



INTERNATIONAL INSTITUTE FOR PRIVATE
COMMERCIAL AND COMPETITION LAW
(IIPCCL - AUSTRIA)

Research Article

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Burnout as an Emergent Property of Complex Adaptive Systems: A Systems Perspective

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DOI: <https://doi.org/10.2478/bjir-2026-0019>

Abstract

Burnout is widely recognized as a major challenge for contemporary healthcare systems and has been extensively examined through occupational and organizational theories that emphasize job demands, organizational resources, leadership, workplace relationships, and ethical factors. While these perspectives have substantially advanced the understanding of burnout, comparatively less attention has been given to the dynamic organizational processes through which burnout develops and persists within healthcare systems operating under persistent structural pressure.

The conceptual model proposed in this paper was informed by recurring patterns of organizational adaptation identified during the interpretation of the authors' previous qualitative research on burnout among healthcare professionals working within a healthcare system undergoing prolonged institutional transition. These observations suggested that existing burnout theories, while successfully explaining many occupational and organizational determinants of burnout, provided a more limited understanding of the adaptive organizational processes through which burnout develops and persists over time. This prompted the exploration of Complex Adaptive Systems (CAS) theory as a complementary framework for understanding the dynamic organizational processes associated with burnout.

Building on established burnout theories, the paper proposes a conceptual model that interprets burnout as an emergent property of adaptive organizational dynamics. The model suggests that persistent structural constraints generate adaptive responses that enable healthcare organizations to maintain continuity of care while simultaneously contributing to the ongoing reproduction of the organizational conditions associated

with chronic occupational strain. Within this perspective, adaptive practices that sustain organizational functioning may also reduce the visibility of structural deficiencies, delay organizational learning, and reinforce continued reliance on further adaptation. Rather than proposing a new theory of burnout, the paper offers a systems-oriented perspective that extends existing occupational and organizational approaches by emphasizing adaptation, emergence, and recursive feedback as complementary mechanisms for understanding burnout. In doing so, it provides a conceptual framework that may support future empirical research on the dynamic organizational processes underlying burnout and inform organizational strategies aimed at promoting more sustainable healthcare systems.

Keywords: burnout; Complex Adaptive Systems; healthcare organizations; organizational adaptation; emergence; systems thinking.

1. Introduction

Burnout has emerged as one of the most pressing occupational challenges confronting contemporary healthcare systems. Increasing workforce shortages, rising service demands, organizational restructuring, technological advances, and the growing complexity of patient care have substantially intensified chronic occupational stress among healthcare professionals worldwide. The World Health Organization (2019) recognizes burnout as an occupational phenomenon resulting from chronic workplace stress that has not been successfully managed, while the National Academy of Medicine (2019) identifies clinician burnout as a major threat to healthcare quality, patient safety, and workforce sustainability. Extensive evidence has consistently linked burnout to poorer quality of care, increased medical errors, absenteeism, staff turnover, and considerable organizational costs (West et al., 2018; Maslach & Leiter, 2021). Consequently, burnout is increasingly understood not merely as an individual occupational health problem but as a critical organizational and public health challenge.

Over the past four decades, burnout research has substantially advanced the understanding of the phenomenon and its determinants. Following the pioneering work of Freudenberger (1974), Maslach and Jackson (1981) conceptualized burnout as a multidimensional syndrome characterized by emotional exhaustion, depersonalization, and reduced personal accomplishment. This framework, later consolidated through the Maslach Burnout Inventory (Maslach et al., 1996) and refined by Maslach and Leiter (2021), became the dominant model for burnout research. Complementing this perspective, the Job Demands–Resources (JD–R) model explains burnout as the result of an imbalance between occupational demands and available resources (Demerouti et al., 2001; Bakker & Demerouti, 2017). Additional theoretical developments—including Conservation of Resources theory (Hobfoll, 1989; Hobfoll et al., 2018), perceived organizational support (Eisenberger et al., 1986), psychological safety (Edmondson, 2019), and research on moral distress and moral injury (Dean et al., 2019; Dzeng & Wachter, 2020)—have further emphasized the importance of organizational conditions, leadership, workplace

relationships, and ethical tensions in shaping professional well-being. Collectively, these perspectives have progressively shifted the focus from individual vulnerability toward the organizational context in which healthcare professionals work.

Despite these important advances, an important theoretical gap remains. Existing models successfully explain the occupational and organizational conditions associated with burnout but provide more limited insight into the dynamic processes through which burnout develops, persists, and becomes embedded within healthcare organizations over time. Healthcare systems rarely operate under stable conditions. Instead, professionals continuously adapt to chronic staff shortages, resource limitations, organizational uncertainty, changing clinical priorities, and increasing service demands. These adaptive responses—including informal coordination, workarounds, and task prioritization—are often essential for maintaining continuity of care. However, by compensating for structural deficiencies, they may simultaneously reduce their visibility, reinforce existing organizational constraints, and delay structural change. Burnout may therefore emerge not simply from excessive job demands or insufficient resources themselves, but from the cumulative interactions between persistent structural pressures and the adaptive organizational dynamics through which healthcare organizations sustain everyday functioning.

Complex Adaptive Systems (CAS) theory provides a useful framework for understanding these dynamics. Plsek and Greenhalgh (2001) first proposed that healthcare organizations should be viewed as complex adaptive systems composed of multiple autonomous yet interdependent actors whose behaviours continuously influence one another. More recent work has shown that healthcare systems evolve through nonlinear interactions, self-organization, emergence, adaptation, and recursive feedback processes rather than through simple linear cause-and-effect relationships (Braithwaite et al., 2018; Greenhalgh & Papoutsi, 2018). Organizational outcomes therefore arise from continuous interactions among professionals, teams, managers, technologies, and institutional structures rather than from isolated individual actions. Viewed through this perspective, burnout may be understood as an emergent property arising from the adaptive dynamics through which healthcare systems maintain performance under conditions of persistent structural strain.

This systems perspective has important implications for both research and organizational practice. Although interventions focused on resilience, stress management, and individual coping may provide some benefit, their effects remain limited unless accompanied by organizational changes addressing working conditions and system-level factors (West et al., 2016). Rather than replacing established burnout theories, CAS complements them by extending the unit of analysis beyond individual professionals and their immediate work environment to the healthcare organization as a dynamic adaptive system in which patterns of interaction, adaptation, and feedback shape professional well-being. The purpose of this paper is to examine burnout through the theoretical lens of CAS and to argue that this perspective provides a more comprehensive explanation of how burnout emerges, persists, and evolves within healthcare organizations. Specifically, the paper proposes that burnout should be understood not only as an individual response to

chronic occupational demands but also as an emergent property of complex healthcare systems, arising from the continuous interactions between structural constraints and adaptive organizational processes. This perspective broadens the theoretical foundations of burnout research and provides a systems-oriented framework for future empirical studies and organizational strategies aimed at promoting more sustainable healthcare systems.

2. The Evolution of Theoretical Perspectives on Burnout

2.1 Burnout as an Occupational Syndrome

The scientific understanding of burnout has evolved considerably over the past five decades, reflecting a gradual refinement of both its conceptualization and theoretical explanation. The earliest descriptions emerged from observations of professionals working in emotionally demanding occupations. Freudenberger (1974) first characterized burnout as a state of physical and emotional exhaustion resulting from excessive occupational commitment among helping professionals, bringing scientific attention to a phenomenon that was increasingly recognized across healthcare and other human service settings. A major conceptual advance was made by Maslach and Jackson (1981), who established burnout as a distinct occupational syndrome rather than a manifestation of fatigue, stress, or individual psychological vulnerability. Their multidimensional model—comprising emotional exhaustion, depersonalization, and reduced personal accomplishment—provided the first coherent framework for understanding burnout as a work-related phenomenon. By locating burnout within the relationship between professionals and their work environment, this perspective shifted scientific attention away from individual pathology toward chronic occupational stress embedded in organizational settings. The subsequent development of the Maslach Burnout Inventory (Maslach et al., 1996) represented an equally important methodological contribution. As the most widely used instrument for measuring burnout, the MBI enabled consistent assessment across professions, organizations, and countries, providing the empirical basis for much of the contemporary evidence on burnout (Schaufeli et al., 2009; Maslach & Leiter, 2021). This standardization greatly facilitated comparative research and established burnout as a robust field of scientific inquiry.

Subsequent refinements further reinforced the organizational interpretation of burnout. Maslach and Leiter (2021) argued that burnout reflects a chronic mismatch between workers and key characteristics of their work environment rather than individual weakness or inadequate resilience. This perspective consolidated the workplace as the primary context for understanding burnout and stimulated extensive research examining how organizational conditions influence professional well-being.

The enduring contribution of Maslach's framework lies in establishing burnout as an occupational phenomenon rooted in the experience of work and in providing the conceptual foundation for subsequent theoretical developments. While later models expanded the understanding of the organizational processes underlying burnout, the multidimensional framework introduced by Maslach and colleagues remains the cornerstone of contemporary burnout research.

2.2 Understanding Burnout Through Job Demands and Organizational Resources

Following the conceptualization of burnout as an occupational syndrome, subsequent theoretical developments increasingly focused on explaining the conditions under which it develops. While Maslach's framework established burnout as a work-related phenomenon, it offered a comparatively limited explanation of the organizational mechanisms through which burnout emerges. This marked an important shift in burnout research, moving beyond the description of burnout toward the mechanisms through which occupational environments influence its development.

Among these developments, the Job Demands–Resources (JD–R) model proposed by Demerouti et al. (2001) has become one of the most influential frameworks for understanding burnout across occupational settings. The model proposes that every occupation is characterized by a specific configuration of job demands and job resources, and that burnout develops when demands chronically exceed the resources available to meet them. Job demands—including workload, time pressure, emotional demands, role conflict, and cognitive complexity—require sustained physical or psychological effort and are therefore associated with physiological and psychological costs. In contrast, job resources such as professional autonomy, supervisory support, constructive feedback, opportunities for development, and adequate staffing facilitate goal attainment, promote motivation, and buffer the adverse effects of excessive demands (Bakker & Demerouti, 2007; Bakker & Demerouti, 2017).

The JD–R model substantially advanced burnout research by demonstrating that burnout cannot be understood solely as the consequence of excessive job demands. Rather, it results from the ongoing balance between demands and resources within the work environment. Because this balance varies across occupations and organizational settings, the model provides a flexible framework that has been widely applied in occupational health research. This perspective is further strengthened by Conservation of Resources (COR) theory, which conceptualizes stress as the consequence of actual or anticipated loss of valued personal, social, and organizational resources (Hobfoll, 1989; Hobfoll et al., 2018). From this perspective, burnout reflects the cumulative effects of prolonged resource depletion, whereby sustained occupational demands progressively erode professionals' capacity to recover and cope effectively. Together, the JD–R and COR frameworks conceptualize burnout as a dynamic process driven by the continuous interaction between occupational demands and available resources rather than by excessive demands alone.

Beyond their theoretical contribution, these frameworks have informed a substantial body of empirical research and organizational interventions aimed at reducing excessive job demands while strengthening workplace resources. In doing so, they reinforced the view that effective burnout prevention requires organizational change alongside interventions targeting individual coping and resilience.

2.3 Organizational Perspectives on Burnout

Building on the Job Demands–Resources framework, subsequent research increasingly recognized that occupational demands and resources are themselves shaped by the

broader organizational environment. Leadership, workplace culture, communication, institutional priorities, and interpersonal relationships influence not only the conditions under which professionals work but also their capacity to respond to occupational challenges. Consequently, burnout came to be viewed not simply as a response to job characteristics but as a phenomenon embedded within broader organizational systems. Leadership emerged as one of the most influential organizational determinants of professional well-being. Supportive and participatory leadership styles have been consistently associated with lower levels of burnout and higher work engagement (Shanafelt & Noseworthy, 2017; West et al., 2018). Closely related to leadership, research on perceived organizational support demonstrated that employees who believe their organization values their contributions and cares about their well-being are less likely to experience burnout and more likely to remain engaged in their work (Eisenberger et al., 1986). Similarly, studies on psychological safety have shown that work environments characterized by trust, open communication, and the freedom to express concerns without fear of negative consequences foster collaboration, learning, and professional well-being (Edmondson, 2019).

This organizational perspective was further extended by research on moral distress and moral injury. These concepts suggest that burnout cannot always be explained by excessive workload or insufficient resources alone. Healthcare professionals frequently experience profound psychological distress when organizational constraints prevent them from providing the standard of care they consider ethically appropriate or professionally necessary (Dean et al., 2019; Dzung & Wachter, 2020). Burnout therefore reflects not only chronic occupational strain but also persistent tensions between professional values and organizational realities.

Collectively, these developments demonstrated that professional well-being depends not only on the intensity of work but also on the quality of the organizational environment in which work is performed. Leadership, organizational support, psychological safety, teamwork, communication, and ethical climate emerged as central determinants of burnout, encouraging a shift from interventions focused primarily on individual resilience toward organizational strategies aimed at improving working conditions and staff well-being (National Academy of Medicine, 2019; Shanafelt & Noseworthy, 2017; West et al., 2020).

Despite these important advances, organizational perspectives have generally conceptualized organizations as the context within which burnout develops rather than as dynamic systems whose internal interactions continuously reshape working conditions. Organizational characteristics are typically examined as relatively stable antecedents of burnout. Comparatively less attention has been devoted to understanding how organizations adapt to ongoing internal and external pressures, or how these adaptive processes reshape the demands, resources, and relationships experienced by healthcare professionals over time. Addressing these questions requires a theoretical perspective capable of explaining organizations as dynamic adaptive systems in which working conditions are continuously produced, transformed, and reproduced through ongoing interactions (Greenhalgh & Papoutsi, 2018). Such a perspective is provided by CAS theory.

2.4 The Remaining Theoretical Challenge

The theoretical perspectives discussed thus far have substantially advanced the understanding of burnout. Collectively, they have established burnout as an occupational phenomenon, explained the role of job demands and organizational resources in its development, and demonstrated the importance of leadership, organizational support, workplace relationships, and ethical climate in shaping professional well-being. Rather than representing competing explanations, these perspectives provide an increasingly comprehensive understanding of the occupational and organizational determinants of burnout.

Despite these important advances, an important theoretical challenge remains. Existing models primarily explain burnout by identifying the conditions associated with its development, such as excessive workload, insufficient resources, ineffective leadership, poor organizational support, and ethical conflict. Although these factors consistently predict burnout across healthcare settings, they provide comparatively limited insight into how organizational conditions themselves are continuously reshaped through the everyday interactions of healthcare professionals, teams, managers, and institutions. Healthcare organizations rarely function under stable conditions. Instead, they operate in environments characterized by workforce shortages, fluctuating resource availability, technological innovation, changing clinical priorities, and evolving policy demands. To sustain patient care and organizational functioning under these conditions, healthcare professionals continuously adapt their practices through informal coordination, workarounds, redistribution of responsibilities, prioritization of clinical activities, and other adaptive responses. In the short term, these adaptations enhance organizational resilience by allowing healthcare systems to continue functioning despite persistent structural constraints. At the same time, by compensating for those constraints, they may reduce their visibility, normalize chronic overload, and delay organizational learning and structural improvement (Hollnagel, 2017; Braithwaite et al., 2018).

These observations raise an important theoretical question. If healthcare organizations continuously adapt to structural constraints, how do these adaptive processes influence the emergence, persistence, and recurrence of burnout over time? More specifically, how do adaptive responses that successfully preserve organizational functioning also contribute to reproducing the conditions that generate chronic occupational strain? Existing burnout theories recognize the importance of organizational context, yet they generally conceptualize it as a relatively stable set of antecedent conditions rather than as a dynamic process emerging from continuous interactions and recursive feedback. Addressing these questions requires a theoretical perspective capable of examining healthcare organizations as dynamic systems rather than static organizational contexts. Complex Adaptive Systems theory offers such a perspective. Rather than replacing existing burnout theories, CAS complements and extends them by explaining how interactions among organizational actors generate the adaptive dynamics through which burnout emerges, persists, and evolves over time. From this perspective, burnout is understood not only as the consequence of excessive occupational demands or

insufficient organizational resources, but also as an emergent organizational phenomenon generated through the adaptive dynamics by which healthcare systems respond to persistent structural constraints.

3. Complex Adaptive Systems: A Systems Perspective on Burnout

3.1 Why Healthcare Organizations Behave as Complex Adaptive Systems

Healthcare organizations are widely recognized as some of the most complex organizational settings in contemporary society. Their functioning depends on the continuous interaction of multiple professional groups, managerial structures, technological systems, regulatory frameworks, patients, and families, all operating within environments characterized by uncertainty, time pressure, and constantly changing priorities. Traditional organizational models often portray these organizations as relatively stable structures in which outcomes can be explained through identifiable causal relationships between organizational characteristics and individual performance. Increasingly, however, this linear perspective has proven insufficient for explaining how healthcare organizations function in everyday practice (Plsek & Greenhalgh, 2001; Greenhalgh & Papoutsis, 2018).

CAS theory offers an alternative perspective on organizational functioning. Rather than viewing organizations as static entities governed by predictable cause-and-effect relationships, CAS conceptualizes them as dynamic systems composed of multiple interconnected and interdependent agents whose behaviours continuously influence one another. Organizational outcomes therefore emerge not simply from formal structures or individual decisions, but from countless local interactions through which professionals continuously adjust their actions in response to changing circumstances (Braithwaite et al., 2018).

This perspective has become increasingly influential in health services research because it closely reflects the realities of clinical practice. Healthcare professionals rarely work under fixed or predictable conditions. Instead, they routinely respond to fluctuating patient volumes, unexpected clinical events, staffing shortages, technological failures, competing organizational priorities, and resource constraints. Consequently, effective clinical work depends not only on formal procedures and organizational policies but also on professionals' ability to coordinate, negotiate priorities, improvise, and modify their practices as situations evolve. As Hollnagel (2017) argues, the successful functioning of complex healthcare systems depends less on strict procedural compliance than on the capacity to adapt effectively to everyday variability.

Within Complex Adaptive Systems, adaptation should not be interpreted as evidence of organizational dysfunction. On the contrary, adaptive behaviours represent normal and essential mechanisms through which healthcare organizations maintain continuity of care despite persistent operational pressures. Informal collaboration, flexible redistribution of responsibilities, workarounds, and real-time problem solving frequently compensate for limitations that formal organizational structures are unable to address. Such adaptive practices are therefore not exceptional responses to crisis but inherent characteristics of how complex healthcare organizations sustain everyday performance (Braithwaite

et al., 2018; Greenhalgh & Papoutsis, 2018).

Viewing healthcare organizations through the lens of CAS shifts the analytical focus from isolated organizational components to the dynamic interactions that continuously shape organizational functioning. Rather than asking how individual organizational factors influence outcomes, CAS theory examines how patterns of interaction, adaptation, and feedback generate system-level behaviours over time. This perspective provides the conceptual foundation for examining organizational processes as dynamic adaptive phenomena.

3.2 Core Principles of Complex Adaptive Systems for Understanding Burnout

Viewing healthcare organizations as CAS shifts attention from static organizational characteristics to the dynamic processes through which organizational conditions are continuously created, modified, and reinforced. Rather than focusing exclusively on individual risk factors or isolated organizational determinants, a systems perspective emphasizes how interactions among multiple actors generate patterns of organizational functioning over time. Three interrelated principles of CAS are particularly relevant for understanding burnout: adaptation, emergence, and recursive feedback.

The first principle is adaptation. Within Complex Adaptive Systems, adaptation is not an exceptional response to organizational disruption but a normal feature of everyday organizational life. Healthcare professionals continuously adjust their practices in response to fluctuating patient demands, staffing shortages, resource limitations, technological change, and institutional priorities. These adaptive adjustments allow healthcare organizations to maintain continuity of care despite persistent structural pressures (Hollnagel, 2017; Braithwaite et al., 2018). From a systems perspective, organizational functioning therefore depends not only on formal structures and procedures but also on the continuous adaptive capacity of professionals working within the system.

The second principle is emergence. CAS theory assumes that system-level outcomes rarely result from a single causal factor. Instead, they arise from the cumulative interactions of multiple interconnected elements operating simultaneously (Plsek & Greenhalgh, 2001; Braithwaite et al., 2018). Consequently, organizational phenomena cannot always be explained by examining individual components in isolation. Rather, they emerge from the dynamic relationships among people, organizational structures, technologies, and environmental conditions.

The third principle is recursive feedback. Within Complex Adaptive Systems, adaptive responses do not simply react to organizational conditions; they also modify the conditions that generated them. Therefore, organizational change occurs through continuous feedback processes rather than through linear cause-and-effect relationships (Meadows, 2008; Sterman, 2000). Adaptive practices such as informal coordination, workarounds, redistribution of responsibilities, or emotional distancing may successfully maintain organizational performance in the short term. At the same time, by compensating for structural deficiencies, these responses may reduce the visibility of underlying problems, delay structural improvement, and reinforce the need for further adaptation. Taken together, these principles provide a fundamentally different perspective on

organizational functioning. Rather than viewing healthcare organizations as relatively stable contexts within which burnout develops, CAS theory conceptualizes them as continuously evolving systems in which adaptation, emergence, and recursive feedback shape organizational outcomes over time. Collectively, they establish the conceptual foundation for a systems understanding of burnout.

3.3 Burnout as an Emergent Organizational Phenomenon

Within the framework of Complex Adaptive Systems, burnout can be understood in a fundamentally different way. Existing theoretical models have demonstrated that excessive job demands, inadequate organizational resources, ineffective leadership, poor communication, and ethical conflict contribute to burnout. This perspective does not challenge these explanations; rather, it integrates them within a broader understanding of how organizational conditions are continuously produced and reshaped through adaptation. Burnout is therefore understood not simply as the consequence of particular occupational stressors, but as an emergent organizational phenomenon arising from the adaptive organizational dynamics through which healthcare organizations sustain their functioning under persistent structural constraints.

Healthcare organizations must maintain continuity of care despite chronic workforce shortages, increasing service demands, financial constraints, technological change, and organizational uncertainty. Under these conditions, healthcare professionals continuously adapt their practices by redistributing responsibilities, developing informal patterns of collaboration, prioritizing urgent clinical tasks, compensating for limited resources, and modifying established routines when formal organizational processes prove insufficient. These adaptive practices are not exceptional responses to organizational failure but constitute the everyday mechanisms through which complex healthcare organizations preserve operational continuity (Hollnagel, 2017; Braithwaite et al., 2018).

Although these adaptive responses frequently maintain service delivery and protect patients from immediate system failures, they also generate unintended organizational consequences. By repeatedly compensating for structural deficiencies, healthcare professionals reduce the visibility of organizational problems, allowing chronic understaffing, resource limitations, communication failures, and excessive workloads to persist without fundamental structural change. Successful adaptation therefore represents both a source of short-term organizational resilience and a mechanism through which systemic vulnerabilities become embedded within everyday clinical practice.

Within this adaptive process, chronic occupational strain gradually accumulates. Professionals are repeatedly required to compensate for organizational constraints while simultaneously maintaining high standards of patient care. Over time, emotional exhaustion, psychological distancing, reduced professional fulfilment, and other manifestations of burnout reflect not only exposure to demanding working conditions but also the cumulative consequences of sustained organizational adaptation. Burnout is therefore best understood as an emergent property of the interactions between persistent structural constraints and the adaptive responses intended to preserve

organizational functioning.

This systems perspective also helps explain why burnout frequently persists despite interventions targeting individual professionals or isolated organizational factors. Programmes designed to strengthen resilience, improve stress management, or reduce specific occupational demands may alleviate some immediate symptoms without fundamentally altering the adaptive processes through which healthcare organizations continue to compensate for structural deficiencies. As long as these underlying adaptive dynamics remain unchanged, the organizational conditions that generate burnout are likely to re-emerge, even when individual stressors are temporarily reduced.

Understanding burnout as an emergent organizational phenomenon therefore shifts the focus of analysis from individual resilience to system adaptation. The central question is no longer why some professionals experience burnout while others do not, but how patterns of organizational adaptation progressively create conditions under which burnout becomes increasingly likely. By integrating occupational demands, organizational conditions, and adaptive system dynamics within a single explanatory framework, CAS theory offers a more comprehensive understanding of how burnout emerges, persists, and evolves in contemporary healthcare organizations. This systems perspective provides the theoretical foundation for the conceptual model proposed in the following section.

4. A Conceptual Model of Burnout as an Emergent Property

4.1 The Proposed Conceptual Model

The theoretical perspectives reviewed in the preceding sections converge toward a common conclusion: burnout cannot be fully explained by isolated occupational demands, organizational characteristics, or individual vulnerabilities considered independently. Building upon this synthesis, the present paper proposes a conceptual model that explains burnout as an emergent property of adaptive organizational dynamics within CAS (Figure 1). Rather than proposing a new theory of burnout, the model integrates established occupational and organizational perspectives into a systems framework that explains how persistent structural constraints, professional adaptation, and recursive organizational processes interact to generate chronic occupational strain over time.

The proposed model comprises four interdependent and mutually reinforcing processes. The first involves persistent structural constraints that create sustained pressure on healthcare organizations. The second consists of the adaptive responses through which healthcare professionals maintain continuity of care despite these constraints. The third concerns the recursive organizational consequences of successful adaptation, whereby the continuous compensation for structural deficiencies reduces their visibility, delays structural change, and reinforces dependence on further adaptation. The fourth process involves the progressive accumulation of chronic occupational strain, through which burnout emerges as a system-level property of these adaptive organizational dynamics.

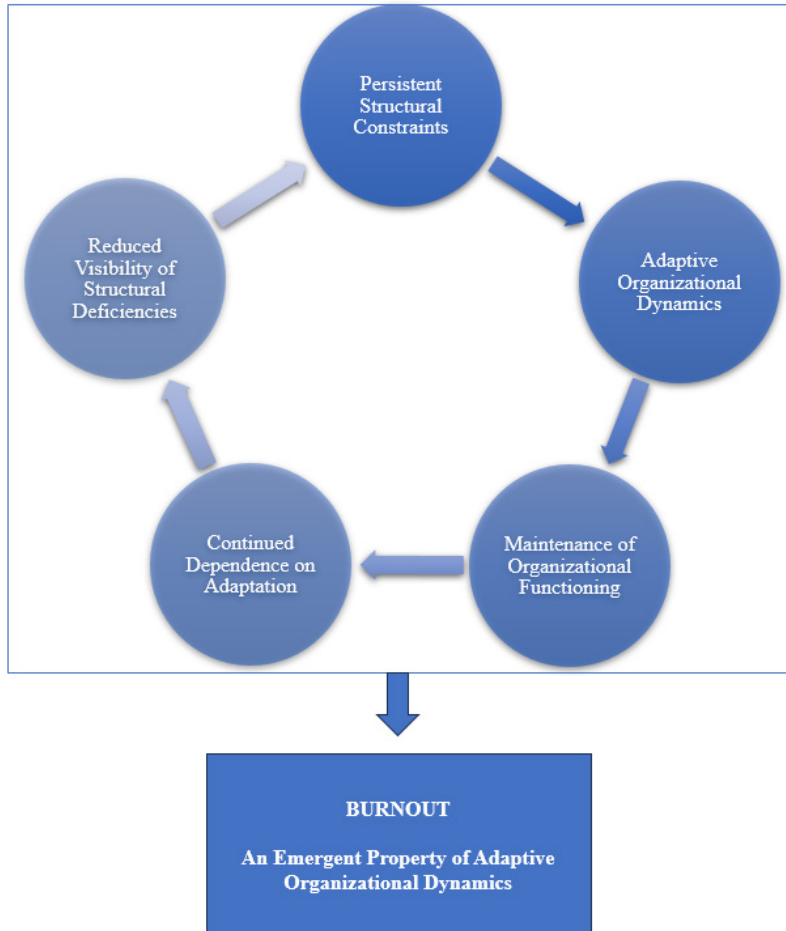


Figure 1. Conceptual model of burnout as an emergent property of adaptive organizational dynamics.

These processes should not be interpreted as sequential stages but as mutually reinforcing components of a dynamic organizational system. Persistent structural constraints generate adaptive responses; adaptive responses sustain organizational functioning; successful adaptation reduces the visibility of structural deficiencies; and the persistence of these deficiencies creates the need for further adaptation. Rather than interrupting this cycle, successful organizational functioning may unintentionally contribute to its continuation by reducing the perceived urgency for structural reform. Burnout therefore develops within a self-reinforcing adaptive cycle rather than through a simple linear chain of occupational causes.

This conceptualization shifts the analytical focus from individual exposure to occupational stress toward the behaviour of the organizational system itself. From this perspective, burnout represents more than the cumulative consequence of excessive workload,

insufficient organizational resources, or ineffective leadership considered in isolation. Instead, it reflects the long-term organizational consequences of repeated adaptation to persistent structural pressures and provides a systems perspective for understanding how burnout develops within complex healthcare organizations.

4.2 Self-Reinforcing Adaptive Cycles and the Persistence of Burnout

A central implication of the proposed model is that burnout is best understood as a dynamic organizational process rather than the endpoint of a linear sequence of occupational stressors. Instead of resulting from isolated organizational deficiencies, burnout develops within self-reinforcing adaptive cycles through which healthcare organizations continuously respond to persistent structural pressures while simultaneously reproducing the conditions that sustain them. This perspective shifts attention from identifying static determinants of burnout to understanding the adaptive organizational dynamics that allow chronic occupational strain to persist over time.

Within these adaptive cycles, organizational functioning depends on healthcare professionals' capacity to compensate for structural constraints. Informal coordination, redistribution of responsibilities, workarounds, prioritization of clinical activities, and other adaptive responses enable healthcare organizations to maintain continuity of care despite chronic workforce shortages, resource limitations, and increasing operational pressures. In the short term, these adaptive practices strengthen organizational resilience by preserving service delivery and preventing immediate system disruption.

Paradoxically, the very adaptations that sustain organizational performance may also contribute to the persistence of burnout. Because adaptive responses compensate for structural deficiencies, the underlying organizational problems become less visible. As healthcare organizations continue to function, the perceived urgency for structural change may diminish, allowing chronic workforce shortages, communication failures, resource limitations, and excessive workloads to remain largely unaddressed. Consequently, healthcare organizations become increasingly dependent on professionals' adaptive capacity to sustain everyday operations.

This dependence generates a recursive organizational process. As structural constraints persist, professionals must repeatedly adapt to maintain patient care. Repeated adaptation, in turn, enables the organization to continue functioning without fundamentally resolving the conditions that created the need for adaptation. Rather than interrupting the cycle, successful adaptation reinforces it by preserving organizational stability while simultaneously reproducing chronic occupational strain. Burnout therefore persists not because adaptive responses fail, but because they succeed in maintaining organizational functioning under conditions that remain structurally unchanged.

This systems perspective also provides an alternative explanation for the limited long-term effectiveness of many burnout interventions. Programmes that strengthen individual resilience, improve stress management, or address isolated organizational problems may alleviate some immediate manifestations of burnout. However, unless they also modify the adaptive organizational dynamics through which structural pressures are continually managed and reproduced, the conditions that generate burnout are likely

to recur. Sustainable burnout prevention therefore requires interventions that address not only occupational demands and organizational resources, but also the recursive adaptive processes through which healthcare systems maintain their functioning over time. These implications provide the basis for the research and organizational considerations discussed in the following section.

4.3 Implications for Burnout Research and Organizational Practice

The proposed model has important implications for both burnout research and organizational practice. By conceptualizing burnout as an emergent property of adaptive organizational dynamics, it broadens the analytical focus beyond the identification of individual risk factors or isolated organizational determinants. Rather than challenging existing burnout theories, the model integrates them within a systems perspective that emphasizes how occupational demands, organizational conditions, and adaptive processes continuously interact to shape burnout over time.

From a research perspective, this framework encourages a shift from predominantly static models of burnout toward the investigation of dynamic organizational processes. Instead of examining occupational demands and organizational resources as independent predictors of burnout, future research should explore how these conditions evolve through ongoing interactions among healthcare professionals, managers, organizational structures, technologies, and policy environments. Longitudinal, systems-oriented, and mixed-method research designs may therefore provide important opportunities to investigate how burnout emerges, persists, and changes within complex healthcare systems.

The model also has important implications for organizational intervention. Existing approaches have frequently focused on strengthening individual resilience, stress management, mindfulness, and coping strategies, or on improving specific organizational conditions such as staffing levels or leadership practices. Although these interventions remain valuable, the present model suggests that their long-term effectiveness may be limited if they fail to address the adaptive organizational dynamics through which structural pressures are continually managed and reproduced. Sustainable burnout prevention therefore requires interventions that target not only occupational demands and organizational resources, but also the recursive adaptive processes that maintain organizational functioning over time.

A systems perspective further emphasizes the importance of organizational learning. Adaptive practices should not be interpreted solely as indicators of professional resilience or organizational success. They also provide valuable information about the structural constraints that healthcare professionals encounter in everyday clinical practice. Informal workarounds, repeated redistribution of responsibilities, and persistent reliance on discretionary adaptation may therefore be understood as indicators of organizational vulnerabilities rather than simply effective coping strategies. Systematically identifying and analysing these adaptive patterns may enable healthcare organizations to recognize opportunities for structural improvement before chronic occupational strain becomes embedded within routine practice.

The principal contribution of this paper lies in reconceptualizing established burnout theories through the lens of Complex Adaptive Systems. Rather than proposing a new theory of burnout, the model extends existing occupational and organizational perspectives by shifting the analytical focus from identifying the determinants of burnout to explaining the adaptive organizational processes through which burnout emerges, persists, and evolves over time. In doing so, it offers a systems-oriented framework that complements existing burnout theories while providing new directions for empirical research and organizational intervention.

The development of the proposed model was informed by an iterative dialogue between empirical evidence and theoretical interpretation. It builds upon the findings of the authors' previous qualitative study examining burnout among healthcare professionals working within a transitional healthcare system (Filaj & Sota, in press). While that study documented a cyclical pattern describing the adaptive dynamics of burnout, the present paper further develops these findings into a broader conceptual framework by elaborating their theoretical foundations and positioning them within the CAS literature. This development was prompted by an interpretive challenge encountered during the analysis of the empirical findings. Although established burnout theories successfully explain many occupational and organizational determinants of burnout, they appear less able to account for the adaptive organizational processes reflected in the observed cyclical pattern. The model presented in this paper should be understood as a theory-informed conceptual framework that integrates empirical findings with established burnout research and CAS theory. Although grounded in empirical evidence, it remains a conceptual framework that requires further refinement and validation across diverse healthcare settings and organizational contexts.

5. Conclusion

Burnout has traditionally been understood as the consequence of excessive occupational demands, insufficient organizational resources, or ineffective workplace environments. These perspectives have substantially advanced burnout research by identifying the occupational and organizational conditions associated with professional exhaustion and by informing important strategies for prevention and intervention. However, they provide only a partial explanation of the dynamic processes through which burnout develops, persists, and recurs within healthcare organizations operating under persistent structural pressure.

The present paper argues that CAS theory offers a broader conceptual framework for understanding these dynamic processes. Rather than replacing established burnout theories, a systems perspective complements and extends them by shifting the unit of analysis from isolated organizational determinants to the adaptive interactions through which healthcare systems continuously sustain their functioning. Within this framework, burnout is conceptualized as an emergent property of adaptive organizational dynamics, arising from the recursive interactions between persistent structural constraints and the adaptive responses that enable healthcare organizations

to maintain continuity of care.

The conceptual model proposed in this paper reconceptualizes burnout by emphasizing that chronic occupational strain is not simply the cumulative consequence of excessive workload or inadequate organizational support. Instead, it reflects the long-term organizational consequences of repeated adaptation to persistent structural pressures. Adaptive practices that preserve patient care and organizational performance in the short term may simultaneously reduce the visibility of underlying structural deficiencies, delay organizational learning, and reinforce dependence on further adaptation. Burnout therefore persists not because adaptive responses fail, but because they successfully enable healthcare systems to function under conditions that remain fundamentally unchanged.

This systems perspective has important implications for both research and organizational practice. Future burnout research should move beyond predominantly static explanatory models toward investigating the dynamic organizational processes through which burnout develops and evolves over time. Likewise, organizational interventions should extend beyond strengthening individual resilience or modifying isolated organizational factors to address the adaptive organizational dynamics that continually reproduce chronic structural pressures. Viewing adaptive practices as indicators of organizational vulnerabilities rather than merely successful coping strategies may provide valuable opportunities for organizational learning and sustainable system improvement.

Several limitations should be acknowledged. The conceptual model presented in this paper is theoretical and requires empirical validation across diverse healthcare settings and organizational contexts. Although its development was informed by the empirical findings of the authors' previous qualitative study on burnout among healthcare professionals working within a transitional healthcare system (Filaj & Sota, in press), that study was not originally designed to investigate burnout from a CAS perspective. Consequently, the proposed model should be understood as a theory-informed conceptual framework that extends the interpretation of those empirical findings by integrating them with established burnout research and CAS theory. Future empirical research will be necessary to examine the extent to which this framework provides additional explanatory value beyond existing burnout theories and whether its assumptions are transferable to other healthcare systems and occupational contexts.

Taken together, the arguments presented in this paper suggest that understanding burnout as an emergent property of adaptive organizational dynamics offers a new way of conceptualizing one of the most persistent challenges facing contemporary healthcare organizations. By integrating established burnout theories with the principles of CAS, the framework proposed in this paper provides a more comprehensive explanation of how burnout emerges, persists, and evolves within complex healthcare systems. Rather than viewing burnout solely as a consequence of adverse working conditions, this perspective positions it as an indicator of the adaptive behaviour of healthcare systems under persistent structural pressure. In doing so, it contributes to the theoretical development of burnout research while providing a systems-oriented foundation for future empirical investigation and for organizational strategies aimed at promoting

healthcare systems that are not only resilient but also capable of sustainable organizational change.

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