

Abstract

Title of Dissertation: THE ROLE OF PERSONAL INTEGRITY IN SHAPING HEALTHCARE WORKER PERCEPTIONS OF PATIENT SAFETY CULTURE IN US HOSPITALS DURING THE COVID-19 PANDEMIC

Lauren M. Edelstein, Doctor of Philosophy,
2024

Dissertation directed by: Dr. Luisa Franzini, Healthcare Policy and Management Department

Overview: The COVID-19 pandemic strained hospitals in unprecedented ways that required healthcare workers to adapt to and endure challenges, testing their ability to do a good job with the human and technological resources available to them. Using a proxy variable for personal self-integrity (PSI), derived from questions on the Agency for Healthcare Research and Quality (AHRQ) Hospital Survey on Patient Safety Culture (HSOPS), this dissertation explores the way workers' capacity to maintain alignment of their actions and morals shifted during the pandemic.

Conceptual Framework: The investigations within this study can be understood through the Healthcare Workforce Integrity Model, an innovation based on the Job Demands and Resources Model that accounts for the deeply moral nature of healthcare work. The model holds that intensity of job demands and the strength of supportive job resources shape workers' abilities to maintain PSI in their work. Over a sustained period, this impacts worker energy and motivation, and ultimately, organizational resilience.

Methods: The study uses descriptive statistics and regression modeling based on data from the AHRQ's HSOPS and data from the Hospital Cost and Utilization Project (HCUP), from timeframes before and during the COVID-19 pandemic, to analyze shifting perceptions about patient safety culture within the hospital workforce.

Results: Workers' capacity to maintain their PSI worsened steadily over the pandemic. When patient mortality was higher, workers' PSI worsened, with particularly acute effects experienced in ICU settings. When hospital workers perceived teamwork and leadership support negatively, and when they perceived that staff were blamed for patient safety problems, their perceptions of their own personal integrity diminished by statistically significant margins. No significant associations indicate that hospital workers' perceptions of teamwork, leadership support, or being blamed for safety problems were more closely tied with their ability to maintain positive PSI during the pandemic than they were before the pandemic.

Conclusions: Organizational solutions are needed to support healthcare workers' ability to thrive and maintain integrity in non-crisis moments just as much as they are needed during moments of crisis and uncertainty. Achieving this goal can better ensure that healthcare workers feel they can depend on their institutions and its people to do the right thing.

THE ROLE OF PERSONAL INTEGRITY
IN SHAPING HEALTHCARE WORKER PERCEPTIONS OF
PATIENT SAFETY CULTURE IN US HOSPITALS
DURING THE COVID-19 PANDEMIC

Lauren M. Edelstein

Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2024

Advisory Committee:

Professor Luisa Franzini, Chair

Associate Clinical Professor Negin Fouladi

Assistant Professor Rebecca Gourevitch

Associate Professor Neil Sehgal

Dean's Chair Debra Shapiro

© Copyright by
Lauren M. Edelstein
2024

Acknowledgements

This has been a journey! Reaching the final steps of obtaining my PhD feels both monumental and anti-climactic all at once. My research from the start was focused on what I cared about most and is at the intersection of several threads I have long been passionate about - ethics, communication, conflict management, and healthcare improvement. Seeing it come to fruition feels a bit like reaching the top of a mountain! I say it is anti-climactic because once you reach that pinnacle, there are plenty more mountains to climb.

I owe immense gratitude to my dissertation committee, mentors, and family who helped me reach this moment. First, thank you to each member of my dissertation committee for supporting me and guiding me as I developed my research and findings. You helped grow my confidence in my research skills and I was regularly bolstered by your encouragement and your suggestions for making this project as good as it could be. I'd like to give a particular shout out to Dr. Neil Sehgal, who I reached out to in February 2018 to ask about the MHA degree at UMD. He not only convinced me to take the leap to get a PhD, but became an invaluable mentor and friend along the way. I also wish to acknowledge my mentor and friend Dr. Evan DeRenzo, who planted the seed of me getting a PhD long before I decided to go for it. There were years when I was convinced I would not, but am happy and proud to say, "I did it!"

My parents Susan and Ken Ordene always encouraged me and supported me to be the best version of myself I could be, instilling in me the values of caring deeply and doing my best. I am forever grateful for your support of me through all the ups and downs.

My husband, David, and my two girls, Naomi and Hannah, got to see the day-to-day experience of me working toward this degree. Your presence (and sometimes your willingness to let me disappear to work) always gave me perspective and helped me manage my time. I hope that Naomi and Hannah find their own inspiration to reach high for their own goals from having seen me navigate being a mom, college instructor, and a doctoral student at the same time. David, while it's been a tough stretch, I know I could not have done this without you... literally.

Onwards and upwards!

Table of Contents

<i>Acknowledgements</i>	<i>ii</i>
<i>Table of Contents</i>	<i>iii</i>
<i>List of Figures</i>	<i>v</i>
<i>List of Tables</i>	<i>vi</i>
Chapter 1: Introduction	1
Literature Review	3
Introduction.....	3
Personal Integrity in Healthcare Work.....	4
Personal Integrity and Its Links to Healthcare Worker Well-being	6
Staffing Strains during the COVID-19 Pandemic	7
Resilient Healthcare and Personal Integrity.....	9
Conceptual Model	10
Exploring the Methodological and Conceptual Conditions	15
Data Sources	17
HSOPS Data.....	18
HCUP Data.....	21
Chapter 2: COVID-19 and Hospital Workers’ Perceptions of Personal Integrity	22
Literature Review	22
COVID-19 Job Demands Varied Across Hospital Care Units	22
Job Roles Variably Buffer Healthcare Workers Facing High Job Strain	23
Methods	25
Data Sources and Variables	25
Hypothesis and Statistical Methods.....	27
Results	29
Discussion	37
Chapter 3: Perceptions of Teamwork and Leadership Support During the Pandemic	43
Literature Review	43
Teams, Leadership Support, and Patient Safety Culture.....	43
What Makes Strong Teams and Leaders	44
COVID-19 Impacts on Team and Leadership Support	46
Methods and Measures	47
Results	49
Discussion	58
Chapter 4: Blame and Self-Integrity During the Pandemic	62
Literature Review	63
A Blame v. Learning Orientated Patient Safety Culture	63
Learning v. Blame Orientation During the COVID-19 Pandemic and Its Impacts on Healthcare System Resiliency	66
Methods and Measures	68

Results	70
Discussion	74
<i>Chapter 5: Conclusion</i>	<i>79</i>
Strengths	79
Limitations of This Study and Future Research Needs	80
Conclusion	82
<i>List of References</i>	<i>84</i>

List of Figures

Figure 1-1: Healthcare Workforce Integrity Model	14
Figure 2-1: Percentage negative/ neutral PSI during the COVID-19 pandemic	29
Figure 2-2: Percentage negative/ neutral PSI and in-hospital mortality rate during the COVID-19 pandemic	31
Figure 2-3: ICU versus non-ICU mortality rate changes between January 2019 and June 2022.....	34
Figure 3-1: Percentages of negative and neutral responses about perceptions of teamwork, leadership support, and PSI between January 2020 and July 2022.....	50
Figure 3-2: Average percentage of negative and neutral views about teamwork support between January 2019- July 2022 for each worker position group.....	51
Figure 3-3: Average percentage of negative and neutral views of leadership support between January 2019- July 2022 for each worker position group.....	51

List of Tables

Table 1-1 - Survey respondents by staff position.....	20
Table 2-1: Logistic regression- Association between monthly overall hospital mortality rates and PSI	32
Table 2-2: Average mortality rate in US hospitals before and during the COVID-19 pandemic.....	33
Table 2-3 Linear Probability Regression analysis- to compare PSI shifts for ICU workers exposed to ICU mortality and non-ICU workers exposed to non-ICU mortality in US hospitals	35
Table 2-4: Logistic Regression- PSI shifts for ICU workers based on exposure to ICU mortality rates in US hospitals.....	36
Table 2-5: Logistic Regression- PSI shifts for non-ICU workers based on exposure to non-ICU mortality rates in US hospitals	37
Table 3-1: Differences in the mean PSI for those reporting negative/neutral versus positive perceptions of teamwork	52
Table 3-2: Table: Differences in the mean PSI for those reporting negative/neutral versus positive perceptions of teamwork	52
Table 3-3: Logistic Regression- relationship between worker perceptions of PSI and teamwork between January 2019- July 2022.....	54
Table 3-4: Logistic Regression- Relationship between worker perceptions of PSI and leadership support between January 2019- July 2022.....	55
Table 3-5: Linear Probability Regression- Relationship between worker views about teamwork and PSI before and during the COVID-19 pandemic in US hospitals	56
Table 3-6: Linear Probability Regression- Relationship between worker views about leadership support and PSI before and during the COVID-19 pandemic in US hospitals.....	57
Table 4-1: Logistic Regression- Relationship between worker perceptions of blame orientation and learning orientation between January 2019 and July 2022	71
Table 4-2: Logistic Regression- Relationship between worker perceptions of blame orientation and ability to maintain PSI between January 2019 and July 2022 in US hospitals.....	72
Table 4-3: Linear Probability Regression- Relationship between worker views about blame orientation and PSI before and during the COVID-19 pandemic in US hospitals	73

Chapter 1: Introduction

The COVID-19 pandemic strained hospitals in unprecedented ways that required healthcare workers to adapt and endure challenges, testing their ability to do a good job with the human and technological resources available to them. This study uses descriptive statistics and regression modeling based on data from the Agency for Healthcare Research and Quality (AHRQ)'s Hospital Survey on Patient Safety (HSOPS) and data from the Hospital Cost and Utilization Project (HCUP), from time frames before and during the COVID-19 pandemic, to analyze shifting perceptions about patient safety culture within the hospital workforce. This study builds on prior research, in examining factors that influenced workers' capacities to maintain personal integrity during the COVID-19 pandemic.

As the haze of the COVID-19 pandemic lifts globally, healthcare systems have a renewed obligation to figure out not only how to consistently provide good care, but to do so in a way that enables workers to feel that they have the human and technological resources to do a good job. Prior empirical findings highlight that a demanding work environment, that makes it feel difficult or impossible to provide good care, leads not only to worse care but also to worker burnout (Leiter, 1993; Brunsberg, et al., 2019; Crijns, et al. 2020). Links between care quality and worker well-being are emphasized by the Institute for Healthcare Improvement's Quadruple Aim, which raised attention to the interconnection between patient safety, quality, and worker well-being (Bodenheimer and Sinsky, 2014).

Healthcare workers' perceptions that they are equipped to do their jobs well, can shape the resiliency of healthcare organizations, not only when hospital usage is "normal," but also when there are fluctuations in patient volume and staffing. Burnout has been a particularly vexing problem, and one exacerbated by pandemic strain, with the United States Surgeon General reporting in 2022 that more than half of the US hospital workforce experienced symptoms of burnout (Murthy, 2022).

Given the essential nature of high-quality healthcare to the thriving of society, it is of great importance to better understand the factors that shape healthcare workers capacity to feel they can do a good job. This dissertation seeks to understand the precursors to burnout and patient safety declines in a way that can help healthcare organizations become more effective moving forward at achieving the objectives of the Quadruple Aim.

This project will explore the following 3 aims and related emergent hypotheses:

Aim 1: Examine how mortality during the COVID-19 pandemic impacted hospital workers' perceptions about their own personal integrity.

Hypotheses:

1. During the pandemic (April 2020-July 2022), hospital workers' perception that they could maintain personal integrity steadily decreases.
2. Spikes in the severity of the pandemic (as indicated by spikes in hospital mortality rates) led to surges in workers' negative self-perceptions of personal integrity.
3. Mortality had a more severe impact on the PSI of hospital workers in the ICU (who faced higher rates of mortality in their care setting) than hospital workers in non-ICU care settings, due to differences in the mortality rates in each environment.

Aim 2: Analyze how shifts in perceptions about teamwork and leadership support during the COVID-19 pandemic impacted hospital workers' perceptions of their own personal integrity.

Hypotheses:

1. During the COVID-19 pandemic, hospital workers' perceptions of teamwork impacted their perceptions of their own personal integrity.
2. During the COVID-19 pandemic, hospital workers' perceptions of leadership support impacted their perceptions of their own personal integrity.

3. Hospital workers' perceptions of teamwork impacted their perceptions of their own personal integrity more during the pandemic crisis than it did before it.
4. Hospital workers' perceptions of leadership support impacted their perceptions of their own personal integrity more during the pandemic crisis than it did before it.

Aim 3: Examine how hospital worker perceptions about blame versus learning orientations during the COVID-19 pandemic effected their perceptions of their own personal integrity.

Hypotheses:

1. Hospital workers who perceive a positive culture of organizational learning related to patient safety problems are less likely to feel blamed for making or reporting errors.
2. The greater the chances that hospital workers perceive staff are blamed for patient safety problems, the greater the chances that they have negative perceptions about their own personal integrity.
3. Hospital workers' perceptions of a blame orientation within their organization impacted perceptions of their own personal integrity more during the COVID-19 pandemic than it did before the pandemic.

Literature Review

Introduction

This research investigates the impacts of the COVID-19 pandemic on healthcare worker perceptions about workplace support for patient safety in US hospitals to better understand the way these demands and supports shaped workers' capacity to maintain personal integrity, and in turn the ability of hospitals to maintain enable workforce well-being and organizational resilience.

Several factors motivate the importance of this work. The focus on patient safety culture was birthed from the field of healthcare quality improvement in the 1970s and 80s, and laid bare in the publication of *To Err is Human* by the Institute of Medicine in 2000, where experts brought

attention to the complex challenges that underpin why healthcare workers make mistakes or fail to prevent them (Kohn et al., 2000; Maxfield, et al., 2005; Bates and Singh, 2018; Barach and Berwick, 2003). Patient safety can be defined as the prevention or reduction of harms or injuries caused by healthcare interventions (as opposed to those caused by a patient's condition) (Vincent, 2010).

Strong system-level patient safety depends on how individual behaviors, processes, and technologies interact within the system. System-level patient safety also relies on the ability of the healthcare system to pool information about instances of errors and problems to promote learning system-wide (Vincent, 2010; Rosen, et al., 2022).

The Institute of Medicine describes patient safety as the first dimension of quality (Kohn et al., 2000). This means that pursuing high-quality healthcare depends on the ability of healthcare institutions to cultivate patient safety. Here, research indicates that actionable behavior-change across a healthcare system and attention to creating a culture of patient safety could mark the difference between good medical outcomes and poor ones, and between cohesive, high achieving clinical care teams and those prone to emotional exhaustion, poor clinical performance, and burnout (Kohn et al., 2000; Maxfield, et al., 2005; Bates and Singh, 2018, Brunsburg et al., 2019; Mardon et al., 2010). What is less understood, however, are the intermediate steps between work intensity, the qualities of supportive leadership and teams, and overall organizational resilience. This dissertation seeks to unpack and explore these factors.

Personal Integrity in Healthcare Work

Integrity at work, a vital concept across all types of work, is the alignment of one's actions and morals in the workplace (Petrick and Quinn, 1997). When staffing structures feel appropriate to maintain high quality patient care, workers perceive integrity because they can align their actions with their morals. When workers recognize that they (or those working alongside them) are performing tasks without the necessary baseline of staffing, resources, training, or equipment to

ensure quality care, the deficiency degrades worker integrity, leading to moral distress which can compound over time (Riedel et al., 2022; Rosen et al., 2022; Epstein and Hamric, 2009). When individuals operate in teams and as a part of an organization, as is the case in hospital work, their control over ensuring that the demands they experience is manageable is moved from mainly an individual endeavor to one intertwined with others, where others' actions and choices can directly impact an individual's ability to align their actions with their morals. When a healthcare worker feels unable to achieve this alignment and feels that there are barriers that prevent them from demonstrating integrity at work, they will experience distress (Epstein and Hamric, 2009).

Epstein and Hamric (2009) define "moral distress" as taking place when an individual experiences "perceived violation of one's core values and duties, concurrent with a feeling of being constrained from taking ethically appropriate action." Over time, when moral distress compounds, it leads to moral injury. Moral injury is a serious consequence that can lead workers to burnout and occurs when the economic, legal, and institutional pressures force healthcare workers to perform their jobs in ways that knowingly put patients' best interests at risk (Rosen et al., 2022). Providing care to patients when there are shortages in staff, being forced to work when ill oneself, feeling rushed because of insufficient patient to staff ratios, providing care without personal protective equipment, or providing care to high acuity patients without the appropriate equipment or in care units ill-equipped for it are all examples where a loss of integrity in work might lead to compounded effects over time. According to Rosen et al. (2022) moral injury emerges when repeated instances of moral distress compound, creating sustained anguish due to workers' experience of persistent emotional and ethical violations. Healthcare worker integrity and mental well-being are tested when workers knowingly participate in, or are bystanders to, threats to patient safety on their care units.

Personal Integrity and Its Links to Healthcare Worker Well-being

The National Academies of Medicine describe healthcare worker well-being as the experience of professional fulfillment, meaning, satisfaction, and engagement with one's work, and its absence as indicative of burnout (Mehta et al., 2021). While there is increasing evidence of clinician burnout and its associated harms to patient safety, the mechanisms at play that ultimately lead to burnout are less understood (Buchbinder et al, 2023). Understanding these precursors to burnout more deeply is a central purpose of this dissertation.

The Institute of Healthcare Improvement added clinician well-being as to its "Triple Aims" for high quality care in recognition of how integral healthcare worker well-being is to the capacity of institutions to consistently provide safe, high-quality care (Bodenheimer and Sinsky, 2014). Task overload, taxing mental or physical tasks, conflict with others, burdensome bureaucracy, experience of harassment, and negative changes in day-to-day work are all factors that have been associated with burnout.

Aiken et al. (2002) and Shin et al. (2018) found that as the number of patients a nurse cares for increases, the nurse's workplace satisfaction decreases, and chance of burnout increases. Aiken et al. (2002) identified that one additional patient per nurse not only significantly increased the odds of burnout and decreased the odds of job satisfaction, but also increased the likelihood of a patient under the nurse's care dying within 30 days of admission by 7% and increased the odds of failure-to-rescue by 7% (Aiken et al, 2002). Needleman et al. (2011) discovered a significant association between increased risk of patients dying when overall staffing levels fall below target levels by 8 hours or more (hazard ratio per shift 8 hours or more below target, 1.02; 95% confidence interval [CI], 1.01 to 1.03; P<0.001). Shin et al. (2018) found that nurses' intentions to leave their jobs was 1.05 times higher when nurse-to-patient ratio was increased by 1 and that a one-patient increase in a nurse's patient load was associated with an 8% increase in the odds of job

dissatisfaction (Shin, et al., 2018). Sturm et al. (2019) found clear correlations between healthcare workers' perceptions of high workload and emotional strain. This research shows that when team functioning deteriorates, which was more likely to happen in the context of high workload, team communication, team collaboration, and worker mental wellness all deteriorate, contributing to worse care outcomes (Sturm et al., 2019). Halbesleben et al. (2008) found that burnout was tied with perceptions of worse patient safety. These research findings demonstrate that perceptions of work overload contribute to risk of burnout, when workers feel that despite their best efforts, they are stymied from doing their job to the best of their abilities. Because the COVID-19 pandemic deeply strained healthcare systems, it offers a prime context for exploring the way worker perceptions of self-integrity are shaped by the intensity of their job demands, which in turn affect burnout risk.

Staffing Strains during the COVID-19 Pandemic

The outbreak of the COVID-19 pandemic in the US in March 2020 created enormous responsibility and strain on hospitals, leading to operational and ethical challenges that continue to reverberate. Rangachari and Woods (2020) explain that COVID-19 positioned workers to fight a deadly virus with insufficient personal protective equipment and no evidence-based treatments. The American Hospital Association reports that since February 2020, hospital employment nationwide has decreased by about 94,000, with job vacancies of varied nursing personnel types up to 30% between 2019 and 2020, and a 31% increase in job vacancies for respiratory therapists between 2019 and 2020 (AHA-Data Brief, 2021). In hospital departments such as emergency, intensive care units, and nursing, where the strain of caring for COVID-19 patients was felt most acutely, the turnover rate went from 18% (in 2019) to 30% (in 2020) (AHA-Data Brief, 2021). Overall, the number of full-time staff for each patient went down by 3% from before the pandemic (AHA-Data Brief, 2021).

A spike in the demand for expensive traveling short term contract clinicians emerged during the pandemic to compensate for staffing shortages caused by workers leaving their jobs (Yang and Mason, 2022). Between September 2019 and October 2020, hospitals experienced a 15.6% increase in their labor expenses for each adjusted discharge, and had higher expenses overall, including the cost of paying for temporary contract workers (AHA-Data Brief, 2021). As hospital leaders struggled to add enough staff to take care of patients, clinicians faced pressure to leave their jobs, not only due to the emotional strain and physical risks of working in a hospital during the pandemic, but also because incentives to earn more as temporary contract workers than they could as full time employee at a single hospital (AHA-Data Brief, 2021; Yang and Mason, 2022). The aggregate effect of large numbers of workers in an organization all experiencing high levels of strain that caused them to consider leaving (or actually leaving) their jobs, is weakened resilience at the organizational level (Han et al., 2019).

In the context of staffing shortages during the COVID-19 pandemic, hospitals faced increased patient acuity, with acuity rates increasing about 6% compared to pre-pandemic levels (AHA-Data Brief, 2021). Pre-pandemic research established the links between staffing levels, patient outcomes, and worker mental well-being (Shin, et al., 2018; Tawfik et al.; 2018; Aiken et al, 2002). Research by Al-Amin et al. (2022) about COVID-19 staffing and patient outcomes supported pre-pandemic findings, showing marginally significant associations between RN staffing levels and patient mortality during the COVID-19 pandemic. During the pandemic, patient mortality was lower when RN and emergency medicine physician staffing levels were higher (Al-Amin, et al. 2022). These data show that much like findings pre-pandemic, during the COVID-19 pandemic, staffing levels impacted patient outcomes, and the added risks to workers and patients during the COVID-19 pandemic, might have even intensified the importance of maintaining a robust staff.

Data show that the COVID-19 pandemic amplified emotional distress experienced by healthcare workers. Sexton et al. (2022) found that the COVID-19 pandemic significantly increased emotional exhaustion within the healthcare workforce with workers reporting an increase in feelings of emotional exhaustion: in September 2019, where 31.8% of physicians reported emotional exhaustion (95% CI, 30.0%-33.7%); by January 2022, this figure was 40.4% (95% CI, 38.1%-42.8%), an increase of more than 27%. In a longitudinal analysis of hospital workers, Corbaz-Kurth et al. (2022) identified that workers showed statistically significant increases in problems related to their “work quantity, duration, and understaffing” (May-June 2020 [T1]: 9.8%, June-October 2020 [T2]: 15.2%, December 2020-February 2021 [T3]: 15.8%) and significant increases in “emotional burden” over time (T1: 16.9%, T2: 17.8%, T3: 25.8%). These factors have led to fewer staff being available to treat sicker patients, thus contributing to worse patient outcomes, and worse worker mental well-being. This paper fills a gap in the literature by looking at how the intensity of job demands may have enabled or detracted from workers’ ability to maintain integrity, which in turn impacted their well-being and ability to provide high quality and safe care when facing high job strain of pandemic-time conditions.

Resilient Healthcare and Personal Integrity

The COVID-19 pandemic disruptions strained not only individual workers but collectively put significant pressure on healthcare organizations, highlighting the importance of addressing the antecedents to burnout not only for the benefit of individuals, but critically, as to better equip healthcare leaders to invest in changes to enable better system-level adaptability and resilience. Resilient Healthcare (RHC) is system-level concept based on the flexibility and adaptations of an organization, when anticipating disruptions, monitoring the way the healthcare system is working, responding to new and changing demands, and learning from experience (Corbaz-Kurth et al.,

2022). RHC depends on the workers' trust in their institution, leaders, and teams to show good judgment, adhere to a shared set of values, and demonstrate fairness.

As earlier defined, integrity at work is the alignment of one's actions and morals in the workplace (Petrick and Quinn, 1997). Integrity can be supported or jeopardized at the individual level, where one's own choices and actions enable or endanger it (Petrick and Quinn, 1997). "Perceived self-integrity" (PSI) is based on individuals' views of themselves as being "competent, good, coherent, unitary, stable, capable of free choice, capable of controlling important outcomes, and so on" (Steele, 1988). Workers' PSI is threatened when they are unable to act consistent with their own morals. Integrity can be supported or threatened at individual, team, and organizational levels. Individuals' PSI is bolstered when workers feel the system in which they operate is striving to help them align their actions and morals, or is diminished, when they feel forced to take actions that lead to guilt and regret.

Integrity is an individual level concept, whereas RHC is a system level concept. To enable RHC, the workforce needs to feel that the conditions of their work enable them to maintain integrity. Whether justified or not, worker perception- rather than objective measures - will ultimately matter most when looking to understand the antecedents to burnout, since it is a very personal experience based on individual perceptions. Tapping into data to understand worker perceptions can help identify ways to bolster individual worker well-being and, in turn, system level resilience.

Conceptual Model

This paper proposes the Healthcare Workforce Integrity Model as an innovation built on the foundation of the well-established Job Demands-Resources (JD-R) model. This innovation incorporates the concept of "perceived self-integrity" (PSI) to account for the inherently moral nature of healthcare work. The Healthcare Workforce Integrity Model shows that when job

demands intensify, the effectiveness with which job resources enable workers to maintain alignment of their actions and their morals will directly shape their ability to maintain energy and motivation.

The Model takes several of the trends that have been recognized through empirical research both within and outside of healthcare to demonstrate how the imbalance in workplace demands and resources contribute to organizational problems (Scheepers et al., 2015; Medich et al., 2022; Zhou et al., 2022; Barello, 2021; Bakker et al, 2004; Schaufeli, 2017; Shanafelt and Noseworthy, 2017). In the original JD-R model, on which the Healthcare Workforce Integrity Model is based, when job demands are chronically high and are not met with supportive job resources to bolster worker resilience, worker energy drains, and the quality of the work worsens (Bakker and Demerouti, 2007). Job resources, by contrast, enable workers greater coping ability and appear through individual capacities, organizational structures, and team and leader dynamics (Bakker and Demerouti, 2007). Past research has identified several types of job resources that can impact workers' ability to manage their work demands:

1. Individual resources: control and flexibility over work, access to participation in decision making, availability of resources, ability to apply one's skills and talents in pursuit of job goals;
2. Organizational resources: alignment between individual and organizational values, fair pay, communication, fair and just practices and processes, trust in leadership;
3. Team and leader resources: Performance feedback, opportunities for learning and growth, communication. (Demerouti and Bakker, 2011; Schaufeli, 2017).

The balance of job demands and job resources impact worker performance and energy. Intense job demands are tied with workers experiencing emotional exhaustion, and weak job resources lead workers to lose motivation and become disengaged at work. Taken together, the imbalance

increases the likelihood that workers will experience burnout symptoms and perform poorly (Demerouti et al., 2001).

The JD-R Model, a theory from the field of organizational psychology and management, has been found to extend to the healthcare workforce. Research has shown that when healthcare workers experience burnout symptoms and report low levels of engagement, there are increased odds of workers leaving their positions, weakening organizational resilience (Willard-Grace et al, 2019). In a clinical healthcare context, job demands and resources include:

<i>Job Demands</i>	<i>Job Resources</i>
<ul style="list-style-type: none"> • Patient acuity • Patient volume • Reporting and documentation • Complex tasks • High stakes tasks 	<ul style="list-style-type: none"> • Individual resources like autonomy, control, expertise, credibility, flexibility, and moral judgment • Team and leader resources like dependability, reliability, helpfulness, respect, and trust, and ethical practice • Institutional resources like honesty, transparency, trustworthiness, and ethical practice • Technological resources like functionality and availability of space, equipment, information, people, and time

Due to its very essence, healthcare extends “job demands” into a deeply moral space where workers’ performance is embedded into the acts of enabling human respect, dignity, and survival. When job demands result in workers feeling that they are required to perform their work in a way that is out of touch with what they deem as necessary to do the right thing, workers risk experiencing reduced energy and motivation at work, which can then shape the resilience of their organizations to be equipped to provide high quality care. For example, when workers recognize that they (or those working alongside them) are performing tasks without a baseline of necessary staffing, resources, training, or equipment as to ensure quality care, or if they are expected to perform work that makes them complicit in violating quality standards, ignoring critical patient values, or completing tasks that conflict with what that worker knows to be “right”, a worker’s perceptions of their own personal integrity diminishes (Rangachari and Woods, 2020; Riedel et al., 2022; Rosen et al., 2022). The job demands in hospitals are exacerbated by environmental and

context factors like inefficient workflows, time-sucking tasks with little return on investment (ROI) to workers or their patients, regulatory burdens, and outdated technologies that create conditions of work pressure and work overload. When healthcare institutions experience unexpected stressors or major disruptions, such as a pandemic, the intensified job demands and strain on resources can be a jolt that negatively impact patients and healthcare workers alike.

Within this framework, job resources (individual, team and leader, institutional, and technological) offer buffering effects. Individual resources may include control and flexibility, access to decision making, fair pay, and recognition -- all factors more readily available to those with higher status. Team and leader resources involve the role teams and leaders play in enabling workers to feel supported when work feels busy, stressful, or when problems emerge. Institutional resources may include open and honest communication as well as clarity about policies and practices that balance the need for standardization and adaptability. Technological resources include having sufficient and appropriate space and staff, functional electronic medical record systems, and necessary equipment like beds, ventilators, surgical tools, personal protective equipment, and medicine. Examples of job resources that support resilient healthcare include having enough staff and space to meet the demand, the way leaders and teams support each other, the way teams problem solve, and institutional receptivity toward learning rather than blame when workers communicate about concerns, errors, and problems.

The mechanisms at play (See *Figure 1-1*) impact the extent to which hospitals experience organizational resilience. Hospital workers with more job resources to buffer the effects of intense job demands are more capable of maintaining their feelings of PSI. This, in turn, can help workers to maintain the motivation they need to support high quality care. If healthcare organizations do not broadly cultivate job resources or intentionally or unintentionally weaken them across segments of their workforce, they will be at risk of endangering workers' ability to feel that they can maintain

PSI. It may be that individuals in this type of organization may experience mixed impressions of job resources based on individual, leader, team, and technological resource variations, leading to variability in PSI. As a result, workers' energy and motivation will be in flux, making their organization's capacity to remain resilient in the face of disruption tenuous. For organizations where workers perceive that their supportive job resources are lacking, when job demands spike, workers will perceive a noticeable loss in their ability to maintain PSI, which reduces worker health and energy, and over a sustained period within the overall workforce, leads to weakened organizational resilience. Positive PSI, therefore, is an antecedent to high levels of worker energy and motivation, which contribute to stronger organizational resilience. Negative PSI, by contrast, serves as an antecedent to low motivation, burnout, and lower organizational resilience. This conceptual model guides the research herein. See *Figure 1-1*.

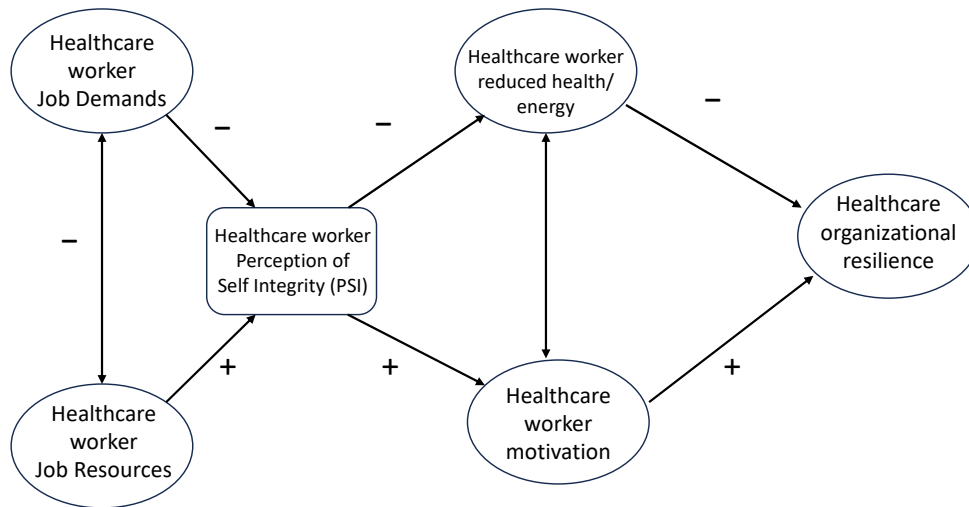


Figure 1-1: Healthcare Workforce Integrity Model

While the capacity to maintain alignment of one's actions and morals can be evaluated through examination of a multitude of elements, this study will examine a particular subset of these

factors, namely workers' survey responses about whether they believe their unit staffing structures enable them to provide safe, quality care.

Exploring the Methodological and Conceptual Conditions

When evaluating the relationships between healthcare worker perceptions of unit patient safety culture, there are reciprocal relationships rather than directional relationships between clinician perceptions of workplace strain and their assessment of care unit safety (Tawfik, et al., 2018; West et al., 2009). It may be that the experience of workplace strain creates feelings of low self-esteem and guilt, which then increases the chance that a clinician reports medical errors, but it also may be the case that a worker responsible for contributing to or causing harm, and then admitting it, experiences decline in mental well-being due to the stress experienced from their failure to perform their work properly.

Research by Vogelsmeier et al. (2010) found that the most troubled organizations, where staff and managers did not feel comfortable sharing their challenges, and where they were more disengaged from their work, reported few problems with their patient safety climate in survey data. By contrast, in organizations where staff and managers collaborated openly and took joint responsibility of challenges, both staff and managers reported more problems with the patient safety climate. Vogelsmeier et al. (2010) explain that the difference in findings between the two groups is due to discomfort and lack of information sharing in the less engaged organizations and more openness, safety, and transparency around shortcomings in the more engaged organizations. It may be that hospitals with the most resilient and successful patient safety cultures are those that are also most open and honest about the reality of their shortcomings. And, those hospitals with the greatest problems, are either too fearful or blinded to the deep challenges they face. These findings show that within unsupportive organizations, staff are more likely to feel exhausted and disengaged, and

are also less likely to feel safe communicating with their leadership about concerns, resulting in less openness about the organization's shortcomings.

Welp and Manser (2016) conducted a systemic study of peer reviewed research focused on the relationship between hospital clinicians' well-being, patient safety and teamwork, utilizing the JD-R model. In their study, Welp and Manser found substantial relationships between clinician well-being, patient safety, and teamwork, though they identified nuances that may impact the nature of those relationships. They share that the causal mechanisms between the concepts (*i.e.*, does good teamwork cause clinician well-being or does clinician well-being improve patient safety?) cannot be established from the studies within their meta-analysis.

There are a few key takeaways within the Welp and Manser, Vogelsmeier, and Tawfik's work related to evaluating patient safety culture, which are critical to this project. One is that measuring patient safety based on subjective ratings by a survey respondent, rather than through an external indicator of safety, may be measuring a clinician's willingness to report problematic events. A clinician's willingness to report errors or problems is likely to be higher in a positive and supportive climate than in a negative and toxic climate because in a positive and supportive environment workers will feel safer pointing out errors and problems. Secondly, team structures are variable and team composition can be dynamic and temporal within healthcare, focused on a particular patient or a particular shift. Thus, while individual experiences may offer some insight on associations or reciprocal relationships between worker well-being, patient safety, and teams, causal relationships will be difficult without focusing on the experiences of members of intact teams. (This study will focus on individual level experiences, rather than the experiences of intact teams, and so I expect that, similarly to Welp and Manser, that findings will depict associations and reciprocal relationships rather than causal relationships.) And third, the research further supports the work of Tawfik and Vogelsmeier, indicating that the directionality of the relationship between patient safety and clinician

perceptions is unclear, even if the association is present- workers with negative perceptions about their workplace culture may not be able to provide safe patient care, but it may also be the case that involvement in a case where a patient was harmed due to a problem or medical error may lead to guilt and emotional stress and have negative impacts on a worker's perceptions of the culture. These findings fit in line with past research on the JD-R model, which finds that job stress and motivation are both outcomes and predictors of job demands and resources (Bakker and Demerouti, 2007). Baker and Demerouti explain:

Just like the tendency of depressed people to assess their environment more negatively and thus contributing to a more negative climate (Beck, 1972), burned-out employees may perceive relatively high job demands and complain more often about their workload, thus creating a negative work climate (Bakker and Schaufeli, 2000). In a similar vein, engaged employees may perceive more resources and be better able to mobilize their resources, because they are more pleasant colleagues to interact with. (Bakker and Demerouti, 2007)

Thus, when looking at factors related to effective workplace social dynamics and patient safety, the nature of the relationships between these concepts can be defined more accurately as reciprocal processes rather than unidirectional, causal ones.

Data Sources

This dissertation presents descriptive statistics and regression modeling based on publicly available data compiled by Westat in support of the AHRQ's survey, HSOPS, and from AHRQ's publicly available inpatient hospital dataset compiled through HCUP.¹ Using these data sources, this study draws insights about shifts in worker PSI in the setting of pandemic era work demands. The empirical investigations utilize 2021 and 2022 dataset waves of the HSOPS 2.0, which together span from November 2018 through July 2022. HCUP data from the time frame spanning April 2020 to

¹ The SOPS® data used in this analysis were provided by the SOPS Database. The SOPS Database is funded by the U.S. Agency for Healthcare Research and Quality (AHRQ) and administered by Westat under Contract No. HHSP233201500026I / HHSP23337004T.

June 2022 are utilized in investigating Aim 1 (how mortality rates during the COVID-19 pandemic impacted hospital workers' perceptions about their own personal integrity), in particular. I analyzed this data using the STATA/IC 16.1 statistical software and created all graphs using Microsoft Excel. Of note, on March 6, 2023, the University of Maryland College Park IRB issued an IRB exemption letter for this research project.

HSOPS Data

HSOPS is a voluntary survey tool available through AHRQ for US hospitals looking to evaluate their cultures of patient safety. HSOPS offers the largest known publicly-available patient safety culture dataset on US hospitals (Hare et al. 2022, Famolaro et al. 2021). It is the most frequently used patient safety culture survey, is the focus in the greatest number of published studies about patient safety culture, and will serve as one of the two core data sources within this research (Hare et al. 2022; Famolaro et al. 2021; Churruca et al., 2021). The HSOPS survey includes questions about worker perceptions about work pace, staff sufficiency, teamwork, leadership support, and how problems and errors are handled, as well as information about workers' primary care units and job roles. These variables are central to this study.

The HSOPS 2.0, the version of the HSOPS survey used in this dissertation research, includes 32 items looking at 10 different dimensions of patient safety culture, as well as questions related to respondent profiles, such as job type, care unit type, average hours worked weekly, and years in profession, and years worked at current institution (Famolaro et al. 2021). The HSOPS 2.0 was piloted in 2019 to replace its predecessor, HSOPS 1.0 and was found to be psychometrically valid (Sorra, 2022). The 2021 dataset wave includes 172 participating hospitals and 87,856 individual respondents in the United States (US) and its territories within a 2-year time frame which started in November 2018 and ended in October 2020 (Famolaro et al. 2021). Within the 2021 dataset, 85% of the hospitals administered the survey during the COVID-19 pandemic (March 2020 - October

2020) (Famolaro et al. 2021). The 2022 dataset includes 400 participating hospitals and 206,410 individual respondents in the US and its territories in a time frame spanning between November 2020 and July 2022 (Hare et al. 2022).

Notably, no hospitals submitted HSOPS survey responses for the months of December 2020 through February 2021, which coincides with the first winter surge of the COVID-19 pandemic (see Figure 2-1 and Figure 2-2, below). While any conjecture about the reason for this data gap is speculative, the absence of data for this period is acknowledged as a limitation of this study.

The publicly available HSOPS datasets are considered fairly consistent with the distribution of hospitals registered by the American Hospital Association (AHA), even though the decision to submit results to the public database were up to the discretion of the participating hospitals (Hare et al. 2022; Famolaro et al. 2021). The hospitals that participated did not receive any special training in advance. Each hospital had the choice to administer the survey on paper or on a computer (Hare et al. 2022; Famolaro et al. 2021). Some used a combination of modes and others selected one method (Hare et al. 2022; Famolaro et al. 2021). Further, some hospitals chose to invite any worker to complete the survey while others invited only smaller subsets of the workforce (Hare et al. 2022; Famolaro et al. 2021).

Respondents self-selected their staff position and were given the discretion to select the category they felt they fit into the best. A detailed breakdown of the survey data by staff position is shown on *Table 1-1*. The survey specified several sub-categories for each staff group. The “Nursing” category includes: Advanced Practice Nurse (NP, CRNA, CNS, CNM), Licensed Vocational Nurses (LVN), Licensed Practical Nurses (LPN), Patient Care Aides, Hospital Aides, Nursing Assistants, and Registered Nurses (RN). The “Medical” category specifies: Physician Assistants, Residents, Interns, Physicians, Attendings, and Hospitalists. The “Other Clinical” group includes: Dietitians, Pharmacists, Pharmacy Technicians, Physical, Occupational, or Speech

Therapists, Psychologists, Respiratory Therapists, Social Workers, Technologists, and Technicians (e.g., EKG, Lab, Radiology). The “Supervisor/ Leader” group includes: Supervisors, Managers, Department Managers, Clinical Leaders, Administrators, Directors, Senior Leaders, Executives, and C-Suite Leaders. The “Support” category accounts for those who define their work within: Facilities, Food Services, Housekeeping, Environmental Services, Information Technology, Health Information Services, Clinical Informatics, Security, Transport, Unit Clerk, Secretary, Receptionist, and Office Staff. Those who selected the “Other” category, self-selected into this group, likely because they did not feel that they properly fit in any of the other categories. (Hare et al. 2022; Famolaro et al. 2021).

Table 1-1 - Survey respondents by staff position

Staff Position	Number of survey respondents	Percentage of total respondents
Nursing	117,380	42.65%
Medical	12,914	4.69%
Other Clinical	54,892	19.95%
Supervisor/ Leader	21,955	7.98%
Support	42,683	15.51%
Other	25,381	9.22%

The average hospital response rate in the 2021 survey wave was 47% and the response hospital rate in the 2022 wave was 48%, although only 3% of all US hospitals submitted data for the 2021 survey and less than 7% of all US hospitals submitted data in the 2022 wave (Hare et al. 2022; Famolaro et al. 2021). The data submitted by hospitals to AHRQ was not audited for accuracy, but was cleaned after submission for out-of-range values, such as response values that indicated data entry errors, where responses to survey items were straight-lined (where a respondent provided the same exact response for all survey items), and blank records (when respondents did not answer or listed “Does not Apply or Don’t Know”) (Hare et al. 2022; Famolaro et al. 2021).

HCUP Data

The HCUP data is drawn from the State Inpatient Databases (SID) through a Federal-State-Industry partnership and is sponsored by AHRQ. The database integrates data from State organizations, hospital associations, private data organizations, and the Federal government. Of the 49 data organizations that participate in HCUP, 36 of them have agreed to release state specific files through AHRQ, which may lead to some variations in information availability. The HCUP data includes individual data files from 49 data organizations with information on 95% of all acute care hospital discharges in their respective states. Data elements include details from patient discharge abstracts, with protections in place to conceal individual patients, physicians, and hospitals. Core clinical and nonclinical information are included in the data. Data relevant to this study include whether the patient stay included time in the ICU, total discharges, and mortality rates out of total discharges. Patient, hospital, and regional characteristics are also present in the data.

While HCUP data collection began in 1988, the information that will be used in this study includes years between January 2019 to June 2022, accounting for 83.2 million hospital discharges across the United States. Data that is specific to COVID-19, is reported beginning in April 2020 (HCUP Visualization of Inpatient Trends in COVID-19 and Other Conditions. Healthcare Cost and Utilization Project, 2022). This research study focuses on national level mortality data, and so while variations based on regional, urban versus non-urban, and many other granular layers exist, the use of national level data enables a high-level view of trends in mortality that can be compared with the national level trends embedded in the HSOPS survey data.

Chapter 2: COVID-19 and Hospital Workers' Perceptions of Personal Integrity

This investigation into how the COVID-19 pandemic impacted hospital workers' perceptions about their own personal integrity, and its associated hypotheses, is based on past research into staffing levels, patient outcomes, and worker strain. This project explores a different facet of these dynamics to understand the way the pandemic shaped workers' perceptions of their own capacity to maintain personal integrity. More deeply understanding the role of personal integrity can help healthcare leaders to invest in changes to better support the workforce, before workers experience so much strain that they harm patient safety or burn out.

Literature Review

Associations between staffing levels, care quality, worker satisfaction, and burnout risks are well-established. (Aiken et al. 2002; Shin et al. 2018; Needleman et al. 2011; Sturm et al. 2019; Halbesleben et al. 2008.) When the pandemic reached the US in 2020, data shows clear evidence of intensified worker strain. The role of lost personal integrity because of work strain is less understood and is explored in this study.

COVID-19 Job Demands Varied Across Hospital Care Units

In hospital departments such as emergency, intensive care, and nursing, where the strain of caring for COVID-19 patients was felt most acutely, the turnover rate went from 18% (in 2019) to 30% (in 2020) (AHA-Data Brief, 2021). Across healthcare worker roles, emotional exhaustion increased between 2019 and 2021 (Sexton, 2022). Based on previous findings about the impact of job demands on the healthcare workforce, I predict that the COVID-19 pandemic reduced healthcare worker PSI.

Evidence suggests this impact on PSI will differ based on care unit, because of variances in both preexisting job demands and the effects of the pandemic. Chen et al. (2021) conducted a study

to assess the mental health impacts of the COVID-19 pandemic within the nursing workforce and found that working in ICU settings and caring for COVID-19 patients increased the likelihood of worse mental well-being. Butera et al. (2021) investigated nurses' mental well-being from before to during the COVID-19 pandemic in French-speaking Belgium. In ICU departments, 89.1% of nurses reported an increased workload after the COVID-19 pandemic (and only 2.3% a decreased workload), and these ICU nurses' risk of burnout increased from 51.2% before the pandemic to 66.7% during the pandemic ($p < .003$). By contrast, less than half on emergency department (ED) nurses (45.1%) reported an increase in workload, while 37% reported a decrease, and the prevalence of burnout risk for ED nurses, while consistently higher than that of ICU nurses, remained stable across the time frames (69.8% vs. 70.7%). Butera et al. (2021) aptly point out that the study indicates that routine, non-pandemic specific interventions are needed for ED nurses, and that ICU nurses appear to need more specific interventions in times of increased workload, such as the COVID-19 pandemic.

By examining shifts in PSI for ICU and non-ICU workers during the pandemic, this research will explore how the variance in job demands between care units impacted workers' ability to maintain integrity.

Job Roles Variably Buffer Healthcare Workers Facing High Job Strain

This research also investigates variations in workers' perceptions of PSI based on their job role. Job role, and the status associated with a particular job, offer healthcare workers variable degrees of prominence, respect, and influence in the workplace, which can impact the ability of workers to cope with surges in job intensity and strain. Those with decision-making authority and who are empowered to control the actions and behaviors of others can experience tangible advantages, such as a doctor having the authority to give direction to a nurse, or a charge nurse assigning patients to other nurses (Armellino et al., 2010). Workers with higher degrees of control

and decision-making power are often more capable of aligning their own actions and their morals, helping them to cope with increased job intensity in ways less accessible to those with less control and power, who are more beholden to decision-makers. In addition, higher status affords more benefits (i.e. higher salary, greater flexibility, more convenient parking, more private or fancier offices), a reputation that makes others value their opinions, and more benefit of the doubt in ambiguous situations (Nembhard and Edmondson, 2006).

Individuals develop feelings of superiority or inferiority based on the way their membership in particular professions or job types is seen within the organization's hierarchy. Lower status individuals are more likely to underestimate their own contributions and question their ability to perform (Nembhard and Edmondson, 2006). The literature identifies traditional chains of command in hospitals that shape expectations about job status. The higher one is on the hierarchy, the more authority and autonomy tends to be associated with the job type. This hierarchy is (ranked from highest to lowest status): 1) Management, 2) Attending Physicians, 3) Resident Physicians, 4) Physician Assistants (PAs)/ Nurse Practitioners, 5) Nurses, and 6) Medical Assistants/ Techs (Lichtenstein, et al. 2004; Currie, et al., 2015; Bruijn-Geraets, et al.; 2014; Kreindler, et al., 2012). Thomas et. al. (2004) share a quote from a nurse: "questions can only go down the chain of command, and you are very careful about questions going up the chain of command." Physicians, as the high-status members of healthcare teams, have been shown to ignore important information communicated by nurses (lower status team members) and at the same time, nurses have been known to hold back information related to diagnosis and treatment from physicians (Nembhard and Edmondson, 2006). In one research study, frontline workers perceived a problematic climate 1.4 times more often than senior managers, and 1.25 times more often than their direct supervisors (Singer et al., 2008). Past literature suggests that power dynamics and status may meaningfully influence worker perceptions about their ability to maintain personal integrity at work.

The way job status impacts worker resiliency is demonstrated in empirical findings. In a meta-analysis that included 42,473 physicians, Panagioti et al. (2019) found that residents and early-career physicians experienced significantly more burnout and provided poorer quality care due to low professionalism compared to middle and late-career physicians (OR, 3.39; 95% CI, 2.38-4.40; $I^2 = 23\%$ vs OR, 1.73, 95% CI, 1.46-2.01; $I^2 = 67\%$, respectively; Cohen $Q = 7.27$; $P = .003$). These findings support the way individual status serves as a buffer that enables higher status workers to be insulated from some of the job strains that lower status healthcare workers face. This is not to say that higher status workers are exempt from job strain, since some demands they may face due to their role and responsibilities cannot simply be transferred to others, such as managing successful completion of job tasks and simultaneously managing the emotional, physical, and psychological needs of their direct reports. It is, rather, a recognition, that status provides some buffers that are less readily available to those lower on the hierarchy, offering higher status workers the opportunity for greater individual resources to bolster their PSI in the face of workplace strain. While past research focused on burnout traits and low professionalism, this research seeks to take a few steps back to understand precursors to burnout through exploring perceptions of PSI across healthcare workers within different job roles, factors impacting not only burnout but also patient safety, worker well-being and the resilience of healthcare organizations.

Methods

Data Sources and Variables

The investigations in this section rely on data from both HSOPS and HCUP. Before conducting statistical analysis, I concatenated the HSOPS 2021 and 2022 datasets and merged these data with the HCUP data based on month and year. The month and year indicator in the HSOPS data refers to the respondents' survey submission dates. For the HCUP data, the month-year variable shows overall national hospital mortality rates reported for each month-year. Data analysis

using month-to-month submission of survey responses in HSOPS and national mortality rates in HCUP enables an exploration of the relationship between worker perceptions and national mortality rates over time.

The HSOPS dataset includes two questions that directly explore worker PSI. These questions are outlined as a part of an official composite defined as “Staffing and Workpace” by AHRQ (SOPS, 2023). I selected these two questions as a proxy construct for PSI because they reflect the definition of personal integrity, which requires the alignment of one’s actions and morals. These two survey questions, which are referred to throughout this dissertation as PSI, highlight both the worker perception about having a workload -- the “actions” of work -- that enable workers to feel they could do a good job to foster high levels of patient safety and quality. Feeling like one can do the right thing to support high quality patient care is the “moral dimension” of healthcare. It is important to note that PSI could be defined and explored through other facets of integrity, such as patient/family level factors (for example, because of perceived appropriateness of end-of-life treatments or appropriate disclosure/nondisclosure of patient information to others), or other unit or organizational factors (for example, workers feeling complicit in following directions that make their performance worse rather than better). This study focuses on one aspect of PSI, specifically how workers perceive their ability to do a good job within the constraints of their unit’s staffing structure- number of hours worked in a shift and work pace expectations. The survey questions used are:

Perceived Self-integrity (PSI): Staff Sufficiency to Enable High Quality Care
Staff in this unit work longer hours than is best for patient care.
The work pace in this unit is so rushed that it negatively affects patient safety.

For each survey question, raw response options appear on a 5-point Likert scale. Because both of these questions are negatively worded questions (*i.e.* a response of “agree” or “strongly agree”

represents negative PSI), I reverse coded the responses, as follows: “Strongly agree” (value of 1), “Agree” (value of 2), “Neither agree nor disagree” (value of 3), “Disagree” (value of 4), “Strongly disagree” (value of 5). Both survey questions making up the PSI variable were negatively worded, and therefore reverse coded.

I then combined the two survey questions and dichotomized them into the PSI variable by calculating respondents’ average responses to the two survey questions. Respondents who selected the neutral category or less (value ≤ 3) as their mean response to the two questions (sum of values ≤ 6), were coded as a “negative or neutral,” while respondents whose mean response across the questions was more positive than neutral (mean value > 3 , sum of values > 6) were coded as a “positive.” The binomial categorization includes one category showing those who viewed PSI favorably, and a second category, that includes those who viewed their PSI in a neutral way or poorly. Sensitivity analysis comparing worker responses to the two survey questions that make up the PSI variable validated the use of this composite variable, showing that 77% of respondents for each of the two individual questions were within 1 point of one another, and 93% of respondents reported results within 2 points.

Hypothesis and Statistical Methods

The first hypothesis states that hospital workers’ perception of their own personal integrity steadily decreases during the pandemic. Using descriptive analysis, in addition to presenting overall worker perceptions of personal integrity, the data explores variations in worker PSI across 6 job categories: nursing, medical, other clinical, support, supervisor/ leader, and other. These 6 job categories are the same as those defined within the original HSOPS survey responses.

The second hypothesis states that spikes in the severity of the pandemic (as indicated by spikes in monthly hospital mortality rates) led to surges in negative perceptions of PSI. I conducted this analysis in 2 phases. First, I offer descriptive statistics on monthly mortality rates and worker

PSI, based on the month and year of the survey submission. This enabled me to assess the relationship between PSI and the severity of the pandemic to see whether the increases in negative perception and spikes in month-to-month mortality rate trend together, or not.

The second phase of this analysis used logistic regression analysis to assess the relationship between the monthly mortality rate, as the independent variable (X) and PSI as the outcome variable (Y). In this model, I performed a logarithmic transformation (base 2) of the monthly mortality data, which leads to calculated odds ratios relating the likelihood of negative/neutral PSI to a doubling of the monthly mortality rate. When running the regression models for this study, goodness of fit and sensitivity testing enabled me to ensure the appropriateness of the model setup. Control variables included workers' years working in their current hospital care unit, hours worked per week, direct patient contact (y/n), teaching v. non-teaching hospital, region, and bed size category. Odds ratios, standard errors, confidence intervals, and p-values are calculated and reported.

The third hypothesis examines if surges of negative perceptions of PSI were more severe among hospital workers in ICU care units during the COVID-19 pandemic, which experienced a more significant and persistent increase in mortality rate compared to non-ICU units. The first part of this analysis used descriptive statistics to provide context for national mortality trends in ICU versus non-ICU settings during the study period. I further explored the hypothesis using a linear probability model to evaluate the statistical significance of the difference between the effect of ICU mortality on ICU workers versus non-ICU mortality on non-ICU workers. For the final stage of this analysis, I used two logistic regression models, both with national mortality (log base 2 transformed) as the independent (X) variable and PSI as the dependent (Y) variable. For the first model, I used conditional statements to limit mortality data to patients who had spent time in an ICU, and I limited survey responses about PSI to only those working in an ICU. In the second model, I reversed this, limiting mortality data to patients who had not spent time in the ICU and survey

responses about PSI only to non-ICU workers. This analysis enabled me to more deeply evaluate the effect of mortality rates on the ICU and non-ICU workforce.

Results

This research utilizes both descriptive statistics and regression analysis to examine the impact of the COVID-19 pandemic on hospital workers' views about their own personal integrity. The first component of this study (*Figure 2-1*) explores shifting month-to-month percentages of negative/neutral views of PSI out of total responses during the pandemic time frame (April 2020-July 2022). These values appear for all workers in the dark red line and are also depicted for each job category in the other colored lines.

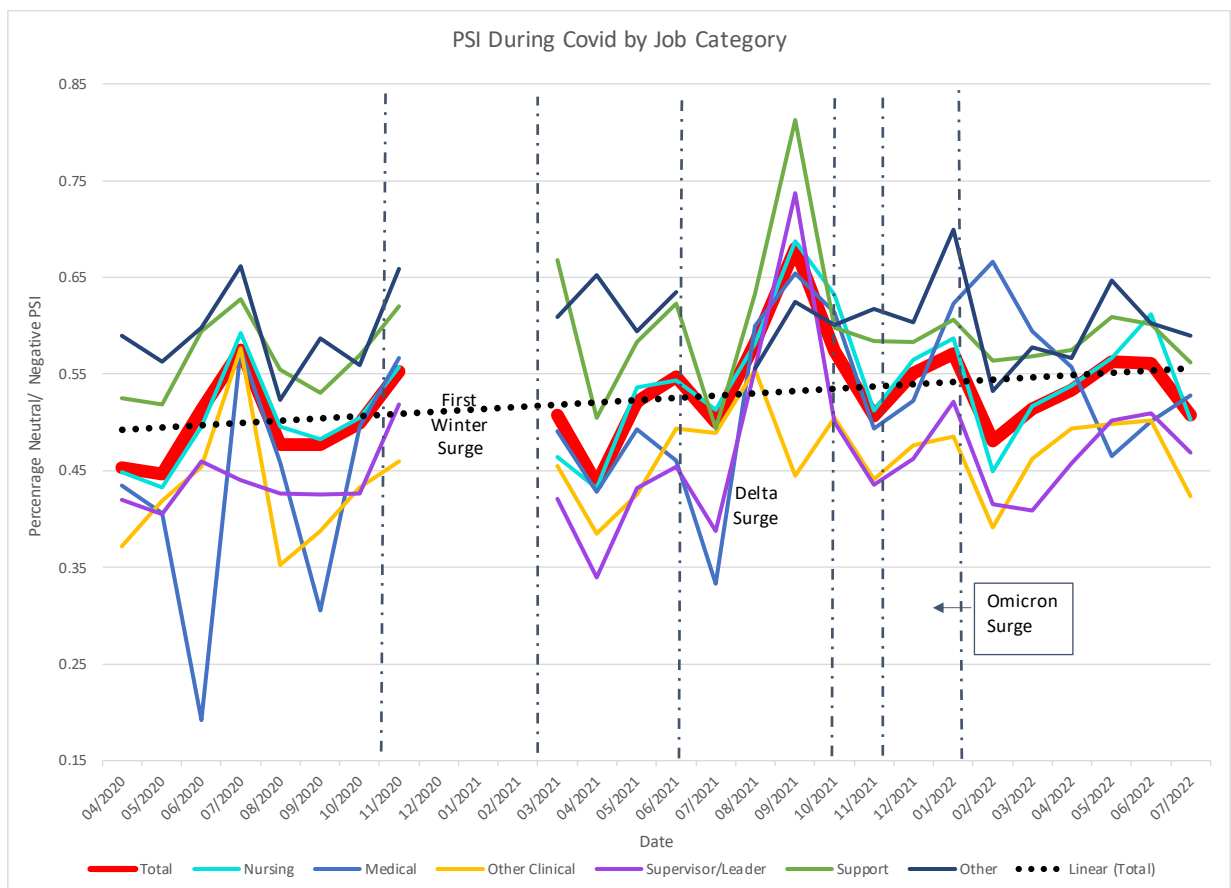


Figure 2-1: Percentage negative/ neutral PSI during the COVID-19 pandemic

Figure 2-1 shows noticeable variations in worker PSI. In this graph, the months are marked on the X-axis and show shading for each period defined by the CDC as being a part of a COVID-19

surge (Iuliano, et al., 2022). The increase in negative PSI across most job categories between July 1, 2021 and November 1, 2021 coincided with a surge in COVID-19 cases brought about by the Delta variant (Iuliano, et al., 2022). An increase in negative PSI, albeit less extreme compared to the earlier surge, coincides with the surge in the Omicron variant.

Further, the months of November 2020-March 2021 coincide with some of the most difficult early parts of the pandemic, when vaccines were just beginning to roll out, and fear about COVID-19 was particularly acute (CDC Museum COVID-19 Timeline, 2023; Iuliano, et al., 2022). During this time, hospitals did not submit any responses to the HSOPS survey. Accordingly (although the slope of the PSI variable in the months immediately before and after this gap visually suggest a spike in negative PSI consistent with the other findings of this study), this study is limited by the absence of data for this time-period.

When looking at variations by job category, we can observe that non-clinical support staff, which includes individuals who work in facilities, food services, housekeeping/environmental services, IT, security, patient transport, and as clerks, secretaries, and related office staff positions, experienced the most significant drop in their feelings of ability to maintain PSI during the Delta wave. Those in supervisory and leadership roles experienced the next most significant drop in ability to maintain PSI during the Delta wave, which stands out since they tended to have some of the most positive PSI trends both before and after the Delta wave. The group “other”, was available to workers who did not self-identify within any of the other designated groups. This group trends toward having overall worse PSI relative to the other more readily identifiable surveyed groups. Not surprisingly, nurses, the largest survey respondent group (117,380 individual respondents, composing 42.65% of all survey respondents), trended closely with the overall trend line for shifting PSI. Shortly after the Omicron wave hit, those in the “Medical” job category experienced their most significant reduction in PSI. These individuals include PAs, residents, attendings and hospitalists.

When comparing the PSI from the early part of the pandemic to the latter part, those identifying within the “medical” job group show the greatest overall reduction in their PSI. For all other job groups, it appears that national surges in the COVID-19 pandemic are roughly associated with workers experiencing worsened PSI. Overall, PSI for all workers decreased steadily during the pandemic, with an annualized slope of 0.028 (2.8 percentage points per year).

Figure 2-2 is a descriptive graph that shows the relationship between the overall US hospital mortality rate as a percentage of total hospital discharges and shifts in the percentage of negative/neutral PSI out of total reported PSI for all survey respondents during the Covid time frame. The 40-70% scale for negative/neutral PSI is shown on the left-hand margin, and changes in overall hospital mortality rates appear on the right-hand margin with a range between 2% and 5%.

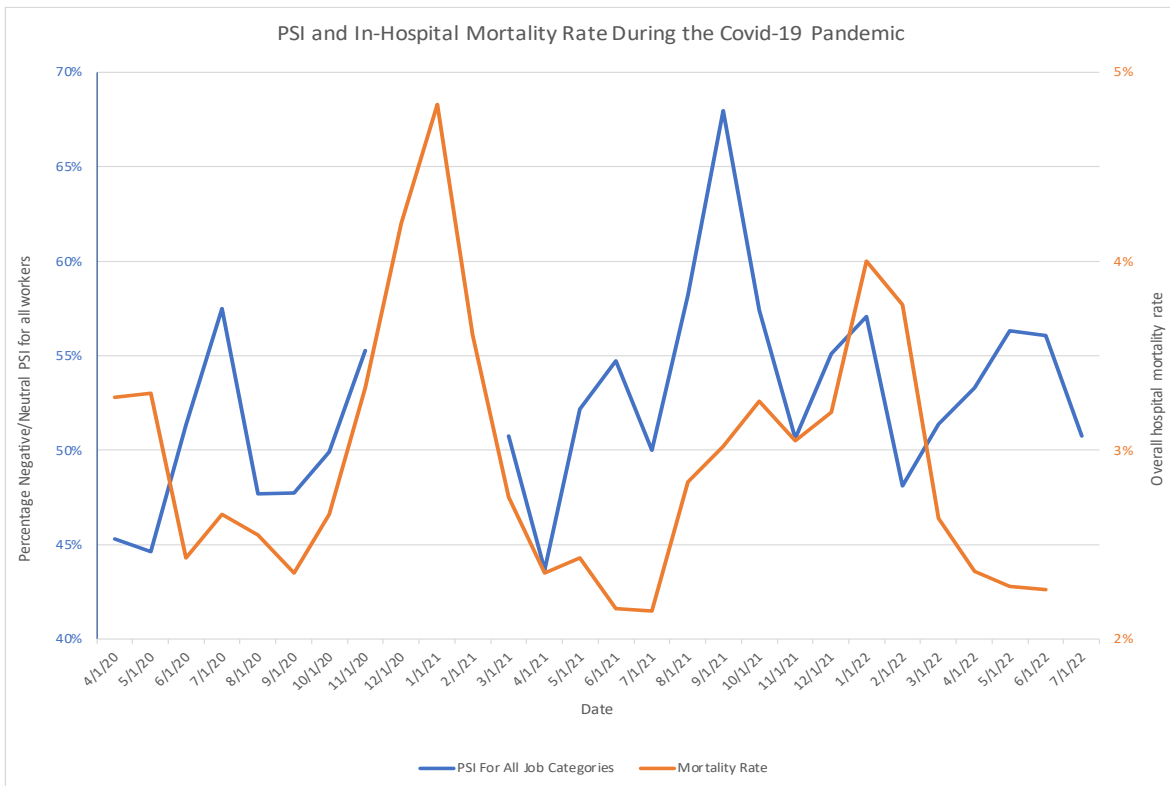


Figure 2-2: Percentage negative/ neutral PSI and in-hospital mortality rate during the COVID-19 pandemic

This simple descriptive graph shows a few important findings. First, while the HSOPS data reporting included a data gap during the Winter 2020-2021 time frame, the direction of the trend

lines for negative/neutral PSI on either side of this gap, combined with evidence of a spike in mortality rates during this same period suggests that it was likely (though cannot be shown through available data) that negative/neutral PSI spiked along with mortality in winter 2020-2021. There is also evidence of some trending between national mortality rates and worsened PSI amongst hospital workers during the Delta and Omicron waves. In the spring of 2022, a divide emerges, however, where PSI worsens in ways that cannot be explained by national mortality, since spring into summer 2022, there is a noticeable decrease in national mortality rate when negative/neutral PSI rates spike. Descriptive analysis shown in *Figure 2-2* provides some insights of value, though understanding the way outside factors may shape the relationship between the two variables is absent, without more robust analytic methods.

A more robust analysis is offered through logistic regression to assess whether there are statistically significant associations between monthly national mortality rates and PSI when accounting for confounding variables. In Table 2-1, we observe that for each time overall mortality rates double, the odds of workers having a negative/neutral PSI increases by 18% ($OR=1.18$ $SD=0.009$, $p<0.01$, $CI 1.06-1.11$). These results provide evidence of a statistically significant association between negative/neutral PSI and higher rates of national hospital mortality.

Table 2-1: Logistic regression- Association between monthly overall hospital mortality rates and PSI

Dependent Variable: PSI N=253,570	Odds Ratio	SD	P-value	95% Confidence intervals
Overall Hospital Mortality Rate (Log base-2)	1.18	0.02	0.00	1.14– 1.22
<i>Controls</i>				
Length of time in current hospital unit/ work area				
Less than 1 year	--	--	--	--
1 to 5 years	1.19	0.01	0.00	1.17 – 1.22
6 to 10 years	1.16	0.02	0.00	1.13 – 1.20
11 or more years	1.08	0.01	0.00	1.05 – 1.10
Number of hours a week working in this hospital				
Less than 30 hours a week	--	--	--	--
30 to 40 hours per week	1.06	0.01	0.00	1.04 – 1.09
More than 40 hours per week	1.30	0.02	0.00	1.27 – 1.34
Direct patient contact				

Yes- typically have direct interaction with patients	--	--	--	--
No- typically do not have direct interaction with patients	1.26	0.01	0.00	1.23– 1.28
Teaching v Non-Teaching Hospital	-			
Non-teaching hospital	--	--	--	--
Teaching hospital	1.00	0.01	0.00	0.95 – 1.00
Census Region				
Northeast	--	--	--	--
Midwest	1.10	0.02	0.00	1.07 – 1.13
South	1.00	0.01	0.95	0.97 – 1.02
West	1.22	0.02	0.00	1.18 – 1.27
Bed Size				
2-24 beds	--	--	--	--
25-49 beds	0.89	0.03	0.00	0.84 – 0.95
50-99 beds	1.00	0.03	0.88	0.94 – 1.06
100-199 beds	1.21	0.03	0.00	1.14 – 1.28
200-299 beds	1.30	0.04	0.00	1.24 – 1.38
300+ beds	1.44	0.04	0.00	1.36 – 1.52

Table 2-2 and Figure 2-3 show the differences between exposure to mortality for hospital workers in ICU versus non-ICU care units during the Covid pandemic. The data show that ICU care units experienced a more significant and persistent increase in mortality rate compared to non-ICU units. The ICU mortality rate month-to-month shows a slope of .87% per year between January 2019 and June 2022, whereas the non-ICU mortality rate during the same period shows a slope of .22%. This means that the mortality rate in ICU units increased 3.8 times faster compared to non-ICU units in the same time period (see Figure 2-3). Additionally, as we see in Table 2-2, before the pandemic the average mortality rate in the ICU setting was 5.31% and increased to an average of 7.69% during the pandemic. This represents a change of 2.39%. In the non-ICU setting, average hospital mortality was 1.45% before the pandemic, but increased to an average of 2.00% during the pandemic, a change of 0.55%.

Table 2-2: Average mortality rate in US hospitals before and during the COVID-19 pandemic

	Average Mortality Rate in US Hospitals before the pandemic (January 2019-March 2020)	Average Mortality Rate in US Hospital during the pandemic (April 2020-June 2022)	Change in Average Mortality in US Hospitals from before to during the pandemic
ICU Setting	5.31%	7.69%	2.39%
Non-ICU Setting	1.45%	2.00%	0.55%

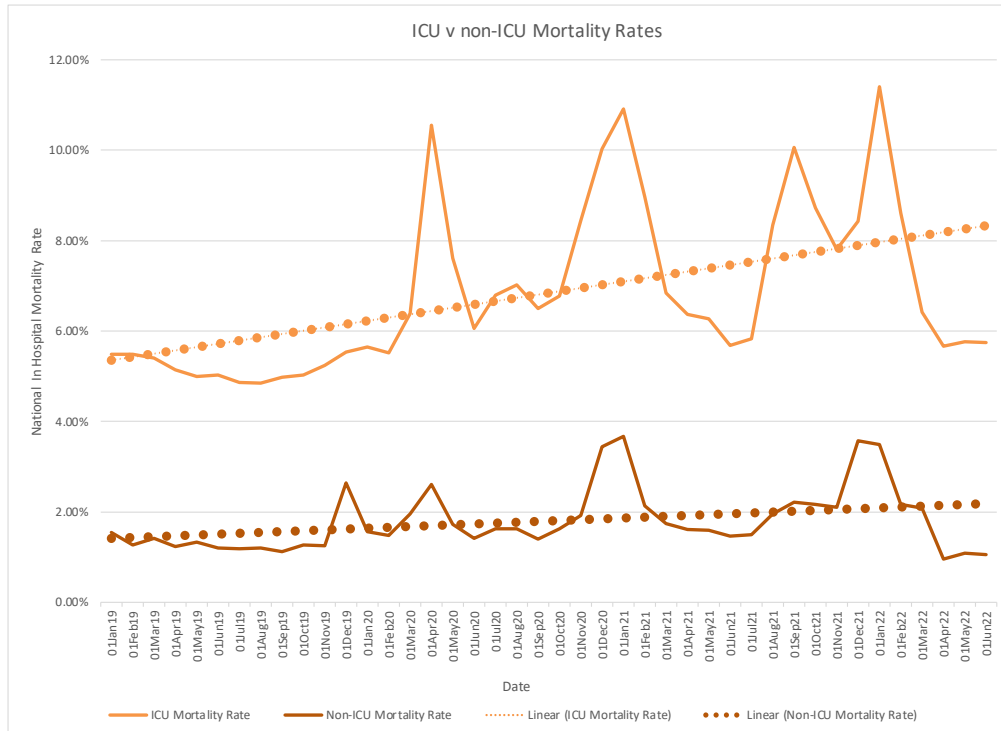


Figure 2-3: ICU versus non-ICU mortality rate changes between January 2019 and June 2022

A linear probability model using interaction terms enabled me to assess the statistical significance of the differences between how shifts in ICU mortality impacted the PSI of ICU workers versus how shifts in non-ICU mortality shaped the PSI of non-ICU workers. This analysis appears in Table 2-3. A test of these differences reveals that they are statistically significant ($P < .001$).

Table 2-3 Linear Probability Regression analysis- to compare PSI shifts for ICU workers exposed to ICU mortality and non-ICU workers exposed to non-ICU mortality in US hospitals

Dependent Variable: PSI (Negative/ Neutral) <i>N=237,349</i>	Co-efficient	SE	P-value	95% Confidence intervals
Non-ICU Workers	--	--	--	--
ICU Workers	-0.12	0.02	0.00	-0.16 – -0.07
Workers in non-ICU Care Settings * Non-ICU Setting Mortality Rate	0.67	0.30	0.03	0.08 – 1.27
Workers in ICU Care Settings * ICU Setting Mortality Rate	2.09	0.30	0.00	1.49 – 2.69
<i>Controls</i>				
Length of time in current hospital unit/ work area				
Less than 1 year	--	--	--	--
1 to 5 years	0.04	0.00	0.00	0.04 – 0.05
6 to 10 years	0.04	0.00	0.00	0.03 – 0.05
11 or more years	0.02	0.00	0.00	0.01 – 0.03
Number of hours a week working in this hospital				
Less than 30 hours a week	--	--	--	--
30 to 40 hours per week	0.02	0.00	0.00	0.01 – 0.02
More than 40 hours per week	0.07	0.00	0.00	0.06 – 0.07
Direct patient contact				
Yes- typically have direct interaction with patients	--	--	--	--
No- typically do not have direct interaction with patients	0.06	0.00	0.00	0.05 – 0.06
Teaching v Non-Teaching Hospital				
Non-teaching hospital	--	--	--	--
Teaching hospital	-0.01	0.00	0.00	-0.01 - -0.00
Census Region				
Northeast	--	--	--	--
Midwest	0.02	0.00	0.04	0.01 – 0.02
South	0.00	0.00	0.72	-0.01 – 0.01
West	0.04	0.01	0.00	0.03 – 0.05
Bed Size				
2-24 beds	--	--	--	--
25-49 beds	-0.03	0.01	0.00	-0.04 – -0.01
50-99 beds	-0.01	0.01	0.48	-0.02 – 0.01
100-199 beds	0.04	0.01	0.00	0.03 – 0.06
200-299 beds	0.06	0.01	0.00	0.05 – 0.07
300+ beds	0.08	0.01	0.00	0.07 – 0.10

Stratified logistic regression analyses offer more detailed insights into the PSI shifts for ICU and non-ICU workers when mortality rates increased during the pandemic. *Table 2-4* shows logistic regression results that depict shifts in PSI for ICU workers based on changes in ICU-specific hospital mortality; *Table 2-5* uses identical methodology to shows PSI shifts for non-ICU workers focused on non-ICU hospital mortality rates. The results indicate that the odds of worse PSI were more substantial for ICU workers relative to non-ICU workers. When controlling for worker and hospital characteristics, for each time ICU mortality rates doubled, the odds of ICU workers having

a negative/neutral PSI increased by 33% (OR=1.33 SD=0.11, p<0.01, CI 1.12-1.57). By contrast, for each time mortality rates doubled for patients outside of ICU settings, the odds of non-ICU workers having a negative/neutral PSI increased by 6% (OR=1.06 SD=0.02, p<0.01, CI 1.103-1.09). When viewed together, the findings show that PSI is impacted by shifts in hospital mortality, but that the increases in mortality experienced in ICU settings, contributes to worse odds of negative/neutral PSI compared to the impacts of mortality shifts on PSI experienced by non-ICU workers.

Table 2-4: Logistic Regression- PSI shifts for ICU workers based on exposure to ICU mortality rates in US hospitals

Dependent Variable: PSI N=11,542	Odds Ratio	SD	P-value	95% Confidence intervals
Hospital ICU Mortality Rate	1.33	0.11	0.00	1.12 – 1.57
<i>Controls</i>				
Length of time in current hospital unit/ work area				
Less than 1 year	--	--	--	--
1 to 5 years	1.42	0.07	0.00	1.29 – 1.57
6 to 10 years	1.47	0.09	0.00	1.29 – 1.66
11 or more years	1.29	0.08	0.00	1.13 – 1.45
Number of hours a week working in this hospital				
Less than 30 hours a week	--	--	--	--
30 to 40 hours per week	1.03	0.07	0.63	0.91 – 1.17
More than 40 hours per week	1.22	0.09	0.00	1.05 – 1.40
Direct patient contact				
Yes- typically have direct interaction with patients	--	--	--	--
No- typically do not have direct interaction with patients	0.88	0.07	0.14	0.75 – 1.04
Teaching v Non-Teaching Hospital				
Non-teaching hospital	--	--	--	--
Teaching hospital	0.94	0.05	0.21	0.85 – 1.03
Census Region				
Northeast	--	--	--	--
Midwest	1.60	0.14	0.00	1.35 – 1.89
South	1.02	0.08	0.84	0.87 – 1.19
West	2.27	0.22	0.00	1.87 – 2.75
Bed Size				
2-24 beds	--	--	--	--
25-49 beds	0.73	0.14	0.10	0.50 – 1.06
50-99 beds	0.53	0.10	0.00	0.37 – 0.77
100-199 beds	0.66	0.11	0.02	0.48 – 0.94
200-299 beds	0.90	0.15	0.53	0.64 – 1.25
300+ beds	0.71	0.12	0.04	0.51 – 0.99

Table 2-5: Logistic Regression- PSI shifts for non-ICU workers based on exposure to non-ICU mortality rates in US hospitals

Dependent Variable: PSI N=199,303	Odds Ratio	SD	P-value	95% Confidence intervals
Non- ICU Hospital Mortality Rate	1.06	0.02	0.00	1.03 – 1.09
<i>Controls</i>				
Length of time in current hospital unit/ work area				
Less than 1 year	--	--	--	--
1 to 5 years	1.20	0.01	0.00	1.17 – 1.23
6 to 10 years	1.18	0.02	0.00	1.14 – 1.21
11 or more years	1.09	0.02	0.00	1.06 – 1.12
Number of hours a week working in this hospital				
Less than 30 hours a week	--	--	--	--
30 to 40 hours per week	1.06	0.02	0.00	1.03 – 1.10
More than 40 hours per week	1.32	0.02	0.00	1.28 – 1.36
Direct patient contact				
Yes- typically have direct interaction with patients	--	--	--	--
No- typically do not have direct interaction with patients	1.24	0.01	0.00	1.22 – 1.27
Teaching v Non-Teaching Hospital			-	
Non-teaching hospital	--	--	--	--
Teaching hospital	0.99	0.01	0.44	0.97 – 1.01
Census Region				
Northeast	--	--	--	--
Midwest	1.02	0.02	0.35	0.98 – 1.06
South	0.97	0.01	0.02	0.94 – 0.99
West	1.13	0.03	0.00	1.08 – 1.19
Bed Size				
2-24 beds	--	--	--	--
25-49 beds	0.88	0.03	0.00	0.82 – 0.93
50-99 beds	0.94	0.03	0.07	0.88 – 1.00
100-199 beds	1.20	0.04	0.00	1.13 – 1.28
200-299 beds	1.25	0.04	0.00	1.17 – 1.32
300+ beds	1.40	0.04	0.00	1.33 – 1.49

Discussion

The analysis in this empirical study centered on three central hypotheses, which will be addressed further here to more deeply explore the way that the pandemic shaped workers' perceptions about their ability to maintain personal integrity.

The first hypothesis predicts that hospital workers' perceptions of personal integrity steadily decreased during the COVID-19 pandemic. Empirical evidence supports this hypothesis, with

findings of a steady decrease at a rate of 2.8 percentage points a year in workers' ability to maintain perceptions of personal integrity during the pandemic.

Embedded within this data are findings that worker groups were not a monolith, with significant variation appearing across worker position groups. For example, support staff, inclusive of those who work as clerks, secretaries, and related office staff positions, as well as those in facilities, food services, housekeeping/ environmental services, IT, security, and patient transport experienced the most significant drop in their feelings of PSI during the Delta wave. Further, the work group "Other" struggled throughout the pandemic, with a noticeable spike in negative PSI occurring during the Omicron wave. Research by Zhou et al (2022) found that support staff (as opposed to clinicians and leaders) faced particularly acute psychological symptoms and burnout. Zhou et al. explain that support staff toiled in hospitals during the pandemic, assuming infection risks and high uncertainties, but without the job prestige, high salary, attention, and respect of other hospital workers. The research herein, fits in line with these findings by Zhou et al., albeit focusing on pre-cursors to burnout rather the outcome of burnout itself. The data shows that during the Delta wave, the PSI of support staff sharply worsened, leaving them feeling that they were unable to do a good job within the constraints of the existing structures and resources available to them. Like support staff, the category of workers who chose to identify as "other," struggled during to do a good job with the resources available. While there may be a variety of reasons why individuals selected the "other" job category, social psychology research into the notion of "othering" teaches that individuals who see themselves as an "other" are more likely to feel marginalized and disempowered (Akbulut and Razum, 2022). From this, we can deduce that support staff and those who might see themselves as "other" may require pointed attention as to address the ways they receive resources (human and/or technological) to perform their jobs well, so that in moments of disruption and high intensity, they can maintain their integrity.

The experience of supervisors and leaders offers another interesting finding related to the way the PSI of workers was impacted during the COVID-19 pandemic. While leaders generally held rosier perceptions of their PSI, likely due to the protective effects of their status, during the Delta wave, leaders experienced the second most significant decline in PSI after support staff. Prior literature highlights that when facing high degrees of work strain, leaders cannot simply transfer all the burdens of their responsibility onto others (Singer, et al., 2008; Nembhard and Edmondson, 2006). At some point, leaders experience psychological effects when their role in overseeing, supporting, and enabling their direct reports feels like it is not enough to do their jobs well (Singer, et al., 2008; Nembhard and Edmondson, 2006). The fact that the Delta wave led to a sharp worsening of PSI for leaders indicates that during the Delta wave, to an extent that differed from earlier and later Covid-waves, leadership felt unable to provide their staff with the support and resources they felt was their responsibility.

The descriptive analysis of how workers' PSI was impacted by the pandemic's strain raises one more important piece of empirical insight—the “medical” job group, defined as physicians, residents, hospitalists, and PAs, experienced the greatest overall reduction in PSI during the pandemic. For all other job groups, the national surges in COVID-19 rates across the US are all roughly associated with workers experiencing worse PSI. This means that workers' capacity to maintain alignment of their actions and their morals worsened during surges of disease and were improved in between these acute surges. The physician and PAs work group, by contrast, experienced a worsening of PSI that cannot be neatly explained by changes in the rates of the COVID-19 infection. Their PSI got worse later in the pandemic, at a point when all the other job groups were trending toward improved PSI. To better contextualize the experience of physicians and PAs, related empirical findings offer signposts. Sexton et al. (2022) found that after an initial pandemic decrease, compared to nurses, physicians experienced a sharp spike in their experience of

emotional exhaustion. The investigation here fits in line with this earlier research. During the latter part of the pandemic, the protective effects of job status for physicians and PAs abruptly falls off, leaving these workers feeling that the resources and structures of their work environments no longer enabled them to feel they could do a good job as readily as it once did. The fact that physicians and PAs were outliers in the late pandemic period is reason for concern. While left unexplored in this particular study, to better support physicians and PAs in the post-pandemic period, it would be worthwhile for future research to investigate both causes and potential remedies.

The second hypothesis within this study considered whether spikes in the severity of the pandemic (as indicated by spikes in hospital mortality rates) led to surges in workers' negative self-perceptions of personal integrity. The logistic regression analysis affirmed the hypothesis, showing statistical significance in the association between negative/neutral PSI and higher rates of national hospital mortality-- each time overall mortality rate doubles, the odds of workers having a negative/neutral PSI increases by 18% ($p < 0.01$). These findings highlight that when national mortality rates were higher, the likelihood that workers were able to feel that they were doing a good job with the available resources diminished.

Past research has shown association between higher rates of post-traumatic stress, compassion fatigue, and psychological burden for healthcare workers after they are exposed to patient deaths (Mendlovic et al., 2023; Joliat et al., 2019). Work by Aiken et al. (2002) shows that when staff are forced to cope with high patient load, there is an increased risk of patient mortality and also higher odds of worker burnout and decreased job satisfaction (Aiken et al., 2002).

The empirical evidence in this analysis of national mortality and PSI is aligned with this prior research, but adds a new dimension, in showing that workers' feelings of being able to maintain perceptions of integrity with the available resources worsened with exposure to high rates of patient death. This study did not explore staffing levels or availability of critical equipment, like Aiken et al.

(2002), but highlights the association between high rates of mortality and workers perceiving that they do not have the resources they need to do a good job. Workers who perceive a lack of resources and supports to do a good job and who face the psychological effects of seeing high numbers of patients die on their watch, feel less able to provide good care (worse PSI), without them having the capacity to fix it. This finding shows that healthcare workers need more than mental wellness support. Healthcare workers need to feel that they have resources- human and technological- even in moments of acute challenge and disruption, to help them do a good job.

The third and final hypothesis of this study anticipated that surges of negative perceptions of workers' own personal integrity during the COVID-19 pandemic would be more severe among hospital workers in ICU care units, which experienced a more significant and persistent increase in mortality rate compared to non-ICU units. This hypothesis was supported by the data.

To understand the comparison between ICU and non-ICU worker experiences, the context is important. On a national basis, the average non-ICU mortality rate increased by 0.55% from before to during the pandemic. By comparison, in the ICU (a setting already accustomed and structured to care for the sickest patients) this increase in the average mortality was 2.39%. This study found that each time that mortality rates doubled in non-ICU settings, the odds of non-ICU workers having a negative/neutral PSI increased by 6% (OR=1.06 SD=0.02, $p < 0.01$, CI 1.103-1.09), whereas when mortality rates doubled in ICU settings, the odds of ICU workers experiencing negative/neutral PSI increased by 33% (OR=1.33 SD=0.11, $P < 0.01$, CI 1.12-1.57). Additionally, the analyses in this study show that high mortality rates impact worker PSI. ICU workers were exposed to more significant and persistent increases in mortality rate compared to non-ICU units, which led to them having worse PSI compared to non-ICU workers by statistically significant margins ($P < 0.001$). The fact that ICU workers' PSI is substantially impacted when high numbers of patients are dying in warrants future exploration. While only speculative, this finding may suggest

that when hospitals are experiencing particularly high strain, hospitals may be re-allocating their resources- both human and technological- to other parts of the hospital. Simultaneously, it may be the case that at these moments of acute strain, patients that would normally be moved into an ICU unit cannot be moved due to capacity issues, leaving very sick patients in care settings ill equipped to support them, leading ICU workers to experience worsened PSI.

The ICU workforce's PSI worsened significantly during the pandemic time frame, in a way that far exceeded the changes in PSI felt by workers outside the ICU. Findings about ICU mortality and its associations with ICU capacity strain have been found in prior empirical work to have deleterious effects on the mental wellness of ICU healthcare workers (Wilcox et al., 2022; Opgenorth et al. 2018, Bravata et al., 2021). Past work has shown that the intensity of work demands and the emotional strain on healthcare workers can have negative impacts on care quality and worker retention (Needleman et al., 2011; Shin, et al., 2018; Butera et al., 2021).

Synthesizing the findings in this study with this early work, we can conclude that all healthcare workers, but especially those most at risk of experiencing loss of their perceived personal integrity due to particularly severe workplace strain, would greatly benefit from stronger support. The Healthcare Workforce Integrity Model provides a map that might help healthcare leaders define a pathway forward. The model shows that the supportive resources, such as good leadership, well-functioning teams, cultures that support good communication and learning, may all help enable workers to cope with intensified work demands in ways that can bolster their PSI. In subsequent sections of this dissertation project, several types of supportive resources will be evaluated, to explore the way they contribute to worker capacity to maintain PSI. Healthcare is deeply moral work, and to enable the healthcare workforce to take good care of patients and maintain their energy and motivation, especially at times when day-to-day strain is high, it is critical that healthcare leaders invest in efforts to support workers' personal integrity.

Chapter 3: Perceptions of Teamwork and Leadership Support During the Pandemic

This study examines the relationship between hospital workers' perceptions of teamwork and leadership support and their perceptions of their own personal integrity during the COVID-19 pandemic. In this way, this investigation extends on past research which identified positive associations between the strength of team and leadership support and workplace satisfaction, worker well-being, care quality, and patient safety. Understanding relationships between teamwork, leadership support, and PSI can further support healthcare leaders in making data-informed decisions about investing in teamwork and leadership skills.

Literature Review

During the COVID-19 pandemic, data indicate that the crisis impacted team and leadership support. Nurse job performance, including the quality of the care nurses provide, and nurse resilience when experiencing adversity at work, has been found to be tied closely with their perceptions of team support and workplace engagement (Wei et al., 2019). Butera et al. (2021) found that professional and contextual characteristics, such as worker's job role and unit type, contributes to how severe the pandemic jolted the workforce. Workers whose day-to-day, with or without a pandemic, already felt strained may not have even recognized that they had unmet needs, whereas those who perceived an increase in job demands or a loss in team and leadership support, perceived their problems more acutely. These past findings bolster the current hypotheses explored within this section of this dissertation.

Teams, Leadership Support, and Patient Safety Culture

Laschinger (2008) investigated job resources through a survey of 234 nurses based on their perceptions of supportive team and leader behaviors and perceptions of care quality. The study found that where organizational, team, and leader resources were supportive, both job satisfaction

and patient care quality were also stronger (Laschinger, 2008). Medich et al. (2022) identified that when workers' job training and education matched the way leaders distributed their work responsibilities, workers were less likely to experience burnout (OR = 0.56; 95% CI, 0.36-0.85) (Medich et al., 2022). Those who reported better teamwork (OR = 0.68; 95% CI, 0.57-0.81) and felt valued as a contributing member of the team (OR = 0.48; 95% CI, 0.33-0.70) were also less likely to experience burnout (Medich et al., 2022). In a comprehensive literature review, Manser (2009) found that strong teamwork, through collaboration, communication, coordination, and leadership, within and across departments and professional groups, plays an important role in worker mental being and prevention of medical errors.

In hospitals, the importance of teamwork and effective of leadership cannot be underestimated. One patient might see several physician specialists, a physical therapist, a respiratory therapist, a phlebotomist, a dietician, several nurses including nurse navigators, nurse practitioners, BSN and RN nurses, and care technicians. In such a setting, for a care plan to be cohesive and for a patient to experience high quality care, individual clinicians must collaborate with others from different disciplines (Hughes and Salas, 2013). "Caregivers cannot simply do their jobs and assume others will come along at some point to do theirs. Instead, their knowledge and efforts must be integrated to deliver quality care" (Nembhard and Edmondson, 2006). Strong teamwork and supportive leaders underpin the way patients care experience unfolds and is critical for patient safety and quality, factors that ultimately factor into workers' own ability to maintain PSI.

What Makes Strong Teams and Leaders

Effective leadership among healthcare workers has been found to facilitate open communication within teams, enabling individuals to share information about, and participate in, improvement efforts related to patient safety issues without fear of reprisal or embarrassment (Blumenthal et al., 2012; Carroll and Edmondson, 2002). Medical trainees identify that leadership

and management skills, such as task delegation, teamwork, and communication, are important to their ability to provide safe, high-quality care (Barnes et al., 2020). At the same time, however, these skills are consistently seen by clinicians as those which will naturally come with increased clinical experience, knowledge, and length of time served rather than training (Barnes et al., 2020; Blumenthal et al. 2012). This view, that lived experience, rather than specialized teamwork and leadership training is pervasive and engrained. Healthcare settings have historically focused on individual expertise: “Great doctors and nurses, not great organization or management, have been seen as the means for ensuring that patients receive quality care” (Tucker and Edmondson 2003). In a *New England Journal of Medicine* piece published by leading patient safety experts in December 2022, authors share: “Patient safety policy and practice has relied too heavily on the vigilance and heroism of clinicians, rather than the design of safe systems” (James et al., 2022). This tendency to focus on expertise rather than organization, leadership, and effective management structures, impacts the functioning of healthcare systems.

Creating highly functioning teams and leaders requires investment into cultivating worker skills. Blumenthal et al. (2012) highlight that leadership skills can and should be learned because of the impact they can have on care quality, despite the common view in healthcare that leadership skills emerge through experience, rather than through education. Yeung et al., (2012) conducted a small study of team and leadership skills within a group of clinicians performing a simulated cardiopulmonary resuscitation for an adult in cardiac arrest. In the study, team members with prior team leadership training had independently better leadership behavior than those without prior training (Yeung et al., 2012). Further, those who showed the strongest leadership skills performed technically higher quality cardiopulmonary resuscitation ($R^2=.75$, $p<.001$) (Yeung et al., 2012). Wheelan et al. (2003) studied 394 staff across 17 ICU units and identified associations between the strength of team collaboration skills and patient mortality. When team collaboration was stronger,

patient mortality was lower (Wheelan et al., 2003). These findings indicate that improving healthcare workers' teamwork and leadership skills can positively impact their abilities to provide safe high-quality care. In this study, I explore the connection between healthcare workers' perceptions about the supportiveness of their teams and leaders and their ability to maintain strong PSI, especially in times of crisis.

COVID-19 Impacts on Team and Leadership Support

The COVID-19 crisis created uncertainty, high job strain, and resource scarcity for healthcare organizations in ways that impacted the functioning of healthcare teams and their leaders. Jordan et al. (2022) explain that during the pandemic some clinical and non-clinical staff who previously felt they could communicate effectively to support and participate in patient care, were made to feel less important to their team and ineffective at their jobs, because they were forced to limit communications and interactions due to COVID-19 infection control procedures (Jordan et al. 2022). More supportive team behaviors during the COVID-19 crisis are also reported. Research by Jordan et al. (2022) also shows that in some institutions, the pandemic led to newfound interprofessional closeness as frontline workers felt that they needed to “band together” as they worked through stressful and frightening times. Butera et al. (2021)'s study of healthcare workers showed that strong team and leadership support are protective factors for ICU and Emergency Department staff, that reduces their likelihood of experiencing emotional exhaustion when compared to those who report poor workplace social support. Such findings demonstrate that strong and supportive teams and leaders bolstered individuals in the face of disruption and strain, in ways enabled them to maintain their motivation and energy to an extent less available to workers whose teams and leaders were less supportive. The Healthcare Workforce Integrity Model helps to explain these dynamics. Workers' perceptions of their ability to maintain personal integrity, which is cultivated through the resources available to them to meet the demands of their jobs, impact the way

they cope with job strain. This research expands our understanding of the relationship between team and leadership support and workers' ability to maintain their PSI during the pandemic.

Methods and Measures

The core goals of this section, and its associated hypotheses, are to understand the relationship between worker PSI and team and leadership support. Exploring the role of these job resources on workers' abilities to maintain PSI during the COVID-19 pandemic can help raise awareness about how the quality of teamwork and leadership impacts organizational resilience.

The PSI construct in this section is identical to the one discussed in Chapter 2 of this dissertation (see pages 25-27, above). In constructing the variables for both "teamwork" and "leadership support," I mirrored the structure used for PSI. Both the "teamwork" and the "leadership support" variables are a composite of 3 different survey questions chosen by HSOPS designers to represent teamwork and leadership support (*SOPS Hospital Survey Items and Composite Measures*, 2023):

Teamwork
In this unit, we work together as an effective team.
During busy times, staff in this unit help each other
There is a problem with disrespectful behavior by those working in this unit.

Leadership support
My supervisor, manager, or clinical leader wants us to work faster during busy times, even if it means taking shortcuts.
My supervisor, manager, or clinical leader takes action to address patient safety concerns that are brought to their attention
My supervisor, manager, or clinical leader seriously considers staff suggestions for improving patient safety.

For the positively worded questions, responses were coded as follows: "Strongly agree" (value of 5), "Agree" (value of 4), "Neither agree nor disagree" (value of 3), "Disagree" (value of 2), "Strongly disagree" (value of 1). For the negatively worded questions (*i.e.* the third questions for which a

response of “agree” or “strongly agree” represents negative views), I reverse coded the responses as follows: “Strongly agree” (value of 1), “Agree” (value of 2), “Neither agree nor disagree” (value of 3), “Disagree” (value of 4), “Strongly disagree” (value of 5). I then dichotomized and combined the three survey questions into a composite for each variable by calculating respondents’ average responses to the three survey questions. Respondents who selected the neutral category or less (value ≤ 3) as their mean response for the 3 questions (sum of values ≤ 9) are coded as a “negative or neutral.” Respondents whose mean response across the 3 questions is more positive than neutral (mean value > 3 , sum of values > 9) are coded as a “positive.”

The first and second hypotheses within this section focus on the relationship between hospital workers’ perceptions of teamwork and leadership support and their PSI during the pandemic (April 2020-July 2022). Here, the examination uses descriptive statistics to identify differences in perception about views on teamwork and leadership support across the workforce. For the “teamwork” variable, I also use descriptive statistical analysis to show detailed insight for each individual survey question that is a part of the “teamwork” composite.

In the second phase of this analysis, independent T-tests enable comparison between worker perceptions of teamwork and leadership support based on whether those workers perceived positive or negative/neutral PSI. After assessing these relationships using T-tests, a deeper examination, using logistic regression analysis and control variables, extends the evidence about relationships between the job resources of teamwork and leadership support and PSI. This analysis examines the relationship between teamwork support and leadership support and PSI during the pandemic.

The next part of this study investigates the strength of the relationship between workers’ perceptions of teamwork (hypothesis 3) and leadership support (hypothesis 4) and workers’ perceptions of their own personal integrity during the pandemic compared to before the pandemic. To assess hypothesis 3, I used an interaction term that represents the combined effect of timeframe

(pre-pandemic: January 2019 through March 2020; during the pandemic: April 2020-July 2022) and perceptions of teamwork on PSI. For assessing hypothesis 4, I used an interaction term that shows the combined effect of the same timeframes and perceptions of leadership support on PSI. I then analyzed the relationship between worker views about teamwork and PSI before versus during the pandemic using a linear probability model where the independent (X) variable is the interacted term, and the dependent variable (Y) is PSI, with a set of worker and hospital characteristics serving as control variables.

Results

Data analysis of the HSOPS survey provides evidence about the relationships between job resources, including teamwork and leadership support, and worker PSI during the COVID-19 pandemic. In *Figure 3-1*, descriptive data based on HSOPS shows that negative and neutral responses about teamwork and leadership support all trended together during the Delta and Omicron Covid waves. The known data provides some interesting hints of what may have happened during the first winter surge, where a data gap prevents direct analysis. Based on the visible trend lines on either side of the data gap, negative and neutral PSI appear to spike during that first winter surge but based on the line directionality on either side of the gap, views about leadership and teamwork appear more positive or flat.

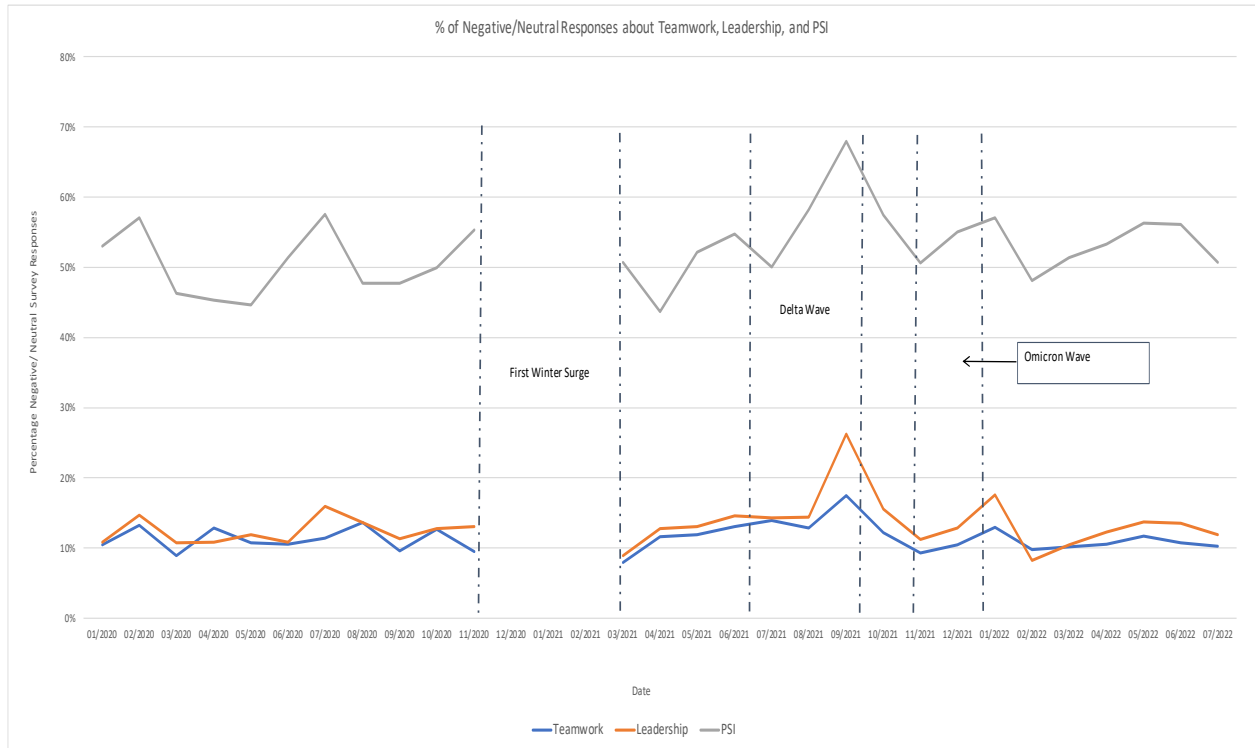


Figure 3-1: Percentages of negative and neutral responses about perceptions of teamwork, leadership support, and PSI between January 2020 and July 2022

Figure 3-2 and Figure 3-3 show descriptive insight about differences on views of teamwork and leadership based on worker job positions. For both the teamwork composite variable and the question about leadership support, supervisors and leaders have the most positive perceptions. Similarly, support staff (which include individuals who work as clerks, secretaries, and related office staff positions, as well as those who work in facilities, food services, housekeeping/ environmental services, IT, security, and patient transport) have the most negative perceptions about teamwork and leadership support of all worker groups. Those in the medical category, which accounts for PAs, residents, attendings, and hospitalists, report the second most positive outlook about teamwork, but are more tepid about leadership support.

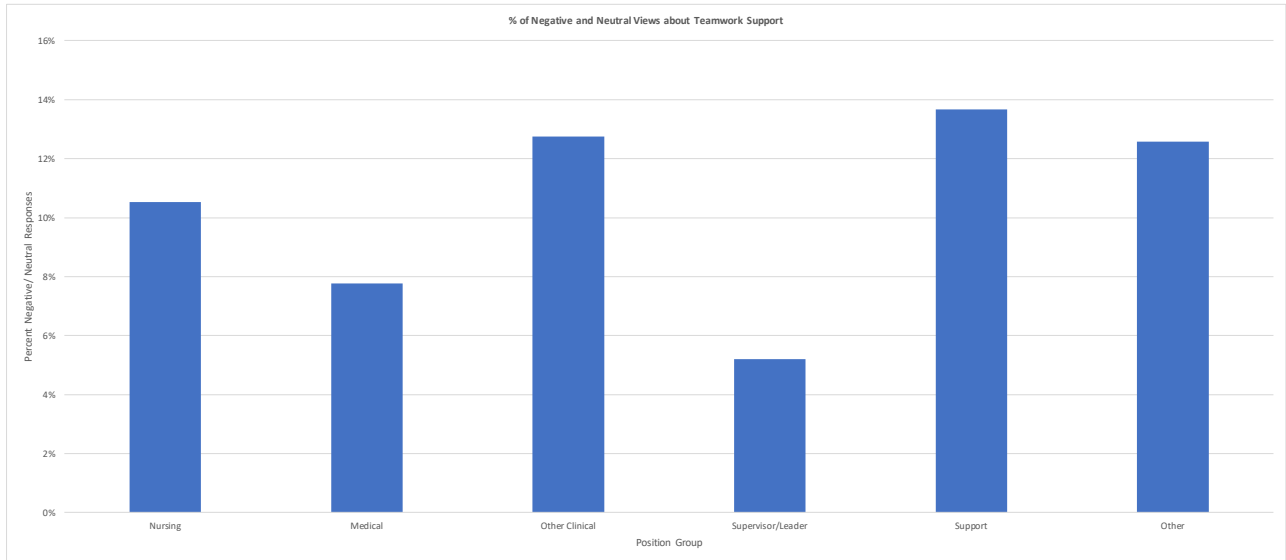


Figure 3-2: Average percentage of negative and neutral views about teamwork support between January 2019- July 2022 for each worker position group

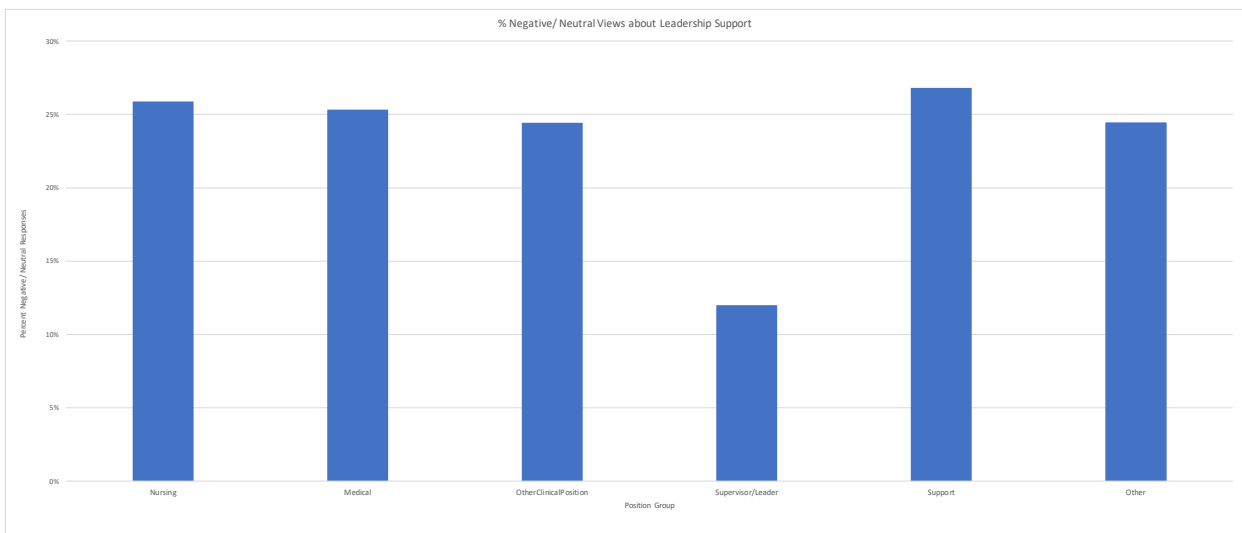


Figure 3-3: Average percentage of negative and neutral views of leadership support between January 2019- July 2022 for each worker position group

A close look at the survey data helps showcase the way that perceptions of teamwork and leadership support may have impacted worker PSI. Independent t-tests of the average responses for PSI (response values between 1 and 5) provide insight into the differences between the mean PSI scores for those reporting negative/neutral perception of teamwork and leadership support versus positive perception of those resources. Here, PSI was calculated as a mean score of the two PSI-

related survey questions (see page 26, above), where a score less than 3 reflects positive perception of PSI a score greater than or equal to 3 indicates neutral or negative perceptions of PSI.

Table 3-1: Differences in the mean PSI for those reporting negative/neutral versus positive perceptions of teamwork

Two-sample t test: PSI based on a 1-5 Likert Scale				
	Observations	Mean	SD	95% CI
Teamwork (Negative/ Neutral views)	29,820	2.62	0.95	3.19 - 3.21
Teamwork (Positive views)	226,624	3.20	0.91	2.62 - 2.62
Combined	256,444	2.69	0.93	2.68 – 2.69
Difference		0.58		0.57 - 0.59
		t(256,442)=103.5	P=<0.001	

Table 3-2: Differences in the mean PSI for those reporting negative/neutral versus positive perceptions of leadership support

Two-sample t test: PSI based on a 1-5 Likert Scale				
	Observations	Mean	SD	95% CI
Leadership Support (Negative/ Neutral views)	35,266	3.38	0.91	3.37 - 3.39
Leadership Support (Positive views)	221,178	2.58	0.88	2.57 - 2.58
Combined	256,444	2.69	0.93	2.68 – 2.69
Difference		0.80		0.80 - 0.81
		t(256,442)=157.74	P=<0.001	

The data, based on a sample of 256,444 survey responses, show that workers who reported more negative or neutral views about teamwork reported, on average, negative/neutral survey scores about their PSI (95% CI, 3.19-3.21), while respondents with more positive views of teamwork reported, on average, positive PSI scores (95% CI, 2.62-2.62). The difference between these two groups was statistically significant (95% CI 0.57-0.59, t(256,442)=103.5, p=<0.001) (see Table 3-1). An independent t-test based on PSI and leadership support yields similar associations: respondents who reported more negative or neutral views of leadership support report negative/neutral mean survey score about PSI (95% CI, 3.37-3.39), while respondents with more positive views of leadership reported positive PSI (95% CI, 2.57-2.58). Here, too, the difference was statistically

significant (95% CI: 0.80-0.81, $t(256,442)=157.74$, $p<0.001$) (see Table 3-2). These findings in Table 3-1 and Table 3-2 and support the hypothesis that hospital workers' perceptions of teamwork and their perceptions of leadership support are each independently associated with worker PSI. Logistic regression analysis allows for further exploration of how teamwork and leadership support shape worker PSI and allows for incorporation of controls to account for factors that may impact the relationship between these central variables of interest. The first model, shown in *Table 3-3*, focused on PSI (dependent variable) and teamwork (independent variable). The analysis supports the hypothesis. When accounting for control variables, workers with negative or neutral views about the supportiveness of their teams have increased odds of reporting negative or neutral views about their PSI by a factor of 2.43 (SE 0.03, $p<0.01$, CI 2.36-2.49). The second model, shown in Table 3-4, analyzes the relationship between PSI and leadership support, and also shows statistically significant findings, after accounting for confounders. When workers report negative or neutral views about leadership support, those workers are 3.87 times more likely to hold negative or neutral views about their PSI (SE .05, $p<0.01$, CI 3.76 – 3.98).

Table 3-3: Logistic Regression- relationship between worker perceptions of PSI and teamwork between January 2019- July 2022

Dependent Variable: PSI (Negative/ Neutral views) N=265,691	Odds Ratio	SE	P-value	95% Confidence intervals
Teamwork (Negative/ Neutral views)	2.43	0.03	0.00	2.36 – 2.49
<i>Controls</i>				
Length of time in current hospital unit/ work area				
Less than 1 year	--	--	--	--
1 to 5 years	1.17	0.01	0.00	1.14 – 1.19
6 to 10 years	1.15	0.02	0.00	1.12 – 1.18
11 or more years	1.07	0.01	0.00	1.05 – 1.10
Number of hours a week working in this hospital				
Less than 30 hours a week	--	--	--	--
30 to 40 hours per week	1.03	0.01	0.00	1.01 – 1.06
More than 40 hours per week	1.27	0.02	0.00	1.24 – 1.31
Direct patient contact				
Yes- typically have direct interaction with patients	--	--	--	--
No- typically do not have direct interaction with patients	1.27	0.01	0.00	1.25 – 1.30
Teaching v Non-Teaching Hospital			-	
Non-teaching hospital	--	--	--	--
Teaching hospital	1.00	0.01	0.02	0.96 – 1.00
Census Region				
Northeast	--	--	--	--
Midwest	1.05	0.02	0.00	1.02 – 1.10
South	1.00	0.01	0.72	1.00 – 1.02
West	1.22	0.02	0.00	1.18 – 1.26
Bed Size				
2-24 beds	--	--	--	--
25-49 beds	0.88	0.03	0.00	0.83 – 0.93
50-99 beds	0.95	0.03	0.08	0.89 – 1.01
100-199 beds	1.18	0.03	0.00	1.12 – 1.25
200-299 beds	1.27	0.04	0.00	1.20 – 1.34
300+ beds	1.38	0.04	0.00	1.31 – 1.46

Table 3-4: Logistic Regression- Relationship between worker perceptions of PSI and leadership support between January 2019- July 2022

Dependent Variable: PSI (Negative/ Neutral views) N=265,691	Odds Ratio	SE	P-value	95% Confidence intervals
Leadership Support (Negative/Neutral views)	3.87	0.05	0.00	3.77 – 3.98
<i>Controls</i>				
Length of time in current hospital unit/ work area				
Less than 1 year	--	--	--	--
1 to 5 years	1.12	0.01	0.00	1.10 – 1.15
6 to 10 years	1.09	0.01	0.00	1.06 – 1.12
11 or more years	1.03	0.01	0.00	1.00 – 1.01
Number of hours a week working in this hospital				
Less than 30 hours a week	--	--	--	--
30 to 40 hours per week	1.02	0.01	0.01	1.00 – 1.05
More than 40 hours per week	1.27	0.02	0.00	1.24 – 1.31
Direct patient contact				
Yes- typically have direct interaction with patients	--	--	--	--
No- typically do not have direct interaction with patients	1.36	0.01	0.00	1.33 – 1.38
Teaching v Non-Teaching Hospital			-	
Non-teaching hospital	--	--	--	--
Teaching hospital	1.00	0.01	0.02	0.96 – 1.00
Census Region				
Northeast	--	--	--	--
Midwest	1.04	0.02	0.02	1.01 – 1.07
South	1.00	0.01	0.77	1.00 – 1.02
West	1.18	0.02	0.00	1.14 – 1.23
Bed Size				
2-24 beds	--	--	--	--
25-49 beds	0.88	0.03	0.00	0.83 – 0.93
50-99 beds	0.95	0.03	0.07	0.89 – 1.01
100-199 beds	1.18	0.03	0.00	1.12 – 1.25
200-299 beds	1.27	0.04	0.00	1.20 – 1.34
300+ beds	1.37	0.04	0.00	1.30 – 1.44

This evidence demonstrates a statistically significant relationship between hospital workers’ perceptions of teamwork and leadership support and their perceptions about their ability to maintain personal integrity.

The next part of this analysis focused on how the strength of pre-pandemic teamwork and leadership support impacted the strength of worker PSI during the pandemic (see *Table 3-5* and *Table 3-6*). In these analyses, I compared (before and during the pandemic) the relationship between hospital workers’ perceptions of support from their teams and leaders and their views of personal

integrity. Given the increased intensity of the work demands facing healthcare workers during the pandemic, I anticipated that workers would rely more on their teams and leadership to bolster their ability to maintain integrity during the pandemic. The data, however, tell a different story. When looking at the way that teamwork and leadership supports shaped PSI before and during the pandemic, the findings do not indicate any significant relationships.

Table 3-5: Linear Probability Regression- Relationship between worker views about teamwork and PSI before and during the COVID-19 pandemic in US hospitals

Dependent Variable: PSI (Negative/ Neutral views) N=258,703	Co-efficient	SE	P-value	95% Confidence intervals
Teamwork				
Positive views about teamwork	--	--	--	--
Negative/ Neutral views about Teamwork	0.21	0.01	0.00	0.20 – 0.23
Time Frame				
Before pandemic (Jan 2019- March 2020)	--	--	--	--
During pandemic (April 2020-July 2022)	0.03	0.01	0.00	0.01 – 0.04
Teamwork * Time Frame	0.02	0.01	0.11	-0.00 – 0.04
<i>Controls</i>				
Position Group				
Nursing	--	--	--	--
Medical	-0.06	0.00	0.00	-0.07 – -0.05
Other clinical	-0.10	0.00	0.00	-0.10 – -0.09
Supervisors/ leaders	-0.15	0.00	0.00	-0.16 – -0.14
Support staff	0.00	0.00	0.19	-0.00 – 0.01
Other	0.01	0.00	0.00	0.00 – 0.02
Length of time in current hospital unit/ work area				
Less than 1 year	--	--	--	--
1 to 5 years	0.04	0.00	0.00	0.04 – 0.05
6 to 10 years	0.05	0.00	0.00	0.04 – 0.05
11 or more years	0.03	0.00	0.00	0.03 – 0.04
Number of hours a week working in this hospital				
Less than 30 hours a week	--	--	--	--
30 to 40 hours per week	0.01	0.00	0.05	0.00 - 0.01
More than 40 hours per week	0.08	0.00	0.00	0.08 – 0.10
Direct patient contact				
Yes- typically have direct interaction with patients	--	--	--	--
No- typically do not have direct interaction with patients	0.07	0.00	0.05	0.00 – 0.01
Teaching v Non-Teaching Hospital				
Non-teaching hospital	--	--	--	--
Teaching hospital	-0.00	0.00	0.11	0.07 – 0.08
Census Region				
Northeast	--	--	--	--
Midwest	0.00	0.00	0.30	-0.00 – 0.01
South	-0.01	0.00	0.02	-0.01 – -0.00
West	0.04	0.00	0.00	0.04 – 0.05
Bed Size				
2-24 beds	--	--	--	--
25-49 beds	-0.03	0.01	0.00	-0.04 – -0.01

50-99 beds	-0.01	0.01	0.29	-0.02 – 0.01
100-199 beds	0.05	0.01	0.00	0.03 – 0.06
200-299 beds	0.06	0.01	0.00	0.04 – 0.07
300+ beds	0.08	0.01	0.00	0.07 – 0.09

Table 3-6: Linear Probability Regression- Relationship between worker views about leadership support and PSI before and during the COVID-19 pandemic in US hospitals

Dependent Variable: PSI (Negative/ Neutral views) N=258,703	Co-efficient	SE	P-value	95% Confidence intervals
Leadership Support				
Positive views about Leadership Support	--	--	--	--
Negative/ Neutral views about Leadership Support	0.30	0.01	0.00	0.27 – 0.31
Time Frame				
Before pandemic (Jan 2019- March 2020)	--	--	--	--
During acute phase of pandemic (April 2020-July 2022)	0.03	0.01	0.00	0.02 – 0.05
Leadership Support * Time Frame	0.01	0.01	0.54	-0.01 – 0.02
<i>Controls</i>				
Position Group				
Nursing	--	--	--	--
Medical	-0.05	0.00	0.00	-0.67– -0.04
Other clinical	-0.10	0.00	0.00	-0.10 – -0.08
Supervisors/ leaders	-0.14	0.00	0.00	-0.15 – -0.13
Support staff	0.01	0.00	0.00	0.00 – 0.01
Other	0.02	0.00	0.00	0.01 – 0.03
Length of time in current hospital unit/ work area				
Less than 1 year	--	--	--	--
1 to 5 years	0.03	0.00	0.00	0.03 – 0.04
6 to 10 years	0.03	0.00	0.00	0.03 – 0.04
11 or more years	0.02	0.00	0.00	0.02 – 0.03
Number of hours a week working in this hospital				
Less than 30 hours a week	--	--	--	--
30 to 40 hours per week	0.00	0.00	0.28	-0.00 - 0.01
More than 40 hours per week	0.08	0.00	0.00	0.07 – 0.9
Direct patient contact				
Yes- typically have direct interaction with patients	--	--	--	--
No- typically do not have direct interaction with patients	0.08	0.00	0.05	0.08 – 0.09
Teaching v Non-Teaching Hospital				
Non-teaching hospital	--	--	--	--
Teaching hospital	-0.00	0.00	0.11	-0.01 – 0.00
Census Region				
Northeast	--	--	--	--
Midwest	-0.00	0.00	1.00	-0.01 – 0.01
South	-0.01	0.00	0.03	-0.01 – -0.00
West	0.04	0.00	0.00	0.03 – 0.05
Bed Size				
2-24 beds	--	--	--	--
25-49 beds	-0.02	0.01	0.00	-0.04 – -0.01
50-99 beds	-0.01	0.01	0.31	-0.02 – 0.01
100-199 beds	0.05	0.01	0.00	0.03 – 0.06
200-299 beds	0.05	0.01	0.00	0.04 – 0.07
300+ beds	0.08	0.01	0.00	0.06 – 0.09

Discussion

This study explores how shifts in perceptions about teamwork and leadership support during the COVID-19 pandemic impacted hospital workers' perceptions of their own personal integrity. Hypotheses 1 and 2 predicted the presence of a statistically significant relationship teamwork and PSI, and leadership support and PSI. These hypotheses are supported by the data.

The Healthcare Workforce Integrity Model, which shapes the theory behind this study, shows that in the presence of high job demands, increasing the supports provided through effective teamwork and leadership can enable workers to cope with intensified work demands, bolstering their PSI. Simultaneously, when teamwork and leadership are perceived as unsupportive, when facing high job demands, workers are likely to experience a decline in their PSI. This theory is supported through both comparative descriptive and regression analyses.

Descriptive analysis reveals that negative and neutral responses about teamwork and leadership trended together. During the Delta and Omicron pandemic waves, there were parallel spikes in negative views of teamwork, leadership support, and PSI. Prior to these spikes in pandemic intensity, and in between those spikes, there are also similar trends toward more positive views within the hospital workforce about teamwork, leadership support, and PSI. This descriptive data offers a broad view, but also may conceal confounding factors that influence the relationships.

Logistic regression modeling, including control variables, provided a powerful analytic approach to assess these relationships in a way that accounted for confounding factors. Empirical findings show that hospital workers with negative or neutral views about teamwork and leadership supportiveness have a significantly increased odds of negative or neutral views about their PSI (Teamwork: OR: 2.43, SE 0.03, $p < 0.01$), (Leadership Support: OR: 3.87, SE .05, $p < 0.01$, CI 3.76 – 3.98). This means hospital workers' perceptions of teamwork and leadership support significantly shapes their perceptions of their own personal integrity.

Prior research on the impact of teamwork and leadership on the healthcare workforce during the pandemic has shown that strong teamwork and leadership support are associated with less clinician burnout and a stronger patient safety climate (Bhanja et al, 2022; Rehder, et al., 2023). The reverse was also true- when workers' views about teamwork and leadership worsened, risks of burnout increased and the patient safety climate also became weaker (Bhanja et al, 2022; Rehder, et al., 2023). The original JD-R model offers the beginnings of an explanation for this relationship: in the presence of intense job demands, job resources such as teamwork and leadership support help increase worker energy and motivation, which in turn improves safety outcomes. But the JD-R model – a transactional model that is not industry-specific – does not account for the moral nature of caring for the sick, with its high stakes, unpredictability, and sacred obligations to heal and support people at their most vulnerable moments. The Healthcare Workforce Integrity Model fills this gap by incorporating the moral character of healthcare work into its basic premises. Rathert and Fleming (2008) offer important insight on this topic, explaining that the moral nature of healthcare activities is transmitted through leaders and is practiced within teams. When in a benevolent ethics context, leaders are more likely to support interactions in which teams will discuss concerns openly, trust each other rather than behaving in defensive and reactionary ways, and be mindful of carrying out their work to “do the right thing” even when encountering difficult, high stakes, and stressful moments (Rathert and Fleming, 2008). This context of the benevolent organizational ethics climate is in alignment with the results in this study. The empirical findings in this investigation demonstrate that there is, indeed, a clear moral relationship between teams, leaders, and workers' capacity to maintain integrity. When workers feel that they are supported through teams and leaders to do the right thing, they will be more capable of maintaining their own integrity, which in aggregate across a workforce, will shape the energy and motivation that drives organizational resilience. By contrast, when workers perceive that their teams and leaders are not supportive,

acting in punitive, distrusting, or self-interested ways rather than with benevolence, it is much more difficult for workers to maintain their PSI. This, in turn, stunts individuals' energy and motivation, ultimately impacting the ability of healthcare organizations to maintain high quality patient safety in the face of disruption and crisis.

In hypotheses 3 and 4, this study considered whether the strength of the relationship between hospital workers' perceptions of teamwork and of leadership support impacted their perceptions of their own personal integrity more during the pandemic crisis (April 2020-July 2022) than it did before the pandemic (Jan 2019- March 2020). Here the data did not support the hypotheses. This indicates that the pandemic crisis, with all its uncertainties, fears, staff and equipment shortages, high mortality, and altered workflows, did not result in a foundational change to the pillars of patient safety culture or organizational ethics.

Even though the results from earlier parts of the analysis established statistically significant associations between teamwork, leadership support and PSI, these associations were not found to be more strongly aligned during the pandemic than they were before it. Rehder et al. (2023) found that during the pandemic, healthcare facilities in which teamwork and leadership engagement worsened, there was a concordant decrease in other dimensions of workplace culture, deteriorating both safety climate and worker well-being. At the same time, Redher et al. (2023) found that in facilities where teamwork improved or remained steady, safety culture and worker well-being improved. These kinds of parallel trends appeared in this study too. This study shows that concordance between healthcare workers' perceptions of teamwork and leadership support and their PSI, did not become more tightly or loosely associated than they were before the pandemic crisis.

This evidence may empower healthcare leaders to recognize that their capacity to support teams and demonstrate good leadership cannot begin when moments of crisis arise, when workers are particularly strained and vulnerable. Rather, they need to be established under non-crisis times, as

to foster patterns of interaction, trust-building, coordination of care, and workplace norms that help workers feel that they can trust that their leaders and team members to do the right thing when a crisis emerges. Organizations with highly effective teams and leaders under non-crisis moments will be more capable of supporting worker integrity in the face of acute disruption. The arrival of the COVID-19 crisis did not change the extent to which teams and leadership support became important to workers, it simply showed that when these skills are lacking, workers' PSI will be worse, too.

Chapter 4: Blame and Self-Integrity During the Pandemic

This study explores hospital workers' perceptions during the pandemic of whether their institutions addressed safety problems by blaming individuals and investigates the relationship between feeling such blame and workers personal self-integrity (PSI). This research is based on the Healthcare Workforce Integrity Model in theorizing that those who feel blamed and accused will feel less supported in their organizations and therefore will be more likely to perceive their workplace demands as problematic. These combined factors, in turn, lead to workers feeling worse PSI, which contributes to them experiencing reduced energy and motivation at work.

Tensions about whether patient safety issues are most appropriately framed as system problems where the solution is engagement in system-level learning activities, or individual problems that demand personal accountability (sometimes to mask individuals being personally blamed), existed before the pandemic, and most certainly will continue to be negotiated as COVID-19 becomes endemic. This research seeks to deepen our understanding of the way that learning versus blame orientations shaped the way workers viewed their organizations during the pandemic.

The hypotheses are based on findings within prior research. In a context of staffing strains, workers prioritize the essentials of day-to-day patient care over engaging with administrators, leaders, and other departments to create more systemic change, even if system-wide learning positively impacts patient safety culture (Tucker and Edmondson 2003). Using analysis of the 2016 and 2018 HSOPS data, Gampetro et al. (2022) found that nurses were less likely to report patient safety concerns when they did not feel psychologically safe to do so. This same study identified that when nurses reported a patient safety concern and received feedback from hospital leadership afterwards, this improved nurse perceptions about patient safety, and encouraged more reporting (Gampetro et al., 2022). Unfortunately, there is extensive empirical evidence that even when healthcare workers witness problems that can impact patient safety few speak up (Maxfield, et al.,

2005; Shanafelt, et al., 2019; Bochatay, et al., 2017). And yet, in the *Silence Kills* study, which remains relevant today, the small number of workers (10%), who were confident enough in their ability to communicate their concerns, worked harder, felt more satisfied, and were more committed to staying in their jobs (Maxfield, et al, 2005). These findings indicate that when problems arise, engrained cultural factors across healthcare institutions inhibit the type of open communication and sharing that can foster system-wide learning.

Literature Review

A Blame v. Learning Orientated Patient Safety Culture

To encourage a learning orientation, leaders need to prioritize giving workers opportunities to share their concerns, problem solve, and to participate in and observe changes. Healthcare settings involve high degrees of time pressure, which contributes to workers' inclinations to rely more on norms and expert intuition, rather than on calculated deliberative processing, a more time-consuming mode of cognition (Salas, et al., 2010). Martinez et al. (2015) posit: "A strong desire to 'fit in with the team' and fear of repercussions can trump the moral courage required to speak up about safety concerns and unprofessional [behavior]." Taken together, the personal risks in the context of uncertainty, time pressure, and ambiguity reveal that the decision to remain silent is a rational one, not one merely based in culture or habit. Healthcare leaders cannot assume that workers will naturally demonstrate psychological safety and openly reveal concerns without setting up the structures to enable it. Past research indicates that for a supportive learning-oriented culture to exist within healthcare spaces, passively assuming workers will "say something" if they have concerns is unlikely to work. By contrast, leaders need to model for workers who showing vulnerability and admitting mistakes will foster learning and support within work groups, rather than being the basis of punishment and ridicule.

Amy Edmondson shares that admitting errors or asking for help makes workers concerned that they would face direct or indirect harms or blame. Generally, individuals have an easier time reporting issues that do not seem blameworthy, such as system issues like IT problems or problems with test orders being received. Because these issues can be viewed as factual, it is easier to name them. By contrast, it is much harder and riskier to raise concerns related to behavior or actions that attribute blame. These include concerns about rudeness, tone, respect, use of inappropriate language, bullying coworkers or patients, harassment, abuse of power, refusal to listen to patient wishes, ignoring safety precautions at the bedside, privacy violations etc. (Schwappach, et al., 2014; Dixon Woods et al., 2022; Hickson et al., 2007). Workers may fear that they will appear incompetent, lose face, or have an altered, undesirable image in the eyes of others (Edmondson, 1999; Edmondson, 2002). They also worry about incurring tangible costs if their actions create negative reactions by people in positions of power to offer or deny them raises, promotions, or desirable assignments (Edmondson, 1999; Edmondson, 2002). Further, raising concerns risks altering their relationships with co-workers in an undesirable way (Edmondson, 1999; Edmondson, 2002). In addition, uncertainties, which are a natural part of complex medical care, may inhibit worker confidence in their own knowledge or judgments, and thereby increase their hesitancy to speak (Leykum, et al., 2014; Dixon Woods et al., 2022).

Tucker and Edmondson's research (2003) identifies 3 main, interrelated reasons why both errors and problems often fail to result in process change or system-level learning. The first is individual vigilance, a cultural norm within healthcare that highly values clinician independence and personal responsibility to solve problems to support patient care. The second is unit efficiency. In a context of staffing strains, clinicians prioritize the essentials of day-to-day patient care over engaging with administrators, leaders, and other departments to create more systemic change. For example, a patient whose lab results failed to show up on the electronic medical record within the expected turn

around may lead a nurse to just call down to get the readings and manually enter them, rather than attempting to figure out, or engage others in a process to understand where the breakdown occurred and correct it (Tucker and Edmondson, 2003). Clinician empowerment is the third factor that may inhibit widescale awareness-raising, learning, and change (Tucker and Edmondson, 2003). While the idea of “empowerment” has a positive connotation, in this context, empowerment inhibits system level improvement. Healthcare workers, especially in the presence of staffing and resource strains, are encouraged to feel “empowered” to use their expertise and skills to problem solve to correct many difficulties they may encounter, rather than involving their leaders or administrators. This is not to say that team and leader support is always irrelevant, but when work is busy, resolving problems independently is viewed as a sign of being empowered and capable.

Further, team collaboration is the expected modality through which high-quality care is delivered, yet accountability tends to be assigned at the individual level in the face of problems and errors, even where breakdowns in teamwork may truly be to blame (Zajac et al., 2021). The consequence of these (perhaps) well-intended and culturally embedded practices, is that many errors and problems may fail to cause process change or system-wide learning that could improve patient safety once the individual situation is resolved (Tucker and Edmondson 2003; Zajac et al., 2021).

In their review of the literature, Khatri et al. (2009) identified that a blame orientation is more likely in healthcare settings that have hierarchical, compliance-based management systems, whereas learning orientations are more likely in organizations that regularly elicit employee involvement in decision making. Lateef (2020) identified that when workers perceive large power-distance they may feel that they need to self-censor out of worry that sharing concerns may lead to punitive response or harm to their self-image. Bould et al. (2015) found that residents expressed feeling fear and intimidation to communicate openly about their concerns and that adherence to the norms that exist in an organization, and conformity to those socially approved procedures gives the

impression that a worker is committed to following organizational expectations (Philippe and Durand, 2011; Bould et al., 2015). Thus, if there is a norm that workers speak up about quality or safety concerns as a prerequisite of enabling organizational learning, then raising problems would be seen as sign of high commitment to an organization. By contrast, in cases where workers' sharing problems is seen as going against socially approved norms, that individual, rather than being seen as conforming to norms may instead be seen as deviant, and blameworthy (Philippe and Durand, 2011; Dixon Woods et al., 2022). Lateef (2020) explains that those in higher power positions need to regularly reinforce with their lower status coworkers who sharing concerns, problems, and potential problems will be seen as an asset to team learning. To do so would encourage those in lower power positions to show greater willingness speak up and share (Lateef, 2020). By contrast, when workers experience disrespectful communication and incivility, they will be less trusting of their coworkers and leaders, which will reduce their receptivity to sharing and learning (Lateef, 2020; Rangachari and Woods, 2020).

In a meta-analysis of literature, researchers found that creating psychological safety within teams relies on several antecedent leadership behaviors including leadership inclusiveness, trustworthiness, change orientation, and ethical leadership (Aranzamendez et al., 2015). Without this learning orientation, workers are less likely to experience psychological safety to raise concerns. Workplace psychological safety entails willingness to raise attention to concerns about work conditions, relationships, quality, and safety. It promotes the ability to speak up about problems and errors.

Learning v. Blame Orientation During the COVID-19 Pandemic and Its Impacts on Healthcare System Resiliency

Organizational resiliency was tested during the COVID-19 pandemic. Rangachari and Woods (2020) explain that when individual workers were forced to problem solve when COVID-19

led to resource and staffing shortages, they innovated to create novel workarounds for their patients. Rangachari and Woods offer the example of ICU workers who experienced challenges in shift handoffs during the COVID-19 pandemic when high severity patients, high patient volume, and time pressure led to challenges with ensuring all key information was communicated. In response, a team of ICU workers invented written handoff templates to supplement their verbal hand offs. Here, as Rangachari and Woods (2020) explain, if the regular ICU nurses implemented their hand off template for their own use, without the space for sharing it with others, float nurses, and other care units within the institution would lose out on the potential benefits and might even unintentionally cause harm if the new practice was misunderstood or used incorrectly.

Carroll and Edmondson (2002) explain that local level learning within teams is critical for safety especially when new circumstances emerge. The COVID-19 pandemic, in posing disruption and strain to regular operations, is one example of the type of new circumstance discussed by Carroll and Edmondson. Here, rigid insistence on following standardized procedures risks stifling innovation (Rangachari and Wood, 2020). This might appear if workers feel blamed for going against standardized protocols or are accused of risking patient safety when trying to individually problem solve. At the same time, because of the risks posed by untested, poorly executed, or haphazard solutions to problems, healthcare organizational leaders, in their commitment to patient safety, might struggle to balance encouraging local level innovation with a desire to enforce compliance with policy and standards. Maintaining standardized procedures and processes can help prevent dangerous practice variations. In this context, the collateral damage of trying to balance these tensions comes into focus. Hospital workers operated in busy and unpredictable pandemic settings that demanded individual level problem solving, where the trust within their teams and with their institutional leadership were being tested from many directions. To maintain integrity at work in the face of heightened job demands, healthcare workers had to decide how to adapt and cope on

an individual basis, within their teams, with their leaders, and within their institutions. The way workers experienced these tensions during the pandemic is explored through this research, in its examination of perceived learning v. blame orientations within the workforce, and how this orientation impacted views about PSI.

Methods and Measures

This study uses HSOPS data from the 2021 and 2022 survey waves to explore how learning versus blame orientations shaped worker PSI during the COVID-19 pandemic, a time of acute job demands for healthcare workers. Each hypothesis relies on composite variables that are based on a set of relevant HSOPS survey questions.

Learning orientation
This unit regularly reviews work processes to determine if changes are needed to improve patient safety.
In this unit, changes to improve patient safety are evaluated to see how well they worked.
When errors happen in this unit, we discuss ways to prevent them from happening again.
This unit lets the same patient safety problems keep happening.

Blame orientation
When staff make errors, this unit focuses on learning rather than blaming individuals
In this unit, there is a lack of support for staff involved in patient safety errors
In this unit, staff feel like their mistakes are held against them
When an event is reported in this unit, it feels like the person is being written up, not the problem
In this unit, staff are afraid to ask questions when something does not seem right

Statistical analysis of the HSOPS survey data enables us to better understand the relationship between healthcare workers’ perceptions of a learning orientation and their likelihood of feeling blamed for making or reporting errors. The first step in performing this analysis involved creating composite constructs that represented the two core themes—blame orientation and learning orientation. For each survey question, raw response options appeared on a 5-point Likert scale: “Strongly agree” (value of 5), “Agree” (value of 4), “Neither agree nor disagree” (value of 3),

“Disagree” (value of 2), “Strongly disagree” (value of 1). Where the question wording indicated a that a response of “agree” or “strongly agree” meant the opposite of a learning or blame orientation, I utilized reverse coding: “Strongly agree” (value of 1), “Agree” (value of 2), “Neither agree nor disagree” (value of 3), “Disagree” (value of 4), “Strongly disagree” (value of 5). I then dichotomized the composite variables based on the average response. For the learning orientation composite, respondents who provided mean responses of negative or neutral to the four questions (mean value ≤ 3 , sum of values ≤ 12), were coded as negative/neutral, and respondents whose mean response across the six questions was positive (mean value > 3 , sum of values > 12) were coded as “positive.” The blame orientation composite was coded similarly, except that with 5 questions, the sum of values cutoff was 15.

The PSI composite variable is identical to that discussed in earlier sections of this paper (see pages 25-27, above) with perceptions of PSI shown as either positive or neutral/negative.

To evaluate the first hypothesis, which focused on the relationship between learning and blame orientations, I used logistic regression analysis, incorporating each composite variable and control variables, and reported outcomes using odds ratios (OR). In this analysis, “learning orientation” was the independent variable (X) and “blame orientation” was the dependent variable (Y), with a set of worker and hospital characteristics serving as control variables. Control variables included: teamwork, leadership support, workers’ years working in their current hospital care unit, hours worked per week, direct patient contact (y/n), teaching v. non-teaching hospital, region, and bed size category. Controlling for workers’ views about teamwork and leadership support, both features of workplace culture, helps to ensure that this study is able to focus on the relationships between the core dependent and independent in this study.

The second part of this study evaluated if staff that perceived that workers were personally blamed for patient safety problems had more negative perceptions of PSI, than hospital staff that

did not perceive blame in this way. In investigating this hypothesis, I employed logistic regression analysis where the composite variable for “blame orientation” served as the independent (X) variable, and perception of PSI was the dependent variable is (Y). Control variables, as described above in the first part of this study, were also used in this part of the research.

The final, third hypothesis, evaluated if hospital workers’ perceptions of a blame orientation within their organizations impacted their own personal integrity more during the acute phase of the pandemic crisis (April 2020-July 2022) than it did before the pandemic (Jan 2019- March 2020). To assess hypothesis 3, I analyzed the relationship between worker views about their units’ blame orientation and PSI before versus during the pandemic using a linear probability model. I used an interaction term that represented the effect of timeframe (pre-pandemic: January 2019 through March 2020; during the acute pandemic phase: April 2020-July 2022) and perception of the blame orientation, where the independent (X) variable was the interacted term, and the dependent variable (Y) was PSI, with a set of worker and hospital characteristics serving as control variables.

Results

This study explored the way hospital worker perceptions of blame versus learning orientations during the Covid pandemic shaped their own capacity to maintain PSI. The first component of this investigation analyzed the relationship between blame and learning orientations, exploring if hospital workers who perceived a negative culture of organizational learning related to patient safety problems were more likely to feel blamed for making or reporting errors. Logistic regression analysis supported the hypothesis, with clear evidence to demonstrate that individuals with more negative views about their organizations’ support for learning have a statistically significantly higher likelihood of perceiving that their organizations blame individuals for patient safety errors by a factor of 4.86 (SE 0.07, $p < 0.01$, CI 4.73-5.01) (see *Table 4-1*). There are statistically significant correlations, too, between the teamwork and leadership support control variables. Those

who view teamwork and leadership support in a negative or neutral way are much more likely (than those with positive views of teamwork and leadership support) to perceive that their organizations blame workers for patient safety problems.

Table 4-1: Logistic Regression- Relationship between worker perceptions of blame orientation and learning orientation between January 2019 and July 2022

Logistic Regression Analysis:				
Dependent Variable: Workers perceive a blame orientation (negative/ neutral views) N=254,857	Odds Ratio	SE	P-value	95% Confidence intervals
Learning orientation				
Positive views about workplace learning orientation	--	--	--	--
Negative views about workplace learning orientation	4.86	0.07	0.00	4.73 – 5.01
<i>Controls</i>				
Teamwork				
Positive views on teamwork	--	--	--	--
Negative/ Neutral views on teamwork	3.32	0.05	0.00	3.22 – 3.42
Leadership support				
Positive views on leadership support	--	--	--	--
Negative/ Neutral views on leadership support	3.99	0.06	0.00	3.87 – 4.11
Length of time in current hospital unit/ work area				
Less than 1 year	--	--	--	--
1 to 5 years	1.37	0.02	0.00	1.32 – 1.42
6 to 10 years	1.36	0.03	0.00	1.31– 1.42
11 or more years	1.32	0.03	0.00	1.28 – 1.38
Number of hours a week working in this hospital				
Less than 30 hours a week	--	--	--	--
30 to 40 hours per week	1.15	0.02	0.00	1.11 – 1.20
More than 40 hours per week	1.14	0.02	0.00	1.09– 1.19
Direct patient contact				
Yes- typically have direct interaction with patients	--	--	--	--
No- typically do not have direct interaction with patients	0.66	0.01	0.00	0.64 – 0.86
Teaching v Non-Teaching Hospital				
Non-teaching hospital	--	--	--	--
Teaching hospital	1.02	0.02	0.23	1.00 – 1.05
Census Region				
Northeast	--	--	--	--
Midwest	1.02	0.02	0.36	0.98 – 1.07
South	1.08	0.02	0.00	1.03– 1.12
West	1.21	0.03	0.00	1.15 – 1.28
Bed Size				
2-24 beds	--	--	--	--
25-49 beds	1.08	0.05	0.11	0.98 – 1.19
50-99 beds	1.08	0.05	0.14	0.98 – 1.18
100-199 beds	1.18	0.06	0.00	1.08– 1.29
200-299 beds	1.18	0.05	0.00	1.08 – 1.29
300+ beds	1.21	0.05	0.00	1.11 – 1.32

The second hypothesis in this study explored the relationship between workers' perceptions of being blamed for patient safety problems and worker views about their own personal integrity. Logistic regression analysis showed that this relationship exists. Hospital workers who perceived staff to be blamed for patient safety problems were 2.47 times more likely to have negative perceptions of PSI by a statistically significant margin (SE 0.03, $p < 0.01$, CI 2.41-2.54) (see *Table 4-2*).

Table 4-2: Logistic Regression- Relationship between worker perceptions of blame orientation and ability to maintain PSI between January 2019 and July 2022 in US hospitals

Logistic Regression Analysis:				
Dependent Variable: PSI N=254,857	Odds Ratio	SE	P-value	95% Confidence intervals
Blame orientation				
Workers do not perceive blame orientation (positive views)	--	--	--	--
Workers perceive blame orientation (negative views)	2.47	0.03	0.00	2.41 – 2.54
<i>Controls</i>				
Teamwork support				
Positive views on teamwork support	--	--	--	--
Negative/ Neutral views on teamwork support	1.38	0.02	0.00	1.34 – 1.42
Leadership support				
Positive views on leadership support	--	--	--	--
Negative/ Neutral views on leadership support	2.49	0.04	0.00	2.42 – 2.56
Length of time in current hospital unit/ work area				
Less than 1 year	--	--	--	--
1 to 5 years	1.09	0.01	0.00	1.06 – 1.11
6 to 10 years	1.05	0.01	0.00	1.03– 1.08
11 or more years	1.00	0.01	0.84	0.98 – 1.03
Number of hours a week working in this hospital				
Less than 30 hours a week	--	--	--	--
30 to 40 hours per week	1.00	0.01	1.00	0.98 – 1.03
More than 40 hours per week	1.25	0.02	0.00	1.21– 1.28
Direct patient contact				
Yes- typically have direct interaction with patients	--	--	--	--
No- typically do not have direct interaction with patients	1.42	0.01	0.00	1.40 – 1.45
Teaching v Non-Teaching Hospital				
Non-teaching hospital	--	--	--	--
Teaching hospital	0.98	0.01	0.02	0.96 – 1.00
Census Region				
Northeast	--	--	--	--
Midwest	1.03	0.02	0.04	1.00– 1.06
South	1.00	0.01	0.50	0.96– 1.02
West	1.16	0.02	0.00	1.12 – 1.20
Bed Size				
2-24 beds	--	--	--	--
25-49 beds	0.88	0.03	0.00	0.83 – 0.93
50-99 beds	0.94	0.03	0.03	0.88 – 1.00

100-199 beds	1.16	0.03	0.00	1.10– 1.23
200-299 beds	1.24	0.04	0.00	1.17– 1.31
300+ beds	1.34	0.04	0.00	1.27– 1.40

The third hypothesis investigated if the strain of working through the pandemic led to tighter associations during the pandemic for workers perceiving a blame orientation and having negative PSI, compared to the associations between these factors before the pandemic. The underlying motivation of this hypothesis derives from the conceptual model, in linking healthcare workers' ability to maintain PSI with how effectively resources, like an organizational culture that emphasizes learning rather than blame, can bolster workers during times of acute strain and intensified job demands. This analysis shows that the hypothesis is unsupported by the data (see Table 4-3).

Table 4-3: Linear Probability Regression- Relationship between worker views about blame orientation and PSI before and during the COVID-19 pandemic in US hospitals

Dependent Variable: PSI N=248,213	Co-efficient	SD	P-value	95% Confidence intervals
Blame Orientation				
Workers do not perceive blame orientation (positive views)	--	--	--	--
Workers perceive blame orientation (negative views)	0.20	0.01	0.00	0.19 – 0.22
Time Frame				
Before pandemic (Jan 2019- March 2020)	--	--	--	--
During acute phase of pandemic (April 2020-July 2022)	0.02	0.01	0.00	0.01 – 0.04
Blame orientation * Time Frame				
Workers do not perceive blame orientation (positive views) * Before the pandemic	--	--	--	--
Workers perceive blame orientation (negative views) * During the acute phase of pandemic	0.007	0.01	0.41	-0.01 – 0.02
<i>Controls</i>				
Teamwork				
Positive views about teamwork	--	--	--	--
Negative/ Neutral views about teamwork	0.06	0.00	0.00	0.06 – 0.07
Leadership Support				
Positive views about leadership	--	--	--	--
Negative/ Neutral views about leadership	0.19	0.00	0.00	0.18- 0.19
Length of time in current hospital unit/ work area				
Less than 1 year	--	--	--	--
1 to 5 years	0.02	0.00	0.00	0.01 – 0.03
6 to 10 years	0.01	0.00	0.00	0.01 – 0.02
11 or more years	0.00	0.00	0.82	-0.00 – 0.01
Number of hours a week working in this hospital				
Less than 30 hours a week	--	--	--	--
30 to 40 hours per week	0.00	0.00	0.88	-0.01 – 0.01

More than 40 hours per week	0.05	0.00	0.00	0.04– 0.06
Direct patient contact				
Yes- typically have direct interaction with patients	--	--	--	--
No- typically do not have direct interaction with patients	0.08	0.00	0.00	0.08 – 0.09
Teaching v Non-Teaching Hospital				
Non-teaching hospital	--	--	--	--
Teaching hospital	-0.01	0.00	0.01	-0.01 - -0.01
Census Region				
Northeast	--	--	--	--
Midwest	0.00	0.00	0.30	-0.00 – 0.01
South	-0.00	0.00	0.19	-0.01 – 0.00
West	0.03	0.00	0.00	0.02 – 0.04
Bed Size				
2-24 beds	--	--	--	--
25-49 beds	-0.02	0.01	0.00	-0.04 – -0.01
50-99 beds	-0.01	0.01	0.08	-0.02 – 0.00
100-199 beds	0.04	0.01	0.00	0.03 – 0.05
200-299 beds	0.05	0.01	0.00	0.04 – 0.06
300+ beds	0.07	0.01	0.00	0.06 – 0.08

Discussion

This empirical investigation focused on workers’ views about being personally blamed for safety problems and how feeling blamed during the during the COVID-19 pandemic related to hospital workers’ ability to maintain a positive view of PSI. The 3 hypotheses within this study explored several dimensions of this central idea.

The first hypothesis predicted that hospital workers who perceived a positive culture of organizational learning related to patient safety problems were less likely to feel blamed for making or reporting errors. This study shows very clear evidence in support of the hypothesis. Workers who perceived that their organizations were not using safety problems as a learning opportunity were 4.86 times more likely to perceive that individuals were personally blamed for errors and problems (SE 0.07, $p < 0.01$, CI 4.73-5.01).

Since the release in 2000 of the Institute of Medicine’s report, *To Err is Human*, healthcare leaders and researchers have given a great detail of attention to better understand the problem of medical errors in the United States, including the challenges of how to shift from a culture of silence

and individual blame toward one that is capable of learning and changing at a system level (Edmondson, 2004; Khatri et al., 2009; Wachter and Pronovost, 2009; Vogelsmeier et al., 2010).

The ties between a blame and learning orientation as two sides of a coin is extensively discussed in the literature. The empirical study here lends credence to these associations, validating that healthcare workers who perceive that their institutions target individuals for errors and problems in a punitive way, also report being much less likely to see their institutions as places focused on learning from mistakes. These relationships make intuitive sense and the data in this study offers further evidence to demonstrate these links.

Shifting away from a blame orientation toward a learning one has been a wicked problem. “Zero harm” has become a mantra of regulatory bodies and healthcare organizations to tout the vision that clinical organizations can carry out the goals of the 2000 IOM report of ending preventable patient harms (Zero Harm, 2023; Thomas, 2020; Kohn, et al. 2000).

The way that the “Zero Harm” vision has played out is complicated. Well-meaning hospital leaders who want to promote a culture of safety encourage reporting errors and near misses. They might do so by promoting psychological safety within teams and by creating opportunities for workers to develop a shared sense of accountability that can help foster a learning organization. These leaders may be seen as highly successful in promoting a culture of safety through admitting their shortcomings, but in doing so they risk displaying their institution’s faults and vulnerabilities in a way that might reflect badly in the public sphere or with oversight bodies. In fact, they are at risk of showing that rather than “zero harm” they uncover quite a bit of preventable harm!

Organizations, by contrast, that lack safe and robust reporting mechanisms or who discourage their use through active or passive methods (*i.e.*, intimidation, making the tools difficult to use, using them to attribute blame and punishment, or simply doing nothing to encourage reflection and improvement after incidents are reported), may have remarkably low rates of reported errors. Does

this mean they are on the path toward zero harm? On the surface it might look like it. Though, in such institutions, staff are more likely to feel exhausted and disengaged, and are also less likely to feel safe communicating with their leadership about concerns, resulting in less openness about the organization's shortcomings (Vogelsmeier et al., 2010). These institutions, who are blind to their shortcomings, may feel buoyed by their ability to report low rates of errors. As Vogelsmeier et al. (2010) share, "less engaged healthcare organizations continue[d] to hold on to the illusion that 'we have no real problems here.'"

Blame cultures are those where workers feel threatened and uncomfortable admitting to errors or mistakes. Workers in such environments might fear retribution, punishment, or passive aggressive treatment. The findings in hypothesis 2 shed light on the way operating within a culture of blame impacts healthcare workers' perceptions of their own personal integrity. The empirical results in this study support the hypothesis: when hospital workers perceive that staff are blamed for patient safety problems, they are 2.47 times more likely to have negative perceptions of their PSI (SE 0.03, $p < 0.01$, CI 2.41-2.54). PSI, a worker's perception that they can align their own actions and morals, is made possible when workers feel that they have the human and technological supports necessary to do a good job.

Unlike in most other lines of work, the actions and choices undertaken by a healthcare worker can be the difference between life and death for another human being. With such significant responsibility, when workers cause or even might be complicit in contributing to patient harm, the weight can feel excruciating. This circumstance has been extensively discussed as the "second victim phenomenon," where healthcare workers involved in patient safety incidents find that accepting personal responsibility for harm leads to emotional trauma and loss of confidence in their ability to do a good job (Waterman et al. 2007). In this context, loss of PSI, after workers have experienced

the psychological burden of perceiving that they are personally responsible for contributing to patient harm is not surprising.

There are thousands if not millions of micro-actions carried out by a multitude of people within healthcare spaces to provide care to the sick. Care delivery requires attention to system factors such as training and worker competency, access to essential equipment, functionality of equipment, systems engineering, staffing, management and leadership, and worker physical and mental wellbeing. When a worker feels personally responsible for contributing to or causing patient harm, however, it can make it difficult for them to perceive the system context in which the patient safety problems arose. As the empirical findings in this study show, when workers perceive that their institutions blame individuals for patient safety problems, they become more pessimistic about being able to do a good job. The Healthcare Workforce Integrity Model helps elucidate this idea. Within the Model, in the presence of intense job demands, the strength of job resources determines how well workers can maintain alignment of their actions and their morals, which directly shapes their ability to maintain energy and motivation. When workers perceive that they and their coworkers are personally blamed for errors, they will be less likely to see their institutions as supportive. Instead, they will be more likely to put up guardrails to protect themselves as they cope with a loss in PSI, or else they will succumb to these feelings and their drained motivation and energy will cause burnout or less desire to continue in their jobs. At the organizational level, these impacts may lead to reduced organizational resilience and worker turnover.

During times of acute disruption and uncertainty, such as the COVID-19 pandemic, I expected that workers' perceptions of their organizations' blame orientation would impact their perceptions of their own personal integrity more than it would when operations are more typical, due to the higher degrees of reliance workers' might have on their organizational resources to bolster them in coping with high pandemic demands. Empirical findings in exploring hypothesis 3,

however, refute this notion. Workers' likelihoods of depending on supportive organizational resources- human and technological- to maintain their PSI do not vary in a predictable way as workplace intensity shifts. During the study period of January 2019 to July 2022, which spanned before and during the COVID-19 pandemic, survey respondents faced variable and changing experiences with patient volume and acuity, staffing strains, and anxiety over contracting illness. Their needs for support to maintain PSI, including the desire to feel that they would not be personally blamed for patient safety problems, however, was not stronger during the pandemic than it was before it.

These results fit in line with the findings in the second paper of this dissertation, which found that the associations between healthcare workers' reliance on team and leadership support were no more closely tied during the pandemic than they were before it. The clear message of this part of the study is that workers' need for supportive resources in crisis times is not stronger than it is in non-crisis moments. Empirical findings here also fit in line with earlier work by Redher et al. (2023) in their discovery that healthcare facilities with strongly supportive patient safety cultures at the start of the COVID-19 pandemic had a stronger foundation for maintaining or improving these traits during the pandemic. At the same time, for health facilities with weak patient safety cultures at the start, pandemic distress made them prone to further deterioration (Redher et al. (2023). The findings in this project, combined with those from the Redher et al. work show that it is important for organizations to cultivate a culture of shared accountability and learning during non-crisis moments to create the conditions for adaptability and learning when crisis arises.

Chapter 5: Conclusion

Strengths

This dissertation project investigated the way the demands and supportive factors during the COVID-19 pandemic shaped workers' ability to maintain alignment of their actions and morals, and in turn, their energy and motivation at work. These factors are important indicators to better understand healthcare organizational resilience in facing moments of acute strain. Like all empirical work, this project's contributions, including its methodological approach and data, include both strengths and limitations.

Strengths of this project included several attributes of the HSOPS and HCUP data. Large sample sizes were available through both the HSOPS database and the HCUP data. The HSOPS 2.0 survey data is psychometrically validated to assess worker perceptions of patient safety culture and was therefore well-suited to the empirical investigations in this dissertation, which homed in on several of these dimensions in investigating personal integrity, job demands, and job resources. The HSOPS 2.0 database used in this project included both the 2021 and 2022 database waves, which were found to be fairly consistent with the distribution of hospitals registered by the American Hospital Association, even if the decision for hospitals to submit their data was voluntary. Another benefit to using the HSOPS data in this investigation is its inclusion of a broad spectrum of healthcare workers, including those working in both clinical and non-clinical positions. The HCUP data utilized in the first paper in this dissertation is managed by AHRQ and is considered a highly reliable source for information about in-patient stays within the United States. Another strength of this investigation was that the data in both the HSOPS survey and the HCUP databases spanned time frames from before through the late stages of the COVID-19 pandemic, with observations available for each month and year. This enabled me to investigate how perceptions and pandemic severity shifted month-to-month, as the national mood, access to vaccines, and pandemic rates

changed. Lastly, because both data sources used in this project included large samples from across the United States, I was able to conduct analyses on a national level, allowing me to derive conclusions about broad trends impacted US hospital workers.

Limitations of This Study and Future Research Needs

There are limitations in this study that are important to acknowledge. While this investigation enabled me to derive insights on a broad national level based on survey results, rich and detailed insights into individual experiences are unavailable. For this, qualitative research is needed and may be worthwhile in future investigations to supplement the quantitative findings in this study. Further, this project used national level data. This meant that it lacks granularity that may reveal how different geographies, geographically-specific spikes in COVID-19 rates, hospital types, and patient mixes may impact the relationships studied. Due to the nature of the data used in this project, this research is also unable to evaluate differences in perception within intact teams; this is a line of inquiry that would be of great interest to explore in future research.

Additionally, the HSOPS survey data does not offer information about respondent characteristics that might play a role in shaping perceptions, such as personality, culture, race, gender, income, and maximum education attainment, etc. These factors may play a role in shaping worker perceptions, but were unavailable within the data used.

Another limitation of this dissertation was that the investigation did not account for variations in staffing ratios, patient volume, quality and safety measures, and other objective metrics within the hospitals from which respondent data is derived. As a result, this study cannot compare worker perceptions to the objective reality. While it is certainly valuable to gain insights based on worker perceptions, this is a limitation. Exploring how hospital metrics compare to worker perceptions in future research would be of great value to our understanding but is also very difficult to capture due to data access challenges.

In addition, the conduct of this study focused on PSI as a central outcome variable. This variable is a construct based on survey questions that were embedded within the HSOPS tool and were selected to represent PSI after careful consideration. As discussed in this dissertation, PSI can be defined by a variety of factors inclusive, but not limited to, the particular facets of PSI that were used for this project- namely the view that staffing and work pace enabled workers to feel that they could provide safe, high-quality care to patients. While the PSI construct here was deemed to sufficiently describe one example of how workers might understand the alignment of their actions and their morals, there are many more aspects of hospital work that are relevant to personal integrity, but are not part of this construct. PSI in healthcare may encompass work-life balance, allocation of how one's time is spent at work, views about whether decisions made by others within a healthcare system align with your own beliefs about doing the morally "right" thing, and more.

Further, while the construct used in this study sufficiently captures PSI, I acknowledge that individual respondent interpretations of the survey questions, may also be pointing out worker views about operational characteristics of healthcare systems rather than perceptions about alignment of actions and morals. The inclusion of control variables sought to minimize the influence of these other factors, but I acknowledge that as any proxy measure, there are limitations inherent in this study's measure of PSI. In future research, it would be of great interest to develop and test a measurement tool directly focused on PSI.

In addition, I am interested in using future research to evaluate the merits of the Healthcare Workforce Integrity Model more thoroughly. For example, it would be valuable to assess the relationship between PSI and workers' energy and motivation; each are characteristics that foster or may diminish mental well-being. Due to data limitations, this study focused on precursors to burnout rather than the outcome of burnout. Using data from a hospital workforce survey about burnout would enable exploration that would assess burnout as an outcome. It would also be

valuable to assess the relationship between workers' PSI and intention to remain in or leave their jobs.

Conclusion

The strain of the COVID-19 pandemic impacted patient safety culture. This study focused on the proxy variable of PSI, derived from questions in the tool, HSOPS, to home in on the way workers' capacity to maintain alignment of their actions and morals shifted during the pandemic. An essential finding here is that workers' capacity to maintain their PSI worsened steadily over the pandemic time frame. When patient mortality was higher, workers' PSI worsened, with particularly acute effects experienced in ICU settings. Further, this dissertation found that in contributing to a deeply moral mission- caring for the sick- hospital workers who perceived their institution's resources in a negative way were more prone to worse PSI by statistically significant margins. When hospital workers perceived teamwork and leadership support poorly and when they perceived that staff were blamed for patient safety problems, their perceptions of their own personal integrity diminished. The implication of these findings is that supportive resources, in the form of good teamwork and leadership support, and creating a culture that focuses on learning rather than blame, can bolster workers' capacity to maintain their PSI. Another core finding in this project was that no significant associations appeared to indicate that hospital workers' perceptions of teamwork, leadership support, or being blamed for safety problems were any more closely tied with their ability to maintain positive PSI during the pandemic than they were before the pandemic. This finding reflects that healthcare workers' need to feel supported does not become more tightly dependent on their organizations' resources during moments of crisis. Organizational solutions are needed to support healthcare workers ability to thrive and maintain integrity in non-crisis moments just as much as they are needed during moments of crisis and uncertainty. Achieving this goal can better

ensure that healthcare workers feel they can depend on their institutions and its people to do the right thing.

The investigations within this study can be understood through the guiding framework of this dissertation-- the Healthcare Workforce Integrity Model. The model holds that increased intensity of job demands can cause noticeable loss of ability of workers' perceptions that they can maintain PSI in their work, which over a sustained period leads to harms in worker energy and motivation, and ultimately overall, organizational resilience. In this way, PSI serves as an antecedent to factors like emotional exhaustion and lost motivation, each components of worker burnout (West et al, 2018). These findings show that the strain of high demands overwhelms workers, making them at higher risk of perceiving that they cannot do a good job with the resources available to them. Vivek Murthy, US Surgeon General, sums up the challenge in one sentence [Burnout] is about the fundamental disconnect between health workers and the mission to serve that motivates them." (Murthy, 2022). This study suggests that perhaps even before we get to the stage of burnout, the essence of that "fundamental disconnect" is captured by perceptions about one's capacity to maintain personal integrity in the face of the crosswinds of complex medical care. Healthcare leaders need to invest in the human and technological resources required for workers to maintain their personal integrity. To do so will enable workers to maintain their energy and motivation at work, and to make it possible to foster more resilient healthcare organizations.

List of References

- AHA-Data Brief: Health Care Workforce Challenges Threaten Hospitals' Ability to Care for Patients.* (2021, October). American Hospital Association. <https://www.aha.org/fact-sheets/2021-11-01-data-brief-health-care-workforce-challenges-threaten-hospitals-ability-care>
- Aiken, L. H., Clarke, S. P., Sloane, D. M., Sochalski, J., & Silber, J. H. (2002). Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *JAMA*, *288*(16), 1987–1993. <https://doi.org/10.1001/jama.288.16.1987>
- Al-Amin, M., Islam, Md. N., Li, K., Shiels, N., & Buresh, J. (2022). Is there an association between hospital staffing levels and inpatient-COVID-19 mortality rates? *PLoS ONE*, *17*(10), e0275500. <https://doi.org/10.1371/journal.pone.0275500>
- Akbulut, N., & Razum, O. (2022). Why Othering should be considered in research on health inequalities: Theoretical perspectives and research needs. *SSM - Population Health*, *20*, 101286. <https://doi.org/10.1016/j.ssmph.2022.101286>
- Aranzamendez, G., James, D., & Toms, R. (2015). Finding Antecedents of Psychological Safety: A Step Toward Quality Improvement. *Nursing Forum*, *50*(3), 171–178. <https://doi.org/10.1111/nuf.12084>
- Armellino, D., Griffin, M. T. Q., & Fitzpatrick, J. J. (2010). Structural empowerment and patient safety culture among registered nurses working in adult critical care units. *Journal of Nursing Management*, *18*(7), 796–803. <https://doi.org/10.1111/j.1365-2834.2010.01130.x>
- Bakker, A. B., & Demerouti, E. (2007). The Job Demands-Resources model: state of the art. *Journal of Managerial Psychology*, *22*(3), 309–328. <https://doi.org/https://doi.org/10.1108/02683940710733115>
- Bakker, A. B., Demerouti, E., & Verbeke, W. (2004). Using the job demands-resources model to predict burnout and performance. *Human Resource Management*, *43*(1), 83–104. <https://doi.org/10.1002/hrm.20004>
- Barach, P., & Berwick, D. M. (2003). Patient safety and the reliability of health care systems. *Annals of Internal Medicine*, *138*(12), 997–998. Public Health Database. <https://www.proquest.com/scholarly-journals/patient-safety-reliability-health-care-systems/docview/222229499/se-2?accountid=14696>

- Barello, S., Caruso, R., Palamenghi, L., Nania, T., Dellafiore, F., Bonetti, L., Silenzi, A., Marotta, C., & Graffigna, G. (2021). Factors associated with emotional exhaustion in healthcare professionals involved in the COVID-19 pandemic: an application of the job demands-resources model. *International Archives of Occupational and Environmental Health*, *94*(8), 1751–1761. <https://doi.org/10.1007/s00420-021-01669-z>
- Barnes, T., Yu, T.-C. W., & Webster, C. S. (2020). Preparedness of medical students and junior doctors for their role as clinical leaders: A systematic review. *Medical Teacher*, *42*(1), 79–85. <https://doi.org/10.1080/0142159X.2019.1665632>
- Bates, D. W., & Singh, H. (2018). Two decades since to err is human: An assessment of progress and emerging priorities in patient safety. *Health Affairs*, *37*(11), 1736–1743. <https://doi.org/10.1377/hlthaff.2018.0738>
- Bhanja, A., Hayirli, T., Stark, N., Hardy, J., Peabody, C. R., & Kerrissey, M. (2022). Team and leadership factors and their relationship to burnout in emergency medicine during COVID-19: A 3-wave cross-sectional study. *Journal of the American College of Emergency Physicians Open*, *3*(4), e12761. <https://doi.org/10.1002/emp2.12761>
- Blumenthal, D. M., Bernard, K., Bohnen, J., & Bohmer, R. (2012). Addressing the leadership gap in medicine: Residents' need for systematic leadership development training. *Academic Medicine*, *87*(4), 513–522. <https://doi.org/10.1097/ACM.0b013e31824a0c47>
- Bochatay, N., Bajwa, N. M., Cullati, S., Muller-Juge, V., Blondon, K. S., Junod Perron, N., Maître, F., Chopard, P., Vu, N. V., Kim, S., Savoldelli, G. L., Hudelson, P., & Nendaz, M. R. (2017). A multilevel analysis of professional conflicts in health care teams: Insight for future training. *Academic Medicine: Journal of the Association of American Medical Colleges*, *92*(11S Association of American Medical Colleges Learn Serve Lead: Proceedings of the 56th Annual Research in Medical Education Sessions), S84–S92. <https://doi.org/10.1097/ACM.0000000000001912>
- Bodenheimer, T., & Sinsky, C. (2014). From Triple to Quadruple Aim: Care of the Patient Requires Care of the Provider. *Annals of Family Medicine*, *12*(6), 573–576. <https://doi.org/10.1370/afm.1713>
- Bould, M. D., Sutherland, S., Sydor, D. T., Naik, V., & Friedman, Z. (2015). Residents' reluctance to challenge negative hierarchy in the operating room: a qualitative study. *Canadian Journal of Anesthesia/Journal Canadien d'anesthésie*, *62*(6), 576–586. <https://doi.org/10.1007/s12630-015-0364-5>

- Bravata, D. M., Perkins, A. J., Myers, L. J., Arling, G., Zhang, Y., Zillich, A. J., Reese, L., Dysangco, A., Agarwal, R., Myers, J., Austin, C., Sexson, A., Leonard, S. J., Dev, S., & Keyhani, S. (2021). Association of intensive care unit patient load and demand with mortality rates in US Department of Veterans Affairs hospitals during the COVID-19 Pandemic. *JAMA Network Open*, 4(1), e2034266. <https://doi.org/10.1001/jamanetworkopen.2020.34266>
- Bruijn-Geraets, D. P. D., Eijk-Hustings, Y. J. L. V., & Vrijhoef, H. J. M. (2014). Evaluating newly acquired authority of nurse practitioners and physician assistants for reserved medical procedures in the Netherlands: a study protocol. *Journal of Advanced Nursing*, 70(11), 2673–2682. <https://doi.org/https://doi.org/10.1111/jan.12396>
- Brunsberg, K. A., Landrigan, C. P., Garcia, B. M., Petty, C. R., Sectish, T. C., Simpkin, A. L., Spector, N. D., Starmer, A. J., West, D. C., & Calaman, S. (2019). Association of pediatric resident physician depression and burnout with harmful medical errors on inpatient services. *Academic Medicine: Journal of the Association of American Medical Colleges*, 94(8), 1150–1156. <https://doi.org/10.1097/ACM.0000000000002778>
- Buchbinder, M., Browne, A., Jenkins, T., Berlinger, N., & Buchbinder, L. (2023). Hospital physicians' perspectives on occupational stress during COVID-19: a qualitative analysis from two US cities. *Journal of General Internal Medicine*. <https://doi.org/10.1007/s11606-022-07848-z>
- Butera, Sarah, et al. Prevalence and associated factors of burnout risk among intensive care and emergency nurses before and during the Coronavirus Disease 2019 Pandemic: A cross-sectional study in Belgium." *Journal of Emergency Nursing*, vol. 47, no. 6, Nov. 2021, pp. 879–91, <https://doi.org/10.1016/j.jen.2021.08.007>
- Carroll, J. S., & Edmondson, A. C. (2002). Leading organisational learning in health care. *BMJ Quality & Safety*, 11(1), 51–56. <https://doi.org/10.1136/qhc.11.1.51>
- CDC Museum COVID-19 Timeline*. (2023, March 15). Centers for Disease Control and Prevention. <https://www.cdc.gov/museum/timeline/covid19.html>
- Chen, R., Sun, C., Chen, J.-J., Jen, H.-J., Kang, X. L., Kao, C.-C., & Chou, K.-R. (2021). A large-scale survey on trauma, burnout, and posttraumatic growth among nurses during the COVID-19 Pandemic. *International Journal of Mental Health Nursing*, 30(1), 102–116. <https://doi.org/10.1111/inm.12796>
- Churruca, K., Ellis, L. A., Pomare, C., Hogden, A., Bierbaum, M., Long, J. C., Olekalns, A., & Braithwaite, J. (2021). Dimensions of safety culture: a systematic review of quantitative, qualitative and mixed methods for assessing safety culture in hospitals. *BMJ Open*, 11(7), e043982. <https://doi.org/10.1136/bmjopen-2020-043982>

- Corbaz-Kurth, S., Juvet, T. M., Benzakour, L., Cereghetti, S., Fournier, C.-A., Moullec, G., Nguyen, A., Suard, J.-C., Vieux, L., Wozniak, H., Pralong, J. A., Weissbrodt, R., & Roos, P. (2022). How things changed during the COVID-19 pandemic's first year: A longitudinal, mixed-methods study of organisational resilience processes among healthcare workers. *Safety Science*, *155*, 105879. <https://doi.org/10.1016/j.ssci.2022.105879>
- Crijns, T. J., Kortlever, J. T. P., Guitton, T. G., Ring, D., & Barron, G. C. (2020). Symptoms of burnout among surgeons Are correlated with a higher incidence of perceived medical errors. *HSS Journal*, *16*(Suppl 2), 305–310. <https://doi.org/10.1007/s11420-019-09727-6>
- Currie, G., Burgess, N., & Hayton, J. C. (2015). HR practices and knowledge Brokering by hybrid middle managers in hospital settings: The influence of professional hierarchy. *Human Resource Management*, *54*(5), 793–812. <https://doi.org/https://doi.org/10.1002/hrm.21709>
- Demerouti, E., & Bakker, A. B. (2011). The Job Demands-Resources model: challenges for future research. *SA Journal of Industrial Psychology*, *37*(2), 01–09. http://www.scielo.org.za/scielo.php?script=sci_abstract&pid=S2071-07632011000200001&lng=en&nrm=iso&tlng=en
- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology*, *86*(3), 499. <https://doi.org/10.1037/0021-9010.86.3.499>
- Dixon-Woods, M., Aveling, E. L., Campbell, A., Ansari, A., Tarrant, C., Willars, J., Pronovost, P., Mitchell, I., Bates, D. W., Dankers, C., McGowan, J., & Martin, G. (2022). What counts as a voiceable concern in decisions about speaking out in hospitals: A qualitative study. *Journal of Health Services Research & Policy*, *27*(2), 88–95. <https://doi.org/10.1177/13558196211043800>
- Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, *44*(2), 350–383. <https://doi.org/10.2307/2666999>
- Edmondson, A. C. (2004). Learning from mistakes is easier said than done: Group and organizational influences on the detection and correction of human error. *The Journal of Applied Behavioral Science*. <https://doi.org/10.1177/0021886304263849>
- Epstein, E. G., & Hamric, A. B. (2009). Moral distress, moral residue, and the crescendo effect. *The Journal of Clinical Ethics*, *20*(4), 330–342. <https://doi.org/10.1086/JCE200920406>
- Famolaro T, Hare R, Yount ND, Fan L, Liu H, Sorra J. Surveys on Patient Safety Culture™ (SOPS®) Hospital Survey 2.0: 2021 User Database Report. (Prepared by Westat, Rockville, MD, under Contract No. HHSP233201500026I/HHSP23337004T). Rockville, MD: Agency for Healthcare Research and Quality; March 2021. AHRQ Publication No. 21-0017.

- Gampetro, P. J., Segvich, J. P., Hughes, A. M., Kanich, C., Schlaeger, J. M., & McFarlin, B. L. (2022). Associations between safety outcomes and communication practices among pediatric nurses in the United States. *Journal of Pediatric Nursing, 63*, 20–27. <https://doi.org/10.1016/j.pedn.2021.12.008>
- Halbesleben, J. R. B., Wakefield, B. J., Wakefield, D. S., & Cooper, L. B. (2008). Nurse burnout and patient safety outcomes: Nurse safety perception versus reporting behavior. *Western Journal of Nursing Research, 30*(5), 560–577. <https://doi.org/10.1177/0193945907311322>
- Han, S., Shanafelt, T. D., Sinsky, C. A., Awad, K. M., Dyrbye, L. N., Fiscus, L. C., Trockel, M., & Goh, J. (2019). Estimating the attributable cost of physician burnout in the United States. *Annals of Internal Medicine, 170*(11), 784–790. <https://doi.org/10.7326/M18-1422>
- Hare R., Tapia A., Tyler E.R., Fan L., Ji S., Yount N.D., Sorra J., Famolaro T., Surveys on Patient Safety Culture™ (SOPS®) Hospital Survey 2.0: 2022 User Database Report. (Prepared by Westat, Rockville, MD, under Contract No. HHSP233201500026I/HHSP23337004T). Rockville, MD: Agency for Healthcare Research and Quality; October 2022. AHRQ Publication No. 22(23)-0066.
- HCUP visualization of inpatient trends in COVID-19 and other conditions. healthcare cost and utilization project (HCUP). December 2022. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/datavisualizations/COVID-19-inpatient-trends.jsp
- Hickson, G. B., Pichert, J. W., Webb, L. E., & Gabbe, S. G. (2007). A complementary approach to promoting professionalism: identifying, measuring, and addressing unprofessional behaviors. *Academic Medicine: Journal of the Association of American Medical Colleges, 82*(11), 1040–1048. <https://doi.org/10.1097/ACM.0b013e31815761ee>
- Hughes, A. M., & Salas, E. (2013). Hierarchical medical teams and the science of teamwork. *AMA Journal of Ethics, 13*(6), 529–533. <https://doi.org/10.1001/virtualmentor.2013.15.6.msoc1-1306>
- Iuliano, A. D., Brunkard, J., & Boehmer, T. (2022). Trends in disease severity and health care utilization during the early omicron variant period compared with previous SARS-CoV-2 high transmission periods — United States, December 2020–January 2022. *MMWR. Morbidity and Mortality Weekly Report, 71*. <https://doi.org/10.15585/mmwr.mm7104e4>
- James, B. C., Savitz, L., Fairbanks, R. J., Bisognano, M., & Pronovost, P. (2022). Patient safety performance: Reversing recent declines through shared profession-wide system-level solutions. *Catalyst Non-Issue Content, 3*(6). <https://doi.org/10.1056/CAT.22.0318>
- Joliat, G.-R., Demartines, N., & Uldry, E. (2019). Systematic review of the impact of patient death on surgeons. *British Journal of Surgery, 106*(11), 1429–1432. <https://doi.org/10.1002/bjs.11264>

- Jordan, S. R., Connors, S. C., & Mastalerz, K. A. (2022). Frontline healthcare workers' perspectives on interprofessional teamwork during COVID-19. *Journal of Interprofessional Education & Practice*, 29, 100550. <https://doi.org/10.1016/j.xjep.2022.100550>
- Khatri, N., Brown, G. D., & Hicks, L. L. (2009). From a blame culture to a just culture in health care. *Health Care Management Review*, 34(4), 312–322. <https://doi.org/10.1097/HMR.0b013e3181a3b709>
- Kohn, L. T., Corrigan, J. M., & Donaldson, M. S. (Eds.). (2000). *To Err is Human: Building a Safer Health System*. National Academies Press (US). <http://www.ncbi.nlm.nih.gov/books/NBK225182/>
- Kreindler, S. A., Dowd, D. A., Star, N. D., & Gottschalk, T. (2012). Silos and social identity: The social identity Approach as a framework for understanding and overcoming divisions in health care. *The Milbank Quarterly*, 90(2), 347–374. <https://doi.org/https://doi.org/10.1111/j.1468-0009.2012.00666.x>
- Laschinger, H. SK. (2008). Effect of empowerment on professional practice environments, work satisfaction, and patient care quality: Further testing the nursing worklife model. *Journal of Nursing Care Quality*, 23(4), 322–330. <https://doi.org/10.1097/01.NCQ.0000318028.67910.6b>
- Lateef, F. (2020). Maximizing learning and creativity: Understanding psychological safety in simulation-based learning. *Journal of Emergencies, Trauma, and Shock*, 13(1), 5–14. https://doi.org/10.4103/JETS.JETS_96_19
- Leiter, M. P. (1993). Burnout as a developmental process: Consideration of models. In W. B. Schaufeli, C. Maslach, & T. Marek (Eds.), *Professional burnout: Recent developments in theory and research* (pp. 237–250). Taylor & Francis.
- Leykum, L. K., Lanham, H. J., Pugh, J. A., Parchman, M., Anderson, R. A., Crabtree, B. F., Nutting, P. A., Miller, W. L., Stange, K. C., & McDaniel, R. R. (2014). Manifestations and implications of uncertainty for improving healthcare systems: an analysis of observational and interventional studies grounded in complexity science. *Implementation Science: IS*, 9. <https://doi.org/10.1186/s13012-014-0165-1>
- Lichtenstein, R., Alexander, J. A., McCarthy, J. F., & Wells, R. (2004). Status differences in cross-functional teams: Effects on individual member participation, job satisfaction, and intent to quit. *Journal of Health and Social Behavior*, 45(3), 322–335. <https://doi.org/10.1177/002214650404500306>

- Manser, T. (2009). Teamwork and patient safety in dynamic domains of healthcare: a review of the literature. *Acta Anaesthesiologica Scandinavica*, *53*(2), 143–151. <https://doi.org/10.1111/j.1399-6576.2008.01717.x>
- Mardon, R. E., Khanna, K., Sorra, J., Dyer, N., & Famolaro, T. (2010). Exploring relationships between hospital patient safety culture and adverse events. *Journal of Patient Safety*, *6*(4), 226–232. <https://doi.org/10.1097/PTS.0b013e3181fd1a00>
- Martinez, W., Etchegaray, J. M., Thomas, E. J., Hickson, G. B., Lehmann, L. S., Schleyer, A. M., Best, J. A., Shelburne, J. T., May, N. B., & Bell, S. K. (2015). “Speaking up” about patient safety concerns and unprofessional behaviour among residents: validation of two scales. *BMJ Quality & Safety*, *24*(11), 671–680. <https://doi.org/10.1136/bmjqs-2015-004253>
- Maxfield, D., Grenny, J., McMillan, R., Patterson, K., & Switzler, A. (2005). Silence Kills: The seven crucial conversations for healthcare. American Association of Critical-Care Nurses (AACN). <https://psnet.ahrq.gov/issue/silence-kills-seven-crucial-conversations-healthcare>
- Medich, M., Rose, D., McClean, M., Nelson, K., Stewart, G., Ganz, D. A., Yano, E. M., & Stockdale, S. E. (2022). Predictors of VA primary care clerical staff burnout uUsing the Job Demands-Resources Model. *The Journal of Ambulatory Care Management*, *45*(4), 321–331. <https://doi.org/10.1097/JAC.0000000000000431>
- Mehta, L. S., Elkind, M. S. V., Achenbach, S., Pinto, F. J., & Poppas, A. (2021). Clinician well-being—addressing global needs for improvements in the health care field: a joint opinion from the American College of Cardiology, American Heart Association, European Society of Cardiology, World Heart Federation. *European Heart Journal*, *42*(33), 3122–3126. <https://doi.org/10.1093/eurheartj/ehab346>
- Mendlovic, J., Haklay, I., Elliott, R., & Lahad, M. (2023). COVID-19’s impact on medical staff wellbeing: Investigating trauma and resilience in a longitudinal study—Are doctors truly less vulnerable than nurses? *Trauma Care*, *3*(3), 185–201. <https://doi.org/10.3390/traumacare3030018>
- Murray, J. S., Kelly, S., & Hanover, C. (2022). Promoting psychological safety in healthcare organizations. *Military Medicine*, *187*(7–8), 808–810. <https://doi.org/10.1093/milmed/usac041>
- Murthy, V. H. (2022). Confronting health worker burnout and well-being. *New England Journal of Medicine*, *387*(7), 577–579. <https://doi.org/10.1056/NEJMp2207252>
- Needleman, J., Buerhaus, P., Pankratz, V. S., Leibson, C. L., Stevens, S. R., & Harris, M. (2011). Nurse staffing and inpatient hospital mortality. *New England Journal of Medicine*, *364*(11), 1037–1045. <https://doi.org/10.1056/NEJMs1001025>

- Nembhard, I. M., & Edmondson, A. C. (2006). 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*, 27(7), 941–966. <https://doi.org/10.1002/job.413>
- Opgenorth, D., Stelfox, H. T., Gilfoyle, E., Gibney, R. T. N., Meier, M., Boucher, P., McKinlay, D., Job McIntosh, C. N., Wang, X., Zygun, D. A., & Bagshaw, S. M. (2018). Perspectives on strained intensive care unit capacity: A survey of critical care professionals. *PLoS ONE*, 13(8), e0201524. <https://doi.org/10.1371/journal.pone.0201524>
- Panagioti, M., Khan, K., Keers, R. N., Abuzour, A., Phipps, D., Kontopantelis, E., Bower, P., Campbell, S., Haneef, R., Avery, A. J., & Ashcroft, D. M. (2019). Prevalence, severity, and nature of preventable patient harm across medical care settings: systematic review and meta-analysis. *The BMJ*, 366. <https://doi.org/10.1136/bmj.l4185>
- Petrick, J. E., and Quinn, J. F. (1997). *Management Ethics: Integrity at Work*. Sage Publications.
- Philippe, D., & Durand, R. (2011). The impact of norm-conforming behaviors on firm reputation. *Strategic Management Journal*, 32(9), 969–993. <https://doi.org/10.1002/smj.919>
- Rangachari, P., & L Woods, J. (2020). Preserving organizational resilience, patient safety, and staff retention during COVID-19 requires a holistic consideration of the psychological safety of healthcare workers. *International Journal of Environmental Research and Public Health*, 17(12), E4267. <https://doi.org/10.3390/ijerph17124267>
- Rathert, C., & Fleming, D. A. (2008). Hospital ethical climate and teamwork in acute care: The moderating role of leaders. *Health Care Management Review*, 33(4), 323. <https://doi.org/10.1097/01.HCM.0000318769.75018.8d>
- Rehder, K. J., Adair, K. C., Eckert, E., Lang, R. W., Frankel, A. S., Proulx, J., & Sexton, J. B. (2023). Teamwork before and during COVID-19: The good, the same, and the ugly. *Journal of Patient Safety*, 19(1), 36. <https://doi.org/10.1097/PTS.0000000000001070>
- Riedel, P.-L., Kreh, A., Kulcar, V., Lieber, A., & Juen, B. (2022). A scoping review of moral stressors, moral distress and moral injury in healthcare workers during COVID-19. *International Journal of Environmental Research and Public Health*, 19(3), 1666. <https://doi.org/10.3390/ijerph19031666>
- Rosen, A., Cahill, J. M., & Dugdale, L. S. (2022). Moral injury in health care: Identification and repair in the COVID-19 era. *Journal of General Internal Medicine*, 37(14), 3739–3743. <https://doi.org/10.1007/s11606-022-07761-5>

- Salas, E., Rosen, M. A., & DiazGranados, D. (2010). Expertise-based intuition and decision making in organizations. *Journal of Management*, *36*(4), 941–973.
<https://doi.org/10.1177/0149206309350084>
- Schaufeli, W. (2017). Applying the Job Demands-Resources model: A ‘how to’ guide to measuring and tackling work engagement and burnout. *Organizational Dynamics*, *46*, 120–132.
<https://www.wilmarschaufeli.nl/publications/Schaufeli/476.pdf>
- Scheepers, R. A., Boerebach, B. C. M., Arah, O. A., Heineman, M. J., & Lombarts, K. M. J. M. H. (2015). A systematic review of the impact of physicians’ occupational well-being on the quality of patient care. *International Journal of Behavioral Medicine*, *22*(6), 683–698.
<https://doi.org/10.1007/s12529-015-9473-3>
- Schwappach, D. L. B., & Gehring, K. (2014). Silence that can be dangerous: A vignette study to assess healthcare professionals’ likelihood of speaking up about safety concerns. *PLOS ONE*, *9*(8), e104720. <https://doi.org/10.1371/journal.pone.0104720>
- Sexton, J. B., Adair, K. C., Proulx, J., Profit, J., Cui, X., Bae, J., & Frankel, A. (2022). Emotional exhaustion among US health care workers before and during the COVID-19 Pandemic, 2019-2021. *JAMA Network Open*, *5*(9), e2232748.
<https://doi.org/10.1001/jamanetworkopen.2022.32748>
- Shanafelt, T. D., & Noseworthy, J. H. (2017). Executive leadership and physician well-being: Nine organizational strategies to promote engagement and reduce burnout. *Mayo Clinic Proceedings*, *92*(1), 129–146. <https://doi.org/10.1016/j.mayocp.2016.10.004>
- Shanafelt, T. D., Schein, E., Minor, L. B., Trockel, M., Schein, P., & Kirch, D. (2019). Healing the professional culture of medicine. *Mayo Clinic Proceedings*, *94*(8), 1556–1566.
<https://doi.org/https://doi.org/10.1016/j.mayocp.2019.03.026>
- Shin, S., Park, J.-H., & Bae, S.-H. (2018). Nurse staffing and nurse outcomes: A systematic review and meta-analysis. *Nursing Outlook*, *66*(3), 273–282.
<https://doi.org/10.1016/j.outlook.2017.12.002>
- Singer, S. J., Falwell, A., Gaba, D. M., & Baker, L. C. (2008). Patient safety climate in US hospitals: variation by management level. *Medical Care*, *46*(11), 1149–1156.
<https://doi.org/10.1097/MLR.0b013e31817925c1>
- SOPS Hospital Database. (2023) Agency for Healthcare Research and Quality, Rockville, MD.
<https://www.ahrq.gov/sops/databases/hospital/index.html>. <Content last reviewed July 2023.

- SOPS Hospital Survey Items and Composite Measures*. (2023, March). Agency for Healthcare Research and Quality: Hospital Survey on Patient Safety Culture.
<https://www.ahrq.gov/sites/default/files/wysiwyg/sops/surveys/hospital/hospitalsurvey2-items.pdf>
- Sorra, J. AHRQ Surveys on Patient Safety Culture™ Hospital Survey Version 2.0. Accessed on December 13, 2022. <https://www.ahrq.gov/sites/default/files/wysiwyg/sops/surveys/3-sorra-sops-hospital-survey-2-0-webcast.pdf>
- Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 21, pp. 261–302). Academic Press. [https://doi.org/10.1016/S0065-2601\(08\)60229-4](https://doi.org/10.1016/S0065-2601(08)60229-4)
- Sturm, H., Rieger, M. A., Martus, P., Ueding, E., Wagner, A., Holderried, M., Maschmann, J., & Consortium, on behalf of the W. (2019). Do perceived working conditions and patient safety culture correlate with objective workload and patient outcomes: A cross-sectional explorative study from a German university hospital. *PLOS ONE*, *14*(1), e0209487.
<https://doi.org/10.1371/journal.pone.0209487>
- Tawfik, D. S., Profit, J., Morgenthaler, T. I., Satele, D. V., Sinsky, C. A., Dyrbye, L. N., Tutty, M. A., West, C. P., & Shanafelt, T. D. (2018). Physician burnout, well-being, and work unit safety grades in relationship to reported medical errors. *Mayo Clinic Proceedings*, *93*(11), 1571–1580.
<https://doi.org/10.1016/j.mayocp.2018.05.014>
- Thomas, E. J. (2020). The harms of promoting ‘Zero Harm.’ *BMJ Quality & Safety*, *29*(1), 4–6.
<https://doi.org/10.1136/bmjqs-2019-009703>
- Tucker, A. L., & Edmondson, A. C. (2003). Why hospitals don’t learn from failures: organizational and psychological dynamics that inhibit system change. *California Management Review*, *45*(2), 55–72. <https://doi.org/10.2307/41166165>
- Vincent, C. (2010). *Patient Safety*. John Wiley & Sons.
- Vogelsmeier, A., Scott-Cawiezell, J., Miller, B., & Griffith, S. (2010). Influencing leadership perceptions of patient safety through Just Culture training: *Journal of Nursing Care Quality*, *25*(4), 288–294. <https://doi.org/10.1097/NCQ.0b013e3181d8e0f2>
- Wachter, R. M., & Pronovost, P. J. (2009). Balancing “No Blame” with accountability in patient safety. *New England Journal of Medicine*, *361*(14), 1401–1406.
<https://doi.org/10.1056/NEJMSb0903885>

- Waterman, A. D., Garbutt, J., Hazel, E., Dunagan, W. C., Levinson, W., Fraser, V. J., & Gallagher, T. H. (2007). The emotional impact of medical errors on practicing physicians in the United States and Canada. *The Joint Commission Journal on Quality and Patient Safety*, 33(8), 467–476. [https://doi.org/10.1016/S1553-7250\(07\)33050-X](https://doi.org/10.1016/S1553-7250(07)33050-X)
- Wei, H., Roberts, P., Strickler, J., & Corbett, R. W. (2019). Nurse leaders' strategies to foster nurse resilience. *Journal of Nursing Management*, 27(4), 681–687. <https://doi.org/10.1111/jonm.12736>
- Welp, A., & Manser, T. (2016). Integrating teamwork, clinician occupational well-being and patient safety - development of a conceptual framework based on a systematic review. *BMC Health Services Research*, 16, 281. <https://doi.org/10.1186/s12913-016-1535-y>
- West, C. P., Dyrbye, L. N., & Shanafelt, T. D. (2018). Physician burnout: contributors, consequences and solutions. *Journal of Internal Medicine*, 283(6), 516–529. <https://doi.org/10.1111/joim.12752>
- West, C. P., Tan, A. D., Habermann, T. M., Sloan, J. A., & Shanafelt, T. D. (2009). Association of resident fatigue and distress with perceived medical errors. *JAMA*, 302(12), 1294–1300. <https://doi.org/10.1001/jama.2009.1389>
- Wheelan, S. A., Burchill, C. N., & Tilin, F. (2003). The link between teamwork and patients' outcomes in intensive care units. *American Journal of Critical Care*, 12(6), 527–534. <https://doi.org/10.4037/ajcc2003.12.6.527>
- Wilcox, M. E., Rowan, K. M., Harrison, D. A., & Doidge, J. C. (2022). Does unprecedented ICU capacity strain, As experienced during the COVID-19 Pandemic, Impact patient outcome? *Critical Care Medicine*, 50(6), e548–e556. <https://doi.org/10.1097/CCM.0000000000005464>
- Willard-Grace, R., Knox, M., Huang, B., Hammer, H., Kivlahan, C., & Grumbach, K. (2019). Burnout and health care workforce turnover. *Annals of Family Medicine*, 17(1), 36–41. <https://doi.org/10.1370/afm.2338>
- Yang, Y. T., & Mason, D. J. (2022). COVID-19's Impact on nursing shortages: The rise of travel nurses, and price gouging. *Health Affairs Forefront*. <https://doi.org/10.1377/forefront.20220125.695159>
- Yeung, J. H. Y., Ong, G. J., Davies, R. P., Gao, F., & Perkins, G. D. (2012). Factors affecting team leadership skills and their relationship with quality of cardiopulmonary resuscitation*. *Critical Care Medicine*, 40(9), 2617–2621. <https://doi.org/10.1097/CCM.0b013e3182591fda>
- Zajac, S., Woods, A., Tannenbaum, S., Salas, E., & Holladay, C. L. (2021). Overcoming challenges to teamwork in healthcare: A team effectiveness framework and evidence-based guidance. *Frontiers in Communication*, 6. <https://www.frontiersin.org/articles/10.3389/fcomm.2021.606445>

Zero Harm | *The Joint Commission*. (n.d.). Retrieved December 19, 2023, from <https://www.jointcommission.org/resources/patient-safety-topics/zero-harm/>

Zhou, T., Xu, C., Wang, C., Sha, S., Wang, Z., Zhou, Y., Zhang, X., Hu, D., Liu, Y., Tian, T., Liang, S., Zhou, L., & Wang, Q. (2022). Burnout and well-being of healthcare workers in the post-pandemic period of COVID-19: a perspective from the job demands-resources model. *BMC Health Services Research*, 22, 284. <https://doi.org/10.1186/s12913-022-07608-z>