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Leadership Styles, Safety Culture Elements, and Serious Safety Events: An Empirical  
Investigation within a Healthcare System

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This journey would not have been possible without my constancy of purpose, vision, and faith in God.

## Leadership Styles, Safety Culture Elements, and Serious Safety Events: An Empirical Investigation within a Healthcare System

### ABSTRACT

Patient safety in healthcare is a societal concern. In 2016, researchers at Johns Hopkins Hospital identified medical errors as the third leading cause of death in the United States, citing over 400,000 potential deaths annually (Bernstein, n.d.; Makary, 2016). While there is debate on the number of deaths related to medical errors, this remains a problem in the United States, and there is an opportunity for better tracking (Allen & Pierce, 2016).

The purpose of this cross-sectional, non-experimental study was two-fold: (1) to determine if leadership style impacts serious safety events (SSE) and (2) if a safety culture mediates this relationship. This study examined leadership styles of leaders in three hospitals in a health system located in the Mid-Atlantic region of the United States through the MLQ self-assessment survey. The findings of this study found Transactional leadership was associated with fewer serious safety events, and safety culture teamwork did not mediate this relationship. Transformational leadership was associated with more serious safety events and also was not mediated by safety culture teamwork. While this was an unexpected finding, literature does support the attributes of transactional leadership being associated with positive task performance, whereas transformational leadership is associated with contextual performance.

The findings of this study will contribute to the development of leadership training programs in the health system to develop safety leaders at three levels including executive leaders, management, and supervisory leadership. The concept of shared leadership also emerged in the study as an implication for practice. There is also an opportunity to study the impact of staff turnover and temporary staff on safety culture and serious safety events.

# Leadership Styles, Safety Culture Elements, and Serious Safety Events: An Empirical Investigation within a Healthcare System

## CHAPTER 1: INTRODUCTION

### Historical Background

Over 36 million people are hospitalized in over 6,000 hospitals in the United States every year (AHA, 2019). Since *To Err is Human* was published in 2000, citing more than 98,000 people die annually from medical errors (Institute of Medicine [IOM], 2000), the problem remains today. Andel et al. (2012) highlighted preventable medical errors as one of the top ten leading causes of death in the United States. In 2016, researchers at Johns Hopkins Hospital identified medical errors as the third leading cause of death in the United States, citing over 400,000 deaths annually that are potentially related to medical errors (Makary, 2016). While there is controversy over the accounting for deaths from medical errors (Allen & Pierce, 2016; Rodwin et al., 2020), there is agreement the goal should be zero harm (TJC, 2017). Sunshine et al. (2017) found while a modest decline has been noted from 1990-2016, it is still unclear on the progress that has been made. Rodziewicz & Hipskind (2020) continue to note the serious public health problem of medical errors.

In addition to harm and loss of life, preventable medical errors expose economic concerns as well. The Agency for Healthcare Research and Quality (AHRQ) defines SSEs as, “in any healthcare setting, as a deviation from generally-accepted practice or process that reaches the patient and causes severe harm or death” (Agency for Healthcare Research and Quality [AHRQ], 2014). David et al. (2013) concluded that medical errors cost an estimated annual total of \$985 million in 2008 and over \$1 billion in 2009. Andel et al. (2012) also noted in 2008 an estimated \$19.5 billion in preventable medical error costs in the United States. These costs are not only

directly related to additional medical care and increased mortality rates, but also to missed days from work and disability claims. Rodziewicz and Hipskind (2020) note that, depending on the study, medical errors continue to cost anywhere from \$4 billion to \$20 billion per year. In another study by the Accreditation Association for Ambulatory Health Care, medication errors cost \$21 billion in annual healthcare costs (Relias Media, 2020). Because of restrictions on hospital reimbursement, these costs also impact the profitability of hospitals. Patient safety is a significant component of healthcare costs and overall healthcare quality in the United States.

The Institute of Medicine (2001) noted six attributes of quality care, which have stood the test of time, that would better meet patients' needs are depicted in Table 1. These aims were incorporated as an underlying framework in the Affordable Care Act of 2010 (Honoré et al., 2011).

**Table 1**

*IOM Attributes of Quality Care*

Attributes of Quality Care	
Patient-Centered Care	Safe Care
Timely Care	Effective Care
Equitable Care	Efficient Care

Further, the IOM (2001) found that patients expect to be safe from injury caused by the healthcare system, and that reducing risk and ensuring safety would require leadership changes to systems to help prevent and mitigate errors. For example, when patients go to a hospital for a procedure, they expect to have the correct procedure, to be given the correct treatments and medications, and to be discharged from the hospital without any hospital-acquired complications

or infections. Weick and Sutcliffe (2007) described High Reliability Organizations (HROs) as organizations with mindful infrastructure that consistently deliver safe outcomes and manage the unexpected. The healthcare industry, as well as other high-risk industries such as aviation and energy, have been adopting these principles to ensure reliable safety. A qualitative study that explored the perceptions of nursing and respiratory staff found four themes associated with characteristics of HRO concepts, including: (1) process standardization; (2) checks and redundancy; (3) authority migration; and (4) communication and teamwork (Padgett et al., 2017).

Safety, as a component of healthcare quality, requires leadership at all levels within an organization. An important aspect of safety is a safety culture. Further research about the relationship between Serious Safety Events (SSEs) and safety cultures has been highlighted by Mardon et al. (2010). Their study linking preventable medical errors measured as SSEs and safety culture elements found that a more positive patient safety culture was associated with fewer SSEs in hospitals (Mardon et al., 2010). In a cross-sectional study of acute care nurses, Boamah et al. (2018) found that strong transformational leadership had a positive influence on workplace empowerment, which in turn correlated with lower SSEs.

Safety culture is a facet of an organizational culture. Schein (2010) defined an organization culture as how an organization's team members interpret their experiences, values, beliefs about work, and behavior norms for how work is performed. In healthcare, Frankel et al. (2017) described safety culture as including shared values, relationships, psychological safety, and effective communication. Yang et al. (2009) reiterated this definition and expanded safety culture as one that reflects attitudes, beliefs, perceptions, and values that employees share in

relation to safety. These descriptions of culture and safety culture all share common attributes of shared values, relationships, perceptions, and effective communication.

Two of these safety culture elements are consistent with the discussion by Frankel et al. (2006) of a safety culture as having three attributes: (1) a just or non-punitive culture; (2) an engaged leadership and team; and (3) communication effectiveness. In a review of the research dating from 2000 to 2012, Weaver et al. (2013) noted the opportunity to investigate safety culture as a cross-cutting contextual factor that can moderate the effectiveness of other patient safety practices, specifically by incorporating team training and supporting team communication. This research supports teamwork effectiveness as a key aspect of safety culture.

Additionally, DiCuccio (2015) highlighted the opportunity for more research to identify the interventions to improve safety culture and safety outcomes. Nieva and Sorra (2003) also noted two key aspects to a safety culture: (1) a non-punitive environment; and (2) teamwork effectiveness. Nieva and Sorra (2003) discussed the opportunity to investigate how to use safety culture assessment data to initiate and change culture and combine the data with other patient safety information to improve safety. Based on the opportunity to improve safety in healthcare, Nieva and Sorra sought to further investigate safety culture, leadership, and preventable medical errors.

The first aspect of safety culture Nieva and Sorra address is a non-punitive environment. A non-punitive environment includes the concept of a “Just Culture,” coined by Marx (2001). The term “Just Culture” refers to a culture in which the focus is on processes and behavior choices for mistakes rather than on blame. The Just Culture model acknowledges that human error occurs and includes creating an open, fair, and learning culture. The focus of a Just Culture is to design safe systems or processes and to manage behavior choices. The three behaviors

described in the Just Culture model include: (1) human error; (2) at-risk behavior; and (3) reckless behavior (Marx, 2001). Human error is recognized as part of the human condition and is an inadvertent action rather than a conscious behavior choice (Marx, 2001). At-risk behavior is a choice where the risk may not be recognized, whereas reckless behavior is a conscious disregard for reasonable risk. The Just Culture model also includes three duties: (1) a duty to avoid causing harm or unjustified risk; (2) a duty to produce an outcome; and (3) a duty to follow a procedural rule (Marx, 2001). The application of the Just Culture model in an organization is foundational to creating a non-punitive environment. In a Congressional Hearing (2000), Lucian Leape, MD noted that, “the single greatest impediment to error prevention in the medical industry is that we punish people for making mistakes” (p. 70). Edwards (2018) found in a study of 457 acute care hospitals, that wide-spread adoption of Just Culture had not reduced the reluctance to report, or the non-punitive response to error aspect of safety culture. The Just Culture, which intends to promote a non-punitive environment, needs to be studied further, specifically as it relates to preventable medical errors and leadership.

The second element in a safety culture according to Nieve and Sorra is teamwork effectiveness, which requires team-level empowerment and the development of shared leadership. Frankel et al. (2017) described shared leadership as leaders not identified by position or rank. Rather shared leadership is leadership that exists in all levels of the organization, including formal and informal leadership. Armstrong and Laschinger (2006) a model where team members are empowered because of access to information, support, resources, and opportunities to learn and grow in their work setting. Effective teams develop behavior norms that lead to shared understanding, anticipate needs and problems, and use agreed-upon methods to manage situations, including those involving conflict. Groups that do this well reflect a high degree of

teamwork, which includes robust communication (Frankel et al., 2017). Chassin and Loeb (2013) highlighted the negative impact of poor communication on teamwork both within and between teams as a common condition in health care. Poor communication is specifically prevalent in the transitions from one care setting to another, which are fraught with risks of error due to the conveyance of incomplete or inaccurate crucial patient information.

The need for robust communication as part of teamwork in the prevention of medical errors is noted by Manser (2009) and requires empowerment, effective communication, and leadership. The five stages of the empowerment process (Table 2), adapted from Conger and Kanungo (1988), note a movement from psychological powerlessness to empowerment and ultimately behavioral effects. Such behavioral effects include initiation and persistence to complete work or tasks. Further, the model identifies several factors that lead to the potential lowering of empowerment beliefs, such as hierarchical leader behavior, high rule structure, and lack of appropriate authority. These leadership characteristics are found in both transformational and transactional leadership styles.

**Table 2**

*Five Stages of Empowerment Process Adapted from Conger and Kanungo*

Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Conditions leading to psychological state of powerlessness	Use of managerial strategies and techniques	Provide self-efficacy information to subordinates	Results in empowering experience of subordinate	Leading to behavioral effects
Organizational factors, supervision, reward system, nature of job	Participative management, goal setting, feedback system, modeling, contingent, competence-based reward, job enrichment	Enactive attainment, vicarious experience, verbal, persuasion, emotional arousal, and remove conditions under Stage 1	Strengthening of effort, performance expectancy or belief in personal efficacy	Initiation/persistence of behavior to accomplish task objectives

In their literature review, Flin and Yule (2004) reported a link between effective leadership and safety performance in high hazard and complex working environments, such as aviation and energy. Flin and Yule (2004) also noted that an opportunity exists to study transformational and transactional leadership theory and patient safety in healthcare. The relationship of leadership style to safety culture and SSEs is the focus of this study.

Leaders play a critical role in supporting a robust learning system and communication, which enables teamwork effectiveness. The Institute for Healthcare Improvement (IHI) described leaders in safety culture in the following manner:

They serve as guardians of the learning system, meaning they must fully understand, encourage, and apply the concepts of improvement, reliability, and continuous learning. Through regular self-reflection, they encourage transparency at every level and inspire learning in their areas of responsibility and throughout the organization (Frankel et al., 2017, p. 6).

Frankel et al. (2006) noted that effective teamwork and communication requires visible and consistent senior leadership involvement, clinical physician leadership, and use of processes and tools in the clinical work. Healthcare leadership not only include senior leaders but also leaders in middle and front-line management. Gutberg and Berta (2017) proposed the unique position of middle management as being between upper and lower levels in the organization and the opportunity to engage in “ambidextrous” learning as a way to impact safety culture. This supports the concept of shared leadership at all levels of the organization. Weaver et al. (2013) conducted a systematic review and found similar evidence of effectiveness of leadership interventions, which provided the opportunity for visibility and learning and positively impacted perceptions of safety culture and patient safety outcomes.

Preventable medical harm is a compelling reason to study the impact of leadership and safety culture in making healthcare safer and more cost effective. The American College of Healthcare Executives and IHI/Lucian Leape Institute (2017) suggested that leaders seeking to transform their organization’s safety culture would do well to commit focused attention on six key areas: (1) establishing a compelling vision for safety; (2) building trust, respect, and

inclusion; (3) educating and engaging board members in patient and workforce safety issues; (4) emphasizing safety in the development and recruitment of clinical leaders and executives; (5) adopting Just Culture principles to focus on system flaws over individual blame when things go wrong; and (6) setting and modeling behaviors such as transparency, active communication, and civility as expectations for all team members. To continue to improve the safety of healthcare, leadership and a safety culture need to be studied in relation to the reduction of preventable medical harm.

The role of healthcare leaders is to inspire and create a culture that empowers team members to work together to positively impact safety. Bass and Riggio (2006) described four components of transformational leadership from the work of Avolio et al. (1999), which focused on influence, inspirational motivation, intellectual stimulation, and individualized consideration. Conger and Kanungo (1988) highlighted the relationship between empowerment and motivation in the process of developing an intrinsic need for self-determination. Bandura (1977) further expanded on this concept in describing a belief in personal self-efficacy. Additionally, transformational leadership characteristics described by Bass and Avolio (1994)—including the ability of the leader to inspire followers to a shared vision—align with the six focus areas for leaders transforming a safety culture previously described by the American College of Healthcare Executives and IHI/Lucian Leape Institute (2017). These components also align with the focus of Just Culture principles, transparency, and civility.

Safety in healthcare requires a safety culture that includes a non-punitive environment and teamwork effectiveness. These elements of safety culture have been suggested to reduce SSEs. According to findings of a study by Mardon et al. (2010), the concept of a more positive safety culture is associated with fewer SSEs; however, the study noted that more research is

needed to determine the generalizability of the results to larger sets of hospitals and to examine the causal relationship between safety culture and SSEs. Singer et al. (2003) found in a study of 15 hospitals in California that the perceptions of safety culture differed significantly, not only between hospitals but also by clinical status and job class within individual institutions. Further, these studies confirmed that more research is needed to verify these results and to determine how senior leaders and managers can successfully transmit their commitment to safety to the clinical workplace. In addition, Schein (2010) discusses three groups of management: executives; operators; and engineers. Each of these groups has specific focuses and subcultures. Misalignment or poor communication between these groups is contrary to the robust communication required in a safety culture.

Preventable medical errors are a crisis in the U.S. due to both loss of life and serious harm as well as the negative economic impact on hospitals. For this reason, understanding the leadership style that will impact improvement of healthcare safety is paramount. Bass and Riggio (2006) noted that effective leaders are more transformational in style, with leadership focused more on inspiration and empowerment, whereas less effective leaders are either passive or focused more on transactions versus the larger ideals of change. Based on this position, it is important to investigate the relationship between leadership style, safety culture, and their influences on SSEs. Empirical research connections between leadership style and safety culture have the potential to inform the selection of leaders, with specific leadership styles, who can then be trained and coached to have a positive impact on safety culture and SSEs.

### **Statement of the Problem**

Preventable medical errors measured as SSEs in hospitals are a societal concern. However, effective healthcare leaders who can create and implement environments for patient

safety could help remediate the problem. In looking to reduce unnecessary deaths related to these preventable medical errors, there is an opportunity to understand the impact of leadership style. By rethinking our approach to healthcare safety and identifying what leadership style affects these elements of safety, we have the opportunity to select, train, and coach leaders with the leadership style that will improve safety and reduce preventable harm. A review of the literature has demonstrated that a gap exists in the relationship between leadership styles and safety outcomes, specifically the mediating role of safety culture in this relationship (Clarke, 2012; Merrill, 2015; Wang et al., 2011; Weng et al., 2016; Whittington et al., 2009). There is evidence that both transformational leadership and transactional leadership have an impact on safety behaviors and adverse events. Therefore, an opportunity existed to study the relationship of leadership style and preventable medical harm and the mediating effect of a non-punitive environment and teamwork effectiveness as part of safety culture.

Before beginning this study, the hypothesis was that healthcare leaders demonstrating transformational leadership will have a better safety culture and lower SSEs than those of leaders demonstrating transactional leadership and passive-avoidant. The relationship of leadership and safety culture and ultimately the role of leaders in preventing SSEs is discussed in this study.

The Full Range Leadership (FRL) model by Bass and Avolio (1994) is a theory focused on the behavior of leaders towards their followers in the workplace and provided the model framework for this research. The model describes three leadership styles: transformational, transactional, and passive-avoidant. Chassin and Loeb (2013) described the most advanced safety culture and high-reliability stage of maturity as an organization where transparency and codes of behavior exist, and staff takes personal accountability for safety. The Theoretical Framework of this research is based on the concept that movement toward transformational

leadership style both improves engagement, moving from passive to active, and increases efficiency. This framework connects to the underlying problem posed in this research, which is to determine which leadership style has a positive impact on SSEs.

Transformational leaders focus on motivation and inspiration and serve as role models for colleagues and team members or followers (Bass and Avolio, 1994). Healthcare is a team-based activity and leaders have the ability to create high-performing teams by supporting their team members in achieving job performance and attainment of goals (Latham, 2018). Empowerment can be a motivational tool and is noted to entail allowing individuals to perform tasks while simultaneously enhancing individuals' task-related self-efficacy (Locke, 2009).

Motivation occurs in a people-focused culture that values empowerment, autonomy, innovation, and teamwork. Latham (2018) highlighted three elements for motivating team members: providing psychological safety; setting performance goals; and avoiding demotivation. Psychological safety and avoiding demotivation are related to the concept of a non-punitive environment. This is consistent with findings of Zaccaro et al. (2001), which noted the importance of the reciprocal influence of leadership and team processes that allow for team members to integrate their roles into collective team success.

The relationship between leadership, teamwork, and psychological safety is important in a safety culture. The adhocracy structure is characterized by a "coordination and mutual adjustment among all its parts; and the structure is decentralized selectively in both vertical and horizontal dimensions" (Mintzberg, 1980, p. 322). Shortell et al. (1995) found that a participative, flexible, risk-taking organizational culture was significantly related to quality improvement implementation and, in contrast, hierarchical bureaucratic cultures served as a barrier to quality-improvement implementation. An adhocracy culture ties to the concept of

shared leadership where sharing power and influence, being transparent, and encouraging autonomy is a cornerstone. Transformational leaders focus on motivation and inspiration of other leaders and team members, thus creating a culture for shared leadership.

Chassin and Loeb (2013) noted leadership as an essential part of developing the attributes of an HRO. Weick and Sutcliffe (2007) describe an HRO as an organization with characteristics that include sensitivity to small failures, resisting oversimplification, sensitivity to operations, capacity for resilience, and empowering the team members closest to the work. HROs are noted to maintain consistently high safety levels. These HRO principles, translated to healthcare, require leaders who will influence their team members to develop behaviors, habits, and processes that result in outstanding and ever-improving performance (Frankel et al., 2017).

Clarke (2012) found in a meta-analytic review of transformational and transactional leadership styles that both transformational and active transactional leadership styles had a positive association with both perceived safety climate and safety participation. Whittington et al. (2009) found in a field study that examined leader-follower dyads that transactional leadership was positively related to the outcomes of organizational performance, affective commitment, citizenship behavior, and trust. The literature supports both relationships of transformational and transactional leadership and positive safety outcomes.

It is important to understand healthcare leaders' leadership style and the impact on safety culture and SSEs. Yang et al. (2009) highlighted that leadership affects safety culture and safety performance in the healthcare setting. Their study suggests that safety performance improves with a positive patient safety culture and leadership that shows concern and provides motivation and support for the team. Flin and Yule (2004) highlighted that effective leadership has been shown to improve safety performance in high hazard and complex working environments, such

as in aviation, energy, and manufacturing. Both of these studies suggest an opportunity for more research in the areas of healthcare leadership, safety culture, and preventable medical errors.

In the healthcare system today, people are continuing to be seriously harmed by or die from preventable medical errors. In addition, hospitals are losing money due to this safety and quality issue. There is a need to understand the kind of culture and leadership that will decrease unnecessary harm, death, and costs in our hospitals today. To continue to improve patient safety in hospitals, a study of leadership styles that have the most significant impact on elements of safety culture and SSEs is necessary. The opportunity for this study is to understand the impact of leadership style on SSEs and the mediating effect of a non-punitive environment and teamwork effectiveness.

### **Theoretical Framework**

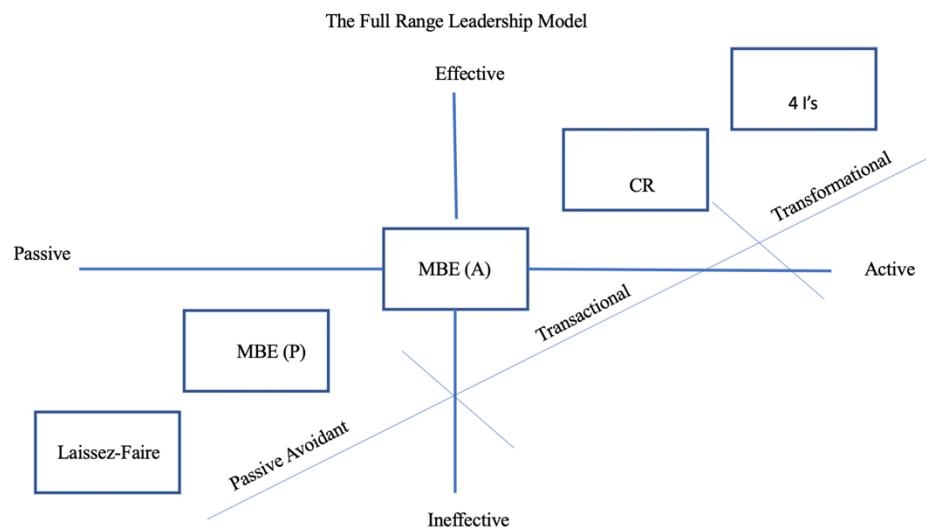
The FRL Model developed by Bass and Avolio (1994) describes three distinct leadership styles and was the main theoretical model for this study. Burns (1978) described leadership as either transformational leadership, which is characterized by inspiration and empowerment, or transactional, a relationship characterized by social exchange. Transformational leaders are charismatic, inspiring, stimulating, and considerate. They provide followers with a sense of purpose, portray images of success, self-confidence, and self-belief, and articulate shared goals, mutual understanding, and attractive futures. Transformational leaders question traditional assumptions and encourage others to approach problems from many different angles. They do all of this while considering the level of maturity, capabilities, and needs of subordinates by treating employees as unique individuals. Figure 1, adapted from Bass and Avolio (1994), shows how transformational leadership builds on transactional leadership in what is called the “augmentation effect.”

Transactional leadership is focused on the roles and tasks necessary to accomplish tasks for team members to achieve desired outcomes (Avolio & Bass, 1999). While this can be motivating by providing a sense of direction, this can also be limited to exchanges of performance and reward and not drive empowerment.

In contrast, passive-avoidant leadership is characterized as the avoidance or lack of leadership. Leaders with passive-avoidant style avoid engagement in decision-making and problem solving (Bass & Avolio, 1994).

**Figure 1**

*Full Range Leadership Model Adapted from Bass and Avolio*



*Note.* This figure shows the range of leadership styles in the Full Range Leadership Model.

Over the last 20 years, Avolio and Bass (1999) have had interest in the measurement of leadership style, specifically transformational, transactional, and passive-avoidant leadership (Avolio & Bass, 1999). The Multifactor Leadership Questionnaire (MLQ) was developed by Avolio and Bass (2004) to measure not only transformational and transactional leadership styles

but also the full continuum of leadership, including the passive-avoidant style of leadership. The instrument measures the styles along a continuum and has been characterized by the components included in the MLQ. The leadership style and components are included in Table 3 (Avolio et al., 1999).

**Table 3**

*MLQ Full Range Leadership Model*

Leadership Style	Components
Transformational	Idealized Attributes or Idealized Influence (Attributes)
Transformational	Idealized Behaviors or Idealized Influence (Behaviors)
Transformational	Inspirational Motivation
Transformational	Intellectual Stimulation
Transformational	Individual Consideration
Transactional	Contingent Reward
Transactional	Management by Exception (Active)
Passive-Avoidant	Management by Exception (Passive)
Passive-Avoidant	Laissez-faire

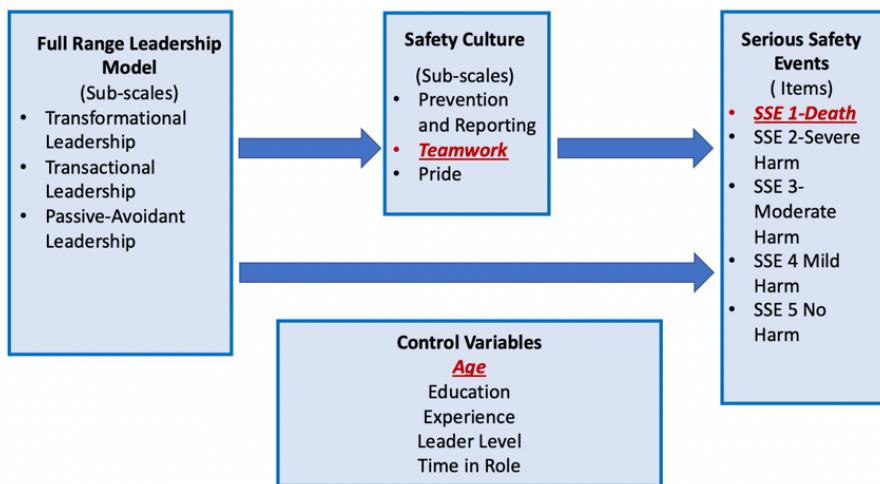
The Theoretical Framework utilized in this study is based on the concept that movement toward transformational leadership style both improves engagement, moving from passive to active, and increases efficiency. This framework connects to the underlying problem posed in this research, which is to determine the leadership style that will have a positive impact on SSEs.

Effective use of transformational behaviors can motivate subordinates to set aside personal goals and adopt the espoused goals of the group or organization. This motivates subordinates to extra levels of effort and therefore can improve performance beyond expected

levels. Bandura (1977) highlighted the fact that motivation or empowerment strengthens personal efficacy expectations and creates self-inducements to attain performance results. This is consistent with Stages Four and Five in the empowerment process described by Conger and Kanungo (1988), where leadership practices focus on expressing confidence in followers and setting high-performance expectations, which leads to self-efficacy and empowerment. While in a meta-analysis by Wang et al. (2011) found a relationship between transformational leadership and positive follower performance, there was also evidence of an augmentation effect over transactional leadership in predicting contextual performance and team-level performance.

### **Conceptual Framework**

This research sought to determine which leadership style predicted the lowest SSE as a measure of healthcare safety. The Conceptual Framework in Figure 2 is based on the relationship of leadership to culture and safety outcomes. According to Chassin and Loeb (2013), leadership is an essential part of delivering safe healthcare. This includes a commitment by leaders to zero patient harm and enable a fully functional safety culture. The Framework begins with leadership style, specifically the three leadership styles described by Bass and Avolio (1994) in the FRL Model. The dependent variable is SSE and the mediating variable is safety culture teamwork.

**Figure 2***Conceptual Framework*

*Note.* This figure shows the Conceptual Framework used for this study.

The leadership style of a leader has an influence on culture, behavior, and performance outcomes (Chassin & Loeb, 2013). Several studies have demonstrated the influence of leadership styles on organizational performance and culture. Armstrong and Laschinger (2006) noted relationships between workplace empowerment and safety culture. This is consistent with the second element of the *Blueprint for Success* (American College of Healthcare Executives and IHI/Lucian Leape Institute, 2017), which is building trust, respect, and inclusion. Transformational leaders are noted to be leaders who can inspire, empower, and align the objectives of the organization to enable followers to exceed expected levels of performance (Bass & Riggio, 2006). In this study, leadership style was measured using the MLQ 5X Leader Form self-assessment.

In this study, leaders in three levels were identified: senior leaders, middle management, and front-line leaders. Williams and Reid (2009) noted that having effective visible leaders at all

levels of the organization is required to improve healthcare safety. These three leadership levels mirror the three aspects of culture described by Schein (2010). According to Flin and O'Connor (2008), leadership for safety can be exercised at all levels in the organization. Senior leadership is responsible for setting safety as a priority, while middle and front-line leadership is responsible for ensuring accountability for safety practices. Further, the authors posit there are six responsibilities leaders must utilize to improve safety: setting safety as a priority; providing visible leadership; ensuring accountability; developing scorecards; monitoring progress; and improving staff knowledge related to safety. Flin and Yule (2004) highlight the importance of different levels of leadership in safety in industry. Emerging findings found that participative and transformational styles were important at all levels of management, whereas transactional styles with attention to monitoring and accountability have been effective at the middle management and front-line management levels (Clarke, 2012; Wang et al., 2011; Whittington et al., 2009).

The ultimate outcome of safety leadership is to prevent SSEs.

An SSE is defined by the American Society for Healthcare Risk Management (ASHRM) (2014) as an unexpected death not related to the natural or expected course of a patient's illness. Patient outcome is symptomatic, requiring life-saving intervention or major medical-surgical intervention, shortening life expectancy or causing major permanent or temporary harm or loss of function. SSE was an outcome measure for healthcare safety in this study. There are two levels of harm included in the SSEs. Table 4, adapted from ASHRM (2014), includes serious harm levels and patient outcomes. SSEs are self-reported by any healthcare employee. The events are reviewed by the patient safety department and categorized according to the definitions from ASHRM. In their review of error reporting systems, Thomas and Peterson (2003) noted that while error reporting systems have the advantages of capturing latent errors, provide multiple

perspectives over time, and are part of routine operations, the disadvantages include reporting and hindsight bias.

**Table 4**

*Safety Event Classification and Patient Outcomes*

Safety Event Class	Level of Harm	Code	Patient Outcome
Serious Safety Event (SSE)	Death	SSE-1	Unexpected death not related to natural course of illness.
	Severe	SSE-2	Patient outcome requires life-saving intervention. Shortening life expectancy or causing major permanent or temporary harm.
	Permanent or Temporary Harm		
	Moderate	SE-3	Patient outcome is symptomatic, requiring intervention, an increased length of stay, or causing permanent or temporary loss of function or harm.
	Permanent or Temporary Harm		
Safety Event Class	Level of Harm	Code	Patient Outcome
Mild Permanent or Temporary Harm	Mild	SE-4	Patient outcome is symptomatic, symptoms are mild, loss of function or harm is minimal or intermediate, but short-term, and minimal or no intervention is required.
	Permanent or Temporary Harm		
	No Detectable Harm/ No Harm	SE-5	Patient outcome is asymptomatic. No symptoms are detected, and no treatment is required. Not able to discover or ascertain the existence, presence or fact of harm, but harm may exist. Harm may appear later.

Safety culture in healthcare has several measurable elements and has been compared to the characteristics of an HRO (Chassin & Loeb, 2013; Frankel et al., 2006). The elements of safety culture include a non-punitive environment, teamwork effectiveness, and pride and reputation, which are associated with High Reliability Organizations (HROs) and healthcare

safety. Effective teamwork includes patterns of communication, coordination, and leadership. Chassin and Loeb (2013) noted that a culture of safety that fully supports high reliability has three central attributes: trust; speaking up; and a focus on improvement. A non-punitive environment is the element of a culture of safety that allows for team members to report close calls and unsafe conditions, leading to early problem resolution before patients are harmed. These events are routinely communicated (Frankel et al., 2017).

The impact of leadership style, including transformational, transactional, and passive-avoidant leadership, on SSEs was studied to identify which of these three styles had a positive impact on SSE. In addition, the mediating effect of safety culture was part of the study to determine if there was any effect on the relationship between leadership style and SSEs.

### **Purpose of the Study**

The purpose of this study is to first determine if leadership style positively impacted SSEs and if safety culture mediates the relationship. Second, this study was intended to identify which leadership style would most positively impact SSEs in hospitals. Results from this study can be used to improve healthcare leadership selection, training, and coaching, and to understand the impact of leadership style on healthcare safety in hospitals. The purpose and importance of this study is described in the following discussion, including the linkage between SSEs, safety culture and leadership style.

Healthcare safety is a recognized societal issue, as preventable medical errors result in unnecessary harm and death in the United States (IOM, 2000; Makary, 2016) and create a negative economic impact (Andel et al., 2012; David et al., 2013). The Joint Commission on Accreditation (JTC) (2017) highlighted the need for leaders to lead their organizations to provide care with zero preventable medical errors. Leaders are responsible for the culture and safety of

healthcare delivered in their hospitals. Safety culture has been recognized as an important component of safety in healthcare. In a cross-sectional study of 91 hospitals, Singer (2009) found hospitals with better safety culture results, including a non-punitive environment, were associated with lower selected safety events.

The role and impact of leadership is recognized as an important component in developing a safety culture and safety practices to prevent SSEs. In a systematic review of 18 studies between 2004 and 2015, Sfantou et al. (2017) found that while many of them recognize leadership style as an element for safety as part of quality, few of the studies identified a correlation between a certain leadership style and patient safety outcomes. This indicates an opportunity for further study and provided the inspiration for this research.

### **Research Questions**

Weaver et al. (2013) performed a systematic review of over 33 studies on promoting healthcare safety culture as a strategy to improve safety. In this review, they noted that there is an opportunity to further understand the role of safety culture in the implementation of safety practices to avoid SSEs. It is for this reason that the three styles of leadership—transformational, transactional, and passive-avoidant—were studied to determine the impact on SSEs and the mediating effect of safety culture. The Research Questions (RQs) are as follows: (1) What is the relationship between leadership styles including transformational, transactional, and passive-avoidant and SSEs?; and (2) How does safety culture mediate the relationship between leadership styles and SSEs? These questions are important and build on previous studies in the area of high reliability and culture of safety.

## **Significance of the Study**

This study contributed to the growing body of research on effective leadership and patient safety in healthcare. Specifically, this study determined the impact of leadership styles on lower preventable medical errors and the relationship to a safety culture. Preventable medical errors are a quality and economic issue in healthcare today (Andel et al., 2012; IOM, 2000; Makary, 2016). For example, an instance in which a patient receives an incorrect dose of medicine that causes either death or permanent disability due to a medication error is considered to be a preventable medical error. An opportunity exists to understand the relationship between leadership styles and lower SSEs and the effect of safety culture. The primary beneficiaries of the study were all of those who were hospitalized by the potential reduction of serious safety events.

This study built on conclusions of Weaver et al. (2013) from the review of 33 studies, which demonstrated evidence that interventions to promote a safety culture, including executive walk arounds, may improve the indices of patient harm. These studies did not explore leadership style or a non-punitive environment as part of safety culture. In addition, several limitations were noted in the review of the studies.

The goal of the study was to identify leadership styles that have the most positive impact on preventable medical errors and the effect of safety culture. This information can be used to select, coach, and train healthcare leaders to improve the safety culture and reduce preventable medical errors in hospitals. This study will contribute to the body of literature on healthcare safety, specifically on the leadership styles that should be selected to lead healthcare organizations. Human resources and organizational development leaders can use the results of this study in developing interviewing guides, leadership coaching, and training programs.

Previous studies have identified the role of effective leadership in safety culture and positive safety outcomes (Sfantou et al., 2017). This study addressed three levels of leadership responsible for clinical departments: senior leaders, middle management, and front-line leaders. As previously discussed, the problem of safety in healthcare requires continued research and focus.

### **Overview of Methodology**

The site of the study was a medium-sized healthcare system located in the Mid-Atlantic region near a large metropolitan city. The health system was comprised of acute care hospitals, home health services, urgent care clinics, outpatient clinics, and physician practices employing over 5,000 people. The study included three hospitals; two of the hospitals were acute care hospitals and the third hospital was an acute rehabilitation hospital. The sample was 136 leaders within these three acute hospitals and consisted of three levels of management: senior management; middle management; and front-line management, responsible for providing management and leadership to clinical areas in the hospital. Examples of these leadership levels include vice presidents, directors or managers, and supervisors. The study was a cross-sectional, predictive, non-experimental design. I serve as a senior executive in the health system and did not have a reporting relationship with any of the study participants.

This study used a quantitative analysis that included correlation, path analysis, and multiple regression. The independent variable was leadership style. The dependent variable was SSE and the mediating variable was safety culture.

The sample of leaders responsible for clinical areas and who voluntarily chose to participate in the study was 80 participants. The study measured the relationship of three

leadership styles to SSE and determined if safety culture mediated the relationship between leadership style and SSE.

Leadership style was measured using the MLQ Form 5X-Short (Avolio & Bass, 2004). The form was completed by the leader as a self-evaluation of leadership style. The consent forms and surveys were distributed electronically via email in the health-system.

Preventable medical error was measured by serious safety events (SSE). This was archival data retrieved from the health system event reporting database. All events were voluntarily reported. The definition of SSE includes those events that reach the patient and cause death or serious harm (ASHRM, 2014).

Safety culture was measured by the three following factors: Prevention and Reporting (Factor One); Resources and Teamwork (Factor Two); and Pride and Reputation (Factor Three) (Press Ganey, 2015). These factors captured perceptions of a non-punitive environment, teamwork effectiveness within units and teamwork across units, and pride and reputation. These factors are consistent with Frankel et al.'s (2006) discussion of safety culture attributes including a just or non-punitive culture, engaged leadership and team, and communication effectiveness.

## **Assumptions**

The following assumptions were made for this study:

1. It was assumed that survey participants in this study were not deceptive with their answers and that the participants would answer questions honestly and to the best of their ability. All participants were provided confidentiality statements in addition to information on how to withdraw from the study without penalty.
2. It was assumed that this study was an accurate representation of healthcare leader's leadership practices.

3. It was assumed that the MQL 5X survey and the Safety Culture survey were valid and reliable instruments for the measurement of transformational and transactional leadership practices, and safety culture. Previous use of these instruments demonstrated the instruments were valid and reliable in self-reporting.
4. It was assumed that quantitative research would not establish cause and effects between variables but rather would establish a relationship between variables. A strong relationship was assumed to be generalizable to the entire population within the health system.
5. It is assumed self-reported serious safety events to be an accurate accounting of the serious safety events which have occurred since there are other methods of review to ensure reporting.

## **Limitations**

The limitations identified in this study were related to social desirability, cross-sectional nature of the data, sample size, the voluntary nature of the study, and the non-profit community health system hospitals as the study site. Social desirability bias can occur when there is a potential for study participants to give “correct” responses that would be positively evaluated by others (Maruyama & Ryan, 2014). Three conditions in this study could have had social desirability: (a) leadership self-assessment; (b) identification of participants; and (c) self-reporting of SSEs. While I had no reporting relationships to any of the study participants, I hold a senior executive role in the health system, which is very visible. In addition, the cross-sectional nature of the data potentially weakens the internal validity since the data is collected at only one point in time (Maruyama & Ryan, 2014).

The sample size was limited to three levels of leaders associated with clinical areas in three hospitals in the community health system and was voluntary in nature. The sample had nestedness in the data; however, the sample size precluded hierarchical liner modeling in the analysis. This was accepted as a noted limitation in the study design. Finally, the non-profit community healthcare setting may not be transferable to for-profit or academic medical institutions. Other limitations that emerged will be discussed in the findings.

### **Definitions of Key Terms**

To ensure a common understanding of key terminology discussed in the study, the key terms are defined below:

**Safety Culture:** Reflects attitudes, beliefs, perceptions, and values that employees share in relation to safety (Yang et al., 2009).

**Non-punitive Environment as part of Safety Culture:** Each individual feels accountable for his/her actions but will not be blamed for system faults beyond their control and will not be penalized for underreporting when it feels unsafe to voice concerns (Frankel et al., 2017).

**Teamwork Effectiveness as part of Safety Culture:** Developing a shared understanding, anticipation of needs and problems, and effectively managing situations and conflict (Frankel et al., 2017).

**High-Reliability Organization (HRO):** Organizations with a culture of collective “mindfulness,” which incorporates five principles: tracking small failures; resisting oversimplification; remaining sensitive to operations; deferring expertise to frontline; and maintaining capabilities for resistance (Weick & Sutcliffe, 2007).

**Serious Safety Event (SSE):** Unexpected death not related to the natural or expected course of the patient's illness. Patient outcome is symptomatic, requiring life-saving intervention or major medical-surgical intervention, shortening life expectancy or causing major, permanent or temporary harm or loss of function (ASHRM, 2014).

**Transformational Leadership:** Leadership with an emphasis on intrinsic motivation and follower development (Northouse, 2016).

**Transactional Leadership:** Leadership that does not individualize the needs of the followers or focus on personal development; the focus is on making an exchange of something valued (Bass & Avolio, 1994).

**Passive-Avoidant Leadership:** A leadership style where leaders are hands-off, allow team members to make decisions, and are characterized as passive (Northouse, 2016).

### **Summary**

Healthcare safety in hospitals continues to be a priority in healthcare. The Joint Commission addresses preventable medical errors in its video *Leading the Way to Zero*, where Dr. Mark Chassin asks the question, “If not now, then when, and if not us, then who [will make zero harm a reality]” (The Joint Commission [TJC], 2017). The imperative to improve patient safety is real. The purpose of this study was to build on the existing literature related to leadership styles, these styles’ impacts on SSEs, the effect of a non-punitive environment, and the importance of effective teamwork as part of a safety culture. This study included leadership in three hospitals within a community healthcare system. The implications of this study will be to

improve the intentional selection and training of healthcare leaders for the purpose of reducing preventable medical errors in hospitals.

### **Organization of the Dissertation**

#### **Chapter 1: Introduction**

Chapter One presents an introduction to the problem of healthcare safety and the opportunity to identify leadership styles impacting a reduction of SSEs and a safety culture. This is summarized in the study's Problem Statement, Purpose, Significance, Methodology, Assumptions and Limitations, and Definition of Key Terms.

#### **Chapter 2: Literature Review**

Chapter Two presents a review of the literature related to leadership and healthcare safety. The essential elements reviewed were the history and impact of preventable medical errors, safety culture as part of organizational culture, elements of a safety culture, and the role and impact of leadership styles on healthcare safety. The literature related to leadership examined the history on leadership theory with a focus on transformational, transactional, and passive-avoidant leadership styles. The purpose of this chapter was to provide theoretical and empirical background on preventable medical errors, safety culture, and the impact of leadership styles, and to identify the opportunity or gap for further investigation.

#### **Chapter 3: Research Methodology**

Chapter Three includes a detailed methodology. The methodology includes the following: sample design; participant's consent including privacy and confidentiality; data collection instruments and procedures; research design; data management and storage; and data analysis.

## Chapter 4: Analysis and Results

Chapter Four includes analysis and results. The data analysis includes a discussion on the final sample size, the variables, descriptive statistics, and reliability and validity. The results section includes a discussion on assumptions and data eligibility of mediated multiple regression, the hypothesis testing results, and a summary.

## Chapter 5: Discussions, Implications, and Conclusions

Chapter Five includes a discussion on the implications of the research and conclusions related to future study and safety in the healthcare industry. Table 5 shows a summary of the practical and research implications of this study.

**Table 5**

*Summary of Practical and Research Implications*

<u>Practical Implications</u>	<u>Research Implications</u>
Identification of leadership skills specific to accountability and safety leadership.	Determine the implications of staff turnover and temporary personnel on SSE.
Train leaders, at all levels technical and leadership skills for safety leadership.	Study a homogenous department i.e. emergency department, intensive care, or surgery across multiple hospitals.
Focus leadership training on skills necessary to have a High Reliability Organization (HRO).	Study the relationship between leadership styles and organizations with characteristics of HRO, and safety outcomes.

## CHAPTER 2: LITERATURE REVIEW

The purpose of this research was to explore the relationships between preventable medical errors, safety culture, and leadership styles in healthcare. The issue of patient safety—specifically preventable medical errors—as well as the impact of safety culture and the relationship of leadership style remain important topics in healthcare today. The measurement framework for this study includes three independent variables (IVs): transformational leadership (MLQTF), transactional leadership (MLQTX), and passive-avoidant leadership (MLQPA); one control variable (CV): age; one mediating variable (MV): safety culture teamwork (SafCTeam); and one dependent variable (DV): serious safety events (SSE). The essential components in this literature review are based on the measurement framework and these are addressed in the following order: (1) preventable medical errors; (2) organizational culture; and (3) leadership. The purpose of this chapter was to provide theoretical and empirical background on preventable medical errors, safety culture, and the impact of leadership styles, and to identify the opportunity for further investigation.

### Preventable Medical Errors

The IOM first published the report *To Err is Human: Building a Safer Health System* (IOM, 2000) in 2000 to draw attention to the problem of medical errors and patient harm. The report estimated that more than 98,000 people die annually due to medical errors. In acknowledgement that medical error has reached epidemic proportions, researchers have not developed sufficient models of safety and safety culture to match the complex challenge of safety in healthcare (Vogus et al., 2010). Sunshine et al. (2017) found while a modest decline has been noted from 1990-2016, it is still unclear on the progress that has been made.

For example, in 2013 TJC's voluntary adverse event reporting program recorded 98 medical alarm related events, with 80 of them resulting in death (Chassin & Loeb, 2013). Still, in 2016, researchers at Johns Hopkins University have identified medical errors as the third leading cause of death in the United States, citing more than 400,000 deaths annually (Makary, 2016). While there is controversy over the accounting for deaths from medical errors (Allen & Pierce, 2016), there is agreement that the goal should be zero harm (TJC, 2017).

### **Serious Safety Events**

The Agency for Healthcare Research and Quality (AHRQ) defines SSEs as, "in any healthcare setting, as a deviation from generally-accepted practice or process that reaches the patient and causes severe harm or death" (AHRQ, 2014). A common definition is central to the use of a standardized classification system. Therefore, the adoption of both a common definition and a standardized classification process may reduce many current healthcare variations, thus enabling a more accurate identification of SSEs. ASHRM (2014) reviewed the AHRQ Harm Scale and adopted its definition of harm: "the extent to which the patient's functional ability is expected to be impaired subsequent to the incident and any attempts to minimize adverse consequences." (p. 5). National Quality Forum (NQF), a nonprofit organization that operates to continually endorse and create national standards and quality measures, noted that serious reportable events are largely preventable and there is a need to help the healthcare field assess, measure, and report performance in providing safe care (National Quality Forum [NQF], 2010). Naessens et al. (2009) noted in a cross-sectional study designed to assess frequency and type of SSE that different detection methods identified different frequency and types of SSEs. The Joint Commission on Accreditation (TJC) in 2018 updated their analysis of voluntarily

reported adverse events from 1995 through the 2<sup>nd</sup> Quarter of 2019 and showed most of these events occurring in the hospital and no appreciable decline.

This study is consistent with findings supporting the need for consistent definitions and methods of measuring SSEs. In addition, the issue of potential inconsistencies in the type of detection or measurement approaches continues to be an area of concern for the purposes of public reporting and organizational comparisons. In addition, this study did not seek to provide organizational comparisons on performance of SSEs, but rather only sought to study the relationship between SSEs, safety culture, and leadership styles.

### **Measurement of Serious Safety Events**

Voluntary incident reporting systems are the main repository for the collection of SSE. Gong (2011) noted that these systems are usually incomplete and may negatively affect their utility for medical error research. In terms of measurement, findings by Naessens et al. (2009) were consistent with other recommendations to combine approaches of using medical record patient information, patient safety indicators, provider-reported events, and the use of a global trigger tool for the most complete picture of SSE. Andrews et al. (1997) noted in an observational study of clinical meetings and patient rounds that the nurses and physicians generally identified SSEs, and these discussions were a good source of data for proactive error prevention. Thomas and Peterson (2003) performed an extensive literature review, found eight methods used to measure medical errors, and noted strengths and weaknesses for each method in order to propose a framework for researchers and healthcare providers to meet patient safety measurement goals. Incident reporting systems, autopsies, mortality and morbidity reviews, and malpractice claims analysis are all methods that help to identify latent errors and capture the contextual issues that surround the errors for the purpose of improving patient safety.

Ranji, (2016) supports the concept that multiple sources of information are necessary in order to provide a comprehensive view of patient safety at the institutional level. Structured clinical reviews of inpatient deaths are an important part of this process, but they tend to identify a limited subset of issues, such as diagnostic errors, failure to rescue, or problems with communication between clinicians.

This study used the most serious level of SSE, which is death. These events are also identified due to the serious nature of the outcome, and 100% mortality review occurs at the hospitals. These mechanisms reduced the concern of using this method for collection of SSE.

In a systematic literature review, including 17 studies, DiCuccio (2015) found a relationship between safety culture and SSE, specifically that a positive safety culture was associated with a desirable direction of safety outcomes. In these studies, leadership was markedly absent as a variable. DiCuccio (2015) also noted the opportunity for future research to determine interventions that improve safety outcomes, specifically research connecting safety culture to safety outcomes. Sfantou et al. (2017) found in a systematic review of eighteen studies leadership was correlated with quality of care and associated measures. Weaver et al. (2013) found in a review of 33 studies some evidence of improved safety culture associated with potentially reduced harm. The strength of the evidence was low, and there exists an opportunity for further study.

## **Organizational Culture**

This section discusses organizational culture and safety culture as part of organizational culture, including the elements and measurement of safety culture. Safety culture is a facet of an organizational culture. Schein (2010) defines organizational culture as how the organization's team members interpret their experiences; how they act and include values and beliefs about

work; and how they demonstrate behavior norms for how work is performed. Schein further describes three levels of culture: artifacts; espoused beliefs and values; and basic underlying assumptions (Schein, 2010).

The surface level of culture described by Schein as “artifacts” includes visible structures and processes as well as observed behaviors (Schein, 2010). This aspect of culture, while most visible, can also be the most difficult to interpret. The daily procedures and processes guide behaviors. The second level, “espoused beliefs and values,” develop through group learning, which begins with someone’s, usually the founder’s, belief or value. Therefore, leadership is an important source of beliefs and values that enable teams. Finally, the third level of culture described by Schein is the “basic underlying assumptions” level which depicts that unconscious beliefs and values are reinforced over time (Schein, 2010). These beliefs and values determine feelings, perception, thought, and behavior. This is the process of developing shared assumptions and ultimately defines the character and identity of the team.

Leaders embed their beliefs, values, and assumptions through a variety of mechanisms, including what they pay attention to, measure, and control as part of operations. Leaders’ reactions to critical situations and role modeling, coaching, and teaching are also primary culture embedding mechanisms (Schein, 2010).

This concept of leadership’s influence is consistent with other scholars, dating back four decades, with each of the scholars building on previous knowledge and concepts. For example, Argyris (1977) distinguished the “single loop” and “double loop” learning because the “double loop” learning concept requires flexibility and transparency on the part of leadership. This is consistent with Argyris’s concept of the need for organizations and leaders to be skilled at “learning” and not simply problem-solving. Both flexibility and transparency are associated with

trust and motivation. Motivation occurs in a people-focused culture that values empowerment, autonomy, innovation, and teamwork (Shortell et al., 1995). Shortell et al. (1995) found that a participative, flexible, risk-taking, organizational culture was significantly related to quality improvement implementation. In contrast, hierarchical bureaucratic cultures served as a barrier to quality improvement implementation (Shortell et al., 1995). Leadership and effective team process allow for reciprocal influence of leadership and team processes (Zaccaro, Rittman, and Marks, 2001), which allows for team members to integrate their roles into collective team success. This relationship of leadership and team is characteristic of an adhocracy structure where “coordination and mutual adjustment among all its parts; and the structure is decentralized selectively in both vertical and horizontal dimensions” (Mintzberg, 1980, p. 322).

Culture in practice begins with leadership. Leaders have the ability to influence priorities, beliefs and behaviors. Hartnell et al. (2016) found in a study of the interaction between senior leadership and the organization’s culture that senior leadership is effective when it provides psychological and motivational resources lacking in the organization’s culture. The implication is for leaders to be aware of organizational culture and adjust their leadership styles accordingly. In healthcare, leadership practices shaping a safety culture include executive walk-arounds, including safety as topic in meetings, daily safety meetings, and task clarification and compliance monitoring (Clarke, 2012; Padgett et al., 2017; Weaver et al., 2013).

### **Safety Culture in Healthcare**

In healthcare, safety culture includes shared values, relationships, psychological safety, and effective communication (Frankel et al., 2017). Safety culture differs from the related concept of a safety climate. Safety climate refers to the shared perceptions of existing policies, procedures, and practices (Zohar & Tenne-Gazit, 2008). The focus and measurement of a safety

climate is important to understand how team members currently view patient safety based on their perception of their leader's commitment to patient safety and the priority placed on patient safety (Frankel et al., 2017). There are three factors in safety culture which are measured in the Press Ganey Safety Culture Survey: (1) Prevention and Reporting; (2) Resources and Teamwork; and (3) Pride and Reputation (Courtesy of Press Ganey PP). Prevention and Reporting (measuring a non-punitive environment) and Resources and Teamwork (measuring effective teamwork) were the two aspects of safety culture used in this study. Ultimately, safety culture teamwork was the mediating variable in the analysis, which will be further discussed in the Preliminary Statistical Analysis section of Chapter Four.

Further, safety culture is one aspect of organizational culture and is described by Reason (1998) as shared values that interact with the organization's structures and control systems to produce behaviors. Based on a literature review, Sammer et al. (2010) found seven domains within a safety culture: leadership; teamwork; evidence-based clinical care; communications; a learning environment; a just culture; and a patient-centered care focus.

Developing a safety culture is a key element to many efforts of improving patient safety and quality care in hospitals today (Weaver et al., 2013). Several studies in the review completed by Weaver et al. (2013) noted that safety culture has been associated with positive clinician behaviors such as error reporting, a reduction in SSE, and ultimately a reduction in patient mortality.

Leaders enable a safety culture when employees are empowered to speak up and actively resolve issues contributing to patient safety. Leaders create safe conditions for the team members to speak up by building high-quality relationships with employees. A study by Adelman (2012) study suggested that award-winning Chief Executive Officers (CEOs) facilitate the employee

voice by being approachable, and this is mainly achieved through their regular presence throughout the organization, which fosters relationships, builds trust, and promotes open communication. Leaders created a cultural focus on continuous improvement largely built around transparency of information, particularly by looking for the bad news from their employees (Adelman, 2012). Kerfoot (2005) noted that top-down patient safety programs miss the intellect of the front-line team members and the knowledge that comes from a cross-disciplinary, non-hierarchical structure in the organization. Transparency and empowerment environments are elements noted in HROs. In the following sections, the relationship among safety culture to HRO characteristics, two specific elements of safety culture, and the measurement of safety culture is reviewed.

### ***High Reliable Organizations and Safety Culture.***

HROs share commonalities with a culture of safety. In a review of the literature, (Sammer et al., 2010) found the elements of teamwork, communication, and a Just Culture to be key elements of a safety culture. These elements are consistent with elements found in HROs.

Weick and Sutcliffe (2007) noted that a common understanding is an issue of culture and that culture is important in HRO systems. Weick and Sutcliffe (2007) further suggested that, before you can decentralize decision making, you first have to centralize so you can have common decision premises and assumptions to ensure that operations are equivalent and coordinated. Weick and Sutcliffe (2007) defined five principles of HROs, one of which is a preoccupation with failure and resilience. Resilience is key because there is an acknowledgment that errors will occur and safety may be threatened, but the organization can contain the harm and learn from these events. This requires a culture of safety, transparency, and leadership. In addition, HROs have structures and a culture in place to identify the team members with the

greatest expertise and allow decision-making authority to reside with those team members (Weick & Sutcliffe, 2007). Hilliard et al. (2012) found that adopting principles of HROs resulted in a 70% reduction of SSEs over a three-year period.

In addition, Padgett et al. (2017) noted in a case study that transforming a hospital to a reliability-seeking organization contributed to a reduction in SSEs. These characteristics are consistent with findings of Amalberti et al. (2005) in studying human factors in aviation and healthcare, which noted five additional sets of behaviors that, when practiced, tend to enhance safety. These behaviors include: (1) accepting limits; (2) abandoning autonomy; (3) transitioning away from a craftsman mindset and embracing standard work; (4) sharing risk vertically with proactive and retroactive communication about problems; and (5) managing the visibility of risk to predict failure and prevent harm. Healthcare has unique barriers that other high-risk ultra-safe industries such as nuclear power and civil aviation do not have. These include a wide range of risk among medical specialties, difficulty in defining medical error, and various structural constraints such as public demand for healthcare services, the inclusion of teaching roles in these entities, and a chronic shortage of staff (Amalberti et al., 2005).

### ***Elements of A Safety Culture.***

A safety culture requires a Just Culture approach and thus a learning culture that is constantly oriented toward improving patient safety (Boysen, II, 2013). This is consistent with both Schein (2010) and Argyris (1977) in their descriptions of a culture where leadership is the source of values and a culture of double loop learning where transparency and flexibility are required of leadership. Frankel et al. (2006) noted that Just Culture, the engagement of leadership in safety, and good teamwork and communication training, are critical and related requirements for safe and reliable care (p. 1707). Weaver et al. (2013) concluded from their systematic review

of studies that an opportunity exists to further investigate safety culture as a factor that can moderate the effectiveness of other safety practices.

Creating a safety culture includes creating a culture where team members are willing to speak up and report mistakes, identify potential errors, and even stop work if there is an unsafe situation. A framework of a Just Culture balances the accountability of both behaviors of individuals and the organization's responsibility for designing and improving work systems (Boysen, II, 2013). Marx (2001) developed the concept of outcome engineering, which is applicable to multiple industries, including healthcare. The algorithm has three basic duties: (1) a duty to produce an outcome; (2) a duty to follow a procedural rule; and (3) a duty to avoid unjustifiable risk (Marx, 2001). Reason (1997) developed the "unsafe acts" algorithm, which asks four questions to determine if the unsafe act is a behavior choice or an organizational safety issue. Visible and engaged leadership is required to create a transparent environment where effective teamwork exists (Frankel et al., 2006).

In a study of 179 hospitals by Mardon et al. (2010), there was a significant relationship found between more positive safety culture and less in-hospital complications and adverse events. Handoffs and transitions, frequency of events reported, and teamwork across units were the aspects of culture noted to have the largest impact. The study also noted the opportunity to examine the causal relationship between safety culture and patient outcomes.

### ***Non-Punitive Environment.***

Psychological safety means that one can voice a concern or ask for help and know that the response will always be respectful. Unless this environment of respect is consistently present and seen as a basic property of the organizational culture, people will hesitate to express concerns and avoidable harm will occur (Frankel et al., 2006, p. 1702). Marx (2001) described a

Just Culture as acknowledging that human error will occur, and leadership needs to have a method to determine if it was unintentional human error or a behavior choice by the individual and act accordingly. A Just Culture, the engagement of leadership in safety, and good teamwork and communication training are critical, related requirements for safe and reliable care.

Developed and applied concurrently, they weave a supporting framework for the effective implementation of new technologies and evidence-based practices (Frankel et al., 2006).

In a review of 26 studies in healthcare settings, Okuyama et al. (2014) concluded that hesitancy to speak up can be an important contributing factor in communication errors leading to SSEs. Multiple influencing factors were noted, including leadership support and fear of responses from others on the team.

### ***Teamwork Effectiveness.***

Manser (2009) reviewed the literature to identify evidence from three main areas of research that support the relationship between teamwork and patient safety. First, studies investigating the factors contributing to critical incidents and adverse events have shown that teamwork plays an important role in the causation and prevention of adverse events. Second, research focusing on healthcare providers' perceptions of teamwork demonstrated that (a) staff's perceptions of teamwork and attitudes toward safety-relevant team behavior were related to the quality and safety of patient care, and (b) perceptions of teamwork and leadership style are associated with staff wellbeing, which may impact clinician's ability to provide safe patient care. Third, observational studies on teamwork behaviors related to high clinical performance identified patterns of communication, coordination, and leadership that support effective teamwork. Leaders in crisis teams need to distribute tasks efficiently to the team and adapt to the situation.

Manser (2009) further noted that other high-risk industries have inspired research efforts in healthcare and have contributed to significant improvements. In recent years, a number of articles on teamwork and team training in high-risk industries other than healthcare have been published in medical and interdisciplinary journals. In the review of these studies, teamwork has shown to be an important contributing factor to SSEs. Further, the review identified a number of studies that indicated lack of teamwork and communication to be frequent contributing factors to SSEs. The process of providing healthcare is inherently interdisciplinary, requiring physicians, nurses, and allied health professionals from different specialties to work in teams and communicate effectively.

Communication is an important component of teamwork effectiveness. Team STEPPS is a system for communication and teamwork designed by the U.S. Department of Defense (DOD) and the AHRQ of the U.S. Department of Health and Human Services (HHS). One component of Team STEPPS is the huddle, which is a team-building tool that increases effective communication among healthcare providers. It is a quick meeting of healthcare members to share information. This brief meeting or huddle takes place at the start of the workday. Glymph et al. (2015) highlighted the huddle as a time where groups plan for contingencies, express concerns, address conflicts, or reassign resources. In addition, huddle moments are briefs that can be used to increase interprofessional collaboration in healthcare. Further, the role of teamwork in patient safety continues to be supported in safety literature, as it is noted to have a positive relationship with transformational leadership styles. For example, teamwork and a non-punitive environment were specifically noted as positive transformational leadership style contributors to the safety climate in a study by Merrill (2015) of 41 nursing departments.

### ***Measurement of Safety Culture.***

Measurement of safety culture has been noted to be an important strategy for reducing preventable medical errors and improving patient safety. The Safety Attitudes Questionnaire (SAQ) has been administered to more than 10,000 providers in 203 clinical areas and in three countries. Sexton et al. (2006) reported that the SAQ demonstrated good psychometric properties and that healthcare organizations can use the tool for benchmarking and patient safety culture improvement efforts. The SAQ includes six patient safety related domains, including teamwork, safety climate, perceptions of management, job satisfaction, working conditions, and stress recognition. From this original work, researchers at Press Ganey and Clemson University created a validated survey tool to measure safety culture (Press Ganey, 2015). The original 24 items in six domains were paired down to a final set of 19 items across three domains or factors, which include Prevention and Reporting, Resources and Teamwork, and Pride and Reputation (Press Ganey, 2015). Prevention and Reporting (measuring a non-punitive environment) and Resources and Teamwork (measuring effective teamwork) were used to measure safety culture in this study. The final analysis included only safety culture teamwork, which will be further discussed in the Preliminary Statistical Analysis section of Chapter Four.

Brown and Wolosin (2013) found in a study examining relationships between safety culture and measures of care processes and adverse patient outcomes that safety culture was an important attribute in identifying methods to advance safe patient care. It should be noted that when leaders prioritized a safety culture, patient outcomes may have improved with less staff turnover and more productivity. This was supported by the multiple associations identified with safety culture and structure of care delivery, skill mix, turnover, and workload intensity.

Weingart et al. (2004) found that employees regarded patient safety as an essential part of their

job, with two-thirds of team members worried at least once a day about making a mistake and 43% attributing workload as a hindrance to delivering safe care. The study noted the complexity of safety culture and the impact on SSE, as well as the opportunity for further study.

## **Leadership**

An initial review of literature related to leadership and safety in healthcare in the last 20 years revealed that very few studies have focused on the impact of leadership style on teamwork effectiveness, non-punitive environment, and SSEs. The majority of the research reviewed has focused on leadership and quality measures (Sfantou et al., 2017), turnover (Sinnott, 2008), safety performance (Yang et al., 2009), safety climate (Zohar & Tenne-Gazit, 2008), and total quality management (Shortell et al., 1995). In this section, I will review a brief history of leadership theory, leadership styles, and the relationship of leadership styles in healthcare to a non-punitive environment, teamwork effectiveness, and SSEs.

### **Background of Leadership Theory**

This section will give background and context to the evolution of leadership and the study of leadership. The study of leadership spans more than 100 years (McCleskey, 2014). Galton's 1869 *Heredity Genius* emphasized the basic idea that leadership is a characteristic ability of extraordinary individuals (Zaccaro, 2007). This idea was known as the "great man theory," which evolved into the study of leadership traits (McCleskey, 2014). The study of leadership continued to evolve to both a task-oriented and people-oriented leadership continuum. Situational Leadership Theory (SLT) specifically evolved from this orientation and focused not only on behaviors along a continuum but also on the level of maturity and readiness of the followers as the context for leader and follower fit (Bass, 2008).

Chemers (2000) noted that the study of leadership theory can be divided into four periods: (1) the period prior to the presentation of Fiedler's 1964 contingency model; (2) the period from 1965 to 1975, focusing on the development and elaboration of contingency theories; (3) the period from 1975 to 1985, when cognitive theories and concerns about gender differences arose; and (4) the period since 1985, which has most extensively focused on transformational theories and cultural influences.

Allen (2018) has taken a different approach to describe the history of leadership theory and has noted that the study of leadership started out as an effort to identify attributes of effective leaders and progressed to descriptions of different perspectives and aspects of leadership. As time went on the succession of contributions to the study of leadership highlighted various theoretical frameworks to increase understanding. Allen (2018) also noted that leadership study began with a focus on historical figures deemed to be great, followed by a study of traits associated with leaders. At each point in the development of leadership theory, the identification of effective leadership attributes circled back to the initial efforts to identify those the attributes that were commonly found in effective leaders. The leadership theoretical model for this study is focused on three leadership styles—transformational, transactional, and passive-avoidant leadership—and the relationship of each of these styles to safety in healthcare.

### **Theoretical Orientation of the Study**

The sections that follow examine and discuss the FRL Model, which includes leadership styles of transformational, transactional, and passive-avoidant leadership (Bass & Avolio, 1994). Leadership is recognized as an important component for organizational success in organizations. The healthcare industry has also recognized the importance of leadership in impacting organizational success. Frankel et al. (2006) identified a Just Culture, engagement of leadership

in safety, and good teamwork and communication training as critical and related requirements for safe and reliable care. In healthcare, TJC, one of the accrediting bodies for healthcare organizations to ensure quality and safety, has incorporated these principals and established standards for leadership (TJC, 2017). The Theoretical Framework for this study was the FRL Model (Bass & Avolio, 1994), which was used to determine the impact of transformational and transactional leadership on teamwork, a non-punitive environment, and SSEs.

Leadership is an important topic in understanding organizational effectiveness. Burns (1978) described the leader as either transactional or transformational. Transactional leaders are those who lead through social exchange or a series of transactions. Transformational leaders, however, inspire followers and empower them by aligning objectives and goals of the individual, group, and larger organization (Bass & Riggio, 2006). The third style of leadership, passive-avoidant leadership, characterized as the avoidance or absence of leadership (Bass & Riggio, 2006), is the most passive form of leadership, and represents non-transaction, avoidance, and lack of decision-making. The FRL model examines the frequency and effectiveness of these three leadership behaviors and contains the four key components of transformational leadership as identified by Avolio et al. (1999), including idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. Bass and Riggio (2006) described this as a focus on the individual follower's motivation and innovation through inspiration and identification of individualized needs. The FRL model is based on the premise that every leader displays each style to some degree (Bass & Avolio, 1994). However, based on (Bass & Avolio, 1994), a more effective leader continues to be associated with a higher degree of

transformational leadership behaviors in studies on organizational performance (Lowe et al., 1996).

### ***Transformational Leadership.***

Transformational leadership focuses on shifting the follower's beliefs, needs, values, and capabilities (Bass & Avolio, 1994). Years prior, Burns (1978) described one aspect of transformational leadership as the teaching aspect, where leaders can elevate and shape the motives and goals of their followers. This is consistent with creating a quality culture that requires leadership at all levels involved in maximizing individual, team, and organizational effectiveness (Bass & Avolio, 1994).

Wang et al. (2011) found in a meta-analysis of over 113 independent studies that transformational leadership was positively related to affirmative follower performance and had a stronger relationship with contextual rather than task performance. In addition, positive team performance and organizational performance was related to transformational leadership in most organizational settings (Avolio & Yammarino, 2013). Boamah et al. (2018) highlighted the lack of empirical research that examines the mechanisms by which leadership influences patient safety outcomes and noted in a cross-sectional study that transformational leadership tended to be significantly associated with decreased adverse safety outcomes through structural empowerment and nurse clinical leadership.

### ***Transactional Leadership.***

Burns (1978) described transactional leadership, which is the majority of leadership models, as the focus on exchanges that occur between leaders and followers. This is characterized by a reciprocal process of mobilizing followers with certain attributes in order to

realize goals mutually agreed upon by both the leaders and the followers. This is not necessarily a joint effort or the collective interests of a group of followers or a team. This leadership occurs when a leader rewards or disciplines the follower, depending on performance. Transactional leadership depends on contingent reward (CR) or passive and negative forms of management-by-exception-active (MBE-A) or management-by-exception-passive (MBE-P) (Bass & Riggio, 2006).

Burns (1978) thought of transactional and transformational leadership as being on opposite ends of a continuum; however, Bass (1985) viewed the leadership style of transformational leadership as an augmentation of transactional leadership style, specifically in predicting effects on follower satisfaction and performance. In a study of leadership style and follower outcomes, Whittington et al. (2009) found that transactional leadership was associated with positive follower outcomes and may be a precondition for transformational leader behavior.

### ***Passive-Avoidant Leadership.***

Passive-avoidant leadership is described by Avolio and Bass (2004) as non-leadership or the absence of leadership and the failure of leaders to provide followers with feedback and direction. Passive-avoidant leadership is described by two sub-scales: (1) MBE-P, where the leader waits for errors or mistakes before taking action; and (2) Laissez-Faire (LF), which is the avoidance or absence of leadership. Specifically, “A passive-avoidant leader avoids getting involved when important issues arise” (Bass & Riggio, 2006, p. 9). While the dominant perspective of passive-avoidant leadership has been negative and regarded as zero leadership, Yang (2015) argued in a conceptual study that there are potentially positive outcomes of passive-avoidant leadership, and that non-involvement could be perceived by followers as a sign of

respect. This study drew attention to the possible positive outcomes of passive-avoidant leadership and therefore was included in the study.

### ***Measurement of Leadership Style.***

Bass's (1985) conceptualization of transactional and transformational leadership included seven leadership components: charisma; inspiration; intellectual stimulation; individualized consideration; contingent reward; management-by-exception; and passive-avoidant leadership. In subsequent writings, (Bass, 1988) noted that although charismatic and inspirational leadership were unique constructs, they were often not empirically distinguishable. Therefore, he ultimately reduced his original seven-factor model to six factors.

Following Bass's (1985, 1988) proposed six-factor model of transactional and transformational leadership, there have been several comprehensive analyses, reviews, and critiques that included recommendations to modify the components in the model (Avolio et al., 1999). A meta-analysis conducted by Lowe et al. (1996) noted that research findings using the MLQ have generally reported statistically significant relationships between leader effectiveness and the transformational leadership behaviors demonstrating charisma, individualized consideration, and intellectual stimulation. The transactional scale contingent reward, which has also been associated with effectiveness though the magnitude of the association, is less than that evidenced by the transformational scales. The transactional scale management-by-exception generally demonstrated low correlations with effectiveness and is often negative when significant.

The MLQ instrument has been used to study leaders in a variety of organizational settings, such as manufacturing, the military, educational and religious institutions. The instrument has also been used at various levels in organizations, including first-line supervisors,

middle managers, and senior managers. MLQ scales have been used to determine a range of effectiveness criteria, such as subordinate perceptions of effectiveness, as well as to a variety of organizational measures of performance, such as supervisory ratings, number of promotion recommendations, military performance grades and such objective measures as percent of goals met, pass rate on educational competency exams, and financial performance of the work unit (Lowe et al., 1996, p. 388). In healthcare, the MLQ instrument has been the preferred instrument to measure a range of leadership styles and organizational outcomes including safety, follower outcomes, safety culture, and employee satisfaction (Merrill, 2015; Whittington et al., 2009).

There has been a historical parallel between quality and leadership theory (Bass, 1985), wherein the most effective leadership form in the FRL model is consistent with the ability to have all employees involved in quality control with an emphasis on continuous improvement and development. The initial premise is motivation, which occurs when the culture emphasizes empowerment, autonomy, innovation, and teamwork (Shortell et al., 1995); the second premise is adhocracy structures and enabling leadership, which is associated with better innovation and therefore adoption due to the decentralization of power and structure (Mintzberg, 1980). Flin and Yule (2004) noted in a study on the U.K. oil industry that managers with a more transformational style had workers reporting more safety initiative behaviors, and those with more transactional styles had more difficulty with employees taking ownership for safety.

Similarly, Clarke and Ward (2006) found transformational leadership style, in combination with transactional tactics, built enthusiasm in a U.K.-based manufacturing organization. The transactional tactics included rational persuasion and coalition tactics that were associated with employee engagement with safety. Trust was noted to be an underlying mechanism in this relationship. Goleman (2000) noted that leaders who have mastered

authoritative, democratic, affiliative and coaching styles have the best climate and business performance. This finding is consistent with attributes in both transformational and transactional leadership styles. The findings of these studies on leadership in other high hazard industries can also apply to the healthcare environment.

### **Leadership Style in Healthcare**

Leadership in healthcare is widely discussed as important for organizational performance. Yang et al. (2009) concluded that safety culture affects safety performance, and leadership affects safety culture, which then indirectly affects safety performance. While this study was in the Taiwanese health system, there are similar conclusions made in the United States. Chassin and Loeb (2013) used The Joint Commission's knowledge of healthcare organizations and other published literature (Chassin & Loeb, 2011; Goeschel et al., 2010) identify the key roles of leadership at the board, senior management, and front-line management levels necessary to drive quality and safety. Sfantou et al. (2017) found in systematic review of literature between 2004 and 2015, that there was strong correlation between leadership and quality of care and associated measures. In addition, Armstrong and Laschinger (2006) found evidence that nurse leaders have the ability to improve safety by creating and empowering professional practice environments. The concept of safety leadership and the relationship of transformational and transactional leadership was explored by Clarke (2012). The findings suggest that while active transactional leadership is important in ensuring compliance with rules and protocols, transformational leadership is associated with encouraging team member participation in safety behaviors. Further, these findings suggest the opportunity to further develop the concept of safety leadership.

In a review of control variables in leadership research, Bernerth et al. (2018) found in a meta-analysis control variable usage in existing leadership studies is rarely grounded in theory. One of the recommendations in the review is to have control variables which match the studies purpose. In addition, Paradiso and Sweeney (2019) research on leadership and healthcare safety culture included the demographics of age, tenure, educational level as control variables.

A review of the literature has demonstrated that a gap exists in the relationship between leadership styles and safety outcomes, specifically the mediating role of safety culture in this relationship (Clarke, 2012; Merrill, 2015; Wang et al., 2011; Whittington et al., 2009). There is evidence that both transformational leadership and transactional leadership have an impact on safety behaviors and adverse events. Therefore, an opportunity existed to study the relationship of leadership style and preventable medical harm and the mediating effect of a non-punitive environment and teamwork effectiveness as part of safety culture.

This study investigated transformational, transactional, and passive-avoidant leadership styles in healthcare leaders. Specifically, this study focused on the impact of these leadership styles on SSEs and the mediating effect of the two elements of a safety culture: a non-punitive environment and teamwork effectiveness.

My specific Research Questions (RQ) and Hypotheses (H) were:

RQ1: What is the relationship between leadership styles including transformational, transactional, and passive-avoidant and serious safety events?

H1a: Transformational leadership style will be inversely related to serious safety events.

H1b: Transactional leadership will be inversely related to SSEs, however, to a lesser extent than transformational leadership.

H1c: Passive-avoidant leadership will be positively related to SSEs.

RQ2: How does safety culture mediate the relationship between leadership styles and serious safety events?

H2: Safety Culture mediates the relationship between leadership style and SSEs.

### **Summary**

In order to reduce SSEs and improve a culture of safety, there needs to be a clear understanding of which leadership styles will enable this improvement. Leadership turnover in healthcare is an unspoken crisis; according to a 2006 report from the American College of Health Care Executives, the median tenure of a hospital CEO is only 43 months, or about three and a half years, which represents a 15% turnover rate. (Sinnott, 2008). This trend holds true today, with the CEO turnover at 18%, thus creating an ongoing opportunity to develop leaders as safety leaders (American College of Healthcare Executives [ACHE], 2019).

Numerous studies in healthcare have emphasized the importance of leadership in achieving organizational success and outcomes (American College of Healthcare Executives and IHI/Lucian Leape Institute, 2017; Armstrong & Laschinger, 2006; Chassin & Loeb, 2013; Clarke & Ward, 2006). Bahn (2013) found in reviewing findings of two other studies that front-line leadership does play a pivotal role in safety culture. However, there is an absence of explicit research on transformational and transactional leadership styles of healthcare leaders in relation to SSE and the mediating role of safety culture elements, including team effectiveness and non-punitive environments.

To accomplish meaningful change in SSEs and medical harm, there needs to be an understanding of leadership styles in order to recruit, train, and coach leaders who will improve teamwork effectiveness, create a non-punitive environment, and reduce harm in

hospitals. Existing literature supports the need to investigate the recurrent subtopic of the impact of transformational, transactional, and passive-avoidant leadership style on SSEs and the mediating effect of a non-punitive environment and teamwork effectiveness. The objective of this quantitative study was to explore and identify the leadership styles that would make a positive impact on preventable medical errors. The major literature constructs discussed in this chapter are summarized in Table 6. The key areas of literature include preventable medical errors, measurement of serious safety events, safety culture, high reliability organizations, and leadership.

**Table 6***Major Literature Constructs That Influenced the Study*

Study	Research area	Research contributions
Makary (2016)	Preventable medical errors	Preventable medical errors are the third leading cause of death in the United States.
Thomas and Peterson (2003)	Measurement of Serious Safety Events	Event reporting systems, mortality and morbidity review, malpractice claims are all methods to detect latent errors and improve patient safety.
Schein (2010)	Organizational Culture	Shared values, beliefs, and behavior norms which are shaped by leadership.
Weaver et al. (2013)	Safety Culture	Safety culture is associated with error reducing behaviors.
Sammer et al. (2010)	Safety Culture	Identified seven domains within a safety culture including leadership, teamwork, evidence-based clinical care, communications, a learning environment, a just culture, and a patient-centered care focus.

Study	Research area	Research contribution
Weick and Sutcliffe (2007)	High Reliable Organizations	HROs have five characteristics in common which requires a culture of safety, leadership, and transparency.
Boysen, II (2013)	Elements of Safety Culture	Creating a safety culture includes creating a culture where team members are willing to speak up and report mistakes, identify the potential error, and even stop work if there is an unsafe situation.
Sexton et al. (2006)	Measurement of Safety Culture	The SAQ demonstrated good psychometric properties, and healthcare organizations can use the tool for benchmarking and patient safety culture improvement efforts.
Wang et al. (2011)	Leadership	A meta-analysis of over 113 independent studies, transformational leadership was positively related to positive follower performance with a stronger relationship with contextual rather than task performance.
Clarke (2012)	Safety Leadership	A meta-analysis of transformational and transactional leadership styles as antecedents of safety behavior demonstrated influence of both styles.
Whittington et al. (2009)	Leadership	Transactional leadership is essential for positive follower outcomes and may be a pre-condition to transformational leadership

## CHAPTER 3: RESEARCH METHODOLOGY

This chapter is presented in the following seven major sections: research design and perspective; population and sample design; operational definitions and variables; data collection procedures; data analytical techniques; overall reliability and validity; and summary. This cross-sectional study was performed using inferential statistical techniques based on a sample of survey respondents. To accomplish meaningful change in SSEs and medical harm, there needs to be an understanding of the leadership styles and their impact on SSEs and the role of safety culture elements.

There is an opportunity to study the relationship of healthcare leadership styles and SSEs, and the mediating effect of safety culture. While leadership styles, safety outcomes, and safety culture have all been studied extensively over the last decade, the specific relationship between healthcare leadership styles and SSEs has not been studied. Safety culture in healthcare has different factors including non-punitive environment, teamwork, and pride. SSEs are measured in different ways including self-reported, chart review, and data derived from medical billing data. To improve safety in healthcare, it is beneficial to understand the role of leadership style and safety culture. Bass and Avolio (1994) noted the parallels between leadership that promote engagement, motivation, and quality results. Additionally, information on leadership style can be used to select, train, and develop safety leaders in healthcare, thus reducing the incidence of preventable medical errors resulting in SSEs.

### **Research Design and Perspective**

This study used a cross-sectional, predictive, non-experimental quantitative design. The study measured the relationship of the three leadership styles to SSE and examined the mediating effect of safety culture. The three styles of leadership in the FRL model—transformational,

transactional, and passive-avoidant—were studied to determine the impact on SSEs and the mediating effect of safety culture. The Research Questions in this study were: (RQ 1): What is the relationship between leadership styles including transformational, transactional, and passive-avoidant and serious safety events?; and (RQ 2): How does safety culture mediate the relationship between leadership styles and serious safety events? These questions build on previous studies in the area of high reliability and safety culture and the relationship to SSEs (American College of Healthcare Executives and IHI/Lucian Leape Institute, 2017; Armstrong & Laschinger, 2006; Chassin & Loeb, 2013; Clarke & Ward, 2006).

### **Population and Sample Design**

The site of the study was a medium-sized healthcare system located in the Mid-Atlantic region near a large metropolitan city. At the time of this study, the health system was comprised of acute care hospitals, home health services, urgent care clinics, outpatient clinics, and physician practices, employing over 5,000 people.

The sample consisted of 136 leaders that met the criteria of providing leadership for clinical areas in three acute hospitals and included three levels of leadership: senior management (SM); middle management (MM); and front-line management (FLM). Leaders in SM, MM, and FLM responsible for clinical areas in the three acute care hospitals were invited to participate in this study via email invitation (Appendix D). Two of the hospitals were acute care hospitals and the third was an acute rehabilitation hospital.

### **Informed Consent**

Participants completed online consent forms written in understandable terms which gave a detailed description of the study purpose and procedure (Appendix C). All study participants were able to read and speak English. Study participants were informed of the voluntary nature of

the study and no participants were coerced to participate or led to believe that there would be any adverse treatment from the organization should they wish to withdraw or not participate. There were no foreseeable risks to participation.

### **Protection of Participants**

The information provided was accessible only to those persons conducting the research. The names of individual participants were not included in any reports of the study. The leadership survey data were stored in the Microsoft Office file on the organization's secure server and were handled by research assistants from the organization's Learning and Development Team. The leadership response data was blinded from me and coded by research assistants to maintain the confidentiality of the respondents' responses. Research assistants and I aggregated the blinded leadership questionnaire data and deleted the data from electronic files once the study was completed. No adverse events were anticipated in the study; however, if participants felt stressed at any point in the survey, they were informed that they should stop the survey or withdraw from participation. Contact information for me and the chair of Hood Institutional Review Board (IRB) was provided as part of the Informed Consent. The IRB Approval Form can be found in Appendix H.

While researcher positionality is usually not a concern with quantitative study designs, it should be noted that I serve as a senior executive in the healthcare system. No participants had any reporting relationships to me.

A pilot test was conducted with a small group of volunteer leaders not eligible to participate in the study to determine the clarity of the questionnaire items, length of time required to take the survey, and the technical administration. The statements proved clear, the average survey time was 20 minutes, and there were no technical administration problems.

Participants who completed all elements of the survey and signed an Informed Consent were included in the sample. The final sample size was 81.

### **Operational Definitions and Variables**

Inferential statistics were used to evaluate the relationship between leadership style and SSEs and the mediating effect of safety culture on this relationship. Several control variables (i.e., age) were evaluated to determine the influence on the dependent variable SSE.

The final research design included three independent variables (IVs): transformational leadership (MLQTF), transactional leadership (MLQTX), and passive-avoidant leadership (MLQPA); one control variable (CV): age; one mediating variable (MV): safety culture teamwork (SafCTeam); and one dependent variable (DV): serious safety events (SSE). The measures and scales for each variable are discussed in this section. Table 7 provides a summary of the variables and how they interacted. The unit of measurement was at a department or unit level. The departments or units were attributed to each leader in the study based on management span of control.

**Table 7***Final Summary of Variables*

Variables	Type of Variable	Data Scale	Measurement Instrument	Measure
Leadership Style Transformational Transactional Passive-avoidant	Independent	Scale Continuous	MLQ Leader Form	Mean scores of MLQ questions
Safety Culture	Mediating	Scale Continuous	Safety Culture Survey Archival Data	Mean score of questions
Serious Safety Events	Dependent	Scale Continuous	Archival Data Review	Events/10,000 patient day
Age	Control	Categorical Ordinal	Demographics in questionnaire	Age categories

**Multifactor Leadership Questionnaire (MLQ)**

The independent variables of leadership style were a continuous scale variable based on the three leadership styles in the FRL model. The measures were based on the 45 statements in the MLQ Short 5X Leader Form (Avolio & Bass, 2004). The statements are rated on a five-point Likert scale, ranging from values 0 (*not at all*), 1 (*once in a while*), 2 (*sometimes*), 3 (*fairly often*), to 4 (*frequently if not often*). The MLQ has been used extensively in research to study transformation, transactional, and passive-avoidant leadership styles in healthcare and other fields. Table 8 includes the components of the Full Range Leadership Model.

**Table 8***Components of the Full Range Leadership Model Measured by MLQ*

Characteristic	Scale Name	Scale Abbreviation	Questionnaire Items
Transformational	Idealized Attributes or Idealized Influence (Attributes)	IA or II(A)	10, 18, 21, 25
Transformational	Idealized Behaviors or Idealized Influence (Behaviors)	IB or II(B)	6, 14, 23, 24
Transformational	Inspirational Motivation	IM	9, 13, 26, 36
Transformational	Intellectual Stimulation	IS	2, 8, 30, 32
Transformational	Individual Consideration	IC	15, 19, 29, 31
Transformational	Contingent Reward	CR	1, 11, 16, 35
Transactional	Management by Exception (Active)	MBEA	4, 22, 24, 27
Passive-Avoidant	Management by Exception (Passive)	MBEP	3, 12, 17, 20
Passive-Avoidant	Laissez-faire	LF	5, 7, 28, 33

### Control Variables

The control variables collected for this study included: Age; Education; Experience; Leader level; and Time in Role. These variables were relevant to this study design. Paradiso and Sweeney's (2019) research on leadership and healthcare safety culture included the demographics of age, tenure, educational level as control variables. Hill (2010) found in a review of studies a relationship between experience of the nurse and quality outcomes.

### Data Collection Procedures

The survey and informed consent were administered online using Microsoft Office Survey tool via a link provided in an email from the research assistant in the Learning and Development department. Prior to the email and survey link being sent, I conducted information sessions on the research project and opportunity to participate.

The MLQ developed by Avolio and Bass (2004) was used to measure style (Appendix A). Permission was sought from Mind Garden to use the MLQ. (Appendix B). The Leader Form of the MLQ 5X survey was deployed via Microsoft Office Forms electronically to study participants. The MLQ Short Form survey was used to evaluate leaders' responses to statements describing leadership style. The MLQ instrument has been utilized in healthcare to measure a range of leadership styles and organizational outcomes including safety, follower outcomes, safety culture, and employee satisfaction (Merrill, 2015; Whittington et al., 2009).

The survey consisted of a total of 51 questions and the average time to complete it was 20 minutes. The instructions included the option to skip questions; however, all 80 respondents completed all 51 questions. Six demographic variables were included in the questionnaire: age, gender, race/ethnicity, level of education, years of experience, leader level, and years in current role. The survey was open from November 2019 through January 2020. The survey window was held open for this period of time to accommodate the November to December holiday season.

The safety culture (SC) data was collected from the annual Safety Culture Survey, which was promoted for all employees to complete voluntarily as part of the employee engagement survey in December 2019. The safety culture survey was deployed by Press Ganey on behalf of the health system via an electronic link to the survey. The survey contained 19 statements related to the three factors in safety culture described in Chapter Two (Appendix F). The survey window was approximately two weeks for voluntary participation of all staff.

The data for these variables were archival data and permission was sought from Press Ganey, the survey and data administrator, and the health system CEO and/or the Senior Vice President for Human Resources (Appendix E).

The SSE data was collected from the healthcare system's event reporting system. This system was managed by the quality services department and was the archival database for reported events.

To maintain confidentiality of the data from me, the research data assistant followed the following process: the MLQ response data was downloaded from the online survey tool into the Microsoft Excel master database spreadsheet and the responses were coded per my specifications. Respondent IDs provided from the online survey tool were coded and not known to me as the researcher. SSE data was received from the database coordinator in a Microsoft Excel spreadsheet. Denominator types and SSE categories were coded per the research protocol specifications and then matched to each respondent and incorporated into the master spreadsheet via cut/paste function. The safety culture data was received by the research data assistant from Press Ganey, the survey administrator, and responses were coded per the research protocol and were double-checked for accuracy.

All identifying information, including names and emails, were removed from the master database spreadsheet. The master database spreadsheet (unblinded) was encrypted and saved to an undisclosed network drive location inaccessible to me as the researcher.

### **Data Analytical Techniques**

IBM SPSS (Version 26) with Hayes PROCESS macro (Hayes, 2018) was used for statistical analysis. PROCESS is a modeling tool developed for methods in mediation analysis, moderation analysis, and conditional process modeling. The data were collected as described in the sampling design and uploaded into SPSS.

Descriptive statistics (means and standard deviations) were calculated for all continuous variables. Bivariate correlational analysis were conducted to analyze the strength and direction

of linear relationships between pairs of variables. Correlational analysis included zero-order correlation, partial correlation, and part correlation. Zero-order correlation was assessed to determine if there was correlation between each of the independent and mediating variables and the dependent variable without controlling for the influence of the other variables. The partial correlation was assessed to determine if there was correlation between each of the independent variables and the dependent variable after controlling for the influence of the other variables on both the independent and dependent variable. And finally, the part correlation was assessed to determine if there was a correlation between each of the independent variables and the dependent variable while controlling for the influence on the independent variable only. The results of these analysis will be discussed in Chapter Four.

Mediated multiple regression or sequential regression analysis was used to predict an unknown value of a variable, Y, from the 5 other variables: X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub>, X<sub>4</sub>, and X<sub>5</sub>. Mediated multiple regression was used to identify which IV would be the best predictor of the DV. The IVs were ordered in the model based on the Literature Review and Hypothesis in this study. This was to avoid one of the pitfalls described by (Petrocelli, 2003) in not having logical reasoning as to why variables were ordered as they were, which has been noted to produce results just as spurious as those produced through stepwise regression.

Hayes (2018) developed a contemporary view of mediation analysis which focuses on testing the indirect mediation effect. Researchers have debated about what is required to establish a mediating effect is to demonstrate a significant indirect effect (Hayes, 2009; Mascha et al., 2013; Zhao et al., 2010). The indirect effect is the difference between the total effect of the independent variable on the dependent variable and the direct effect of this same relationship when controlling for the mediating variable (Hayes, 2018). A large indirect effect relative to the

total effect suggests a strong level of mediation exists in the relationships between the independent and dependent variables (Hayes, 2018). The PROCESS macro (Hayes, 2018) was designed to perform this mediation analysis using the bootstrap procedure, and this model was followed in this mediated multiple regression analysis.

Hayes (2018) described the evolution of initial research as having a focus on establishing whether a relationship exists between two variables and then evolving to a focus on understanding the mechanism(s) by which the effect operates and the boundary conditions and contingencies. The Research Questions and Hypotheses were designed for this evolution to occur in the study. Each of the hypothesis tested, the variables, and inferential statistical test in this study is summarized in Table 9. Mediated multiple regression analysis (MMR) using PROCESS was used to perform this analysis.

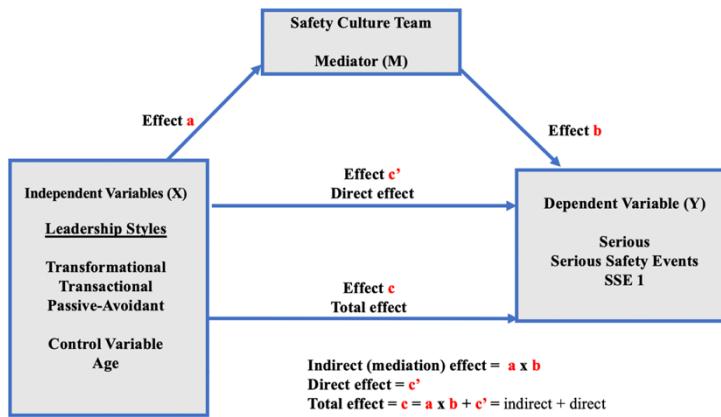
**Table 9**  
*Summary of Hypothesis and Statistical Testing*

No.	Hypothesis	Variables	Inferential Statistical Testing	Survey Source
1a	Transformation leadership style will be inversely related to serious safety events.	TFL and SSE	MMR	See Table 7
1b	Transactional leadership will be inversely related to SSEs, however, to a lesser extent than transformational leadership.	TXL and SSE	MMR	See Table 7
1c	Passive-avoidant leadership will be positively related to SSEs.	IV: PAL and SSE	MMR	See Table 7
2a	Safety Culture mediates the relationship between leadership styles and SSEs.	TFL,TXL, PAL,Tea mSC, SSE	PROCESS mediation analysis	See Table 7

### *Summary of Hypothesis*

The null hypothesis assumed that each of the predictor variables, MLQTF, MLQTX, MLQPA, SafCTeam, age would not influence the DV, SSE. The alternate hypothesis indicated there would be a statistically significant relationship to the DV. See Tables 7 and 9 for the alternate hypothesis presented in the study. This equation represents the linear relationship between multiple IV's and one DV. The "y" represents the predicted value of DV (SSE). The "b" represents the constants or regression coefficients. The "x" values represent the IVs (e.g., MLQTF, MLQTX, MLQPA, SafCTeam, Age). The equation  $y = b^0 + b^1x^1 + b^2x^2 + b^3x^3 + b^4x^4 + b^5x^5$  represents the following formula: Y = DV, SSE1;  $b^0$  = constant;  $b^1$  = transformational leadership;  $b^2$  = transactional leadership;  $b^3$  = passive-avoidant leadership;  $b^4$  = safety culture teamwork;  $b^5$  = age.

The mediated multiple regression analysis (MMR), displayed in Figure 3, describes the paths in the MMR analysis. In this study, path  $a$  is the effect of leadership style on SafCTeam; path  $b$  is the effect of SafCTeam on SSEs, or the mediation effect path ( $a \times b$ ); path  $c'$  is the direct effect of leadership styles and SSEs; and path  $c$  is the total effect of the model ( $c = a \times b + c'$ ) on SSE1. The path analysis for this model is visualized in Figure 3.

**Figure 3***Mediated Multiple Regression Analysis Model*

*Note.* This figure describes the mediated multiple regression analysis model inspired by Mascha et al. (2013).

### Data Qualification Testing

Data Qualification testing was performed utilizing key assumptions associated with multiple regression analysis. There are six key assumptions associated with the multiple regression analysis: (1) Normality; (2) Linearity; (3) Multicollinearity; (4) Homoscedasticity; (5) Autocorrelation; and (6) No influential outliers biasing the model. The results of the data qualification testing will be discussed in Chapter Four.

These assumptions were tested using SPSS statistical software with the results noted in Chapter Four. The bootstrap procedure was utilized in SPSS with the PROCESS tool and was appropriate when assumptions of the statistical model had been violated. The bootstrap procedure is a resampling technique used to estimate quantities about a population by averaging estimates from multiple small data samples. The bootstrap procedure has produced standard error estimates and confidence intervals that were similar to those calculated by using standard statistical estimators (Hansen et al., 1999).

## Normality

Regression analysis assumes that variables have a normal distribution. Highly skewed or kurtotic variables, or variables with substantial outliers can distort relationship and significance tests (Osborne & Waters, 2002). There are multiple methods to test this assumption. The assumption of normality was tested using both Kolmogorov-Smirnov and Shapiro-Wilk (Osborne & Waters, 2002). In addition, histograms were visually inspected to determine whether the variables were distributed normally.

## Linearity

Standard multiple regression can only accurately estimate the relationship between independent and dependent variables if the relationship is linear in nature (Osborne & Waters, 2002). If the relationship is not linear, the results of the regression analysis can be an underestimation of the relationship between two variables (Osborne & Waters, 2002). This underestimation can carry two risks: (1) increased chance of a Type II error for that independent variable (IV); and (2) an increased risk for Type I errors for the other IVs that shared variance with that IV (Osborne & Waters, 2002). Linearity was assessed using the scatterplot of regression standardized residual and predicted value plot. Scatterplots were examined to ensure linearity of each of the IVs to evaluate whether there was evidence of a positive or negative relationship. A box-plot and histogram were used to evaluate outliers.

## Multicollinearity

Multicollinearity occurs when there are independent variables that are highly correlated with each other. Multicollinearity was measured by variance inflation factor (VIF) and tolerance to ensure there was no multicollinearity between variables.. VIF should not exceed 4.0 and tolerance should not be less than 0.2; otherwise, multicollinearity is problematic (Winship &

Western, 2016). This can cause model misspecification due to the difficulty in identifying which IV is exerting the influence on the DV (Winship & Western, 2016). When multicollinearity is found in the data, the IVs with the high VIF values may be removed from the analysis. In this study, two aspects of safety culture, SafCTeam and SafCPreRep, were expected to be highly correlated. The stronger variable, SafCTeam, was used for the final analysis.

### **Homoscedasticity**

Homoscedasticity is an assumption of equal variances and describes a situation where residual error distribution is the same across all values of the IV. The variance of residual errors should be constant across all levels of the IV. When variance of the errors exists, this may potentially cause a Type I error and weaken the analysis of the findings (Osborne & Waters, 2002; Tabachnick & Fidell, 2019). An examination of the residual plots was performed to assess homoscedasticity. An examination of the residual plots indicated that the data were heteroscedastic. This will be discussed further in the data eligibility section of Chapter Four.

### **Autocorrelation**

Autocorrelation occurs when the residuals are not independent from each other. Autocorrelation of the predictor residuals assumption was evaluated using the Durbin-Watson statistic available on SPSSv26. Model 4 contained four predictors: MLQTF, MLQTX, MLQPA, and Age. The value of 1.99 in Model 4 signified that there was little evidence of positive serial correlation or autocorrelation in operation within the model of predictors. Model 5 contained five predictors (MLQTF, MLQTX, MLQPA, Age, and SafCTeam). The value of 1.54 in Model 5 was still in a relatively normal range. The Durbin-Watson statistic indicated that this assumption was met.

## **Influential Outliers Biassing the Model**

Cooks's distance and Mahalanobis's distance was used to identify influential outliers in the set of predictor variables. This is a test to identify data points that negatively affect your regression model (Dhakal, 2017). A value of more than 1 indicated an influential value; however, a more conservative approach was taken and the threshold for Cook's Distance was set at 0.5. The Mahalanobis Distance was 11.2, less than the critical values for evaluating significant outliers for this study (Hayes, 2012). Outliers were examined and removed to ensure the outcome of the regression analysis was not distorted.

## **Overall Reliability and Validity**

A measurement instrument is considered reliable if the instrument provides similar results each time it is used, and to the extent the scores from the measure are free from random error (Maruyama & Ryan, 2014). Four methods sociologists can use to assess reliability are the test-retest procedure, the alternate forms procedure, the split-halves procedure, and the internal consistency procedure. One way that researchers can assess internal consistency is by using statistical software to calculate Cronbach's alpha (co-efficient of reliability).

The data collection for leadership style and safety culture elements were measured using statistically reliable survey instruments. The utility of the MLQ 5X Leadership Form as a valid, reliable leadership assessment tool has been repeatedly established in literature (Avolio & Bass, 1999; Bass & Riggio, 2006; Lowe et al., 1996). The survey instruments for leadership and safety culture have been applied in many healthcare settings. I did not test reliability because these surveys are heavily used in leadership and healthcare research.

## Validity

Validity in research is an indication of how accurately a research method measures the phenomenon the study is intending to measure (Maruyama & Ryan, 2014; Salkind, 2017).

### ***Construct Validity.***

Construct validity refers to the ability to measure a specific construct or idea with an interrelated group of measures or variables (Salkind, 2017). As previously stated, the construct validity of the leadership and culture variables are strong. However, Social desirability bias was a potential limitation. Social desirability bias can occur when there is a potential for study participants to give “correct” responses that would be positively evaluated by others (Maruyama & Ryan, 2014). There were three conditions in this study that could have had social desirability, including: (1) leadership self-assessment; (2) identification of participants; and (3) self-reporting of SSEs.

The measurement of SSEs is still an area of debate in the healthcare field. In addition, the method in this study was self-reported data in an archival database, and Gong (2011) noted that there is variation among organizations in the openness for reporting and the accuracy of the database management. Naessens et al. (2009) raised concern about using only reported events for public reporting and organizational performance comparisons; however, these events were used only for relationship investigation with leadership and safety culture and not for external comparisons. In addition, SSE1, death, is also identified and reviewed by other processes in the organization.

***Internal Validity.***

Internal validity is the extent to which conclusions can be drawn about the causal effects of one variable on another variable(Maruyama & Ryan, 2014). The study design is a cross-sectional study; therefore, the study design data limits the researcher's ability to claim causal relationships between the variables in the analysis. This is noted as a limitation in the study. There was a limited set of control variables in the study, and ultimately one control variable was included in the final analysis. The consideration of alternate explanations (spuriousness) for SSEs needs to be considered.

***External Validity.***

External Validity is the extent to which study results can be generalized to the population(Maruyama & Ryan, 2014). In consideration of external validity, the sample was representative of community healthcare systems in a suburban area. This sample was not necessarily representative of a university or teaching hospital setting. Data were solicited from potential study participants in the health system in which I work due to the timeframe of the study and the access of the population to conduct the study.

### ***Sampling Bias.***

As previously noted, a sample from one local community health system was necessary to complete the study within the specified timeframe. This potential bias limited the respondents to leaders in one health system. This sample may not be representative of larger academic medical centers or for-profit healthcare institutions.

### ***Researcher Bias.***

I have worked in the healthcare industry for 30 years, specifically inpatient care and quality and safety. My personal leadership style has strong attributes of transformational leadership styles based on self-assessment tools. Additionally, as previously noted, I serve as a Senior Executive for the health system.

### **Summary**

The overarching goal of this study design was to assess the impact of leadership style on SSEs and the mediating effect of two aspects of a safety culture—a non-punitive environment and teamwork effectiveness—in three hospitals in a community healthcare system. The methodology was designed to examine the relationships between the independent and dependent variables. An opportunity also existed to examine the effects of a potential mediating variable. This cross-sectional study was designed to gather data for inferential statistics to examine these relationships using SPSS (Version 26) software and Hayes PROCESS. This chapter contained the following major sections: research design and perspective; sampling plan; variables and operational definitions; data collection procedures; data analytical techniques; and overall reliability and validity. A cross-sectional quantitative approach, utilizing correlational and regression analysis techniques, allowed for the investigation of these aforementioned relationships. The convenience sample utilized in this study posed limitations to the overall

population in question and was noted as a threat to external validity (Creswell & Creswell, 2018). Chapter Four presents the results and analysis from this study.

## CHAPTER 4: RESULTS AND ANALYSIS

The focus of this study was to examine the relationship between three leadership styles—transformational, transactional, and passive-avoidant—on preventable medical errors that resulted in serious safety events (SSEs) and the effect of safety culture on this relationship. The literature suggests that there is an opportunity to study the relationship between leadership styles and SSEs, as well as the role of safety culture in mediating this relationship. This study was an effort to measure the relationship between these variables.

This study sought first to examine the relationship between leadership styles and SSEs, and second to determine if safety culture teamwork mediates this relationship. The age of the participants was used as the final control variable. The following research questions were posited:

RQ1: What is the relationship between leadership styles including transformational, transactional, and passive-avoidant and serious safety events?

RQ2: How does safety culture mediate the relationship between leadership styles and serious safety events?

The results in Chapter Four are organized in the following manner: Significance of the Study; Summary of Methods; Study Results; and Final Summary.

### **Significance of Study**

This study was unique in its consideration of the combination of variables, specifically the mediating effect of safety culture on the relationship between leadership style and SSEs. A review of the literature demonstrated that a gap existed in the research. There was evidence that both transformational leadership and transactional leadership impacted safety behaviors and adverse events (Clarke, 2012; Manser, 2008; Wang et al., 2011; Whittington et al., 2009).

Therefore, the opportunity existed to study the relationship between leadership style and preventable medical harm, and the mediating effect of a non-punitive environment and teamwork effectiveness as part of safety culture. This study was conducted in an organization that had not previously examined leadership style, safety culture results, and SSEs. The organization is currently investing in leadership development programs at two levels—entry level leaders and executive leaders. Hopefully, this study will inform and influence these leadership development programs.

### **Summary of Methods**

This research was a non-experimental cross-sectional study. The MLQ Leadership Questionnaire was used to evaluate the three leadership styles of leaders with responsibilities for clinical areas. The MLQ-Short Form Self-Assessment Survey to measure leadership style was administered to leaders with clinical responsibilities in my healthcare organization. The leadership survey also included six demographic questions. In order to ensure complete confidentiality, the administration of the study was handled by one of the data managers and the survey was sent via email using Microsoft Office Forms.

The Safety Culture Survey is administered to all employees on an annual basis as part of the employee engagement survey and is voluntary in nature. The survey has 19 questions that are grouped into three safety culture factors: (1) Prevention and Reporting (SafCPreRep); (2) Resources and Teamwork (SafCTeam); and (3) Pride and Reputation (SafPride). The results of the annual employee safety culture and engagement survey from 2019 was used to measure safety culture teamwork, one of the three safety culture factors.

SSEs were measured by archival data in a self-reporting database used in the health system. The SSE data were classified according to the five classifications of Safety Events

adapted by the American Society for Healthcare Risk Management (ASHRM, 2014). SSE-1 (death) was used as the dependent variable.

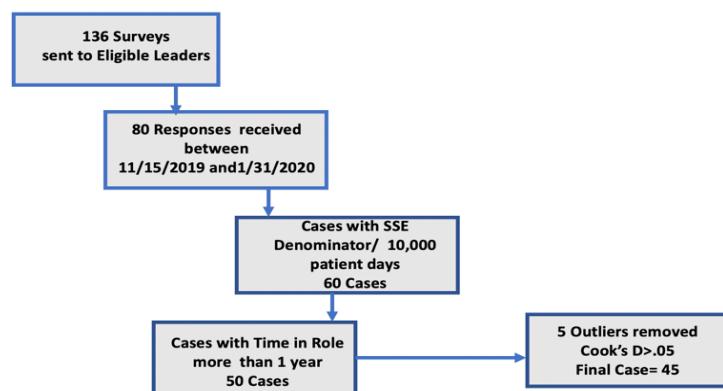
As previously noted in Chapter Three, the data protocols were followed to ensure the data was de-identified for purposes of confidentiality. I conducted information sessions for potential study participants regarding the opportunity to participate in the study during the study enrollment period. All data were matched to the leaders according to the data protocol by the data managers.

## Participants

One hundred and thirty-six eligible leaders with clinical responsibilities received the survey using Microsoft Forms and an email account from one of the data managers. A total of 80 participants responded, which demonstrated a response rate of 58%. Data inclusion criteria included leaders, who had been in their roles for more than one year, and SSE 1 rates which were calculated using 10,000 patient days. Figure 4 displays the final study participants.

**Figure 4**

*Final Study Participant Inclusion*



The final sample size for this study contained a total of 45 responses or 33% of the initial 136 eligible participants for the analysis. This sample was representative, given that the sample

had the same general characteristics of the target population based on a review of the population and sample characteristics by the data manager. For hypothesis testing purposes, the bootstrap procedure was used to correct for the limitation of the sample size (Hansen et al., 1999; Hosseini et al., 2017).

The demographic data initially collected for the study population included age, years of experience, leader level, and time in roles. This demographic data is displayed in Tables 10 and 11. Table 10 shows the frequencies of responses for different age ranges. The age of the participants' ranged from 25 to 65 and older, 60% of which were above the age of 45. Age was used as the only control variable in the regression analysis.

**Table 10**  
*Age of Participants*

Age	% ( <i>f</i> )
<i>Age in years (n=45)</i>	
Under 25	0
25-34	4.4 (2)
35-44	35.6 (16)
45-54	24.4 (11)
55-64	31.1 (14)
65 and older	4.4 (2)

Table 11 shows the frequencies for experience in years, leader level, and time in role. The respondents' years of experience ranged from six to over 16 years, with over 89% greater than 11 years and 69% over 16 years. Eighty percent of the participants were directors or supervisors

and 67% had three to five years of experience in their current roles. There was one participant who did not answer questions regarding years' experience and leader level.

**Table 11**  
*Leader Experience, Level of Leadership, and Years in Role*

Category	% ( <i>f</i> )
<hr/>	
Experience in years ( <i>n</i> =44)*	
6-10	8.9 (4)
11-15	20.5 (9)
16 or more	68.9 (31)
<hr/>	
Leader Level ( <i>n</i> =44)*	
Vice President	17.8 (8)
Director	53.3 (24)
Supervisor	26.7 (12)
<hr/>	
Years in role ( <i>N</i> =45)	
1-3	33.3 (15)
3-5	26.7 (12)
> 5	40 (18)

---

*Note.* \*Question not answered by participant.

## Variables and Measures

### **Leadership Styles (IV)**

Leadership styles were measured using the 45 questions in the MLQ Short Form Self-Assessment (Avolio & Bass, 2004). These questions were assigned to specific leadership styles: (a) transformational leadership; (b) transactional leadership; and (c) passive-avoidant leadership. Under a Likert scale, where a (4) means frequently if not often, a (3) means fairly often, and a (1) means once in a while, the transformational mean score was 3.26, the transactional leadership mean score was 2.47, and the passive-avoidant mean score was .41. All respondents included in the model responded to all of the statements. The 45 statements from the MLQ questionnaire could not be included in this document due to copyright requirements by MindGarden. Table 12 displays the survey results for the three styles of leadership based on an average of the statements associated with each leadership style. The largest standard deviation was noted in the transactional leadership style, while the lowest in the passive avoidant leadership style. The highest mean was noted in the transformational leadership style.

**Table 12**

*Survey Results for Leadership Styles*

Variable	N	Min	Max	Mean	SD
Transformational	45	2.45	3.85	3.26	.37
Transactional	45	1.25	3.50	2.47	.53
Passive-avoidant	45	0	1.13	.41	.26

*Note.* Responses were based on the following values: (0) not at all; (1) once in a while; (2) sometimes; (3) fairly often; and (4) frequently if not often.

### **Safety Culture Teamwork (MV)**

Safety culture teamwork was the final mediator variable used in this study. It was selected for this analysis due to the support in the literature on the influence of teamwork in a safety culture and the relationship of teamwork to the leadership styles in the preliminary analysis. Initially, I planned to use two mediators measuring Safety Culture: (1) safety culture teamwork (SafCTeam); and (2) safety culture reporting prevention and reporting (SafCPreRep). The zero order bivariate correlations showed a high degree of correlation (multicollinearity) between these two mediating variables. Of these two variables, SafCTeam was the one that showed the strongest correlation with the leadership style (IV). Hence, it was retained and SafCPreRep was removed from the model.

Safety Culture teamwork was measured by a set of seven statements, provided in Table 13, on a five-point Likert scale. The seven statements were designed to measure a staff member's perception of teamwork and resources. The highest scores were associated with SC 9 (effective teamwork within units), SC 10 (effective teamwork between units), and SC 11 (effective teamwork between RNs and MDs). The lowest scores were associated with SC 12 (adequate staff). The statements for all the factors in the survey can be found in Appendix F. The survey is a standard survey which has been adapted from the AHRQ Culture of Safety survey. It has been tested and has demonstrated reliability with Cronbach's alpha scores at acceptable levels  $> 0.8$ .

**Table 13***Statements Measuring Safety Culture Teamwork*

Variable	Sub-scales	N	Min	Max	Mean	SD
Safety Culture Teamwork		45	3.18	4.28	3.71	.24
	SC 9 Units work together	45	3.65	5	4.24	.26
	SC 10 Different units work together	45	3.50	4.29	3.80	.15
	SC 11 Effective teamwork RNs and MDs	45	3.44	4.57	3.95	.20
	SC 12 Adequate staff	45	1.92	4.56	3.13	.63
	SC 13 Communication between work units	45	2.89	4.25	3.64	.27
	SC 14 Amount of job stress	45	2.30	4.04	3.34	.42
	SC 15 Communication between caregivers	45	3.44	4.57	3.8	.21

*Note.* Safety Culture responses were based on the following values: (1) strongly disagree; (2) disagree; (3) neutral; (4) agree; and (5) strongly agree.

**Serious Safety Events (DV)**

Serious Safety Events (SSEs) was the dependent variable. SSEs were retrieved from an archival database of self-reported events, which are characterized according the ASHRM's (2014) Serious Safety Event definitions. The categories included (SSE 1) death, (SSE 2) severe harm, (SSE 3) moderate harm, (SSE 4) mild harm, and (SSE 5) no harm. Table 14 summarizes the mean scores for these five categories of harm. The most reliable category was SSE 1 (death), which was used in the model for analysis. The minimum score for all categories of SSEs was zero.

**Table 14***Summary of Serious Safety Events*

Variable	N	Min	Max	Mean	SD
Serious safety events	45				
SSE 1 Death	45	0	.36	.04	.11
SSE 2 Serious harm	45	0	7.72	.26	1.18
SSE 3 Moderate harm	45	0	43.28	4.14	7.48
SSE 4 Mild harm	45	0	669.11	61.82	110.56
SSE 5 No harm	45	0	848.87	195.89	185.47

**Control Variable—Age (CV)**

The control variables initially collected for this study included: Age; Education; Experience; Leader level; and Time in Role. Based on the literature review, these variables were relevant to this study. Paradiso and Sweeney's (2019) research on leadership and healthcare safety culture included the demographics of age, tenure, and educational level as control variables. Hill (2010) found in a review of other studies that there is a relationship between experience of the nurse and quality outcomes. The preliminary analysis revealed age to be the only demographic variable to be a significant predictor of SSEs; therefore, age was the only CV included in the final regression analysis.

The summary of the variables used in the mediated multiple regression analysis is displayed in Table 15. The table includes the question numbers associated with each variable.

**Table 15**

*Summary of Variables Used for Mediated Multiple Regression Analysis*

Variable Name	Variable Type	Level of Measure	SPSS Description	Survey Question
Transformational Leadership	Independent	Scale	MLQTF	No. 10,18,21,25,6,14, 23,24,9,13,26,36, 2,8,30,32,15,19,2 9,31
Transactional Leadership	Independent	Scale	MLQTX	1,11,16,35, 4,22,24,27
Passive-avoidant Leadership	Independent	Scale	MLQPA	3,12,17,20,5,7,28 ,33
Safety Culture Teamwork	Mediating	Scale	SafCTeam	No. 9-15
Serious Safety Events	Dependent	Scale Continuous	SSE 1	NA
Age	Control	Categorical Ordinal	Age	No. 46

### **Internal Reliability**

Mind Garden's MLQ leadership survey and Press Ganey's Safety Culture Assessment are tools that are widely used (Colla et al., 2005; Press Ganey Associates, 2015; Sexton et al., 2006). Cronbach's alpha is one of the most important and pervasive statistics involving test construction (Taber, 2017). Both tools have demonstrated internal reliability with Cronbach's alpha scores above 0.8 (Taber, 2017). The internal reliability scores, represented by Cronbach's alpha, for leadership styles and safety culture in this particular sample were lower than the reported Cronbach's alpha scores from previous studies. MLQ leadership surveys have been used in numerous leadership studies and have reported Chronbach's alpha scores at an acceptable level

( $> 0.7$ ). Press Ganey Associates (2015) has reported Cronbach's alpha scores at an acceptable range ( $>.87$  to  $.92$ ) with larger sample sizes.

## **Study Results**

Results for the study are organized in the following order—Data Screening, Assumptions, Descriptive Statistics, Preliminary Statistical Analysis, and Results of Hypothesis Testing. Data screening procedures were performed to ensure data accuracy and identify outliers. Tests of six key assumptions were performed and described in the following section.

### **Data Screening**

Data processes were followed as outlined in Chapter Three and a review of the data were conducted with the data manager. This review included a visual inspection of the data, descriptives checked by using SPSS Descriptives, and the data rechecked for accuracy. There were neither missing data nor unexpected patterns.

### **Assumptions (Data Eligibility of Multiple Regression)**

There are six key assumptions associated with the multiple regression analysis: (1) Normality; (2) Linearity; (3) Multicollinearity; (4) Homoscedasticity; (5) Autocorrelation; and (6) No Influential Outliers Biassing the Model. These assumptions were tested using SPSS statistical software with the following results observed.

#### ***Normality.***

The assumption of normality was tested using both Kolmogorov-Smirnov and Shapiro-Wilk (Osborne & Waters, 2002). The results indicated that this assumption was violated. However, I used the bootstrapping method and therefore could make valid inferences for the regression analysis.

***Linearity.***

Linearity was assessed using the scatterplot of regression standardized residual and predicted value plot. If the relationship between the independent variables (IVs) and the dependent variable (DV) is not linear, then the results of the regression analysis will underestimate the true relationship. The evaluation of residual plots revealed evidence of a linear relationship, as noted by the appearance of randomly distributed points.

***Multicollinearity.***

Multicollinearity was measured by variance inflation factor (VIF) and tolerance. VIF should not exceed 4.0 and tolerance should not be less than 0.2; otherwise, multicollinearity is problematic (Winship & Western, 2016). Initially, I planned to use two mediators measuring Safety Culture: (1) safety culture teamwork (SafCTeam); and (2) safety culture reporting prevention and reporting (SafCPreRep). As previously mentioned, the zero order bivariate correlations showed a high degree of correlation between these two mediating variables. SafCPreRep was removed from the model. There was no evidence of multicollinearity in the final model, as all VIF and tolerance scores were within acceptable limits.

***Homoscedasticity.***

Homoscedasticity is an assumption of equal variances and describes a situation where residual error distribution is the same across all values of the IV. An examination of the residual plots indicated that the data were heteroscedastic. However, since known parametric bootstrapping was used in PROCESS, this violation was not considered to be significant.

***Autocorrelation.***

The assumption of the lack of autocorrelation of the predictor residuals was evaluated using the Durbin-Watson statistic available in SPSSv26. The Durbin-Watson statistic of 1.54 indicated that this assumption was met.

***No Influential Outliers Biasing the Model.***

A series of outlier analysis was conducted in SPSS using both Cook's and Mahalanobis's Distances, and outliers were removed due to the influence of those distances on the model. Five outliers were removed to ensure the outcome of the regression analysis was not distorted. This meant the final sample size went from 50 to 45.

As there were violations of the assumptions of multiple regression, I ensured that these violations did not affect the quality my results. The next section addresses the bootstrap procedure and how these violations were addressed.

***Bootstrap Procedure and Violations of Multiple Regression.***

The bootstrap procedure was utilized in SPSS with the PROCESS tool. The bootstrap procedure is a resampling technique used to estimate quantities about a population by averaging estimates from multiple small data samples, and it is appropriate to use when assumptions of the statistical model have been violated. For this research I used the bootstrap procedure with 5,000 replicates. The bootstrap procedure has produced standard error estimates and confidence intervals that are similar to those calculated by using standard statistical estimators (Hansen et al., 1999).

Specifically, the bootstrap procedure can be used when assumptions of normality and homoscedasticity have been violated (Hansen et al., 1999), as was the case of this data analysis.

Hosseini et al. (2017) concluded, “The bootstrap method is preferable in linear regression because of some theoretical properties like having any distributional assumptions on the residuals and hence allows for inference even if the errors do not follow normal distribution or constant error variance” (Hosseini et al., 2017, p.2). Hansen et al. (1999) also supported the bootstrap procedure in noting, “The bootstrap procedure can produce valid inferences for ANOVA and regression analysis when the typical assumptions are violated” (p. 2).

### **Descriptive Statistics**

The descriptive statistics of leadership style were run to report the distribution range, mean, standard deviations, variance, and median. The results are provided in Table 16. The leadership style variable was based on a Likert scale where (0) is “not at all” and (4) is “often if not frequently.” The median scores of MLQTF and MLQPA demonstrated the most variance.

**Table 16**

*Descriptive Statistics for Leadership Styles*

Variable	N	Range	Min	Max	Mean	SD	Variance	Median
MLQTF	45	1.40	2.45	3.85	3.26	.37	.139	3.30
MLQTX	45	2.25	1.25	3.50	2.47	.53	.285	2.45
MLQPA	45	1.13	0	1.13	.41	.26	.067	.375

The safety culture was measured on a Likert scale where (1) was “strongly disagree” and (5) was “strongly agree”. Table 17 displays the descriptive statistics for the variable SafCTeam, the mediating variable used in the final regression analysis.

**Table 17**

*Descriptive Statistics for Safety Culture*

Variable	N	Range	Min	Max	Mean	SD	Variance	Median
SafCTeam	45	1.10	3.18	4.28	3.71	.24	.059	3.75

Serious safety events (SSE 1) or death was used in this research expressed as a rate per 10,000 patient days. Table 18 provides the descriptive statistics for SSE 1 attributed to each leader in the population.

**Table 18**

*Descriptive Statistics for Serious Safety Events*

Serious Safety Events	N	Range	Min	Max	Mean	SD	Variance	Median
SSE 1	45	.36	0	.36	.04	.11	.013	.00

### Preliminary Statistical Analysis

The preliminary statistical analysis included a review of the correlations. Correlation analysis was used to describe the strength and relationship between the variables. Cohen (1988) uses the following guidelines in interpreting the strength of the relationship between two variables, small ( $r = .10 - .29$ ), medium ( $r = .30 - .49$ ), and large ( $r = .50 - 1.0$ ) (pp. 79-81). Table 19 provides the results of the correlational analysis of this study, which was performed in SPSS. Significant correlations ( $p < .05$ ) were examined by focusing on the relationship between the IVs and the DV. Significant zero-order correlations, or correlations between the independent variable MLQTF and the dependent variable SSE1, ( $r (45) = .428, p < .05$ ) were noted with higher transformational leadership associated with higher SSEs. There was also a significant, strong positive zero-order correlation noted between age and SSE 1, ( $r (45) = .472, p < .05$ ) with higher age associated with higher SSE 1. There was a significant, weak positive zero-order correlation noted between MLQTX and SSE, ( $r (45) = .011, p < .05$ ).

Given the multivariate nature of this study, partial and part correlations were then examined. The partial correlation is the correlation between the IV and DV, after controlling for

the influence of the other variables on both the independent and dependent variable. The part correlation is the correlation between the IV and DV, after controlling for the influence of the other variables on only the independent variable. It is interesting to note that in the partial and part correlations for MLQTX, there is a jump in the sign from positive to negative. In addition, the relationship strengthened in absolute value terms; the correlation went from .011(zero order) to -.348 (partial) and -.291(part). This could indicate the presence of a suppressive variable, however, further analysis showed MLQTX was not a suppressor.

**Table 19***Correlation Analysis*

Model	Coefficients <sup>a</sup>					
	95% CI for B		Zero-order	Correlations		
	Lower Bound	Upper Bound		Partial	Part	
1	(Constant)	-1.092	.015			
	MLQ_TF	.054	.255	.428 *	.445 *	.390 *
	MLQ_TX	-.146	-.010	.011 *	-.348 *	-.291 *
	MLQPA	-.065	.175	.031	.147	.116
	SafCTeam	-.100	.147	.011	.062	.049
	AGE	.010	.072	.472 *	.393 *	.335 *

Note. Dependent Variable: SSE1 RATE, , \* $p < .05$

**Results of Hypotheses Testing**

Mediated multiple regression was used to assess the ability of three independent, one control, and one mediator variable to predict SSE 1. The measures of transformational leadership, transactional leadership, passive-avoidant leadership, safety culture teamwork, and age were entered into the model to predict SSE (Figure 5). The PROCESS Macro version 3.4 (Hayes, 2018) within SPSS was used with the bootstrap procedure to determine the mediating

effect of SafCTeam between MLQTF, MLQTX, and MLQPA and SSE 1. The results of the full mediated multiple regression model can be found in Appendix G.

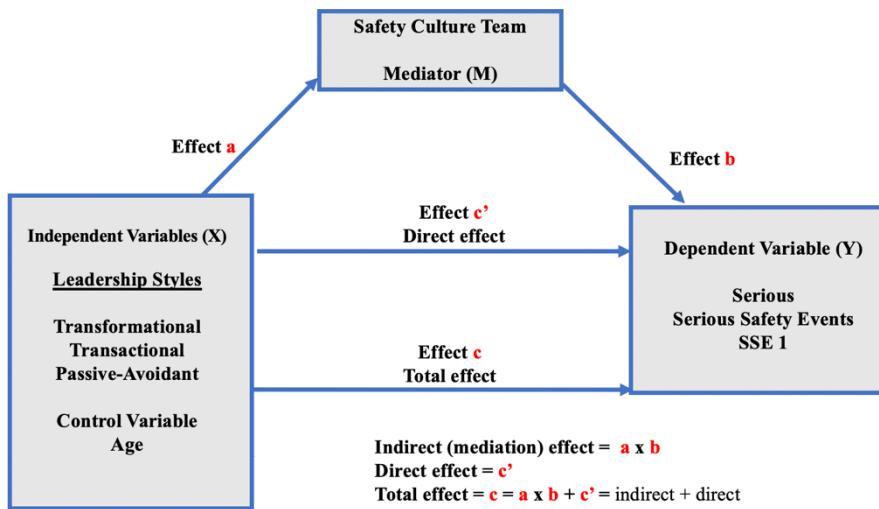
The mediation model was used to determine what, if any, mediation effect was present with SafCTeam between the leadership styles and SSE 1. This is an appropriate approach to answer the question of “how” a relationship is affected (Baron & Kenny, 1986; Judd & Kenny, 1981). According to the original model of Baron & Kenny (1986), there are four paths in establishing mediation: (1) the causal variable is correlated with the outcome (*c* path); (2) the causal variable is correlated with the mediator (*a* path); (3) the mediator affects the outcome variable (*b* path); and (4) for complete mediation, the effect of X on Y while controlling for M (*c'*) should be zero (Baron & Kenny, 1986; James & Brett, 1984; Judd & Kenny, 1981).

Hayes (2018) developed a more contemporary view of mediation analysis, which focuses on testing the indirect mediation effect. Researchers have debated about what is required to establish a mediating effect (Hayes, 2009; Mascha et al., 2013; Zhao et al., 2010). The modern view is that you do not need to have a positive relationship between the variables as outlined by Baron & Kenny (1986). The indirect effect is the difference between the total effect of the independent variable on the dependent variable and the direct effect of this same relationship when controlling for the mediating variable (Hayes, 2018). A large indirect effect relative to the total effect suggests a strong level of mediation exists in the relationships between the independent and dependent variables (Hayes, 2018). The PROCESS macro (Hayes, 2018) was designed to perform this mediation analysis using the bootstrap procedure, and this model was followed in this study’s mediated multiple regression analysis.

In this study, path *a* is the effect of leadership style on SafCTeam; path *b* is the effect of SafCTeam on SSE 1; path *c'* is the direct effect of leadership styles and SSE1, while accounting

for the mediator, SafCTeam; path ( $a \times b$ ) is the mediation effect of SafCTeam; and path  $c$  is the total effect of the model ( $c = a \times b + c'$ ) on SSE1. The path analysis for this model are visualized in Figure 5.

**Figure 5**  
*Paths for Mediated Multiple Regression Analysis Model*

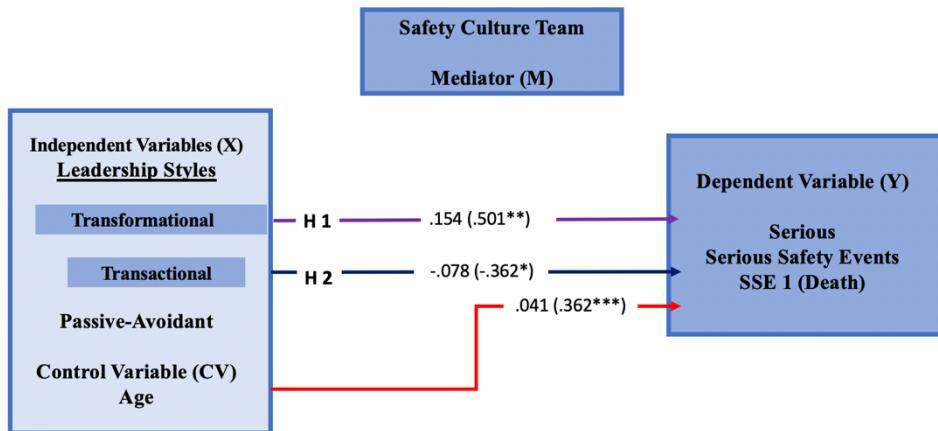


Four hypothesis were tested using the data collected according to the methodology plan.

As mentioned earlier, the six variables in the model were: (IVs) MLQTF, MLQTX, MLQPA; (CV) Age; (MV) SafCTeam; and (DV) SSE 1. The full model presented in Table 20 is statistically significant ( $p < .01$ ), with  $R^2 = .3857$ ,  $F(4,40)=4.896$  for the direct effects on the dependent variable, and statistically significant ( $p < .001$ ), with ( $R^2 = .3833$ ,  $F(4,40)=6.215$  for the total effects on the dependent variable. The model was not statistically significant ( $p < .05$ ), with  $R^2 = .0464$ ,  $F(4,40)= .4866$  for the direct effects of the mediating variable on the dependent variable. The results of the multiple regression analysis using the PROCESS macro are presented in Table 20, and the significant results from the mediated multiple regression analysis are presented in Figure 6. The raw PROCESS output from SPSS is presented in Appendix G.

**Figure 6**

*Significant Results from MMR Analysis and related Hypotheses*



Notes: Unstandardized Coefficient B (Standardized Coefficient  $\beta$ ). N=45. † $p<.10$ , \* $p< .05$ , \*\* $p<.01$ , \*\*\* $p<.001$ .

These analysis results were used for the assessment of the four hypotheses in the study and the findings are described below.

Hypothesis 1 (H1) stated that transformational leadership style will be inversely related to SSE 1. Based on the results found in Table 20, the relationship between the variables transformational leadership and SSE 1 was statistically significant, with a direct effect  $c'$  of  $B = .1543$ ,  $\beta = .5007$ ,  $p < .01$ , and a total effect  $c$  of  $B = .1526$ ,  $\beta = .4950$ ,  $p < .01$ . The relationship between transformational leadership (MLQTF) and SSE 1 was statistically significant, but not in the predicted direction. As transformational leadership increases, SSE 1 also increases. Hence, H1 was not supported.

Hypothesis 2 (H2) stated that transactional leadership will be inversely related to SSE 1, but to a lesser extent than transformational leadership. Based on the results found in Table 20,

the relationship between the variables transactional leadership and SSE 1 was statistically significant, with a direct effect  $c'$  of  $B = -.0780$ ,  $\beta = -.3622$ ,  $p < .05$ , and a total effect  $c$  of  $B = -.0785$ ,  $\beta = -.3647$ ,  $p < .05$ . Transactional leadership seems to be influential in reducing SSE 1, but to a greater extent than transformational leadership, contrary to our prediction. Therefore, this hypothesis is only partially supported.

Hypothesis 3 (H3) stated that passive-avoidant leadership will be directly/positively related to SSE 1. Based on the results found in Table 20, the relationship between the variables passive -avoidant leadership and SSE 1 was not statistically significant, with a direct effect  $c'$  of  $B = .0549$ ,  $\beta = .1240$ ,  $p > .05$ , and a total effect  $c$  of  $B = .0586$ ,  $\beta = .1324$ ,  $p > .05$ . Hence, H3 was not supported.

Hypothesis 4 (H4) stated that safety culture teamwork mediated the relationship between leadership style and SSE 1. Based on the bootstrap procedure (5,000 replicates) results presented in Table 20 (path  $a \times b$ ), the indirect relationship between each of the three leadership styles and SSE 1 through the mediator SafCTeam was not statistically significant ( $p > .05$ ). The analysis was performed at the 95% confidence interval and the span between the lower level (LLCI) and upper level (ULCI) included zero, so the null hypothesis cannot be rejected. Hence, H4 was not supported.

**Table 20***Model Summary*

Variable	B	95% CI for B		SE B	$\beta$	$R^2$ (4,40)	F (4,40)
		LL	UL				
Coefficient Path <i>a</i> : Direct Effect SafCTeam (MV)							
Constant	3.9303	3.242	4.618	.3403		.0464	.4866 ns
MLQTF	-.0745	-.3336	.1847	.1282	-.1147		
MLQTX	-.0223	-.1987	.1540	.0873	-.0492		
MLQPA	.1557	-.1511	.4625	.1518	.1669		
Age	.0041	-.0758	.0840	.0395	.0172		
Coefficient Path <i>c'</i> : Direct Effect SSE 1 (DV)							
Constant	-.5386	-1.0916	.0145	.2734		.3857	4.896 **
MLQTF	.1543	.0538	.2548	.0497	.5007 **		
SafCTeam	.0238	-.0997	.1472	.0610	.0501		
MLQTX	-.0780	-.1462	-.0098	.0337	-.3622 *		
MLQPA	.0549	-.0651	.1750	.0594	.1240		
Age	.0407	.0098	.0716	.0153	.3618 ***		
Coefficient Path <i>c</i> :Total Effect SSE 1 (DV)							
Constant	-.4451	-.7077	-.1825	.1299		.3833	6.215 ***
MLQTF	.1526	.0536	.2515	.0490	.4950 **		
MLQTX	-.0785	-.1459	-.0112	.0333	-.3647 *		
MLQPA	.0586	-.0585	.1758	.0580	.1324		
Age	.0408	.0103	.0713	.0151	.3627 ***		
Coefficient( <i>a</i> x <i>b</i> ): Indirect Effect SafCTeam							
MLQTF	-.0018	-.0255	.0063	.0079	-.0154		
MLQTX	-.0005	-.0102	.0119	.0051	-.0046		
MLQPA	.0037	-.0201	.0278	.0110	.0322		
Age	.0001	-.0054	.0046	.0023	.0008		

Note. N=45. † $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

### Summary

This study examined the relationships between leadership style, safety culture teamwork, and SSE 1. A survey of 80 leaders with clinical responsibilities was conducted to gather data for evaluation of these variables. Data eligibility testing was conducted to ensure that the data was

eligible for the appropriate analysis. Using Hayes PROCESS with bootstrapping, a mediated multiple regression analysis was performed.

This study sought first to examine the relationship between leadership styles and SSE 1 and second to determine if safety culture teamwork mediated this relationship. The following research questions were posited:

RQ1: What is the relationship between leadership styles including transformational, transactional, and passive-avoid and serious safety event (death)?

RQ2: How does safety culture mediate the relationship between leadership styles and serious safety event (death)?

After controlling for age, contrary to expectations, transformational leadership was found to increase instead of decrease SSE 1 (death), while transactional leadership was identified as the only style to be related to lower SSE 1 (death). Finally, Safety Culture Team was not found to have a mediating effect on the relationship between leadership styles and SSE 1 (death). The four hypotheses and related findings are summarized in Table 21.

**Table 21***Summary of Findings*

No.	Hypothesis	Findings
1	Transformational leadership style will be inversely related to SSE 1 (death).	Not supported
2	Transactional leadership will be inversely related to SSE 1 (death), however, to a lesser extent than transformational leadership.	Partially Supported
3	Passive-avoidant leadership will be directly/positively related to SSE 1 (death).	Not supported
4	Safety Culture mediates the relationship between leadership styles and SSE 1 (death).	Not supported

## CHAPTER 5: DISCUSSION, IMPLICATIONS, AND CONCLUSIONS

The literature review highlighted three leadership styles (transformational, transactional, and passive avoidant), safety culture elements, and serious safety events; however, leadership styles, serious safety events, and the mediating role of safety culture has not been extensively studied. This study was designed to investigate the gap in the literature related to the role of leadership and its relationship to serious safety events, and the effect of safety culture. Previous findings analyzed in the literature review were used as a foundation for this study design, specifically the opportunity to study the relationship between these variables. This chapter includes a discussion of the findings, including practical and theoretical implications of the study. The results are summarized related to the relationship of leadership styles and SSE 1 (death), and the mediating effect of safety culture teamwork. The results have been compared with other study findings related to leadership styles and safety in healthcare. Conclusions, implications, and recommendations for further research are discussed in the text that follows. The limitations of the study are reviewed and discussed in the context of opportunities for further research in the areas of leadership, safety culture, and SSEs in healthcare.

This research is significant because there continues to be a need to reduce avoidable medical errors and the resulting death and serious patient harm. It was assumed that survey participants in this study were not deceptive with their answers and that the participants would answer questions honestly and to the best of their abilities. All participants were provided with confidentiality statements in addition to information on how to withdraw from the study without penalty. Additionally, it was assumed that the MQL 5X Survey was a valid and reliable instrument for the measurement of transformational, transactional, and passive-avoidant leadership practices. Previous use of this instrument showed that the instrument was valid and

reliable in leaders' self-reporting (Avolio & Bass, 2004; Lowe et al., 1996; Muenjohn & Armstrong, 2008). Finally, it was assumed that the study results were generalizable to the subject population.

### **Summary of Study**

Patient safety in healthcare is a societal concern. In 2016, researchers at Johns Hopkins Hospital identified medical errors as the third leading cause of death in the United States, citing over 400,000 potential deaths annually (Makary, 2016). While there is debate on the number of deaths related to medical errors, this remains a problem in the United States. Deaths from medical errors are an unacceptable outcome of care in the hospital.

The purpose of this cross-sectional, non-experimental study was two-fold: (1) to determine if leadership style impacts serious safety events (SSE 1- death) and (2) to determine if a safety culture mediates this relationship. This study examined leadership style of leaders in three hospitals in a health system located in the Mid-Atlantic region of the United States through the MLQ self-assessment survey.

The results obtained from this study suggested that transactional leadership style was inversely related to SSE 1s, meaning the more transactional the leadership style, the lower SSE 1s. Transformational leadership, however, did not have an inverse relationship with SSE 1s, meaning the more transformational the leadership style, the higher the SSE 1s. While this was an unexpected finding, literature does support the attributes of transactional leadership being associated with positive task performance, whereas transformational leadership is associated with contextual performance.

The teamwork aspect of safety culture did not appear to mediate the relationship between leadership style and SSE1s. The data analysis suggested that safety culture teamwork

(SafCTeam) had no mediating effect on this relationship. It was assumed that quantitative research would not establish a cause and effect, but rather a relationship between variables. A strong relationship was assumed to be generalizable to the subject population. Despite the limitations noted with the potential of social desirability bias related to leadership self-assessment and self-reporting of safety events, the results presented gives insight on the impact of leadership on SSEs and the relationship of teamwork in a safety culture.

The findings of this study will contribute to the development of leadership training programs in the health system to develop safety leaders at three levels including executive leaders, management, and supervisory leadership. The concept of shared leadership also emerged in the study as an implication for practice, and the relationship to HRO.

## **Discussion**

The identification of the leadership styles that promote safety outcomes will contribute to the existing body of literature in pursuit of reducing SSEs. There is a role in safety leadership for both transformational and transactional styles of leadership. Whittington et al. (2009) supported the belief that transactional leadership may be a necessary pre-condition to transformational leadership behaviors. High Reliable Organizations (HROs), which demonstrate lower safety events, possess characteristics such as leadership, teamwork, transparency, and a safety culture (Chassin & Loeb, 2013; Pronovost et al., 2006). The safety culture is influenced by a leader's involvement and focus on safety. This study was designed to investigate transformational, transactional, and passive-avoidant leadership styles, and the impact on SSEs as well as the potential mediating effect of a safety culture teamwork.

Research on transformational leadership suggests that this leadership style is positively related to positive follower performance and that there is a stronger relationship with contextual

rather than task performance (Wang et al., 2011). On the other hand, active transactional leadership has been associated with rules and regulations compliance (Clarke, 2012). The data in this study suggested that transactional leadership (MLQTX) was associated with lower SSE 1. Safety practices in healthcare include protocols, procedures, and safety checks, which is related to task performance.

There are several assumptions on the role of leadership in developing a safety culture and reducing SSEs in a hospital setting. There is a relationship between leadership and culture and specifically safety culture (Schein, 2010; Yang et al., 2009). Leaders embed their beliefs, values, and assumptions through a variety of mechanisms, including what they pay attention to, measure, and control as part of operations (Schien, 2010). There is some debate on the effect leaders have on culture, or if culture is a powerful force that leadership has limited capacity to influence (Hartnell et al., 2016). In healthcare, this is an area where turnover in Chief Executive Officers (CEOs) may be a factor. As previously noted the average time of a hospital CEO continues to be three to five years. Hartnell et al., (2016) study findings suggested culture can serve as a substitute for leadership when leadership behaviors are redundant with cultural values, meaning they both share a task or relationship-oriented focus. The findings also supported leadership contingency theories indicating that CEO leadership is effective when it provides psychological and motivational resources lacking in the organization's culture (Hartnell et al., 2016). In the case of this study, the three hospitals involved had CEOs whom had been in their roles in the three to five-year timeframe.

Leaders' reactions to critical situations, role modeling, coaching, and teaching are also primary culture embedding mechanisms (Schein, 2010). Research on safety culture suggests that safety culture affects safety performance and that leadership affects safety culture and indirectly

affects safety performance (Yang et al., 2009; Weaver et al., 2013; Padgett et al., 2017). While this study did not show a mediating effect of safety culture teamwork between leadership style and SSE 1, there is evidence of such effect in the literature. The gap in the literature, which was the basis for this study, addressed investigating the mediating effect of safety culture between leadership style and SSE 1 (death). The implications for future study include exploration on the effect of turnover and aspects of shared leadership, on HRO and reduction of SSE.

Further, the perceptions of safety culture, specifically teamwork, are also associated with structure of care delivery, skill mix, turnover, and workload intensity (Brown & Wolosin, 2013). These other factors were not separately considered in this study. Teamwork, team effectiveness, and HRO attributes all contain aspects of shared leadership. While these are separate concepts, there is considerable overlap noted in the literature, and in practice. Healthcare is complex with highly skilled practitioners making critical decisions, which are time sensitive for safe patient outcomes.

### **Leadership Style and Serious Safety Events**

As previously stated, the results from this study indicated that transformational leadership was associated with higher SSE 1, a finding that did not support H1. While this was not the expected result, Clarke (2012) noted that transformational leadership is associated with motivating individuals and relates to stronger performance with contextual rather than task performance. Contextual performance is related to motivating team members to be engaged with safety practices, whereas task performance is related directly to the compliance and completion of procedures and protocols. There is a role for multiple styles of leadership for effective organizational performance. The continuum of active transactional leadership to a more transformational leadership style is one example. Whittington et al., ( 2009) discuss while

transactional behavior is essential for positive follower outcomes, this may be a precondition for effective use of transformational leadership behavior. In the discussion by Wang et al., (2014) in their meta-analysis on shared leadership and team effectiveness, the concept of multiple types of leadership shared was associated with team effectiveness.

Other evidence in the literature noted that positive team performance and organizational performance has been indicated to relate to transformational leadership in most organizational settings (Avolio & Yammarino, 2013). These findings support the opportunity to examine the mechanisms by which leadership influences patient safety outcomes, as highlighted by Boamah et al. (2018). The findings in this study were inconsistent with Boamah et al.'s (2018) study, which suggested transformational leadership to be significantly associated with decreased adverse safety outcomes through structural empowerment and nurse clinical leadership. Structural empowerment was not a construct in this study; however, it should be noted that 80% of the study participants were clinical directors or supervisors who provided direct leadership to clinical units. While my study did not address structural empowerment as construct, the Boamah et al. study only addressed transformational leadership, and did not address transactional leadership. The concept of structural empowerment is however consistent with the concept of HRO and shared leadership. I believe the difference in the outcomes of these studies support the need for further study on leadership styles, HRO, and safety outcomes.

There are additional explanations for the unexpected positive relationship found between transformational leadership and serious safety events in this study. Kennedy (2005) noted this could be due to a small sample size, multicollinearity or minimal variation in the explanatory variables, or heteroscedasticity, as was the case in this sample. The bootstrap procedure was used to correct for these assumption violations, as previously noted in Chapter Four. Additionally,

common sense played a factor in reviewing and analyzing the data and literature. Safety in healthcare requires adherence or compliance to specific procedures and tasks to ensure safety and the reduced potential for medical errors.

While transformational leadership is noted to be important in motivating followers, transactional leadership is noted to be particularly effective with task completion or compliance. However, in an analysis of shared leadership and team effectiveness, Wang et al., (2014) noted the positive effects of shared leadership on team performance including transformational and transactional styles of leadership. In addition, Hartnell et al., (2016) support the role of senior leadership in providing psychological support and motivation in improving performance. There is a role for relationship and task leadership in driving high reliability performance.

Transactional leadership, specifically active transactional leadership, is important in ensuring compliance with rules and regulations, whereas transformational leadership is primarily associated with encouraging employee participation in safety (Clarke, 2012). The study results indicated that transactional leadership style had a positive relationship with lower SSE 1. Clinical leaders play a significant role in safety leadership in setting expectations for safety practices and holding followers accountable to those tasks and practices. Whittington et al. (2009) found transactional leadership was positively related to follower outcomes, including performance, effective commitment, and citizenship. Further, transactional leadership may be a necessary pre-condition for effective use of transformational leadership behaviors.

Effective commitment or motivation strengthens personal efficacy expectations and creates self-inducements to attain performance results (Bandura, 1977). This is consistent with Stages Four and Five in the empowerment process described by Conger and Kanungo (1988),

where leadership practices focus on expressing confidence in followers and setting clear performance expectations.

This process of setting clear performance expectations is active transactional leadership. The contingent reward aspect of active leadership has been found to be effective in motivating followers to achieve higher levels of performance (Bass & Riggio, 2006). The data in this study partially supported existing theories that purport a combination of transactional and transformational leadership styles as a means of obtaining the most effective leadership outcomes within organizations (Bass et al., 2003). This is also supported by the concept of transactional leadership as a precursor to transformational leadership. Leadership development is an evolutionary process that occurs over time with experience and training.

It is also important to consider the level of leader in the organization in the study results, given that 80% of the leaders in the sample were directors or supervisory level leaders who worked closely with frontline staff. The leaders in the sample are closer to the front-line team members and direct day to day operations and compliance with policy, procedures, and protocols for safety. The effects of shared leadership are stronger when the work of the team is more complex, as is the case in healthcare (Wang et al., 2014).

Leadership is important in promoting safe practices in health care. Passive-avoidant leadership was not related to higher SSEs in this study, as this relationship was not statistically significant and therefore did not exist. This leadership style, as some literature has suggested, is non-leadership.

Safety Leadership requires leaders to message safety, build engagement and accountability, lead local learning, and support operations (Clapper et al., 2019). The characteristics of a safety leader are similar to characteristics in a transformational leader but

more closely align with those of a transactional leader, where the leader holds followers accountable to specific tasks and practices. This is an important insight and has implications for development of safety leaders' skills. The implication for safety leaders is to demonstrate active transactional leadership, feel responsible for their teams' practice habits, constantly monitor for compliance, and give feedback.

### **Leadership Style, Serious Safety Events, and Safety Culture**

The mediating effect of SafCTeam on the relationship between leadership styles and SSE 1 was not statistically significant; therefore, there was no mediating effect. This finding was different than what was previously discussed when Yang et al. (2009) concluded that (1) safety culture affects safety performance and (2) leadership affects safety culture and therefore indirectly affects safety performance. Weaver et al. (2013) also suggested safety culture to be associated with error reducing behaviors.

The Press Ganey Survey of the safety culture teamwork factor used in this study had seven statements, two of which are related to staffing and stress. While this was part of the resources and teamwork factor in the safety culture survey, the factor of staffing and stress was not studied as a separate mediating variable. There is evidence in the literature that the perceptions of safety culture, specifically teamwork, are also associated with structure of care delivery, skill mix, turnover, and workload intensity (Brown & Wolosin, 2013).

While the results of this study did not indicate a mediating effect of safety culture teamwork, the literature supports the role of leadership in culture development, specifically the attributes of a safety leader in developing a safety culture and achieving safety outcomes. This may suggest a theoretical gap in the literature, or at least that there is an opportunity for further

understanding of the relationship between leadership style, safety culture development and the impact on serious safety events.

Safety culture emerges from organizations' adoption of High Reliability Organization (HRO) principles. In a study by Padgett et al. (2017), the following themes emerged as part of a safety culture: process standardization; checks and redundancy; authority migration; and communication and teamwork. These themes are consistent with the principles of HROs (Chassin & Loeb, 2013; Padgett et al., 2017; Pronovost et al., 2006) and behaviors associated with active transactional leadership. Transactional leadership is part of the accountability system required to build HRO culture. Team effectiveness is a component of HRO, and in shared leadership there is role for both transformational and transactional leadership. There is definitely the possibility of other contingency factors that may be in play. There is an opportunity to build on the studies of shared leadership, and specifically multiple forms of leadership on team effectiveness and HRO.

The control variables collected for this study included: Age; Education; Experience; Leader level; and Time in Role. These variables were relevant to this study design. Paradiso and Sweeney's (2019) research on leadership and healthcare safety culture included the demographics of age, tenure, educational level as control variables. Hill (2010) found in a review of studies a relationship between experience of the nurse and quality outcomes. The preliminary analysis revealed age to be the only demographic variable to be a significant predictor, therefore age was included in the final regression analysis.

### **Limitations**

This study was limited to a sample of healthcare leaders in three hospitals in the health system where I serve as a senior executive. The study site was a non-profit community hospital,

which would be representative of other non-profit community hospitals but may not be representative of academic medical centers or for-profit health systems. The final sample size was 45, therefore the bootstrap method was utilized in the analysis. A representative sample of the population is one of the conditions of applying the bootstrap method. The sample was representative of the population as previously noted by review of the data managers supporting the research. The SSE most serious outcome, death, was used in the final analysis.

The leadership style data represented information from leaders' self-assessments. As previously reported, there was a possibility that social desirability bias impacted the data. This held true for the safety culture data, which was employee responses to the 2019 annual engagement and safety culture survey. It was not possible to determine if participants in the two surveys under-reported based on perceived undesirable information or over-reported based on a perceived positive response. In addition, there was the issue of hierarchical data, or "nested modeling" in the data, where there was a hierarchy of leaders with overlapping area responsibilities. The data set was not sufficient to support hierarchical linear modeling (HLM) approach to achieve adequate power (Woltman et al., 2012).

Application of the cross-sectional data method means the data were taken at a point in time; therefore, the results could be different if another timeframe is chosen (Levin, 2006). This study design was chosen because it was a feasible design and is an appropriate design to assess both prevalence of a characteristic in a population and relationships among variables (Maruyama & Ryan, 2014). However, the cross-sectional data limits the researcher's ability to claim causal relationships between the variables in the analysis.

## **Practical Implications**

The findings of this study indicated an opportunity for further action to be taken to reduce the incidence of SSEs through continued development of active transactional leadership behaviors in safety leaders. Safety leadership is identified as a key component in achieving safety outcomes including the leadership style and influence on follower safety practice. There are two practical implications of the study findings for this organization: first, the opportunity to focus on the identification of leadership skills necessary to reduce SSEs; and second, the opportunity to train specific leadership behaviors and skills required to build high reliability organizations (HROs).

### **Leadership Skills Necessary for the Reduction of Serious Safety Events**

The identification of leadership skills associated with transactional leadership, which are necessary for the reduction of SSEs, is critical to make an impact on healthcare safety. The first implication is to identify and understand transactional leadership behaviors in the context of a safety leader and how this type of leadership skill is related to the concept of accountability. Components of active leadership include making decisive decisions, setting clear expectations, creating role clarity, and developing an accountability structure and practice. Accountability in leadership is both an art and a science. Building accountability structures for safety in the health system is linked to the attributes of HROs. The key is for leadership to talk about safety and for teams to demonstrate safety practices on a daily basis (Clapper et al., 2019). The skills include leader-to-leader accountability, leader standard work, and the use of a daily management system to guide daily safety practices by all team members.

### **Development of Safety Leaders**

There are two leadership development programs in the health system, including one for “emerging leaders” and another for “senior leaders.” There are leadership skills necessary for both groups of leaders in developing safety leaders at all levels in the organization. The findings of this study and the existing literature can be a basis for a “safety leadership” training section in the leadership curricula of the programs. Training for safety leaders includes both reliability skills or technical skills, and relationship skills or leadership skills. The findings of this study suggest the opportunity to focus on the relationship of transactional leadership with attributes of leadership required for HROs. The attributes of HROs include elements of safety culture and leadership. The combination of these skills is called “universal skill” for safety leaders in HROs (Clapper et al., 2019, p. 38).

### **Theoretical Implications and Future Research Opportunities**

This study highlighted the opportunity to further develop and identify the leadership styles required of safety leaders. Specifically, this study focused on active transactional leadership as related to HRO principles and reduction of SSEs, with the potential of also influencing other factors. As previously discussed, staffing and stress were not variables in this study. This study also presents an opportunity to focus on a specific area of practice, such as an emergency department, critical care unit, or procedural area. Study results in a cross-sectional design would be enhanced by adding a qualitative component to the research.

Based on the findings from this study and previous literature, there are two potential areas for future study: (1) implications of staff turnover and temporary personnel on SSEs and achieving HRO; and (2) the relationship between leadership styles, organizations with characteristics of HRO, and safety outcomes. The second area for future study should include theories related to shared leadership and structural empowerment as it relates to leadership style

and HRO characteristics. Specifically, how do these theories promote HRO, and which leadership styles may mediate the relationship between structural empowerment and HRO. Each of these study designs would benefit from a mixed-method methodology. The contextual aspect of the research is important in studying perceptions (Lyons & Coyle, 2007).

### **Staff Turnover and Temporary Personnel on Serious Safety Events and HRO**

Neither staff turnover nor the use of temporary personnel was a variable factored into this study; however, a study by Brown and Wolosin (2013) suggested that structure of care delivery, skill mix, turnover, and workload intensity could impact safety outcomes. Two of the statements in the SafCTeam were related to staffing and stress. The staffing experience during the COVID-19 pandemic is an example of this implication where hospitals have an influx of agency nurses and only a brief timeframe for training post anesthesia care unit (PACU) nurses to work in ICU with critically ill, ventilator-dependent COVID+ patients. The issue of staff turnover could be studied as a mediating variable in the relationship between safety culture and SSEs. Sexton et al. (2018) noted the relationship was potent between active leadership and active team participation by walk-arounds with feedback and other safety culture indicators, including reduction in stress and burnout. There would be a benefit to design a study across multiple hospitals in a homogeneous department, such as an emergency department, intensive care unit, or surgical services.

### **Relationship Between Leadership Styles, HRO, and Safety Outcomes**

There is an opportunity to further explore the relationship between leadership styles and organizations with attributes of HRO, and the effect on safety outcomes. In addition, the issue of culture as a product of leadership, specifically the HRO principles, emerged as an area for leadership training and future research.

There is also an opportunity to train leaders to be safety leaders by developing their technical and relationship skills. The opportunity exists to design an experimental research study that evaluates the impact of safety leadership training on HRO practices, safety culture, and SSEs. The theoretical framework which would be appropriate to use as a basis for this type study could be structural empowerment, specifically as this framework may relate to the role of safety leader and patient safety. Training would be specific to the leadership roles of middle management and senior leaders. This research would build on previous findings about safety leaders and safety outcomes. The literature supports the conclusion that management leadership who implement daily supportive actions for safety are important catalysts for safety improvement (Kristensen et al., 2016; Weng et al., 2016).

## **Conclusions**

This study was intended first to examine the relationship between leadership styles and serious safety events, and second to determine if safety culture teamwork mediates that relationship. Serious safety events continue to be an issue in healthcare. This was the driver behind this study. The following research questions were posited: (RQ1) What is the relationship between leadership styles including transformational, transactional, and passive-avoid and serious safety events?; and (RQ2) How does safety culture mediate the relationship between leadership styles and serious safety events?

RQ1 investigated the relationship between leadership style and SSEs. While the results related to transformational leadership did not support the hypothesis, this leadership style is associated with motivating followers intrinsically. On the other hand, transactional leadership is associated with extrinsic motivation and task performance. Task and procedure compliance are associated with HRO characteristics of leadership in a hospital setting.

RQ2 related to the mediating effect of safety culture between leadership style and SSEs. No mediating effect was seen in these results. In this study, safety culture was measured by resource and teamwork factors. Staffing or resource components were not addressed in this study; however, such components could be included in future research. The issue of culture as a product of leadership, specifically the HRO principles, emerged as an area for leadership training and future research.

The results of this study added to the growing body of literature addressing the need to identify leadership styles associated with safety leaders as well as the effect of safety culture on reducing serious safety events. The coaching and training of safety leaders in healthcare is a critical element in eliminating preventable medical errors. Healthcare is a complex industry and is seeing benefits from adopting the attributes of HRO as a mechanism to improve safety. The ability to develop the right leadership skills in leaders who can implement the HRO principles will have a positive effect on health care safety.

### **Afterword**

The relationship between transactional leadership style and accountability during the COVID-19 crisis and implication of leadership style in a crisis situation was a real-time case study. The COVID-19 pandemic was taking its toll on the healthcare system during the writing of this research study. The parallels in effective leadership in crisis situations and maintaining healthcare safety became apparent. The health system implemented the Hospital Incident Command System (HICS) to manage the situation. The purpose of the HICS system is to have the ability to coordinate efficiently, to communicate effectively, and to provide safety and security for our patients and first responders during an emergency situation (California Emergency Medical Services Authority [CEMSA], 2020).

The HICS is an adaptation from the Incident Command System (ICS) developed in the 1970s during the massive wildfire fighting efforts in California (CEMSA, 2020). The functioning of the HICS system is predicated on specific roles, authority, and chain of communication; specific policies and procedures; and decision-making. These attributes are similar to the attributes in the transactional leadership style, where roles are clearly defined, expectations are clear, and a transaction occurs upon task completion. This system has been used during the COVID-19 crisis to manage operations during the extraordinary situation, lasting months, and also to develop the path back to normal hospital operations with a focus on safety for patients and healthcare workers.

Leadership is broadly defined as a leader's ability to induce followers to act for certain goals that represent the values and motivations, the wants and needs, and the aspirations and exceptions of both leaders and followers (Burns, 1978). The art of leadership lies in the way leaders see and act on their own, and in their followers' values and motivations.

Leadership is essential to building culture and achieving results. Healthcare is a complicated system due to the many contingencies associated with delivering care to people in its everchanging environment. This study was conducted in a unique time: during the COVID-19 pandemic, everything we knew about day-to-day life changed in a matter of two weeks and still persists in an altered state. As a result of COVID-19, the healthcare system has been stretched beyond its capacity and forced to change its landscape on a daily basis, which has required extraordinary efforts by healthcare workers and healthcare leaders. I was able to assimilate some of the findings of this research into the current leadership requirements necessary to manage this crisis.

Unlike some crises in healthcare, such as mass-casualties, the COVID-19 crisis has been spread out over the long-term, some dubbing it a “marathon.” The concept of resilience is necessary for the “marathon” and is at the core of HRO principles, which enables the organization to recover from setbacks, use past experience for learning, understand operations, and have skill at respectful communications (Weick & Sutcliffe, 2007). The lessons of transactional leadership and HRO have served the health system well as it manages the effects of the COVID-19 pandemic and anticipate continuing to do so for months to come. Due to the focus of our healthcare leaders and courage of our front-line heroes, we will win this war and evolve to a new state of normal.

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## APPENDICES

### Appendix A: Multifactor Leadership Questionnaire

#### Multifactor Leadership Questionnaire

The three sample items only from this instrument as specified below may be included in your thesis or dissertation. Any other use must receive prior written permission from Mind Garden. The entire instrument may not be included or reproduced at any time in any other published material.

#### Sample Items:

As a leader ....

I talk optimistically about the future. I spend time teaching and coaching. I avoid making decisions.

The person I am rating....

Talks optimistically about the future. Spends time teaching and coaching. Avoids making decisions

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## Appendix B: Mind Garden Permission Letter

For use by Susan Glover only. Received from Mind Garden, Inc. on August 22, 2019

[www.mindgarden.com](http://www.mindgarden.com)

To Whom It May Concern,

The above-named person has made a license purchase from Mind Garden, Inc. and has permission to administer the following copyrighted instrument up to that quantity purchased:

Multifactor Leadership Questionnaire

The three sample items only from this instrument as specified below may be included in your thesis or dissertation. Any other use must receive prior written permission from Mind Garden. The entire instrument may not be included or reproduced at any time in any other published material.

Citation of the instrument must include the applicable copyright statement listed below. Sample Items:

As a leader ....

I talk optimistically about the future. I spend time teaching and coaching. I avoid making decisions.

The person I am rating....

Talks optimistically about the future. Spends time teaching and coaching. Avoids making decisions

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Sincerely,



Robert Most  
Mind Garden, Inc. [www.mindgarden.com](http://www.mindgarden.com)

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## Appendix C: Informed Consent Form

**IRB Use Only:****HOOD COLLEGE  
INFORMED CONSENT FORM****Leadership Styles, Safety Culture Elements, and Serious Safety Events: An Empirical  
Investigation within a Health System  
Consent Form****1. INTRODUCTION**

You are invited to be a participant in a research study about the impact of leadership styles on serious safety events and the effect of safety culture. You were selected as a possible participant because you are a leader in Adventist Healthcare responsible for clinical areas. We ask that you read this document and ask any questions you may have before agreeing to be in the study. We require that participants in this study be at least 18 years old. The study is being conducted by Hood College Doctoral Student.

**2. BACKGROUND AND PURPOSE OF THE STUDY**

The purpose of this study is to determine which leadership style will positively impact serious safety events in hospitals. First the study seeks to determine if leadership style positively impacts serious safety events and if a safety culture affects the relationship between leadership style and serious safety events. The contribution of this study will be to use this information to select and coach leaders who can impact safety culture and healthcare safety. In addition, results from this study can be used to improve healthcare leadership selection, training, and coaching, and to understand the impact of leadership style on healthcare safety in hospitals.

The role and impact of leadership is recognized as an important component in developing a safety culture and safety practices to prevent SSE. In a systematic review of 18 studies between 2004 and 2015, Sfantou et al. (2017) found while many of these studies recognize leadership style as an element for safety as part of quality, few of the studies correlated a certain leadership style with patient safety outcomes. This is the opportunity for further study and the purpose of my research.

**3. DURATION**

The length of time you will be involved with this study is nine months. The final research paper will be complete in August 2020.

**4. PROCEDURES**

If you agree to be in this study, we will ask you to do the following things:

- a. Read and demonstrate agreement to participate via this informed consent.
- b. Know that your participation will involve the completion of a leadership style questionnaire including some demographic information on-line via Microsoft Forms.
- c. Note that the anticipated time allotment for completion of the questionnaire is approximately 20-30 minutes.
- d. Participants are kindly asked to complete the survey within 7 to 10 business days after initial receipt of the survey document.

## 5. RISKS/BENEFITS

This study has the following risks: This research presents no foreseeable risks to you but does provide an opportunity to impact social change.

The benefits of participation are: The possible benefit of your participation is connected to the identification of a prospective model of leadership that could assist hospital organizations to more consistently facilitate successful safety outcomes.

Your participation in this study is voluntary and without tangible compensation.

## 6. CONFIDENTIALITY

The records of this study will be kept private. Any information you provide will be kept strictly confidential. The researcher will not use your information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in any reports of the study.

The leadership questionnaire data will be aggregated by the researcher and staff and will be deleted from electronic files once the study is complete.

## 7. VOLUNTARY NATURE OF THE STUDY

Your participation in this study is completely voluntary. Your decision whether or not to participate will not affect your current or future relations with Hood College or any of its representatives. If you decide to participate in this study, you are free to withdraw from the study at any time without affecting those relationships. This means that everyone will respect your decision of whether or not you want to be in the study. No one at Adventist HealthCare will treat you differently if you decide not to be in the study. If you decide to join the study now, you can still change your mind later. If you feel stressed during the study you may stop at any time. You may skip any questions that you feel are too personal. You may contact the researcher at any time to withdraw from the study via email at [slg17@hood.edu](mailto:slg17@hood.edu). If you withdraw from the study, your responses will be destroyed and will not be included in the study results.

## 8. CONTACTS AND QUESTIONS

The researcher conducting this study is Susan L. Glover. You may ask any questions you have right now. If you have questions later, you may contact the researcher at 301-980-3322 or [slg17@hood.edu](mailto:slg17@hood.edu).

If you have questions or concerns regarding this study and would like to speak with someone other than the researcher(s), you may contact Dr. Diane Rose Graves, Institutional Review Board Chair, Hood College, 401 Rosemont Ave., Frederick, MD 21701, [graves@hood.edu](mailto:graves@hood.edu).

## 10. STATEMENT OF CONSENT

You will be given a copy of this form to keep for your records.

The procedures of this study have been explained to me and my questions have been addressed. The information that I provide is confidential and will be used for research purposes only. I am at least eighteen years old. I understand that my participation is voluntary and that I may withdraw anytime without penalty. If I have any concerns about my experience in this study (e.g., that I was treated unfairly or felt unnecessarily threatened), I may contact the Chair of the Institutional Review Board or the Chair of the sponsoring department of this research regarding my concerns.

Participant signature \_\_\_\_\_ Date \_\_\_\_\_

Signature of Parent/Guardian [if applicable]

\_\_\_\_\_  
Date \_\_\_\_\_

Signature of Person Obtaining Consent

\_\_\_\_\_  
Date \_\_\_\_\_

## Appendix D: Participation Invitation Letter

### Leadership and Patient Safety Research Invitation Letter

Dear AHC Leader,

You are invited to take part in a research study on the Relationship between Leadership Styles, Safety Culture and Serious Safety Events. You were chosen for the study because of your current leadership role within Adventist HealthCare. This study is being conducted by Susan Glover, a doctoral student at Hood College. Please read this form and ask any questions you have before agreeing to be part of the study.

#### Background Information:

The purpose of the study is to determine which leadership style will positively impact SSE in hospitals. First the study seeks to determine if leadership style positively impacts SSE and if safety culture mediate the relationship between leadership style and serious safety events. The contribution of this study will be to use this information to select and coach leaders who can impact safety culture and healthcare safety.

In addition, results from this study can be used to improve healthcare leadership selection, training, and coaching, and to understand the impact of leadership style on healthcare safety in hospitals. I will describe the linkage between SSE, safety culture and leadership style, and the purpose and importance of my study.

#### Procedures:

If you agree to be in this study, you will be asked to:

1. Read and demonstrate agreement to participate via this informed consent.
2. Know that your participation will involve the completion of a leadership style questionnaire including some demographic information on-line via Microsoft Forms.
3. Note that the anticipated time allotment for completion of the questionnaire is approximately 20-30 minutes.
4. Participants are kindly asked to complete the survey within 7 to 10 business days after initial receipt of the survey document.

#### Voluntary Nature of the Study:

Your participation in this study is voluntary. This means that everyone will respect your decision of whether or not you want to be in the study. No one at Adventist HealthCare will treat you differently if you decide not to be in the study. If you decide to join the study now, you can still change your mind later. If you feel stressed during the study you may stop at any time. You may skip any questions that you feel are too personal.

#### Risks and Benefits of Being in the Study:

This research presents no foreseeable risks to you but does provide an opportunity to impact social change. The possible benefit of your participation is connected to the identification of a prospective model of leadership that could assist hospital organizations to more consistently facilitate successful safety outcomes.

Compensation:

Your participation in this study is voluntary and without tangible compensation.

Confidentiality:

Any information you provide will be kept strictly confidential. The researcher will not use your information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in any reports of the study.

Contacts and Questions:

The researcher's name is Susan Glover. The researcher's faculty advisor is Dr. Anita Jose. If you have questions, you may contact the researcher via Phone at: 301-980-3322 or email [slg17@hood.edu](mailto:slg17@hood.edu). If you want to talk privately about your rights as a participant, you can call Diane Rose Graves, Ph.D., Associate Professor of Psychology and Counseling and Chair, Institutional Review Board Hood College at (301) 696-3963. You may keep a copy of this signed form.

Statement of Consent:

If you agree to the terms of this page, please indicate your consent by completing the survey via the link provided. We sincerely hope you will find the time in your extraordinarily busy schedule to join us.

## Appendix E: AHC Confidentiality Agreement and Permission

### CONFIDENTIALITY AGREEMENT

This Confidentiality Agreement ("Agreement") is made and effective the 19<sup>th</sup> day of August, 2019 by and between Adventist HealthCare, Inc., ("AHC") and Susan Glover ("Recipient").

1. **Confidential Information.** AHC proposes to disclose certain of its confidential and proprietary information (the "Confidential Information") to Recipient concerning a research study will serve as a model to improve healthcare leadership selection, training, and coaching, and to understand the impact of leadership style on healthcare safety in hospitals. Confidential Information shall include all data, materials, products, technology, computer programs, specifications, manuals, business plans, software, marketing plans, financial information, and other information disclosed or submitted, orally, in writing, or by any other media, to Recipient by AHC. Nothing herein shall require AHC to disclose any of its information.
2. **Recipient's Obligations.** Recipient agrees that the Confidential Information is to be considered confidential and proprietary to AHC and Recipient shall hold the same in confidence, shall not use the Confidential Information other than for the purposes of its business with AHC, and shall disclose it only to its officers, directors, or employees with a specific need to know. Recipient will not disclose, publish or otherwise reveal any of the Confidential Information received from AHC to any other party whatsoever except with the specific prior written authorization of AHC. Confidential Information furnished in tangible form shall not be duplicated by Recipient except for purposes of this Agreement. Upon the request of AHC, Recipient shall return all Confidential Information received in written or tangible form, including copies, or reproductions or other media containing such Confidential Information, within ten (10) days of such request. At Recipient's option, any documents or other media developed by the Recipient containing Confidential Information may be destroyed by Recipient. Recipient shall provide a written certificate to AHC regarding destruction within ten (10) days thereafter.
3. **Term.** The obligations hereunder shall survive the return of the Confidential Information and shall be binding upon both parties. Further, the obligation not to disclose shall not be affected by bankruptcy, receivership, assignment, attachment or seizure procedures, whether initiated by or against Recipient, nor by the rejection of any agreement between AHC and Recipient, by a trustee of Recipient in bankruptcy, or by the Recipient as a debtor-in-possession or the equivalent of any of the foregoing under local law.
4. **Other Information.** Recipient shall have no obligation under this Agreement with respect to Confidential Information which is or becomes publicly available without breach of this Agreement by Recipient; is rightfully received by Recipient without obligations of confidentiality; or is developed by Recipient without breach of this Agreement; provided, however, such Confidential Information shall not be disclosed until thirty (30) days after written notice of intent to disclose is given to AHC along with the asserted grounds for disclosure.
5. **No License.** Nothing contained herein shall be construed as granting or conferring any rights by license or otherwise in any Confidential Information. It is understood and agreed that neither party solicits any change in the organization, business practice, service or products of the other party, and that the disclosure of Confidential Information shall not be construed as evidencing any intent by a party to purchase any products or services of the other party nor as an encouragement to expend funds in development or research efforts. Confidential Information may pertain to prospective or unannounced products. Recipient agrees not to use any Confidential Information as a basis upon which to develop or have a third party develop a competing or similar product.
6. **No Publicity.** Recipient agrees not to disclose its participation in this undertaking, the existence or terms and conditions of the Agreement, or the fact that discussions are being held with AHC.

7. **Governing Law and Equitable Relief.** This Agreement shall be governed and construed in accordance with the laws of the United States and the State of Maryland and Recipient consents to the exclusive jurisdiction of the state courts and U.S. federal courts located there for any dispute arising out of this Agreement. Recipient agrees that in the event of any breach or threatened breach by Recipient, AHC may obtain, in addition to any other legal remedies which may be available, such equitable relief as may be necessary to protect AHC against any such breach or threatened breach.

8. **Final Agreement.** This Agreement terminates and supersedes all prior understandings or agreements on the subject matter hereof. This Agreement may be modified only by a further writing that is duly executed by both parties.

9. **No Assignment.** Recipient may not assign this Agreement or any interest herein without AHC's express prior written consent.

10. **Severability.** If any term of this Agreement is held by a court of competent jurisdiction to be invalid or unenforceable, then this Agreement, including all of the remaining terms, will remain in full force and effect as if such invalid or unenforceable term had never been included.

11. **No Implied Waiver.** Either party's failure to insist in any one or more instances upon strict performance by the other party of any of the terms of this Agreement shall not be construed as a waiver of any continuing or subsequent failure to perform or delay in performance of any term hereof.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

Adventist HealthCare, Inc.

By: Terry Forde  
Terry Forde  
President & CEO

Recipient

By: Susan Glover  
Susan Glover

Date: 8.12.19

## Appendix F: Press Ganey Culture of Safety Survey Statements

### **Factor 1: Prevention & Reporting**

- 1) I can report patient safety mistakes without fear of punishment.
- 2) In my work unit/department, we discuss ways to prevent errors from happening again.
- 3) Employees will freely speak up if they see something that may negatively affect patient care.
- 4) We are actively doing things to improve patient safety.
- 5) Mistakes have led to positive changes here.
- 6) When a mistake is reported, it feels like the focus is on solving the problem, not writing up the person.
  
- 7) In my work unit/department, caregivers (all employees) and managers work together to ensure the safest possible working conditions.
- 8) I feel free to raise workplace safety concerns.

### **Factor 2: Resources & Teamwork**

- 1) My work unit/department works well together.
- 2) Different work units/departments work well together in this organization.
- 3) There is effective teamwork between physicians and nurses at this hospital.
- 4) My work unit/department is adequately staffed.
- 5) Communication between work units/departments is effective in this organization.
- 6) The amount of job stress I feel is reasonable
- 7) Communication between physicians, nurses, and other medical personnel (other caregivers) is good in this organization.

### **Factor 3: Pride & Reputation**

- 1) This organization provides high-quality care and service.
- 2) I would recommend this organization to family and friends who need care.
- 3) This organization makes every effort to deliver safe, error-free care.
- 4) Executive Leadership provides a work climate that promotes patient safety.

## Appendix G: PROCESS Model Output

\*\*\*\*\* PROCESS Procedure for SPSS Version 3.4.1 \*\*\*\*\*

Written by Andrew F. Hayes, Ph. D. [www.afhayes.com](http://www.afhayes.com)  
Documentation available in Hayes (2018).  
[www.guilford.com/p/hayes3](http://www.guilford.com/p/hayes3)

\*\*\*\*\*

Model : 4  
Y : SSE1RATE  
X : MLQ\_TF  
M : SafCTeam

Covariates:

MLQ\_TX      MLQPA      AGE

Sample

Size: 45

\*\*\*\*\*

OUTCOME VARIABLE:

SafCTeam

Model Summary

R	R-sq	MSE	F	df1	df2	p
.2154	.0464	.0615	.4866	4.0000	40.0000	.7454

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.9303	.3403	11.5500	.0000	3.2425	4.6180
MLQ_TF	-.0745	.1282	-.5809	.5646	-.3336	.1847
MLQ_TX	-.0223	.087	-.2557	.7995	-.1987	.1540
MLQPA	.1557	.1518	1.0257	.3112	-.1511	.4625
AGE	.0041	.0395	.1031	.9184	-.0758	.0840

Standardized coefficients

	coeff
MLQ_TF	-.1147
MLQ_TX	-.0492
MLQPA	.1669
AGE	.0172

\*\*\*\*\*

OUTCOME VARIABLE:

## SSE1RATE

## Model Summary

R	R-sq	MSE	F	df1	df2	p
.6210	.3857	.0092	4.8969	5.0000	39.0000	.0014

## Model

	coeff	se	t	p	LLCI	ULCI
constant	-.5386	.2734	-1.9696	.0560	-1.0916	.0145
MLQ_TF	.1543	.0497	3.1058	.0035	.0538	.2548
SafCTeam	.0238	.0610	.3895	.6990	-.0997	.1472
MLQ_TX	-.0780	.0337	-2.3149	.0260	-.1462	-.0098
MLQPA	.0549	.0594	.9255	.3604	-.0651	.1750
AGE	.0407	.0153	2.6673	.0111	.0098	.0716

## Standardized coefficients

	coeff
MLQ_TF	.5007
SafCTeam	.0501
MLQ_TX	-.3622
MLQPA	.1240
AGE	.3618

\*\*\*\*\* TOTAL EFFECT MODEL \*\*\*\*\*

## OUTCOME VARIABLE:

SSE1RATE

## Model Summary

R	R-sq	MSE	F	df1	df2	p
.6191	.3833	.0090	6.2150	4.0000	40.0000	.0005

## Model

	coeff	se	t	p	LLCI	ULCI
constant	-.4451	.1299	-3.4261	.0014	-.7077	-.1825
MLQ_TF	.1526	.0490	3.1163	.0034	.0536	.2515
MLQ_TX	-.0785	.0333	-2.3577	.0234	-.1459	-.0112
MLQPA	.0586	.0580	1.0115	.3178	-.0585	.1758
AGE	.0408	.0151	2.7028	.0100	.0103	.0713

## Standardized coefficients

	coeff
MLQ_TF	.4950
MLQ_TX	-.3647
MLQPA	.1324
AGE	.3627

\*\*\*\*\* TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y \*\*\*\*\*

Total effect of X on Y

Effect	se	t	p	LLCI	ULCI	c_ps
c_CS						
.1526	.0490	3.1163	.0034	.0536	.251	1.3274

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI	c'_ps
c'_CS						
.1543	.0497	3.1058	.0035	.0538	.2548	1.3428

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
SafCTeam		-.0018	.0079	-.0247

Partially standardized indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
SafCTeam		-.0154	.0685	-.2158

## Appendix H: IRB Approval Form



October 21, 2019

Ms. Susan Glover  
 Hood College  
 401 Rosemont Ave.  
 Frederick, MD 21701

Dear Ms. Glover,

The Hood College Institutional Review Board reviewed your study entitled "*Leadership Styles, Safety Culture Elements, and Serious Safety Events: An Empirical Investigation within a Health System*" (Proposal Number 1920-9). The committee has voted to approve this study. This approval is limited to the activities described in the procedure narrative and extends to the performance of these activities. In accordance with this approval, the specific conditions for the conduct of this research and informed consent from participants must be obtained as indicated. All individuals engaged in human subjects research are responsible for compliance with all applicable Hood Research Policies:

(<https://www.hood.edu/sites/default/files/Hood%20IRB%20Policy%20revised%20September%202013.pdf>).

The Lead Researcher of the study is ultimately responsible for assuring all study team members review and adhere to applicable policies for the conduct of human sciences research. The Hood College IRB approval expiration date is October 21, 2020. As a courtesy, approximately 30-60 days prior to expiration of this approval, it is your responsibility to apply for continuing review and receive continuing approval for the duration of the study as applicable. Lapses in approval should be avoided to protect the safety and welfare of enrolled participants.

No substantive changes are to be made to the approved protocol or the approved consent and assent forms without the prior review and approval of the Hood IRB. All substantive changes (e.g. change in procedure, number of subjects, personnel, study locations, study instruments, etc.) must be prospectively reviewed and approved by the IRB before they are implemented.

Sincerely,

Diane R. Graves, PhD  
 Chair, Hood College Institutional Review Board