4(7):e231809. <https://doi.org/10.1001/jamahealthforum.2023.1809>
- Berwick DM. Salve lucrum: the existential threat of greed in US health care. *JAMA*. 2023;329(8):629–630. <https://doi.org/10.1001/jama.2023.0846>
- Shanafelt T, Trockel M, Rodriguez A, Logan D. Wellness-centered leadership: equipping health care leaders to cultivate physician well-being and professional fulfillment. *Acad Med*. 2021;96(5):641–651. <https://doi.org/10.1097/ACM.0000000000003907>
- Institute of Medicine. *The Future of Nursing: Leading Change, Advancing Health*. Washington, DC: National Academies Press; 2011.
- Shanafelt TD, Gorringer G, Menaker R, et al. Impact of organizational leadership on physician burnout and satisfaction. *Mayo Clin Proc*. 2015;90(4):432–440. <https://doi.org/10.1016/j.mayocp.2015.01.012>
- Shanafelt TD, Wang H, Leonard M, et al. Assessment of the association of leadership behaviors of supervising physicians with personal-organizational values alignment among staff physicians. *JAMA Netw Open*. 2021;4(2):e2035622. <https://doi.org/10.1001/jamanetworkopen.2020.35622>
- Dyrbye L, Hunderfund A, Winter R, et al. The relationship between residents' perceptions of residency program leadership team behaviors and resident burnout and satisfaction. *Acad Med*. 2020;95(9):1428–1434. <https://doi.org/10.1097/ACM.0000000000003538>
- Dyrbye L, Major-Elechi B, Hays T, Fraser C, Buskirk S, West C. Relationship between organizational leadership and health care employee burnout and satisfaction. *Mayo Clin Proc*. 2020;95(4):698–708. <https://doi.org/10.1016/j.mayocp.2019.10.041>
- Dyrbye L, Major-Elechi B, Hays T, Fraser C, Buskirk SJ, West C. Physicians' ratings of their supervisor's leadership behaviors and their subsequent burnout and satisfaction: a longitudinal study. *Mayo Clin Proc*. 2021;96(10):2598–2605. <https://doi.org/10.1016/j.mayocp.2021.01.035>
- Boamah SA, Read EA, Spence Laschinger HK. Factors influencing new graduate nurse burnout development, job satisfaction and patient care quality: a time-lagged study. *J Adv Nurs*. 2017;73(5):1182–1195. <https://doi.org/10.1111/jan.13215>
- Niinihuhta M, Haggman-Laitila A. A systematic review of the relationships between nurse leaders' leadership styles and nurses' work-related well-being. *Int J Nurs Pract*. 2022;28(5):e13040. <https://doi.org/10.1111/ijn.13040>
- Tawfik DS, Adair KC, Palassoff S, et al. Leadership behavior associations with domains of safety culture, engagement, and health care worker well-being. *Jt Comm J Qual Patient Saf*. 2023;49(3):156–165. <https://doi.org/10.1016/j.jcqp.2022.12.006>
- Kelloway EK, Barling J. Leadership development as an intervention in occupational health psychology. *Work Stress*. 2010;24(3):260–279. <https://doi.org/10.1080/02678373.2010.518441>
- Kelloway EK, Dimoff JK, Gilbert S. Mental health in the workplace. *Annu Rev Organ Psychol Organ Behav*. 2023;10(1):363–387. <https://doi.org/10.1146/annurev-orgpsych-120920-050527>

30. Alilyyani B, Wong CA, Cummings G. Antecedents, mediators, and outcomes of authentic leadership in healthcare: a systematic review. *Int J Nurs Stud*. 2018;83:34–64. <https://doi.org/10.1016/j.ijnurstu.2018.04.001>
31. Carton AM. The science of leadership: a theoretical model and research agenda. *Annu Rev Organ Psychol Organ Behav*. 2022;9(1):61–93. <https://doi.org/10.1146/annurev-orgpsych-012420-091227>
32. Zhang C, Nahrgang JD, Ashford SJ, DeRue DS. The risky side of leadership: conceptualizing risk perceptions in informal leadership and investigating the effects of their over-time changes in teams. *Organ Sci*. 2020;31(5):1138–1158. <https://doi.org/10.1287/orsc.2019.1350>
33. Badura KL, Galvin BM, Lee MY. Leadership emergence: an integrative review. *J Appl Psychol*. 2022;107(11):2069–2100. <https://doi.org/10.1037/apl0000997>
34. Shanafelt T, Makowski M, Wang H, et al. Association of burnout, professional fulfillment, and self-care practices of physician leaders with their independently rated leadership effectiveness. *JAMA Netw Open*. 2020;3(6):e207961. <https://doi.org/10.1001/jamanetworkopen.2020.7961>
35. Dyrbye L, Shanafelt T. A narrative review on burnout experienced by medical students and residents. *Med Educ*. 2016;50(1):132–149. <https://doi.org/10.1111/medu.12927>
36. West CP, Shanafelt TD, Kolars JC. Quality of life, burnout, educational debt, and medical knowledge among internal medicine residents. *JAMA*. 2011;306(9):952–960. <https://doi.org/10.1001/jama.2011.1247>
37. McConnell MM, Eva KW. The role of emotion in the learning and transfer of clinical skills and knowledge. *Acad Med*. 2012;87(10):1316–1322. <https://doi.org/10.1097/ACM.0b013e3182675af2>
38. Chen W, Modanloo S, Graham ID, Hu J, Lewis KB, Gifford W. A mixed-methods systematic review of interventions to improve leadership competencies of managers supervising nurses. *J Nurs Manag*. 2022;30(8):4156–4211. <https://doi.org/10.1111/jonm.13828>
39. Geerts JM, Goodall AH, Agius S. Evidence-based leadership development for physicians: a systematic literature review. *Soc Sci Med*. 2020;246:112709. <https://doi.org/10.1016/j.socscimed.2019.112709>
40. Lyons O, George R, Galante JR, et al. Evidence-based medical leadership development: a systematic review. *BMJ Leader*. 2021;5(3):206–213. <https://doi.org/10.1136/leader-2020-000360>
41. Hartviksen TA, Aspors J, Uhrenfeldt L. Healthcare middle managers' experiences of developing capacity and capability: a systematic review and meta-synthesis. *BMC Health Serv Res*. 2019;19(1):546. <https://doi.org/10.1186/s12913-019-4345-1>
42. Aarons GA, Ehrhart MG, Farahnak LR, Hurlburt MS. Leadership and organizational change for implementation (LOCI): a randomized mixed method pilot study of a leadership and organization development intervention for evidence-based practice implementation. *Implement Sci*. 2015;10(1):11. <https://doi.org/10.1186/s13012-014-0192-y>
43. Hofmann R, Vermunt JD. Professional learning, organisational change and clinical leadership development outcomes. *Med Educ*. 2021;55(2):252–265. <https://doi.org/10.1111/medu.14343>
44. Onyura B, Crann S, Tannenbaum D, Whittaker M, Murdoch S, Freeman R. Is postgraduate leadership education a match for the wicked problems of health systems leadership? A critical systematic review. *Perspect Med Educ*. 2019;8(3):133–142. <https://doi.org/10.1007/S40037-019-0517-2>
45. Harvard Online. Health care leadership: what do you need to lead a business in the health care sector? 2023. Available at: <https://www.harvardonline.harvard.edu/series/health-care-leadership>. Accessed July 24, 2023.
46. Guerin RJ, Harden SM, Rabin BA, et al. Dissemination and implementation science approaches for occupational safety and health research: implications for advancing total worker health. *Int J Environ Res Public Health*. 2021;18(21):11050. <https://doi.org/10.3390/ijerph182111050>
47. Sorensen G, Dennerlein JT, Peters SE, Sabbath EL, Kelly EL, Wagner GR. The future of research on work, safety, health and wellbeing: a guiding conceptual framework. *Soc Sci Med*. 2021;269:113593. <https://doi.org/10.1016/j.socscimed.2020.113593>
48. Bakker AB, Demerouti E, Sanz-Vergel A. Job Demands–Resources theory: ten years later. *Annu Rev Organ Psychol Organ Behav*. 2023;10(1):25–53. <https://doi.org/10.1146/annurev-orgpsych-120920-053933>
49. Tummers LG, Bakker AB. Leadership and Job Demands–Resources theory: a systematic review. *Front Psychol*. 2021;12:722080. <https://doi.org/10.3389/fpsyg.2021.722080>
50. Demerouti E, Bakker AB, Nachreiner F, Schaufeli WB. The Job Demands–Resources model of burnout. *J Appl Psychol*. 2001;86(3):499–512. <https://doi.org/10.1037/0021-9010.86.3.499>
51. Leiter MP, Maslach C. Latent burnout profiles: a new approach to understanding the burnout experience. *Burn Res*. 2016;3(4):89–100. <https://doi.org/10.1016/j.burn.2016.09.001>
52. Tamers S, Chosewood L, Childress A, Hudson H, Nigam J, Chang C. Total Worker Health 2014–2018: the novel approach to worker safety, health, and well-being evolves. *Int J Environ Res Public Health*. 2019;16(3):321. <https://doi.org/10.3390/ijerph16030321>
53. Schulte PA, Guerin RJ, Schill AL, et al. Considerations for incorporating “well-being” in public policy for workers and workplaces. 2015;105(8):e31–e44. <https://doi.org/10.2105/AJPH.2015.302616>
54. Lovejoy M, Kelly EL, Kubzansky LD, Berkman LF. Work redesign for the 21st century: promising strategies for enhancing worker well-being. *Am J Public Health*. 2021;111(10):1787–1795. <https://doi.org/10.2105/AJPH.2021.306283>
55. Hammer LB. The interplay of workplace redesign and public policy in the 21st century. *Am J Public Health*. 2021;111(10):1784–1786. <https://doi.org/10.2105/AJPH.2021.306368>