

Chapter

An Introduction to High-Reliability Leadership Style in Healthcare

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Abstract

Hospitals, urgent care units, outpatient clinics, and long-term care facilities constantly keep tightening their safety measures by adopting new interventions. As a result of these efforts, nowadays, fewer patients injure or die from accidental injections, medication errors, falls, or serious healthcare-acquired infections. Yet, many service providers still frequently find themselves at the center of criticism by the media and advocacy groups for their inefficacy in making drastic systematic changes that last. More recent advancements in the field have called for the emulation of the principles of High-Reliability Organizations (HROs) for creating safer services through more radical changes. Building upon this research and juxtaposing it with the leadership literature, our study takes this call one step further by introducing and conceptualizing a leadership style which we call high-reliability leadership style. The chapter also provides a starting point for the advancement of research and practice in healthcare by providing an in-depth exploration of the characteristics of high-reliability leaders. Healthcare organizations can use the findings presented in this chapter for selecting and developing individuals into leadership roles capable of ensuring the sustainable reliability of their care delivery systems.

Keywords: leadership, healthcare delivery systems, patient safety, reliability, high-reliability leadership style, high-reliability leaders

1. Introduction

Since the United States Institute of Medicine published “To Err is Human” to highlight the extent of patient safety deficiencies within the healthcare industry [1], research in the patient safety field has proliferated exponentially. The result of this vast research expansion was the dissemination of a variety of safety interventions, in the form of technological advancements and standardized best practices, to improve the reliability of health service delivery processes [2]. Despite an increase in the adoption of these quality and safety improvement interventions, service provider failures remain a major public concern across all health provision sectors. In fact, the efficacy of these interventions in preventing care delivery failures seems to have reached a plateau due to the gradual escalation in the complexity of healthcare services, which has emerged in more recent decades as a result of a combination of unprecedented factors, such as increased patient acuity and increased human life expectancy [3, 4]. Healthcare service providers’ failures are now considered among the leading causes

of injury and death in the United States [5]. Only hand hygiene failures of service providers contribute to the 1.7 million annual cases of healthcare-acquired infections, which are estimated to cost Americans \$45 billion [6, 7].

While these types of failures in the healthcare industry are not entirely avoidable [8], in more recent years, an alternative and more promising safety approach have been adopted by some healthcare settings. This safety approach originates from a sub-category of complex socio-technical systems, widely known as high-reliability organizations (HROs), that operate under hazardous conditions with the potential for catastrophic failures. Yet, despite operating in such demanding and failure-prone environments, HROs have developed a capability to sustain nearly failure-free operations over very long periods of time. Some classic examples of HROs that are documented by management scholars are: air traffic control systems [9], nuclear power plants [10], nuclear aircraft carriers [11], navy SEALs [12], and space shuttle programs [13, 14].

As healthcare organizations are extremely prone to service provider failures, in the healthcare industry, the emulation of HROs' safety approach has shown astonishing positive outcomes in some settings such as intensive care units, emergency departments, and operating rooms [15, 16]. Despite these recent developments, the characteristics of HRO leaders remain understudied, both among social scientists and healthcare scholars. In particular in the healthcare context, given the complexity and variety of health provision settings, there is still no agreement on how HROs are operated by leaders whose characteristics are different from the traditional leadership roles.

The clarification of this leadership style is a necessity for improving care safety and quality outcomes. First, the noticeable lag of many healthcare settings—such as long-term care organizations—in adopting the HRO principles, to some extent, is ascribable to the ambiguities surrounding the leadership role. The past research advocates that the successful adoption of the HRO approach in healthcare requires a top-down approach, all the way from the leadership to the frontline, to ensure embedding a high-reliability mindset and practices in the day-to-day function of organizations [3]. Second, many healthcare organizations still treat the HRO approach as a framework for incremental improvements and, as a result, they miss the opportunity for creating the foundational changes necessary for operating with high reliability. Therefore, as soon as a key person leaves the organization or a new safety approach is introduced, the organization tends to revert to its old practices and HRO processes disappear [17].

The purpose of this chapter is to shed light on the fundamental role of high-reliability leaders in infusing healthcare organizations with high levels of patient safety. Our research revealed four major characteristics of high-reliability leaders in the healthcare industry: mindfulness, participative tendencies, integrity, and ambidexterity. In the following sections, we first discuss why the high-reliability leadership style is required for creating lasting changes in the operational reliability of healthcare organizations. Then we elaborate on each dimension of high-reliability leaders' characteristics.

2. Leadership in healthcare

A substantial body of literature has charted the evolution of healthcare leadership styles that, over years, unfolded in response to arising opportunities and challenges,

including: the increased complexities of patients' care, ongoing shifts in the care delivery systems, emergence of new technological advancements, recognition of the formerly overlooked organizational goals (particularly patient safety outcomes), and unprecedented challenges of providing care for the aging population [18–24]. This literature discusses the adoption of a variety of leadership theories in healthcare including trait theories, contingency theories, as well as the transactional, transformational, and servant leadership styles.

While emulation of some of these leadership styles occasionally has led to dysfunctional accountability and poor outcomes in the healthcare industry [25, 26], the transformational leadership style has received extensive attention from scholars for its potential for tackling the complex and evolving environment of most healthcare settings. This leadership style has been associated with enhancing the work-oriented values of the caregivers, their self-efficacy, commitment, job satisfaction, building successful teams, and, generally, improving organizational citizenship [27, 28]. Moreover, transformational leadership processes are known to contribute the most to operational objectives such as patient safety and process quality [29, 30].

Traditionally, predominant reliability frameworks for improving safety and quality outcomes in the healthcare industry were created utilizing evidence-based best practices, which are converted into highly standardized operating procedures [31]. These reliability frameworks originate from continuous improvement methodologies, such as Plan-Do-Study-Act (PDSA) cycle. Yet the effectiveness of these traditional reliability frameworks is contingent upon the application of an appropriate leadership approach in conjunction with the implementation of the reliability framework to reap its expected benefits. More often than not, due to the lack of engagement of the staff or due to their resistance to changes, these types of safety and quality improvement frameworks tend to fail [20].

This explains why the application of the transformational leadership process can play a critical role in the success of these traditional improvement frameworks. Under the leadership of transformational leaders, the staff is more likely to act in alignment with organizational goals. Transformational leader strives for creating enduring transformation in their followers by expanding their vision and understanding of the organizational goals, and, thereby, they can alter the trajectory of their organizations in the long run [32, 33]. In this context, a leader will be considered transformational if he/she exhibits four characteristics of role modeling, inspirational motivation, intellectual stimulation, and individualized consideration of followers' needs and concerns [32, 34–36]. As a result of these characteristics of transformational leaders, the followers would have the motivation to act in alignment with organizational goals. As such, in a healthcare setting, the followers of transformational leaders might significantly contribute to improving safety outcomes of the care delivery system by adhering to the requirements of the adopted reliability frameworks.

Despite the fact that the transformational leadership style is extremely impactful in mitigating some major barriers to reliability enhancement in healthcare organizations, this reliability improvement leadership approach is not entirely sufficient in creating fundamental changes necessary for operating failure-free. The problem arises from the fact that the traditional reliability frameworks are, in nature, inadequate for tackling the operational risk of health provision settings. As mentioned earlier, the traditional reliability frameworks are designed based on the principles of continuous improvements philosophy. As a result, no matter how closely followed by the clinical staff, the implementation of these reliability frameworks would essentially create only incremental changes within the health delivery system [31].

The fast-paced evolution of both the care complexities (as evidenced by the recent COVID-19 pandemic) and the care delivery system integration and interactivity—coupled with the dramatic socio-technical changes in the industry—make healthcare systems extremely volatile and unpredictable [3]. Therefore, the implementation of incremental changes, by utilizing the traditional reliability frameworks in conjunction with the adoption of transformational leadership processes to reinforce them, may seriously lag the pace of the healthcare industry's evolution. In response to the ever-shifting healthcare service delivery environment, this research suggests the adoption of the high-reliability leadership approach, which could enhance patient safety outcomes by creating fundamental and philosophical changes in organizations.

3. Methods

To assess the underlying process and characteristics of the high-reliability leadership style in healthcare, we critically reviewed leadership literature in healthcare and juxtaposed them with the HRO literature. For this purpose, we conducted two rounds of search in the PubMed/Medline database to identify the relevant research published between 2002 and 2022 (see PRISMA flow diagram in **Figure 1**. for the number of studies screened, assessed for eligibility, and included in the review). In the first round, the primary search keyword was “patient safety AND leader”. The result of this process was identifying a total of 176 articles. After the initial screening of their abstracts, 108 articles were selected for the detailed assessment. We considered four exclusion criteria when reviewing abstracts: papers that discussed policy-level interventions and contained no (or very little) information about the leadership at an organizational level, papers that were too technical (i.e., specialized in certain subject matter such as laboratory tests or application of FMEA risk management technique) to the extent that the findings were not easily generalizable to other health sectors, papers that had not elaborated adequately on the top level leadership role in organizations, and papers with overall lower quality of the publication.

During the second round, the search keyword “high-reliability organizations AND leader” was used to identify a total of 38 articles of which 34 were deemed suitable for informing our research. Among these 34 articles, three were common between round one and round two. As such, in total, the literature search process yielded 139 healthcare articles which were reviewed to make conclusions on the nature of leadership requirements in healthcare. In addition to this set of articles in healthcare, we also reviewed the seminal literature on HROs (additional 20 publications) to understand the specific principles that allow these organizations to operate with high levels of reliability. Then we used these principles to contextualize and specify characteristics of healthcare leaders that would be conducive to the implementation of the HRO principles. Additionally, this review process allowed us to identify the leadership process which must be devised to translate the HRO theory into practice in healthcare.

4. High-reliability leadership style in healthcare

4.1 HRO principle and healthcare adoption

HROs are systems that despite operating in high-risk, unpredictable, multifaceted, and turbulent environments, exhibit virtually failure-free operations over long

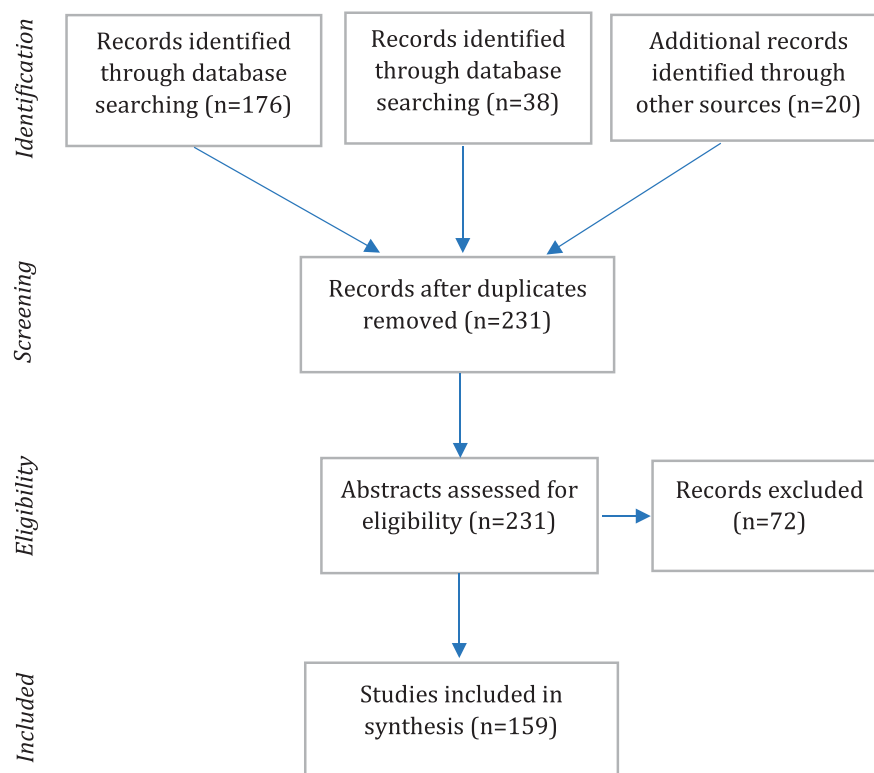


Figure 1.
PRISMA flow diagram. Adopted from [37].

periods of time [38]. The enhanced reliability in these systems is the result of an optimum combination of leveraging technical barriers to failures and deploying interventions that underpin a safe operations philosophy and culture. While the application of technical barriers is often idiosyncratic to each industrial context (and therefore is not easily transferable to other industries uniformly), the philosophical interventions appear in form of processes and principles that impact the human/social factors in these organizations, and as a result, are more readily documentable and, therefore, transferrable. Previous HRO research has identified five major HRO principles that are known to be the foundation of HROs' reliable performance [9–14, 38–41]:

Principle 1: HROs maintain a preoccupation with failures. These organizations are always skeptical about their operating reliability and, therefore, are never content with their own performance. Instead, they are constantly occupied with seeking, identifying, and addressing areas of weakness. Due to this characteristic, HROs are known to be distinctive from traditional organizations because they have created a culture of *perfection-seeking* instead of *being perfect* [3, 38, 39].

Principle 2: HROs have developed a collective sensitivity to operations. HROs leverage heightened awareness of the technical aspects of frontline operations to spot and address minor issues before they escalate into more serious failures. Based on this principle, not only the frontline staff but also all organizational actors (including top/senior managers), should maintain an awareness of the ongoing state of any critical frontline processes [39, 40].

Principle 3: HROs demonstrate a reluctance to simplify interpretations. Based on this principle, operating with high reliability requires a non-stop questioning of accepted rules and assumptions. In other words, as HROs often operate in highly complex and uncertain conditions, simplification is not recommended. Rather, organizational actors are encouraged not to take anything for granted, in particular, when assessing trivial issues and near misses [9–14, 38].

Principle 4: HROs are committed to resilience. According to this principle, HROs must develop the capacity for containing any arising crises and bounce back from them quickly. Additionally, they must investigate failures and re-incorporate the learned lessons into the operating procedure to prevent similar failures in the future. This level of commitment to resilience also requires the development of a culture of failure tolerance toward trivial deviations [9, 12, 38, 40].

Principle 5: HROs defer to expertise. This principle requires organizations to value and prioritize experts' insights. Regardless of their rank, authority, or seniority, experts, with the most pertinent knowledge of time-sensitive processes, should have the necessary autonomy to make quick decisions, without the need for authorization of their senior managers. This prevents insignificant issues from turning into major failures [38–41].

Operating based on these principles has enabled HROs to attain well-coordinated decision-making ability across their organization, which is necessary for avoiding errors with disastrous consequences [42]. These HRO safety principles were first adopted by the healthcare industry over 20 years ago [43]. With the publication of “To Err is Human,” which highlighted some major causes of compromised patient safety such as system fragmentation and the lack of a solid safety culture, the urgent need for adoption of a structured safety approach such as HRO principles became evident. Although certain characteristics of healthcare organizations (e.g., high contact with the service consumers or extensive mobility of the caregivers) make the adoption of HROs' principle slightly challenging in the healthcare context [44], many promising improvements have been reported by healthcare providers that dared to venture to the realm of HRO philosophy. For example, following a comprehensive adoption of the HRO philosophy, some hospitals have experienced a significant reduction in adverse events, ranging from 55 to 100% [44]. The reported improvements are not limited to enhanced safety outcomes. For instance, Hilliard and colleagues [45] report on significant cost savings and financial growth as a result of improved reliability.

4.2 High-reliability leadership in healthcare

While the successful adoption of HRO principles has led to encouraging results, still the assimilation of the HRO philosophy remains scarce, unstructured, and often incomprehensive among healthcare provision settings [3]. Unfortunately, as it is often assumed that emulating HROs is extremely costly and that the financial gains do not offset the adoption cost, there is major resistance to the adoption of HRO principles, in particular among the small- and medium-sized care providers. Some other healthcare organizations are reluctant because they assume that they should be

prioritizing other improvement frameworks such as the implementation of electronic health record (EHR) systems [44]. Yet, these types of assumptions are not necessarily accurate. For instance, Memar Zadeh and Haggerty [3] have reported significant complementary effects between the implementations of EHR and HRO frameworks in the context of long-term care facilities.

One crucial factor that seems to be contributing to this lag, fragmentation, inconsistency, and hesitancy in emulating the HRO principles among healthcare providers is the lack of a high-reliability leadership, which is supposed to be the driving force for the establishment of a robust safety culture. The presence of the right leaders in this context is essential for enhancing the reliability through the creation of the necessary structure (e.g., investing in a wide array of communication technologies to facilitate the sensitivity to operations) and infrastructure (e.g., developing policies surrounding deference to expertise or resilience) for successful adoption of the HRO philosophy. Past research shows that in healthcare organizations, one of the five most commonly reported requirements for successful adoption of HRO principles is the adoption of a corresponding leadership style that infuses the organization with a collective priority of safety [44].

The role of leaders in creating the foundation for operating with high reliability has long been acknowledged in many HRO publications. The leadership commitment to HRO principles is known to be a major facilitator of successful adoption [4, 31, 46–49]. Despite the emphasis of the literature on the critical role of leadership in HROs, studies that investigate the nature of a leadership style corresponding to the leadership of HROs are scant. One notable exception is Martínez-Córcoles' [50] conceptual study in which the author identifies two leadership mechanisms, i.e., leading by expansion and leading by reaction, by which leaders manage the reliability of their systems. While this study is very valuable in paving the research road in studying the concept of high-reliability leadership, it does not elaborate on the personal characteristics of the leaders in HROs. Moreover, to date, no healthcare research has specifically attempted to identify the high-reliability leaders' characteristics necessary for improving patient safety outcomes.

In order to further explore the nature of high-reliability leadership style and the characteristics of high-reliability leaders in the healthcare context, it is crucial to first distinguish between the two concepts of leaders and leadership. Following the recommendations of leadership scholars [33, 51, 52], we recognize the necessity of making a conceptual distinction between the two notions of leaders and leadership. Investigating the concept of leaders requires understanding the “intrapersonal characteristics” associated with individuals who fit this categorization [33]. Whereas leadership is referred to as the “process” through which leaders persuade followers to operate in congruence with their organization's vision and goals [51, 52]. Following this logic, we conceptualize high-reliability leadership as the process through which the vision, values, and actions of organizational actors are aligned with the intention of the organization in terms of operating with utmost reliability to pre-empt the risk of any potential harm to patients.

As such, high-reliability leadership is a top-down process of influencing followers by their leaders. It encompasses all practices and activities that are designed by healthcare organizations' leaders to influence individuals' decisions and ensure that their actions are in accordance with the principles of high-reliability organizations. Undoubtedly, to achieve this, first and foremost, there is a need for the leadership

commitment to the transformation of the organization into a reliability-seeking one. Without leadership commitment at all levels (including boards of trustees and senior clinical and administrative managers), no organizational initiative, including the HRO reliability improvement framework, cannot succeed [4]. The high-reliability leadership process should also gradually infuse the healthcare organization with reliability through the following micro-processes: 1. embedding reliability-oriented measurable goals into the vision and mission of the organizations, 2. allocating the necessary budget for achieving these goals, 3. Creating the necessary structure and infrastructure for achieving the goals, 4. identifying and coordinating lines of responsibility, 5. monitoring the outcomes, and 6. reassessing the effectiveness of the current structure and infrastructure in attaining the goals.

It is noteworthy that, as a result of the preoccupation with the failures principle of HROs, one salient trait of these organizations is that they are unstoppable in “seeking” reliability [39, 53] and, regardless of how reliable their operations are, they never assume that they have already attained high reliability. In other words, there is no room for complacency or satisfaction with the state of reliability in HROs. As a result of this principle, to make operating with high reliability a sustainable goal, the high-reliability leadership process in healthcare must necessarily reflect this reliability-seeking trait. Thus, it is essential for such healthcare organizations to continually regenerate their reliability-oriented goals and reiterate the above-mentioned process of infusing the organization with higher levels of reliability.

If designed appropriately, this high-reliability leadership process could lead to instilling a safety culture, collective mindfulness, and continuous learning, which will help the organizational actors to be constantly preoccupied with failures, sensitive to frontline operations, reluctant to simplify, resilient when facing failures, and reliant on expertise—or, simply, operate based on the principles of HROs. As such, establishing the high-reliability leadership process, over time, would result in the transformation of a traditional healthcare organization into a high-reliability one that constantly reinvents itself and generates long-lasting improvements in process reliability and patient safety outcomes.

4.3 High-reliability leaders’ characteristics in healthcare

While high-reliability leadership encompasses the process by which the leadership team influences the followers to collectively understand and agree on what needs to be done to prevent adverse events, high-reliability leaders are individuals who play critical roles in accomplishing this. These individuals transform a traditional healthcare organization into a high reliability-seeking one, which is untiring in its endeavors to prevent failures and improve patient safety outcomes. Drawing on the HRO and healthcare literature, we have identified four characteristics of high-reliability leaders that enable them to continually drive their organizations toward higher states of reliability: mindfulness, participative tendencies, integrity, and ambidexterity. These characteristics are discussed here.

4.3.1 Mindfulness

One of the most prominent characteristics that any high-reliability leader should demonstrate is mindfulness. The HRO literature conceptualizes mindfulness as attentiveness or awareness [53, 54]. In the context of healthcare organizations, mindfulness represents the state of being aware of the ongoing evolution of the messy and

fluxing care delivery system. As mentioned earlier, nowadays, healthcare operational systems are characterized by the utmost volatility and unpredictability. To tackle this evolving nature of healthcare operations, high-reliability leaders are required to be able to maintain mindfulness by being fully present (i.e., grounded in the now moment wherever they are), standing by the frontline staff as much as possible (either in-person or virtually through a variety of communication technologies), and prioritizing high-risk frontline processes and giving undivided attention to the details of these processes. To possess this characteristic, essentially, leaders require to have a fair amount of technical knowledge of the frontline processes, so they know where to place their attention to prevent adverse events.

Leaders' mindfulness characteristic facilitates harnessing the first two HRO principles, discussed in Section 4.1. First, the preoccupation with failures principle requires the mindfulness of high-reliability leaders so that they can provide the necessary support for the frontline staff in spotting trivial shortcomings and addressing them before they turn into system-wide failures. Second, the sensitivity with operations principle requires all organizational actors collectively create a "big picture" of the ongoing status of the critical frontline processes. Leaders' mindfulness characteristic facilitates the development of this big picture by allowing them to get actively involved in resolving the work-systems challenges that frontline staff constantly deal with.

This intentional engagement of high-reliability leaders with the frontline also helps in the construction of the safety culture by promoting reliability-enhancing work practices among the frontline staff. Other benefits of the mindfulness characteristic of high-reliability leaders include: providing real-time feedback to the staff, detecting previously unknown areas where staff training could improve patient safety, and selecting, developing, and promoting the right employees for future leadership succession plans [4, 45, 55]. Finally, it is noteworthy that while leaders' mindfulness requires their involvement in the frontline processes to be on the same page with their staff and help them in constructing the big picture, it does not mean that leaders should micromanage their subordinates. In fact, based on the fifth principle of HROs (deference to expertise), high-reliability leaders can trust that their subordinates are well trained and know their jobs [15].

4.3.2 Participative tendencies

With the ever-increasing complexities of care delivery systems, participative tendencies of high-reliability leaders are essential for creating a channel of information from the frontline to the top of the organization. This characteristic of high-reliability leaders represents their propensity for allowing and promoting the engagement of subordinates in making sense of operational issues (e.g., near misses) to help managers in their operational decisions. Leaders with participative tendencies are comfortable with shifting some of the responsibility and authority to the frontline staff.

In the majority of healthcare organizations, the frontline is composed of clinical staff (often physicians and registered nurses) and non-clinical staff (often personal support workers). The clinical staff usually have extensive specialized education, which qualifies them for some degrees of autonomous decision-making. The non-clinical staff, on the other hand, while they might lack extensive education, often work closely with patients (e.g., to help them with bathing) and this allows them to learn about the potential operational issues firsthand. As a result, they have access to

valuable information that leaders could use in spotting potential areas of weakness which make the service delivery system susceptible to adverse events.

Moreover, to establish the third principle of HROs, high-reliability leaders should demonstrate such participative tendencies. The third principle, i.e., the reluctance to simplify, requires the organizational actors to recognize and acknowledge the complex nature of their operations and never take anything for granted. As opposed to traditional organizations in which simplification is highly valued to increase focus on key performance areas, HROs forestall oversimplification. Instead, HROs encourage organizational actors to collectively build a nuanced, detailed, picture of the complex, unpredictable, and unknowable environment that they deal with [40].

Nowadays, many healthcare organizations leverage huddle meetings to achieve this [3]. Yet, without the participative tendencies of leaders, a huddle meeting, by itself, cannot guarantee that staff would share what they know. What gives the voice to subordinates to share their ideas and thoughts is the propensity of high-reliability leaders to encourage the active participation of their followers. Leaders' participative tendencies allow them to welcome a diverse range of, not only, farfetched ideas and thoughts but also constructive criticism and skepticism from their followers.

4.3.3 Integrity

Another characteristic of high-reliability leaders is integrity. Generally, management scholars conceptualize the integrity characteristic either as a normative or positive construct [56–58]. The normative view evaluates an entity's integrity subjectively and as the quality of advocating for ethical and moral principles and acting upon these principles [59, 60]. Whereas the positive view considers integrity as a morally neutral concept and assesses it objectively and in terms of the degree of congruence between an entity's principles and its actions [57, 61, 62].

In our study, we adopt the positive view and conceptualize the integrity characteristics of high-reliability leaders in terms of their ability to adhere to their advocated principles and standards. Thus, in our definition, whether or not these principles and standards are infused with morality and ethics is irrelevant to the integrity characteristic of high-reliability leaders. Instead, what matters here is that the leaders' advocated standards and principles originated from the principle of HROs. Therefore, the integrity characteristic of a high-reliability leader is determined by the degree to which a leader adheres to the designed high-reliability protocols and standards of their organization. Put simply, a high-reliability leader who demonstrates integrity characteristic “walks his/her talk” in terms of adherence to the adopted reliability standards of the organization.

The importance of leaders' integrity characteristic arises from the fact that by exhibiting this characteristic, a high-reliability leader sets the standard for followers to adhere to the safety and reliability protocols of their organization. Therefore, this characteristic is crucial for cultivating a safety culture in healthcare organizations. For building this culture, high-reliability leaders need to gently persuade their followers to place patient safety as a priority in everything that they do and when they do this themselves, they act as role models for their followers.

It is also important to note that high-reliability leaders who exhibit high levels of integrity, voluntarily, make themselves vulnerable. According to the fourth HRO principle, i.e., commitment to resilience, all near misses must be reported so that the organization can learn their lessons and re-incorporate these lessons into renewed operating policies and protocols to prevent similar failures in the future. When

high-reliability leaders encounter a fault within their own actions, they would never attempt to hide their failures. Instead, they would use their own failures to show their followers that their organization is a safe place for the staff to discuss their shortcomings and help others to learn from them.

4.3.4 *Ambidexterity*

The final characteristic of high-reliability leaders is their ability to be ambidextrous. At an organizational level, the literature defines ambidexterity as the ability of an organization to stay ahead of the innovation game in a cost-effective fashion in a high-velocity market, through the exploitation of existing resources/capabilities and, simultaneously, exploration of novel resources/capabilities [63–65]. In more recent years some leadership scholars have extrapolated the ambidexterity characteristic to individual leaders' level and argue that when in an organization two diverging operating modes are required simultaneously, the leaders should necessarily exhibit ambidexterity to lead their followers through intricacies of both operating modes [66].

In the HROs context, due to extreme complexity, tight-coupling, and uncertainty of HROs' environment, these organizations must effectively deal with two contrasting operating modes simultaneously: (1) adhering to the standardized operating procedures and routines under the normal condition and (2) improvising to find unique solutions and creative ideas when facing unpredictable situations. HROs leverage standardization to reduce deviations (and thereby unnecessary wastes) and increase productivity. At the same time, to maintain preparedness for unforeseen issues, they never stop questioning the status quo to find and address weaknesses in their system. So, when the unexpected happens, they intentionally deviate from routines to create the space necessary for tackling the issue from a whole new perspective.

Neither of these operating modes is more important than the other, and it is the responsibility of high-reliability leaders to strike a balance between these two operating modes by leading their subordinates to strictly follow the routines and, simultaneously, by encouraging them to improvise when necessary. Achieving this balance, therefore, requires high degrees of ambidexterity on the leaders' part. On the one hand, leaders must have the ability to guarantee their followers' procedural integrity. In a healthcare setting, this means that leaders must control deviations from planned routines (e.g., patients' care plans) by ensuring that the care delivery staff precisely follows procedures just as planned. On the other hand, leaders must proactively manage unanticipated disruptions in plans by giving situational flexibility to their staff to navigate uncertainty through the improvisation of idiosyncratic solutions. This ability of leaders to allow and encourage improvisation is aligned with the fifth principle of HROs, i.e., deference to expertise, in which the expert staff, regardless of their rank or seniority, are encouraged to act almost autonomously and spontaneously when the organization's reliable performance is threatened by an unfamiliar/unforeseen situation.

5. Discussions

Given human limitations, healthcare experts generally agree that care provider failures are inevitable and can never be completely eradicated [8]. Even the title of the published reports by the Institute of Medicine, i.e., "To Err is Human", confirms the harsh reality of compromised patient safety due to the inevitability of human errors. Taking these limitations into account, healthcare research and

practice have primarily relied on the implementation of a diverse array of best practices and interventions for reducing the frequency and severity of failures. Yet, as discussed in this chapter, our research reveals that the traditional reliability frameworks in healthcare often do not address more fundamental safety issues, such as cultural transformation, which are necessary for creating lasting changes [4, 31]. Moreover, the introduction of these reliability frameworks often lags behind the ongoing drastic environmental changes within the healthcare industry. As a result, transformational leadership, which used to be the predominant healthcare leadership style for handling these safety frameworks, is no longer perfectly compatible with the current complexity and pace of the evolution of healthcare delivery systems [25–30].

By introducing and conceptualizing high-reliability leadership, our study makes important contributions to the research. First, as discussed in this chapter, cultivating a safety culture, which is conducive to sustainable reliability in healthcare operations, requires a more radical and proven approach to reliability. Thirty years of research on HROs has documented the outstanding performance of these organizations in terms of operating failure-free in the long run and an extremely volatile environment. Thus, adopting the HROs' principles and practices can be potentially a key to creating lasting reliability in healthcare too. However, research shows that healthcare organizations have struggled in the process of translating HRO theory into practice [67]. Our research takes a major step in facilitating this process by shedding light on the role of high-reliability leadership in infusing the organization with a reliability-seeking mindset and practices that not only do not deteriorate easily but also become stronger with the passage of time.

Second, while the past HRO research recognizes the critical role of leaders in cultivating reliability, no prior healthcare research specifies the characteristics of high-reliability leaders that are necessary for turning a traditional healthcare organization into a reliability-seeking one. Our research identified these overlooked characteristics of high-reliability leaders given the specific attributes of service delivery systems in healthcare organizations. This makes our study particularly interesting for healthcare scholars, practitioners, and policymakers in that we tailored the proposed dimensions of high-reliability leaders' characteristics specifically to healthcare settings. As a result, these findings can be applied as the basis for creating leadership education and training programs to prepare future high-reliability leaders.

A potential shortcoming of this study, however, is the lack of empirical evidence to ground the findings. Future research should assess the impact of our proposed high-reliability leadership process in action research. Characteristics of high-reliability leaders should also be examined through survey instruments to develop measures of high-reliability leaders in healthcare organizations. Another potential area for research is the application of multiple case studies for comparing these characteristics in various healthcare sectors to uncover more specific details on high-reliability leaders given the specific attributes of each category of the healthcare sector.

6. Conclusion

Extensive research has been done in the area of HROs. Yet, the characteristics of high-reliability leaders have not received the necessary attention among the field's scholars. In particular, as more and more healthcare organizations are seeking to

emulate the principles of HROs, the identification of high-reliability leaders' characteristics has become of paramount importance to help this industry in its quest for improving patient safety outcomes. This chapter aimed at specifying the leadership characteristics that are vital for leading healthcare organizations toward operating with higher degrees of reliability. Juxtaposing the past research in leadership, healthcare, and HROs areas, we introduced the high-reliability leadership style and discussed why the adoption of this specific leadership style lies at the heart of preventing frequent healthcare service failures and improving patient safety outcomes. We also specified the characteristics of high-reliability leaders in the healthcare context. Mindfulness characteristic of high-reliability leaders is a necessary attribute for ensuring that a healthcare organization can maintain both a preoccupation with failure and a sensitivity to the care delivery processes. Leaders' participative tendencies are essential for preventing the simplification of assumptions that could allow near-misses or trivial system weaknesses to escalate into irreversible, system-wide, failures. The integrity characteristic of high-reliability leaders is what makes leaders role models for their followers and, thereby, helps organizations to learn from failures and attain resilience. Last, but not least, the ambidexterity characteristic of leaders is crucial for empowering them to handle the unique dual mode of healthcare operations, which requires the staff simultaneously comply and improvise. Healthcare practitioners can use our findings to enhance patient safety outcomes in their organizations by adopting the high-reliability leadership process discussed in this chapter and by fostering these four characteristics in the future generation of their leaders.

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Conflict of interest

The author declares no conflict of interest.

Notes/thanks/other declarations


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References

- [1] Kohn LT, Corrigan JM, Donaldson M. *To Err Is Human: Building a Safer Health System*. Washington, DC: Institute of Medicine; 1999
- [2] Ghaferi AA, Myers CG, Sutcliffe KM, Pronovost PJ. The next wave of hospital innovation to make patients safer. *Harvard Business Review*. 2016;**94**:1-8
- [3] Memar Zadeh M, Haggerty N. Improving long-term care services: Insights from high-reliability organizations. *Leadership in Health Services*. 2021;**35**(2):174-189
- [4] Chassin MR, Loeb JM. The ongoing quality improvement journey: Next stop, high reliability. *Health Affairs*. 2011;**30**(4):559-568
- [5] Makary MA, Daniel M. Medical error—The third leading cause of death in the US. *BMJ*. 2016;**353**:i2139
- [6] Klevens RM, Morrison MA, Nadle J, Petit S, Gershman K, Ray S, et al. Invasive methicillin-resistant *Staphylococcus aureus* infections in the United States. *Journal of the American Medical Association*. 2007;**298**(15):1763-1771
- [7] Mørkeberg J, Sharpe K, Belhage B, Damsgaard R, Schmidt W, Prommer N, et al. Detecting autologous blood transfusions: A comparison of three passport approaches and four blood markers. *Scandinavian Journal of Medicine & Science in Sports*. 2011;**21**(2):235-243
- [8] Gallagher TH, Waterman AD, Ebers AG, Fraser VJ, Levinson W. Patients' and physicians' attitudes regarding the disclosure of medical errors. *Journal of the American Medical Association*. 2003;**289**(8):1001-1007
- [9] Weick KE. The vulnerable system: An analysis of the Tenerife air disaster. *Journal of Management*. 1990;**16**(3):571-593
- [10] Schulman PR. The negotiated order of organizational reliability. *Administration & Society*. 1993;**25**(3):353-372
- [11] Weick KE, Roberts KH. Collective mind in organizations: Heedful interrelating on flight decks. *Administrative Science Quarterly*. 1993;**38**:357-381
- [12] Fraher AL, Branicki LJ, Grint K. Mindfulness in action: Discovering how US navy Seals build capacity for mindfulness in high-reliability organizations (HROs). *Academy of Management Discoveries*. 2017;**3**(3):239-261
- [13] Vaughan D. *The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA*. University of Chicago press; 1996
- [14] LaPorte TR. Institutional issues for continued space exploration: High-reliability systems across many operational generations, requisites for public credibility. In: Dick SJ, Launius RD, editors. *Critical Issue in the History of Space flight*; 2006. pp. 403-427
- [15] Roberts KH, Madsen P, Desai V, Van Stralen D. A case of the birth and death of a high reliability healthcare organization. *BMJ Quality & Safety*. 2005;**14**(3):216-220
- [16] Vogus TJ, Sutcliffe KM. The safety organizing scale: Development and validation of a behavioral measure of

- safety culture in hospital nursing units. *Medical Care*. 2007;**45**:46-54
- [17] Desai V, Madsen PM, Roberts KH. High-reliability organizations in health care. In: *Handbook of Human Factors and Ergonomics in Health Care and Patient Safety*. Boca Raton: CRC Press, Taylor & Francis; 2012
- [18] Jivraj S, Goodman A, Pongiglione B, Ploubidis GB. Living longer but not necessarily healthier: The joint progress of health and mortality in the working-age population of England. *Population Studies*. 2020;**74**(3):399-414
- [19] Casida J, Parker J. Staff nurse perceptions of nurse manager leadership styles and outcomes. *Journal of Nursing Management*. 2011;**19**(4):478-486
- [20] Kumar RD. Leadership in healthcare. *Anesthesia & Intensive Care Medicine*. 2013;**14**(1):39-41
- [21] Stefl ME. Common competencies for all healthcare managers: The healthcare leadership alliance model. *Journal of Healthcare Management*. 2008;**53**(6):360-373
- [22] Calhoun JG, Dollett L, Sinioris ME, Wainio JA, Butler PW, Griffith JR, et al. Development of an interprofessional competency model for healthcare leadership. *Journal of Healthcare Management*. 2008;**53**(6):375-390
- [23] Denis JL, van Gestel N. Medical doctors in healthcare leadership: Theoretical and practical challenges. *BMC Health Services Research*. 2016;**16**(2):45-56
- [24] Hargett CW, Doty JP, Hauck JN, Webb AM, Cook SH, Tsipis NE, et al. Developing a model for effective leadership in healthcare: A concept mapping approach. *Journal of Healthcare Leadership*. 2017;**9**:69
- [25] McAuliffe E, Ward M, DeBrun A, Cunningham U. ISQUA17-2839 collective leadership and safety cultures: Developing an alternative model of leadership for healthcare teams. *International Journal for Quality in Health Care*. 2017;**29**(suppl_1):52-53
- [26] Al-Sawai A. Leadership of healthcare professionals: Where do we stand? *Oman Medical Journal*. 2013;**28**(4):285
- [27] Perez J. Leadership in healthcare: Transitioning from clinical professional to healthcare leader. *Journal of Healthcare Management*. 2021;**66**(4):280-302
- [28] Millward LJ, Bryan K. Clinical leadership in health care: A position statement. *Leadership in Health Services*. 2005;**18**(2):xiii-xxv
- [29] Boamah SA, Laschinger HK, Wong C, Clarke S. Effect of transformational leadership on job satisfaction and patient safety outcomes. *Nursing Outlook*. 2018;**66**(2):180-189
- [30] McFadden KL, Henagan SC, Gowen CR III. The patient safety chain: Transformational leadership's effect on patient safety culture, initiatives, and outcomes. *Journal of Operations Management*. 2009;**27**(5):390-404
- [31] Polonsky MS. High-reliability organizations: The next frontier in healthcare quality and safety. *Journal of Healthcare Management*. 2019;**64**(4):213-221
- [32] Bass BM, Avolio BJ, editors. *Improving Organizational Effectiveness through Transformational Leadership*. Thousand Oaks, CA: Sage; 1994
- [33] Siangchokyoo N, Klinger RL, Champion ED. Follower transformation as the linchpin of transformational

- leadership theory: A systematic review and future research agenda. *The Leadership Quarterly*. 2020;**31**(1):101341
- [34] Bass BM, Riggio RE. *Transformational Leadership*. Erlbaum, Mahwah, NJ: Psychology press; 2006
- [35] Van Knippenberg D, Sitkin SB. A critical assessment of charismatic—Transformational leadership research: Back to the drawing board? *Academy of Management Annals*. 2013;**7**(1):1-60
- [36] Ng TW. Transformational leadership and performance outcomes: Analyses of multiple mediation pathways. *The Leadership Quarterly*. 2017;**28**(3):385-417
- [37] Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Annals of Internal Medicine*. 2009;**151**(4):264-269
- [38] Roberts KH. Some characteristics of one type of high reliability organization. *Organization Science*. 1990;**1**(2):160-176
- [39] Vogus TJ, Welbourne TM. Structuring for high reliability: HR practices and mindful processes in reliability-seeking organizations. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*. 2003;**24**(7):877-903
- [40] Sutcliffe KM. High reliability organizations (HROs). *Best Practice & Research Clinical Anaesthesiology*. 2011;**25**(2):133-144
- [41] Weick KE, Sutcliffe KM. *Managing the Unexpected: Resilient Performance in an Age of Uncertainty*. San Francisco, CA: Jossey-Bass, John Wiley & Sons; 2011
- [42] Bogue B. How principles of high reliability organizations relate to corrections. *Federal Probation*. 2009;**73**(3):22-27
- [43] Roberts KH. HRO has prominent history. *The Newsletter of The Anesthesia Patient Safety Foundation*. 2003;**18**:13-14
- [44] Veazie S, Peterson K, Bourne D. Evidence brief: Implementation of high reliability organization principles. Evidence Synthesis Program. Washington, DC, USA: Health Services Research and Development Service, Office of Research and Development, Department of Veterans Affairs; 2019. VA ESP Project #09-199. Available from: <https://www.hsrd.research.va.gov/publications/esp/reports.cfm>
- [45] Hilliard MA, Sczudlo R, Scafidi L, Cady R, Villard A, Shah R. Our journey to zero: Reducing serious safety events by over 70% through high-reliability techniques and workforce engagement. *Journal of Healthcare Risk Management*. 2012;**32**(2):4-18
- [46] Alavosius MP, Houmanfar RA, Ambro SJ, Burleigh K, Hebein C. Leadership and crew resource management in high-reliability organizations: A competency framework for measuring behaviors. *Journal of Organizational Behavior Management*. 2017;**37**(2):142-170
- [47] Bierly P, Gallagher S, Spender JC. Innovation decision making in high-risk organizations: A comparison of the US and soviet attack submarine programs. *Industrial and Corporate Change*. 2014;**23**(3):759-795
- [48] Nembhard IM, Edmondson AC. Making it safe: The effects of leader inclusiveness and professional status on psychological safety and improvement efforts in health care

- teams. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*. 2006;27(7):941-966
- [49] Ruchlin HS, Dubbs NL, Callahan MA, Fosina MJ. The role of leadership in instilling a culture of safety: Lessons from the literature. *Journal of Healthcare Management*. 2004;49(1):47
- [50] Martínez-Córcoles M. High reliability leadership: A conceptual framework. *Journal of Contingencies and Crisis Management*. 2018;26(2):237-246
- [51] Crawford JA, Dawkins S, Martin A, Lewis G. Putting the leader back into authentic leadership: Reconceptualising and rethinking leaders. *Australian Journal of Management*. 2020;45(1):114-133
- [52] Pilbeam C, Doherty N, Davidson R, Denyer D. Safety leadership practices for organizational safety compliance: Developing a research agenda from a review of the literature. *Safety Science*. 2016;86:110-121
- [53] Weick KE, Sutcliffe KM. Mindfulness and the quality of organizational attention. *Organization Science*. 2006;17(4):514-524
- [54] Weick KE, Putnam T. Organizing for mindfulness: Eastern wisdom and Western knowledge. *Journal of Management Inquiry*. 2006;15(3):275-287
- [55] Kanerva A, Kivinen T, Lammintakanen J. Collaborating with nurse leaders to develop patient safety practices. *Leadership in Health Services*. 2017;30(3):249-262
- [56] Becker TE. Integrity in organizations: Beyond honesty and conscientiousness. *Academy of Management Review*. 1998;23(1):154-161
- [57] Erhard WH, Jensen MC, Zaffron S. Integrity: A positive model that incorporates the normative phenomena of morality, ethics, and legality (abbreviated version). *Routledge: Integrity in Business and Management*; 2017. pp. 11-39
- [58] Monga M. Integrity and its antecedent: A unified conceptual framework of integrity. *The Journal of Developing Areas*. 2016;50(5):415-421
- [59] Parry KW, Proctor-Thomson SB. Perceived integrity of transformational leaders in organizational settings. *Journal of Business Ethics*. 2002;35(2):75-96
- [60] Heineman BW Jr. *High Performance with High Integrity*. Boston, MA: Harvard; 2008
- [61] Jensen MC. Integrity: Without it nothing works. *Rotman Magazine: The Magazine of the Rotman School of Management*, Fall. 2009:16-20
- [62] Simons T. Behavioral integrity: The perceived alignment between managers' words and deeds as a research focus. *Organization Science*. 2002;13(1):18-35
- [63] Benner MJ, Tushman ML. Exploitation, exploration, and process management: The productivity dilemma revisited. *Academy of Management Review*. 2003;28(2):238-256
- [64] Luger J, Raisch S, Schimmer M. Dynamic balancing of exploration and exploitation: The contingent benefits of ambidexterity. *Organization Science*. 2018;29(3):449-470
- [65] O'Reilly CA III, Tushman ML. *Organizational ambidexterity: Past,*

present, and future. *Academy of Management Perspectives*.
2013;27(4):324-338

[66] Kassotaki O, Paroutis S, Morrell K. Ambidexterity penetration across multiple organizational levels in an aerospace and defense organization. *Long Range Planning*.
2019;52(3):366-385

[67] Goldenhar LM, Brady PW, Sutcliffe KM, Muething SE. Huddling for high reliability and situation awareness. *BMJ Quality & Safety*.
2013;22(11):899-906